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Limiting Warming Below 1.8°C

Why in News?

According to a recent study published in **Nature Communications**, limiting global temperature rise to the **UN-mandated Paris Agreement target of 2 degrees Celsius** is probably **insufficient to prevent an accelerated sea level rise** over the next century.

What Does the Recent Study on Rising Temperature Suggest?

- The study suggests that **if global temperatures rise above 1.8°C, the world could see an irreversible loss of the west Antarctic and Greenland ice sheets**, leading to a rapid sea level rise.
- Scientists studying **Antarctica's vast Thwaites Glacier** (Doomsday Glacier) say **warm water is seeping into its weak spots**, worsening melting caused by rising temperatures.
 - Using an **underwater robot vehicle known as Icefin**, mooring data and sensors, they monitored the **glacier's grounding line**, where ice slides off the glacier and meets the ocean for the first time.
- The study highlights that **reaching net-zero carbon emissions before 2060 is critical to avoid this catastrophe**.
- By 2150, **global sea level rise is estimated to increase by roughly 1.4, 0.5, and 0.2 metres under high, mid, and low-emission scenarios**, respectively.

What are the Major Catastrophic Events Caused by Climate Change?

- **About:**
 - As the **Earth's temperature increases**, ice caps and glaciers are melting at an accelerated rate. The melting of land-based ice, such as glaciers and ice caps, contributes to **sea level rise as the water from melting ice flows into the ocean**.
 - The rise in temperature is primarily due to the **increase in greenhouse gases the atmosphere, primarily carbon dioxide**, resulting from human activities such as the burning of **fossil fuels and deforestation**.

➤ Major Event:

- Increase in Concentration of Greenhouse Gases:
 - The concentrations of three main greenhouse gases, carbon dioxide (**CO₂**), methane (**CH₄**) and Nitrous oxide (**NO₂**), were all at record highs in 2021.
 - The emissions of methane, which is **25 times more potent than carbon dioxide in causing global warming**, in fact, increased at the fastest pace ever.

➤ Temperature:

- The global average temperature in 2022 is estimated to be about **1.15 °C above the 1850-1900 average**.
- **La Niña** (a cooling of sea-surface waters in the equatorial Pacific Ocean) conditions have dominated since late 2020.

➤ Sea Level Rise:

- Global mean sea level has risen by an estimated **3.4 ± 0.3 mm per year over the 30 years (1993-2022)** of the **satellite altimeter record**.

➤ Ocean Heat:

- Overall, 55% of the ocean surface experienced at least **one marine heatwave in 2022**.

➤ Extreme Weather:

- In East Africa, **rainfall has been below average in four consecutive wet seasons**, the longest in 40 years, with indications that the current season could also be dry.
- The flooding came hard on the heels of an **extreme heatwave in both India and Pakistan in 2022**.

What are the Steps taken to tackle Climate change?

➤ National:

- **NAPCC:**
 - To counter the emerging threats from climate change, India released its **National Action Plan to Combat Climate Change (NAPCC)**.
 - It has 8 sub missions including **National Solar Mission, National Water Mission** etc.
- **India Cooling Action Plan:**
 - It provides an integrated approach towards cooling and related areas including reduction in the cooling demand.
- This would help reduce emissions thereby combating global warming.

Note:

➤ **Global:**○ **Paris Agreement:**

- It seeks to keep the rise in global temperatures “well below” 2°C from pre-industrial times, while “pursuing efforts” to limit it to 1.5°C.

○ **UN SDGs:**

- These are 17 broad goals for achieving **sustainable development** in the society. Amongst them Goal 13 exclusively focuses on tackling climate change.

○ **Glasgow Pact:**

- It was finally adopted by 197 parties in 2021 during the **COP26 negotiations**.
- It has emphasised that stronger action in the current decade was most critical for achieving the 1.5-degree target.

○ **Sharm-El-Sheikh Adaptation Agenda (at COP 27):**

- It outlines **30 Adaptation Outcomes** to enhance resilience for 4 billion people living in the most climate vulnerable communities by 2030.

Deep Sea Mining and its Threats

Why in News?

Recently, a study suggested that commercial-scale **Deep seabed mining operations can potentially harm the oceans and endangered species, such as cetaceans including blue whales and several dolphin species.**

- The evaluation emphasizes the need for continued conservation efforts to protect these species.

What is Deep Sea Mining?

➤ **About:**

- **Deep-sea mining** is the process of retrieving mineral deposits from the deep seabed, the **ocean below 200 metres** and covers **two-thirds of the total seafloor**.
- According to **International Seabed Authority (ISA)**, an agency under **the United Nations Convention on the Law of the Sea (UNCLOS)** for monitoring all activities related to mineral resources in the deep sea, the **international seabed is the area that lies beyond the limits of national jurisdiction** and represents around 50% of the total area of the world's oceans.

➤ **Governance:**

- ISA is required by UNCLOS to put in place the **governance infrastructure including rules, regulations and procedures governing the contours of deep-sea mining within 2 years**.
- In case of failure, the ISA must **at least evaluate the mining proposal by the end of two years**.
- The **11th Annual Deep Sea Mining Summit 2023** is to be held in **London, United Kingdom**. Agenda includes the **“economic landscape and growth for deep sea mining and technological developments associated with commercialising”**.

Reasons for Growing Interest:

- **Depleting Terrestrial Deposits:** Depleting stocks of metals such as **copper, nickel, aluminium, manganese, zinc, lithium and cobalt** caused shift in focus towards Deep Sea Deposits.
 - Mineral resources are extracted from **Polymetallic nodules** found in various deep ocean regions including deep pacific and Indian oceans.
- **Increasing Demand:** Demand for these metals is also increasing to **produce smartphones, wind turbines, solar panels and batteries**.

What are the Cetaceans?

- Cetaceans are **exclusively aquatic placental mammals (including Whales, Dolphins, Porpoises, etc.) constituting the order Cetacea**. They are found in **oceans worldwide** and in **some freshwater environments**.

What are the Threats?

- Commercial-scale mining is expected to operate 24 hours a day, causing **noise pollution**.
 - It can **overlap with the frequencies at which cetaceans communicate**, which can cause **auditory masking and behaviour change** in marine mammals.
- **Settlement of sediment plumes** generated by mining vehicles **could harm/kill the species at the bottom of the ocean (benthic species)** in the vicinity.
- Sediment discharged from processing vessels can also **increase turbidity in the water column**. Also, far from sight impacts could go largely unquantified.

Note:

What is India's Deep Ocean Mission?

- Deep Ocean Mission seeks to develop the technologies required for exploring and then, extracting minerals in the deep seabed.
- Ministry of Earth Sciences (MoES) will be the nodal Ministry implementing this multi-institutional ambitious mission.
- It would develop a manned submersible (**MATSYA 6000**) that can carry three people to a depth of 6,000 meters in the ocean with a suite of scientific sensors and tools.
- It will pursue technological innovations for exploration and conservation of deep-sea biodiversity through "bioprospecting of deep-sea flora and fauna and studies on sustainable utilization of deep-sea bio-resources.
- The mission will seek to explore the prospects of deriving energy and freshwater from the ocean through "studies and detailed engineering design for offshore ocean thermal energy conversion (OTEC)-powered desalination plants.

Deep Sea Fish Conservation

Why in News?

Supreme Court (SC) has given permission to fishermen using **Purse Seine Fishing** gear to fish beyond territorial waters (12 nautical miles) and within the **Exclusive Economic Zone (EEZ)** (200 nautical miles) of Tamil Nadu but observing certain restrictions.

- This comes in the backdrop against the banning of purse seine fishing by the Tamil Nadu Government in February 2022.
- SC has restricted the purse seiner to fish on two days, Monday and Thursday from 8am to 6pm revoking the complete ban imposed by Tamil Nadu government.

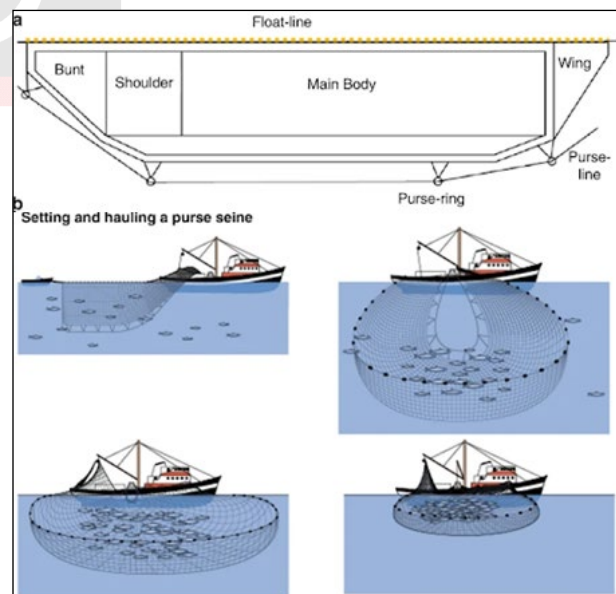
What is UNCLOS?

- The **UNCLOS, 1982** is an international agreement that establishes the legal framework for marine and maritime activities.
- It is also known as **Law of the Sea**. It divides marine areas into five main zones namely- Internal Waters, Territorial Sea, Contiguous Zone, Exclusive Economic Zone (EEZ) and the High Seas.

- It is the only international convention which stipulates a framework for state jurisdiction in maritime spaces. It provides a different legal status to different maritime zones.
- It provides the backbone for offshore governance by coastal states and those navigating the oceans.
- It not only zones coastal states' offshore areas but also provides specific guidance for states' rights and responsibilities in the five concentric zones.

What is Purse Seine Fishing?

- A purse seine is made of a long wall of netting framed with floating and leadline and having purse rings hanging from the lower edge of the gear, through which runs a purse line made from steel wire or rope which allow the pursing of the net.
- The technique is considered to be an efficient form of fishing and has been widely deployed on India's western coasts.
- It is used in the open ocean to target dense schools of single-species pelagic (midwater) fish like tuna and mackerel.



What are the Conservation Efforts for Marine Animal Resources?

- The **United Nations General Assembly** passed Resolutions in 1989 and 1991:
 - It called for a moratoria on all large-scale pelagic drift net fishing vessels in high seas.

Note:

- **UN (United Nations) Ocean Conference 2022:**
 - To ensure global cooperation towards protection and **sustenance of the Ocean ecosystem** of the world.
- **One Ocean Summit:**
 - Combating illegal fishing, decarbonising shipping and reducing plastic pollution.
- **Convention for the Conservation of Southern Bluefin Tuna 1993 (SBT):**
 - The objective of this Convention is to ensure, through appropriate management, the conservation and optimum utilisation of southern bluefin tuna
- **Convention for the Prohibition of Fishing with Long Drift Nets 1989:**
 - It is a regional convention in the South Pacific to restrict port access for drift net fishing vessels.
- **Tarawa Declaration 1989:**
 - It is a declaration of the **South Pacific Forum** to prohibit the use of large drift nets or at least call for their prohibition.

What is the Jurisdiction of Fishing?

- **Fishing is a state subject** and the management plan for marine fisheries in territorial waters is the job of the State.
- State subject consists of **61 subjects (originally 66 subjects)**.
 - These are of **local importance such as, local government, public order and police, agriculture, forest, public health and sanitation, fisheries, education, State taxes and duties**. The states under normal circumstances have exclusive power to make laws on subjects mentioned in the State List.

Marine Spatial Planning Framework

Why in News?

Puducherry has launched the country's first **Marine Spatial Planning (MSP) framework** as part of a pact under the **Indo-Norway Integrated Ocean Initiative**.

- **Puducherry and Lakshadweep** were chosen as **coastlines to pilot the MSP initiative** after a 2019 Memorandum of understanding (MoU) between India and Norway.

What is Marine Spatial Planning?

- MSP is an **ecosystem-based spatial planning** process for analysing current and anticipated ocean and coastal uses and **identifying areas most suitable for various activities**.
- It provides a **public policy process** for society to better determine **how the ocean and coasts are sustainably used and protected** - now and for future generations.

What is this Framework About?

- **Ministry of Earth Sciences** oversees the implementation of the MSP through **National Centre for Coastal Research (NCCR)**, the **National Centre for Sustainable Coastal Management**, the **Puducherry Coastal Zone Management Authority** and **Department of Science, Technology and Environment, Puducherry** in collaboration with Norwegian Environment Agency.
- The two nations have agreed to provide continued assistance towards the **sustainable use of ocean resources**, with the aim of promoting **economic and social development in coastal regions**.
- After successful implementation of pilot project in Lakshadweep and Puducherry, the framework **can be replicated to other coastal regions** of the country.

What is the Significance of MSP Framework?

- **An Ecosystem-based Approach:** It aims to simultaneously enhance ocean health and economic growth in a manner consistent with principles of social equity and inclusion.
- **Vital Governance Tool:** it is a tool to **ensure the emergence of a Blue economy** characterised by a **sustainable and equitable ocean resource management**, instead of an environmentally unsustainable "brown economy".
- **Tool in Balancing Conflicting Interests:** It can be used to **balance the demands for tourism growth with the livelihood concerns of fisher communities** in terms of the use of coastal land and marine waters.
- **In line with Blue Economy Policy:** Blue economy policy seeks to enhance contribution of coastal areas to GDP while preserving Marine biodiversity.
 - Currently, the **blue economy comprises 4.1% of India's economy**.

Note:

- **Vast Coastline:** With a coastline of nearly 7500 kilometres, India has a unique maritime position with respect to environmental responsibilities and economic growth opportunities.

Underwater Noise Emissions

Why in News?

According to a News Study, “**Measuring Underwater Noise Levels Radiated by Ships in Indian Waters**”, the rising **Underwater Noise Emissions (UNE)** from ships in the Indian waters are posing a threat to the **Marine Ecosystem**.

- The measurement of the ambient **noise levels was carried out by deploying a hydrophone autonomous system** around 30 nautical miles from the Goa coastline.

Sounding a warning
Sound is a form of energy for marine mammals which is being denied to them by man-made noise with disastrous results for marine species, finds study.



 250 baleen whales and 30 carcasses of the same species were found stranded in the shallow waters of Tiruchendur beach, Tamil Nadu, on January 12, 2016.	The way out <ul style="list-style-type: none"> • There is a need to develop Green Ports • Since ocean noise levels are increasing at 0.55 dB per year, regulations are needed to reduce it by at least 3 dB in the next five years. • Speed of ships should be less than 5 knots up to port limits • Re-routing of shipping lanes away from foraging region of marine species is also recommended
 150 olive ridley turtles and bottlenose dolphins were found dead on Puri beach in Odisha on January 20, 2016	
 62 olive ridley turtles were found dead on Vizag-Bheemili coastal stretch in Andhra Pradesh in February 2021.	

What are the Highlights of the Study?

- **Increased UNE Levels:**
 - The sound pressure levels of UNE in the Indian waters are **102-115 decibels**, relative to one **microPascal (dB re 1μ Pa)**.
 - Scientists have agreed to use 1μPa as the reference pressure for underwater sound.

- The **East Coast level is slightly higher** than that of the West. There is an increase by a significant value of about 20 dB re 1μPa.

➤ Factors:

- Continuous shipping movement is identified to be a major contributor to the increase in the global ocean noise level.
- **UNE is posing a threat to the life of mammals** like Bottlenose Dolphin, Manatees, Pilot Whale, Seal, and Sperm Whale.
 - The main form of energy for multiple behavioural activities of marine mammals, which include mating, communal interaction, feeding, cluster cohesion and foraging, is based on sound.

➤ Impact:

- The frequencies of ships' underwater self-noise and machinery vibration levels are **overlapping the marine species' communication frequencies** in the low-frequency range of less than 500 Hz.
 - This is called masking, which may lead to a change in the migration route of the marine species to the shallow regions and also making it difficult for them to go back to the deeper water.
- However, the sound that radiates from ships on a long-term basis affects them and **results in internal injuries, loss of hearing ability, change in behavioural responses**, masking, and stress.

What is Marine Sound Pollution?

- Marine sound pollution is the excessive or **harmful sound into the ocean environment**. It is caused by a variety of human activities, **such as shipping, military sonar, oil and gas exploration**, and recreational activities like boating and jet skiing.
- It can have a range of negative impacts on marine life, such as its interference with the **communication, navigation, and hunting behaviors of marine mammals**, such as whales, dolphins, and porpoises. It can also damage the hearing and other physiological functions of these animals, leading to injury or death.

Is there any

Initiative to Safeguard Marine Ecosystems?

➤ Global:

- **Global Programme of Action (GPA)** for the Protection of the Marine Environment from Land-based Activities:

Note:



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- The GPA is the only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal and marine ecosystems.
- **MARPOL Convention (1973):** It covers pollution of the marine environment by ships from operational or accidental causes.
 - It lists various forms of marine pollution caused by oil, noxious liquid substances, harmful substances in packaged form, sewage and garbage from ships, etc.
- The London Convention (1972):
 - Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter.
- **Indian:**
 - **Wild Life Protection Act of India (1972):** It provides legal protection to many marine animals. There are a total of **31 major Marine Protected Areas in India** covering coastal areas that have been notified under Wildlife Protection Act, 1972.
 - **Coastal Regulation Zone (CRZ):** The **CRZ** notification (1991 and later versions) prohibits developmental activities and disposal of wastes in fragile coastal ecosystems.
 - **Centre for Marine Living Resources and Ecology (CMLRE):** The CMLRE, an attached office of Ministry of Earth Sciences (MoES) is mandated with the management strategies development for marine living resources through ecosystem monitoring and modelling activities.

Gross Domestic Climate Risk Ranking

Why in News?

According to **Gross Domestic Climate Risk ranking** by **Cross Dependency Initiative (XDI)**, India has **nine states in the 50 high risk states** including Punjab, Bihar, Uttar Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Gujarat, Kerala and Assam.

- XDI is a global organisation specialising in climate risk analysis for regions, banks and companies.

What is this Report About?

- The index calculated the **'Physical climate risk' to built environments** such as buildings and properties across 2,600 States and provinces globally in 2050.
- The index assigned an **Aggregated Damage Ratio (ADR)** to each region, which signifies the **total amount of damage a region's built environment would sustain in 2050. A high ADR signifies more peril.**

What are the Findings?

- **Vulnerabilities:**
 - Risk originates from **8 climate change Hazards:** Riverine and surface flooding, coastal inundation (coastal flooding), extreme heat, forest fire, soil movement (drought-related), extreme wind and freeze thaw.
 - Most damage posed to built infrastructure globally is caused by "riverine and surface flooding or flooding combined with coastal inundation."
- **Global Findings:**
 - According to report the vast majority (**80%**) of **50 provinces** facing the highest climate risk to their physical infrastructure by 2050 are **in China, the US, and India.**
 - Two of China's largest sub-national economies – Jiangsu and Shandong – top the global ranking; followed by the U.S. which has 18 regions in the top 100 list.
 - **Asia dominates the list** with 114 of the top 200 regions falling in the continent, including **Pakistan, Indonesia and most South East Asian countries.**
 - Devastating flooding in 2022 affected 30% of the area of Pakistan and has partially or fully damaged more than 9 lac houses in Sindh province.
- **India Specific Findings:**
 - Under high emissions scenarios such as the **Representative Concentration Pathway (RCP) 8.5**, high risk provinces will witness an average of **110% increase in damage risk by 2050.**
 - Currently, with 0.8 degrees rise in temperature, India's 27 states and more than three-quarters of its districts are extreme event hotspots accounting for a 5% loss in GDP.

Note:

- If global warming is not limited to 2-degree thresholds, **climate-vulnerable states in India will lose more than 10% of their gross state domestic product (GSDP).**
- **Bihar, Assam, and Tamil Nadu had the highest ADR among other Indian States.** Assam, in particular, would witness the maximum increase of climate risk: rising up to 330% by 2050.
 - Assam has witnessed an experienced exponential increase in flood events since 2011, and it had 15 of India's 25 districts most vulnerable to climate change.
- **11 of the 36 districts in Maharashtra** were found to be "highly vulnerable" to **extreme weather events, droughts** and dwindling water security.

What are the Steps Taken by India regarding Climate Change?

- **Global Leadership:**
 - India has already established its global thought leadership by founding institutions like **International solar alliance (ISA)** and **Coalition for Disaster Resilient Infrastructure (CDRI)**. Also, India gave stronger climate targets for 2030 in revised **Nationally determined contributions (NDCs)**.
- **Reforms in Transport Sector:**
 - India is accelerating its **e-mobility transition** with the Faster Adoption and Manufacturing of (**Hybrid & Electric Vehicles Scheme**).
 - A voluntary **vehicle scrapping policy** to phase out old and unfit vehicles complements the existing schemes.
- **India's Support to EVs:**
 - India is among a handful of countries that support the **global EV30@30 campaign**, which aims for at least 30% new vehicle sales to be electric by 2030.
 - India's advocacy of five elements for climate change "**Panchamrit**", at the **UNFCCC COP26 in Glasgow** is a commitment to the same.
- **Role of Government Schemes:**
 - **The Pradhan Mantri Ujjwala Yojana** has helped 88 million households to **shift from coal-based cooking fuels to LPG connections**.
- **Role of Industries in Low-Carbon Transition:**
 - **The public and private sectors** in India are already playing a key role in **meeting the climate**

challenge, helped by growing customer and investor awareness, as well as increasing regulatory and disclosure requirements.

➤ **Hydrogen Energy Mission:**

- Focus on generation of hydrogen from green power resources.

➤ **Perform, Achieve and Trade (PAT):**

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

Adi Ganga Revival Plan

Why in News?

Recently, plans to **revive Adi Ganga** (the original channel of **River Ganga** passing through the city of Kolkata) have been announced.

- The **National Mission for Clean Ganga** has allocated **around Rs 650 crore** to revive the ancient river and it has been included in a **multi-country South Asian River project on combating pollution**.

What are the Major Issues and Developments Associated with Adi Ganga?

➤ **Encroachment History:**

- The river, which was once the main channel of the **Ganga till the 17th century, has been neglected for decades** and is now **polluted and encroached upon**. The choking of **Adi Ganga** severely impacted the natural drainage of the area.
- However, Adi Ganga continued to thrive till the 1970s. Since then, **its water quality gradually deteriorated** until it turned into a sewer and got rapidly encroached.
- In 1998, the **Calcutta High Court directed the removal of all encroachments on the river within a month**.
 - However, another report, close to two decades after the first order, showed that the encroachments were still existing.

➤ **Current Status:**

- The **river is now practically dead and has turned into a sewer** with a load of faecal bacteria crossing **17 million in 100 millilitres of river water**, according to the state pollution control board data and **dissolved oxygen is zero**.

Note:

➤ **Rejuvenation:**

- The **West Bengal government** has been directed by the **National Green Tribunal** to complete its rejuvenation “**positively by September 30, 2025**”.
- The river was selected for the **pollution study** during an international water conference organised by the non-profit **Action Aid in Sylhet, Bangladesh**.
- Apart from **Adi Ganga, Buriganga in Bangladesh, Puyang in China, Bagmati in Nepal and Klang in Malaysia** were also chosen for pollution study during the conference.

What is the National Mission for Clean Ganga (NMCG)?

➤ **About:**

- On August 12, 2011, the **NMCG** was listed as a society under the **Societies Registration Act, 1860**.
- The NMCG is implemented by the **National Council for Rejuvenation, Protection and Management of River Ganga** also known as the **National Ganga Council**.

➤ **Objective:**

- The objective of the NMCG is to reduce pollution and ensure rejuvenation of the Ganga river.
- This can be achieved by **promoting intersectoral coordination for comprehensive planning & management** and maintaining minimum ecological flow in the river, with the aim of **ensuring water quality and environmentally sustainable development**.

➤ **Organization Structure:**

- The Act envisages five tier structure at national, state and district level to take measures for prevention, control and abatement of environmental pollution in river Ganga as below:
 - National Ganga Council under chairmanship of Hon'ble Prime Minister of India.
 - Empowered Task Force (ETF) on river Ganga under chairmanship of Hon'ble Union Minister of Jal Shakti (Department of Water Resources, River Development and Ganga Rejuvenation).
 - National Mission for Clean Ganga (NMCG).
 - State Ganga Committees
 - District Ganga Committees in every specified district abutting river Ganga and its tributaries in the states.

What are the Other Initiatives Related to Ganga?

- **Namami Gange Programme:** It is an **Integrated Conservation Mission**, approved as a 'Flagship Programme' by the Union Government in June 2014 to accomplish the twin objectives of effective abatement of **pollution and conservation and rejuvenation of National River Ganga**.
 - **Ganga was declared as the 'National River'** of India in 2008.
- **Ganga Action Plan:** It was the first **River Action Plan** that was taken up by the **Ministry of Environment, Forest and Climate Change in 1985**, to improve the water quality by the **interception, diversion, and treatment of domestic sewage**.
 - The National River Conservation Plan is an extension to the Ganga Action Plan. It aims at cleaning the Ganga River under Ganga Action Plan phase-2.
- **Bhuvan-Ganga Web App:** It ensures involvement of the public in monitoring of pollution entering into the river Ganga.

Lead Poisoning

Why in News?

The widespread use of **Lead** has resulted in **extensive environmental contamination**, human exposure and significant **public health problems** in many parts of the world.

What is Lead Poisoning?

➤ **About:**

- Lead poisoning is a type of poisoning **that occurs when lead accumulates in the body**, often over a period of months or years.
- It is caused by the **absorption of Lead in the system and is characterised especially by fatigue, abdominal pain, nausea, diarrhoea**, loss of appetite, anaemia, a dark line along the gums, and muscle paralysis or weakness of limbs.
- Children are **particularly vulnerable to lead poisoning because their bodies are still developing**.

Note:

Everyday risks

There is potential for lead exposure in several common occupations and products that are used in nearly every household

Occupational Sources	Non-Occupational Sources
Battery work	Traditional medicine
Mining	Vehicular exhaust
Glass manufacturing	Contaminated cosmetics and sindoor
Automobile repair	Household storage batteries
Ceramic work	Household paints
Painting	Contaminated spices
Pottery	Effluent from lead-based industries
Smelting	Contaminated soil, dust and water near lead-based industries
Printing work	Food grown in lead contaminated areas
Plumbing	Retained bullets
Soldering	Food stored or cooked in lead-coated vessels
Making lead pipes and plastic	Painted toys

What are the Implications of Lead Poisoning?➤ **High Blood Lead Levels:**

- According to a 2020 report by the **UN Children's Fund (UNICEF)** and Pure Earth, half the children in India report **high blood lead levels**.
 - The report says 275 million children in India record blood lead levels beyond the tolerable limit of 5 µg/dL.
- Of these, **64.3 million children's blood lead levels exceed 10 µg/dL**.
- In terms of average blood lead levels among the population, **some 23 states exceed the 5 µg/dL margin**; levels in the remaining 13 states and Union Territories cannot be determined as there is a lack of research and screening mechanisms to collect data.

➤ **Disability-Adjusted Life Years:**

- According to a 2016 analysis by the Institute for Health Metrics and Evaluation (IHME), Lead toxicity in India **contributes to 4.6 million**

Disability-Adjusted Life Years (number of years lost due to disease burden) and 165,000 deaths annually.

- IHME is an independent population health research center at the University of Washington School of Medicine.

➤ **Adverse Health Impact:**

- Once lead enters the bloodstream, it goes **directly to the brain**, particularly in children.
- It can be **transferred to the fetus during pregnancy**, leading to low birth weight and slow growth. Lead poisoning can cause anemia and various illnesses in children and adults, **affecting neurological, skeletal, and neuromuscular systems**.

What are the Challenges to Cope with Lead Poisoning?➤ **Less Attention:**

- In India, lead does not get as much attention as other potential public health concerns.
- India lacks **systems to screen populations for possible exposure**. India has some 48 national referral centres for lead projects where blood lead levels can be tested, but screening is **usually done on a voluntary basis or at health camps** by non-profits.

➤ **Poor Recycling Laws:**

- Many developing countries, including India and under-developing countries have a **lack of stringent laws** over informal recycling sectors.
- As a result, enormous quantities of (lead)-acid batteries are recovered without using **scientific techniques in an unregulated and uncontrolled way**.
 - Management of lead-acid batteries came under the Batteries (Management and Handling) Rules, 2001. But enforcement capacity to ensure safe and environmentally sound recycling has been inadequate.
- In 2022, The government notified the **Battery Waste Management Rules, 2022**, but it remains to be seen whether the government can successfully implement this.

➤ **High demand for Cheap Products:**

- Many low-cost products in India contain lead, and people may not be willing or able to pay more for lead-free alternatives.

Note:

Aztec Hummingbirds and Indian Sunbirds

Why in News?

Recently a study found that the **loss of a key gene, FBP2** makes hummingbirds more **efficient at breaking down sugar** to use it for energy.

- Hummingbirds' hovering flight, a seemingly effortless suspension in air, is achieved by burning sugar in their flight muscles at a blisteringly fast rate.

What are Hummingbirds?

➤ About:

- Hummingbird, **native to American continent**, has approximately **350 species which are found in Iridescent colours**. These birds are **comparable to India's Sunbirds**.
- Aztecs referred to them as **Huitzilin** or '**A ray of sun**'.

➤ Size:

- These are small birds, barely 5cm long and weigh 2 grams.

➤ Humming:

- Their signature '**Hum**' is **created by beating the wings upto 50 times per second**.

➤ Manoeuvrability:

- They can **hover majestically** as they sip nectar from a flower (mostly Tubular flowers such as Lantana and **rhododendron**), and even fly backward.
- Relative to their body mass, hummingbirds have the **highest metabolic rate** (calories burnt per minute) **among vertebrates**. Most of this energy comes from nectar.
 - Rapid sugar uptake by their digestive system ensures that they utilise energy from nectar ingested just a few minutes ago.

➤ Mimicry and Dance:

- Hummingbirds are **capable of vocal mimicry** like parrots and some songbirds.
- They are also able to **align their muscular movements with auditory sensations** that come to their ears creating a **dance**.

How are Hummingbirds similar to Sunbirds?

➤ About:

- Indian Sunbirds, though **unrelated to Hummingbirds** share many **common features** through convergent evolution. They are part of **Nectariniidae family**.
- Though slightly larger, the sunbirds can **hover briefly**, and go for bright, tubular flowers. They are **critical pollinators** of the '**Flame of the Forest**'.
- As the energy demands of hovering is very high, **sunbirds need to 'perch' while feeding**, unlike **Hummingbirds**.

➤ Habitat:

- They live in **tropical forests, inland wetlands, savannas, and scrubland in Africa, southern Asia, the Middle East, and northern Australia**.

Note: Flame of the forest is a leguminous tree, *Butea frondosa*, native to Eastern India and Myanmar, having hanging clusters of scarlet flowers.

What is the Significance of Recent Research?

- Recent genome studies have shown that hummingbirds lost the **gene (FBP2)** for a key enzyme involved in gluconeogenesis around the time when hovering appeared.
- While **intense exercise in humans can lead to a spike in blood glucose** levels due to **gluconeogenesis**. That is not the case in hummingbirds.
 - **They have a unique metabolism** that allows them to efficiently use energy from nectar.
- This study **could lead to new insights into energy metabolism** and potential therapeutic applications for humans.

Rhododendron

Why in News?

Recently, the **Botanical Survey of India** has published a new report titled '**Rhododendrons of Sikkim and Darjeeling Himalaya- An Illustrated Account**', which lists **45 taxa of rhododendrons**.

What is Rhododendron?

- Rhododendron is a **genus of flowering plants** that includes about **1,000 species**, primarily native to the

Note:

temperate regions of Asia, North America, and Europe, as well as to the tropical regions of southeast Asia and northern Australia.

- They are known for their **showy clusters of large, brightly coloured flowers**, and many species are popular ornamental plants in gardens and parks.
- Rhododendrons are **evergreen or deciduous shrubs or small trees**, with **woody stems and broad, leathery leaves**.
- In India, **Pink Rhododendron** is the state flower of Himachal Pradesh, while Rhododendron arboreum is the **state flower of Nagaland** and the official **State Tree of Uttarakhand**.

What are the Major Highlights of the Report?

- The report reveals that the **Darjeeling and Sikkim Himalayas** are home to more than one-third (34%) of all **rhododendron types** found in India, despite the region comprising only **0.3% of India's geographical area**.
- There are **132 taxa (80 species, 25 subspecies and 27 varieties)** of rhododendrons found in India.
- Of the 45 taxa listed in the report, **five are facing high threats due to anthropological pressures** and climate change.
 - **Rhododendron edgeworthii**, **Rhododendron niveum**, **Rhododendron baileyi**, **Rhododendron lindleyi**, and **Rhododendron maddenii** are among the threatened species.
- Rhododendron is considered an **indicator species for climate change** as the flowering season for rhododendrons has been found to begin as early as **January for some species**.

Pangolin

Why in News?

A new report by **TRAFFIC** and **World Wide Fund for Nature-India** revealed that **1,203 pangolins** were **poached for illegal wildlife trade in India from 2018-2022**.

- These were recovered in **342 seizure incidents across 24 states and one Union territory of India**. The highest number of seizure incidents and pangolins seized were in **Odisha**.

What are the Characteristics of Pangolin?

➤ About:

- **Pangolins are nocturnal mammals** that **dig burrows and feed on ants and termites**, and play a vital role in **ecosystem management**, mostly in **aerating and adding moisture to the soil**.
- Pangolins are known for their unique appearance. They have **scales made of keratin that cover their entire body**.
 - When threatened, they can roll into a ball to protect themselves.

➤ Pangolin Species: There are eight species of pangolin:

- **4 Species in Africa:** Black-bellied pangolin, White-bellied pangolin, Giant Ground pangolin and Temminck's Ground pangolin.
- **4 Species in Asia:** Indian pangolin, Philippine pangolin, Sunda pangolin and the Chinese pangolin.

➤ Habitat:

- It is adaptable to a wide range of habitats including **primary and secondary tropical forests, limestone and bamboo forests, grasslands** and agricultural fields.
- The Indian Pangolin is found across the Indian subcontinent; **Bihar, West Bengal, and Assam** also have the presence of Chinese pangolin.

➤ Threats:

- Once known to be found in large numbers, **its population is rapidly declining in its range due to habitat loss and rampant poaching** for its skin, scales, and meat.
- Pangolins are **among the most trafficked wild mammals**, globally, traded mostly in **Asia**, where their **scales are considered to be medicinal** and their meat a delicacy.

➤ Protection Status:

- In the red list of animals published by the **International Union for Conservation of Nature (IUCN)**, Indian Pangolin is listed in the **Endangered (EN) category**.
 - The Chinese pangolin has been listed as "critically endangered".
- In India, pangolins, both **Indian and Chinese**, are protected under **Schedule 1 of the Wildlife (Protection) Act 1972** that prohibits its **hunting, trade or any other form of utilisation**.

Note:

- All pangolin species are listed in **Convention on International Trade in Endangered Species (CITES) Appendix I**.

Magnetite Pollution

Why in News?

Recently, some Geologists have found the presence of Magnetite Pollution on the roadside Dust of Kolkata.

- The frequency of pollutants is **higher in areas with heavy vehicular traffic** and other polluting sources. The amount of magnetite is proportional to the traffic on a given road.

What is Magnetic Pollution?

➤ About:

- Magnetite pollution refers to the presence of a magnetic mineral called **Magnetite (Fe_3O_4) in the environment**, as a result of **human activities such as mining, steel production and industrial processes**.
 - Magnetite is an oxide of iron. It is the most magnetic of all the naturally occurring minerals on earth. It is a natural magnet.
 - Magnetite contains about 72% metallic iron in it. It is found in Karnataka, Andhra Pradesh, Rajasthan, Tamil Nadu, Goa and Kerala.

➤ Impact:

- **Ecological Impacts:**
 - Magnetic particles can interfere with the migratory patterns of birds and other animals, affecting their survival and reproduction.
- **Soil and Water Contamination:**
 - Magnetite particles can settle in the soil and water, contaminating these environments and affecting the growth of plants and the health of aquatic life.
- **Human Health:**
 - Inhaling magnetic particles can cause respiratory problems and other health problems, such as lung cancer, cardiovascular disease, and central nervous system damage.
- **Building and Infrastructure Damage:**
 - Magnetic particles can cause corrosion of steel structures and other metal objects, leading to damage over time.

○ Electronic Equipment Damage:

- Magnetic pollution can also interfere with the operation of electronic equipment, such as compasses and navigation systems.

World Likely to See 2°C Warming by 2050

Why in News?

Recently, a study published titled “**contradicted projections from the Intergovernmental Panel on Climate Change (IPCC)**”, states that the planet is **likely to warm up by two degrees Celsius by 2050**, even under a low-emission scenario.

- The researchers used **artificial intelligence called Artificial Neural Networks (ANN)** to predict the time for reaching the 1.5 °C and 2°C thresholds.
- The world has recorded a **1.1°C rise in temperature compared with the average in 1850-1900**.

What are the Key Findings?

➤ Projection:

- There is a higher likelihood that 2°C will be reached under the low emission scenario compared with the **IPCC AR6 (Sixth Assessment Report) synthesis assessment**, and may fail to uphold the **Paris Agreement**.
 - The Paris Agreement aims to limit the rise to below 2°C while pursuing efforts to limit the increase to 1.5°C.
 - The IPCC estimated that the 1.5°C threshold could be attained as early as the 2030s under all emission scenarios.
- Global warming is already on the verge of crossing the 1.5°C threshold, even if the **climate forcing pathway is substantially reduced** in the near term.
 - The threshold of 1.5°C will reach somewhere between 2033 and 2035 in the high, intermediate and low forcing scenarios.
- The **world could touch 2°C by 2050 under the high-emission scenario**, 2049 and 2054 in the intermediate and low-emission scenarios, respectively.

Note:

- In contrast, the IPCC estimated the likelihood of touching 2°C of global warming during the mid-21st century is high under a high-emission scenario.

➤ Significance of Limiting Warming:

- Limiting warming to 1.5°C will **reduce the number of people frequently exposed to extreme heat waves** by about 420 million.
- It can also **reduce the probability of drought and risks related to water availability**.

➤ Implications:

- Warming above the threshold of 1.5°C can cause a **broad range of climate risks** — such as impacts on human health, economic growth, crop yields, coastal and small island communities, terrestrial and marine ecosystems, as well as the **frequency, intensity and cost of extreme climate events**.

What are Artificial Neural Networks?

- ANN is a vital **subset of machine learning** that helps computer scientists in their work on complex tasks, such as, strategizing, making predictions, and recognizing trends.
- It is a **computational model that mimics the way nerve cells work in the human brain**. It is designed to simulate the way the human brain analyzes and processes information.

Global Sea-level Rise and Implications: WMO

Why in News?

According to the **World Meteorological Organisation's (WMO)** Report "Global Sea-level Rise and Implications", **India, China, Bangladesh and the Netherlands** face the highest threat of **sea-level rise** globally.

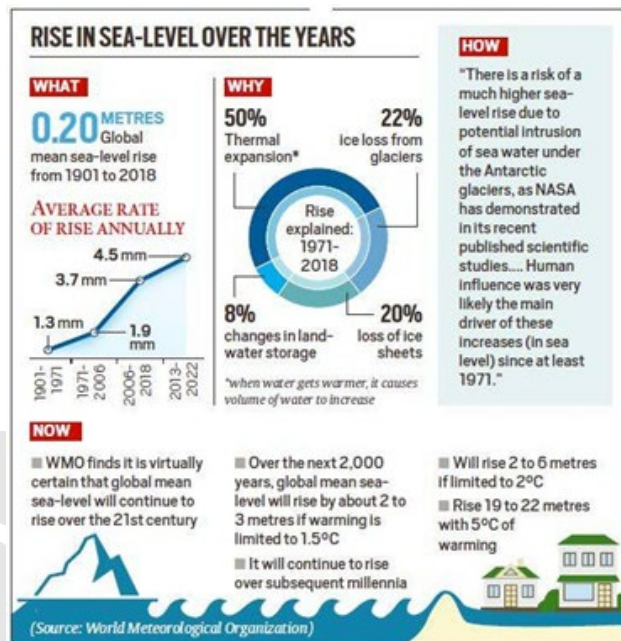
- Several big cities on all **continents are threatened by the rise in sea level**.
- These include Shanghai, Dhaka, Bangkok, Jakarta, Mumbai, Maputo, Lagos, Cairo, London, Copenhagen, New York, Los Angeles, Buenos Aires and Santiago.

What are the Highlights of the Report?

➤ Trends and Projections:

- Between 2013 and 2022, Global mean sea-level was 4.5 mm/year and **human influence** was likely the **main driver of these increases since at least 1971**.

- Global mean sea-level increased by 0.20m between 1901 and 2018,
- 1.3 mm/ year between 1901 and 1971,
- 1.9 mm/year between 1971 and 2006
- 3.7 mm/year between 2006 and 2018.



- Even if global heating is limited to 1.5 degrees Celsius over pre-industrial levels, there will still be a **sizable sea level rise**.
- But every fraction of a degree counts. If temperatures rise by 2 degrees, that level rise **could double, with further temperature increases bringing exponential sea level increases**.

➤ Contributors to Sea Level Rise:

- Thermal expansion contributed to **50% of sea level rise during 1971-2018**, while ice loss from glaciers contributed to **22%**, ice-sheet loss to **20%** and changes in land-water storage **8%**.
- The rate of ice-sheet loss increased by a factor of four between 1992-1999 and 2010-2019. Together, icesheet and **glacier mass loss were the dominant contributors** to global mean sea level rise during 2006-2018.

➤ Impacts:

- At sustained warming levels between 2-3 degree Celcius, the Greenland and West **Antarctic ice sheets will be almost completely and irreversibly lost** over multiple millennia causing potentially multimeter sea-level rise.

Note:

- Sea-level rise will bring cascading and compounding impacts resulting in losses of **coastal ecosystems and ecosystem services**, groundwater salinization, flooding and damage to coastal infrastructure that cascade into risks to livelihoods, settlements, health, well-being, food, displacement and water security, and cultural values in the near to long-term.

What is the Scenario for India?

➤ Rate of Sea Level Rise:

- According to the Ministry of Earth Sciences, on average, the sea level along the Indian coast was observed to be rising at a rate of about **1.7 mm/year during the last century (1900-2000)**.
- A 3 cm sea level rise could cause **the sea to intrude inland by about 17 meters**. At future rates of 5 cm/decade, this could be 300 metres of land taken by the sea in a century.

➤ India is more Susceptible:

- India is most **vulnerable to compounding impacts** of sea level rise.
- In the Indian ocean half of sea level rise is **due to the volume of water expanding since the ocean is warming** up rapidly.
- The contribution from glacier melt is not as high.
- The **Indian Ocean is the fastest warming ocean** in terms of surface warming.

➤ Implications:

- India is facing compound extreme events along our coastline. Cyclones are intensifying rapidly due to **more moisture and heat from ocean warming**.
- The amount of flooding also increases because storm surges **are compounding sea level rise** decade by decade.
- Cyclones are bringing more rain than earlier. Super **Cyclone Amphan (2020)** caused large-scale **flood-ing** and inundated tens of kms inland with saline water intruding.
- Over time, the Indus, **Ganga** and Brahmaputra rivers may shrink, and rising sea levels combined with a deep intrusion of saltwater **will make large parts of their huge deltas simply uninhabitable**.

Best practices in plastic waste management

Sl. No.	State	Best Practice
1	Andhra Pradesh	Plastic waste collected from local bodies or biomining sites is sent for co-processing in cement plants
2	Arunachal Pradesh	Plastic banks were established in one district; Plastic was used in Road Construction in variable districts
3	Goa	Non-biodegradable waste is sent to co-processing plants for which bailing plants have been set up by Goa Waste Management Agency, Local bodies as well as Village Panchayats
4	Gujarat	94000T of plastic waste was sent for incineration during 2019-20s.
5	Haryana	All municipal corporations have been directed to set up material recovery facilities. 41 out of 81 MCs have set up the MRP

What are the Recommendations?

- There is a need to **address the climate crisis and broaden our understanding** of the root causes of insecurity.
- It is imperative to actively support **grassroots resilience efforts to tackle climate change** and improve **Early Warning Systems**.

What is the World Meteorological Organization (WMO)?

- The WMO is an **intergovernmental organization with a membership of 192 Member States and Territories**.
- India is a member of WMO.
- It originated from the International Meteorological Organization (IMO), which was established after the **1873 Vienna International Meteorological Congress**.
- Established by the ratification of the WMO Convention on **23rd March 1950**, **WMO became the specialized agency of the United Nations** for meteorology (weather and climate), operational hydrology and related geophysical sciences.'
- WMO is headquartered in **Geneva, Switzerland**.

Note:

Keoladeo National Park

Why in News?

The Rajasthan Government has proposed to construct a zoo inside **Keoladeo National Park**, a **World Heritage Site** popularly known as **Bharatpur bird sanctuary**, to display a range of wetland species.

- The purpose of this zoo, called Wetland ex-situ Conservation Establishment (WESCE), is to display a **range of wetland species**, including **rhinos**, water buffaloes, crocodiles, dolphins and exotic species.

What is the Purpose of WESCE?

- The WESCE aims to rejuvenate the **biodiversity of Keoladeo National Park**, thereby boosting its outstanding universal values.
- The WESCE plan is part of the ambitious **Rajasthan Forestry and Biodiversity Development Project (RFBDP)** for which Agence Française de Développement (AFD), the overseas development arm of the French government, has agreed to **fund up to Rs 12 crore over eight years**.
- Several facilities are **planned inside Keoladeo National Park**, including,
 - A breeding and reintroduction centre for locally extinct species (otters, fishing cats, **blackbucks**, hog deer, etc).
 - An aquarium for indigenous species like **Gangetic Dolphin**, **crocodiles**; enclosures for the display of large wetland species like Indian Rhino, Water Buffalo, Barasingha (swamp deer); etc.

What are the Key Points of Keoladeo National Park?

- **About:**
 - Keoladeo National Park is a **wetland and bird sanctuary located** in Bharatpur, Rajasthan. It is a **UNESCO World Heritage Site** and one of the most important bird-watching areas in the world.
 - **Chilika Lake** (Orissa) and Keoladeo National Park (Rajasthan) were recognized as the first **Ramsar Sites** of India in 1981.
 - Currently, Keoladeo National Park and **Loktak Lake** (Manipur) are in **Montreux record**.
 - It is known for its **rich avian diversity and abundance of waterbirds**. The park is home to

over 365 species of birds, including several rare and threatened species, such as the Siberian crane.

- Different species from far-flung areas of the northern hemisphere visit the Sanctuary for breeding. The Siberian crane is one of the rare species that can be spotted here.
- **Fauna:**
 - Animals such as Jackals, Sambar, Nilgai, wild cats, hyenas, wild boar, porcupine and mongoose can be found in the region.
- **Flora:**
 - The principal vegetation types are tropical dry deciduous forest dominated by *Acacia nilotica* intermixed with dry grassland.
- **River:**
 - **Gambhir and Banganga** are two rivers that flow through this National Park.

What are Protected Areas in Rajasthan?

- **Tiger Reserves:**
 - **Ranthambore Tiger Reserve (RTR)** in Sawai Madhopur
 - **Sariska Tiger Reserve (STR)** in Alwar
 - **Mukundra Hills Tiger Reserve (MHTR)** in Kota
- **National Park:**
 - **Desert National Park**, Jaisalmer
- **Wildlife Sanctuary:**
 - **Sajjargarh wildlife sanctuary**, Udaipur
 - National Chambal Sanctuary (on tri-junction of Rajasthan, Madhya Pradesh and Uttar Pradesh).



Note:

International Marine Protected Areas Congress

Why in News?

Recently, the 5th International Marine Protected Areas Congress (IMPAC5) was held in Canada in order to **discuss the solutions to address the Funding Gap of Marine Protected Areas (MPAs).**

- This meeting is crucial since nations agreed to protect 30% of Earth's lands and oceans by 2030 at the **15th Conference of the Parties to the Convention on Biological Diversity** held in 2022.

Note: Canada is bordered by three oceans - the Pacific, Arctic and Atlantic - and has the longest coastline in the world.

What are the Highlights of the Meet?

- **Sustainable and Resilient MPA networks:**
 - As many as **70% of MPAs are underfunded**. A well-managed and sufficiently funded MPA can restore good health to vulnerable ecosystems.
 - Achieving sustainable and resilient MPA networks depends **on an overall commitment to protection, leadership**, engagement from stakeholders, institutions, governments and organizations, Indigenous peoples, coastal communities, and individuals in an **inclusive and equitable manner to advance ocean protection**.
 - IMPAC5 aims to **provide a forum for sharing knowledge, successes and best practices in an open and respectful environment** for the exchanging of ideas among a diversity of views.
- **Significance of MPAs:**
 - MPAs can generate sustainable revenues for their own management.
 - Revenue can be generated from statutory and non-statutory MPA fees for tourism programmes, **blue carbon credits generated from mangrove conservation** and avoided deforestation as well as seaweed farming and sustainable coastal fisheries.

What are Marine Protected Areas?

- **About:**
 - MPAs are designated areas of the ocean that are set aside for the protection and conservation of marine ecosystems and their biodiversity.

- Within the region, certain activities are limited, or entirely prohibited, to meet specific conservation, habitat protection, **ecosystem monitoring or fisheries management objectives**.
- MPAs do not necessarily exclude fishing, research or other human activities; in fact, many MPAs are multi-purpose areas.

➤ Need for Establishing MPAs:

- **Biodiversity Conservation:**
 - MPAs help to conserve the diversity of marine species and their habitats, preserving the delicate balance of marine ecosystems and the services they provide, such as food and oxygen production.
- **Sustainable Fisheries:**
 - MPAs can help to regulate fishing activities and prevent overfishing, ensuring that fish populations are able to recover and remain healthy, which in turn supports sustainable fishing practices.
- **Climate Change Mitigation:**
 - MPAs can serve as carbon sinks, helping to absorb and store carbon dioxide from the atmosphere and mitigate the impacts of climate change on marine ecosystems.
- **Research and Education:**
 - MPAs can provide valuable opportunities for scientific research and educational activities, helping to increase our understanding of the marine environment and promote ocean literacy.
- **Economic Benefits:**
 - MPAs can contribute to local economies by attracting tourists, providing opportunities for sustainable tourism and recreation, and supporting local fishing communities.
- **Treaties, Conventions and Agreements:**
 - Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area:
 - It specifically aims to establish a network of 'specially protected areas to conserve cetaceans. It prohibits the deliberate killing of cetaceans in national waters.
 - **Bern Convention:**
 - Formulated under the aegis of the European Community Council in 1979, it has been in force since 1982 and covers European states.

Note:

○ CITES:

- Formulated under UNEP in 1973, **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** has been in force since 1975 and has worldwide application. CITES regulates international trade of species listed on three appendices.

○ EU Habitats Directive:

- Formulated by the European Community Council in 1992, the EU Habitats Directive applies to all EU states, including the Azores and Madeira (part of Portugal) and the Canary Islands.

○ CCAMLR:

- **Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)** is a multilateral response to concerns that unregulated increases in krill catches in the Southern Ocean could be detrimental for Antarctic marine ecosystems particularly for seabirds, seals, whales and fish that depend on krill for food.

What are the Marine Protected Areas in India?

- In India, there are **33 national parks and wildlife sanctuaries** designated under the Wildlife (Protection) Act of 1972 that make up the country's MPAs.
- Marine National Park and Marine Sanctuary in the Gulf of Kutch form one unit and **Bhitarkanika National Park** and Bhitarkanika Sanctuary are an integral part of one MPA. Thus, **there a total of 31 MPAs in India.**
- MPAs cover less than 4.01% of the total area of all **Protected Areas of India.**



Green Steel

Why in News?

Ministry of Steel seeks to reduce carbon emissions in steel industry through promotion of Green Steel.

What is Green Steel?

➤ About:

- Green Steel is the **manufacturing of steel without the use of fossil fuels.**
 - This can be done by using low-carbon energy sources such as hydrogen, coal gasification, or electricity instead of the traditional carbon-intensive manufacturing route of coal-fired plants.
- It eventually **lowers greenhouse gas emissions, cuts cost and improves the quality of steel.**
- **Low-carbon hydrogen (blue hydrogen and green hydrogen)** can help **reduce the steel industry's carbon footprint.**

➤ Ways of Production:

- Substituting the Primary Production Processes with Cleaner Alternatives:
 - **Carbon capture, utilization and storage (CCUS).**
 - Replacing conventional sources of energy with low-carbon hydrogen.
 - Direct electrification through electrolysis of iron ore.

➤ Significance:

- The steel industry is the largest industrial sector in terms of intensive energy and resource use. It is **one of the biggest emitters of carbon dioxide (CO₂).**
- In view of commitments made at the **Conference of the Parties (COP26)** climate change conference, the Indian steel industry **needs to reduce its emissions substantially by 2030 and hit net-zero carbon emissions by 2070.**

What is the Status of Steel Production in India?

- **Production:** India is currently the **world's 2nd largest producer of crude steel**, producing 120 Million Tonnes (MT) crude steel during financial year 2021-2022.

Note:

- **Reserves: More than 80% of the country's reserves** are in the states of Odisha, Jharkhand, West Bengal, Chhattisgarh and the northern regions of Andhra Pradesh.
 - **Important steel-producing centers** are Bhilai (Chhattisgarh), Durgapur (West Bengal), Burnpur (West Bengal), Jamshedpur (Jharkhand), Rourkela (Odisha), Bokaro (Jharkhand).
- **Consumption:** India is the **2nd largest consumer of finished steel** in 2021 (106.23 MT), preceded by China as the largest steel consumer as per World Steel Association.

What are the Related Government Initiatives?

- **Steel Scrap Recycling Policy, 2019:**
 - **Steel Scrap Recycling Policy, 2019** enhances the availability of domestically generated scrap to reduce the consumption of coal in steel making.
- **National Green Hydrogen Mission:**
 - Ministry of New and Renewable Energy (MNRE) has announced **National Green Hydrogen Mission** for green hydrogen production and usage. The steel sector has also been made a stakeholder in the Mission.
- **Motor Vehicles (Registration and Functions of Vehicles Scrapping Facility) Rules September 2021:**
 - It shall increase availability of scrap in the steel sector.
- **National Solar Mission:**
 - Launched by MNRE in January 2010, it promotes the use of solar energy and also helps reduce the emission of steel industry.
- **Perform, Achieve and Trade (PAT) Scheme:**
 - **PAT Scheme** incentivizes steel industry to reduce energy consumption.
- **NEDO Model Projects:**
 - **Japan's New Energy and Industrial Technology Development Organization (NEDO) Model Projects** have been implemented in steel plants for Energy Efficiency Improvement.

Global Risks Report 2023

Why in News?

Recently, the **World Economic Forum (WEF)** has released the **18th Edition of Global Risks Report 2023**

which seeks that the world be prepared for 'Natural disasters and extreme weather events' in the next two years.

- The WEF report has been released ahead of its flagship Davos 2023 Meeting, which is titled as **Cooperation in a Fragmented World**.

What are the Findings of the Report?

- **Most Severe Risks:**
 - **'Failure to Mitigate Climate Change' and 'Failure of Climate Change Adaptation'** are the two **most severe risks facing the world** in the next decade, followed by **'natural disasters and extreme weather events'** and **'Biodiversity loss and ecosystem collapse'**.
 - Today, atmospheric levels of carbon dioxide, methane and nitrous oxide have all **reached record highs**.
 - Emission trajectories make it **very unlikely that global ambitions to limit warming to 1.5°C** will be achieved.
- **Climate Action and Biodiversity Loss:**
 - The world has struggled to make the required progress on climate change despite **30 years of global climate advocacy and diplomacy**.
 - Failure on climate action to address climate change' **has continued to figure among the top risks in the report since 2011**.
 - Biodiversity within and between ecosystems is already declining **faster than at any other point during human history**.
 - But unlike other climate-related risks, 'Biodiversity loss and ecosystem collapse' has **not been perceived to be of concern over the short term**.
 - It has been ranked as the 4th most severe risk in the long term or over the next ten years (by 2033).
- **Reversal of Climate Mitigation Progress:**
 - Growing demands on public- and private-sector resources from the socio-economic short-term crises **attributed to geopolitical tensions**, will likely reduce the speed and scale of mitigation efforts over the next two years.
 - These have, in some cases, also **reversed progress on climate change mitigation**, at least over the short term.

Note:



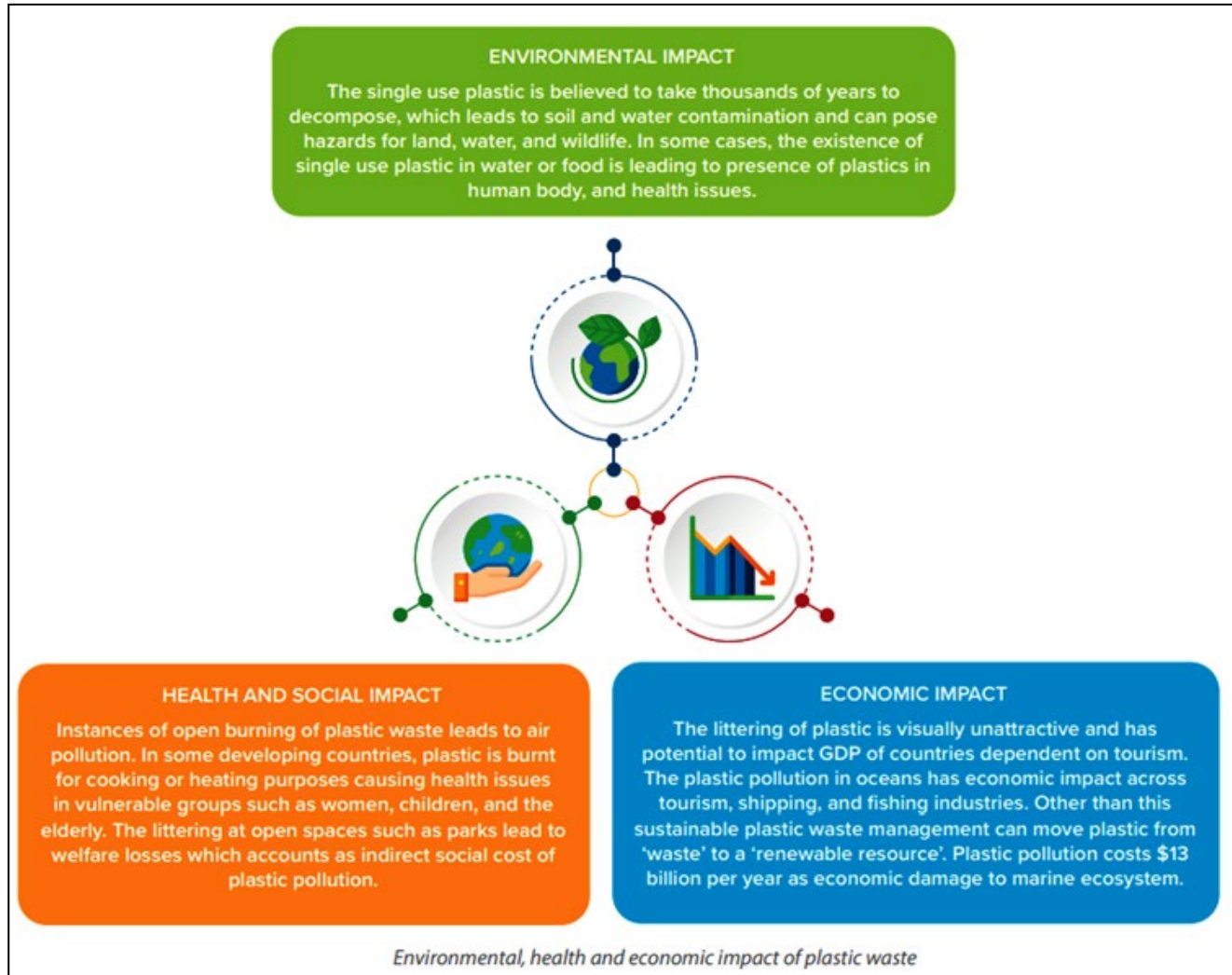
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- For example, the European Union spent at least 50 billion euros on new and expanded fossil-fuel infrastructure and supplies.
- Some countries including Austria, Italy, the Netherlands and France restarted coal power stations.

➤ **Apprehensions and Threats:**

- Over the next 10 years or by 2033, the interconnections between biodiversity loss, pollution, natural resource consumption, climate change and socioeconomic **drivers will make for a dangerous mix.**

- In the meantime, the current **global pandemic and war in Europe has been held responsible for the energy, inflation and food crises.** In fact, 'cost of living' ranks as the top most serious global risk in the short term (over the next two years).
- Failure to mitigate climate change is also a significant global risk that the world is least prepared for.
 - 70% of the respondents in the WEF report said existing measures to prevent or prepare for climate change have been "ineffective" or "highly ineffective".



What is the World Economic Forum?

➤ **About:**

- The WEF is a Swiss nonprofit foundation established in 1971, based in Geneva, Switzerland.

- Recognized by the Swiss authorities as the international institution for public-private cooperation.

- **Mission:** Committed to improving the state of the world by engaging business, political, academic, and

Note:

other leaders of society to shape global, regional, and industry agendas.

- **Founder and Executive Chairman:** Klaus Schwab.
- **Some major reports published by WEF are:**
 - **Energy Transition Index.**
 - **Global Competitiveness Report.**
 - Global IT Report
 - WEF along with INSEAD, and Cornell University publishes this report.
 - **Global Gender Gap Report.**
 - Global Travel and Tourism Report.

Forest and Tree Cover in India

Why in News?

India is lagging behind in the targets to increase the **number and quality of tree- and forest-cover plantations** set in the **National Mission for a Green India (GIM)**.

- States with significant shortfall in tree cover include **Andhra Pradesh, Uttarakhand, Madhya Pradesh, and Kerala.**

How is Tree Cover Different from Forest Cover?

- Tree cover refers to the **total area of land that is covered by trees**, regardless of **whether or not the trees** are part of a forest ecosystem.
 - **Forest cover**, on the other hand, **refers specifically to the area of land that is covered by a forest ecosystem**, which is defined as an area with a **minimum canopy density of 10-30%** and an **area of more than 0.5 hectares.**
- So, all forest cover is tree cover, but not all tree cover is forest cover.

What is the National Mission for a Green India?

- **GIM** is one of the eight Missions under the **National Action Plan on Climate Change.**
 - It aims at **protecting, restoring and enhancing** India's forest cover and responding to climate change.
 - The target under the Mission is 10 million hectares (Mha) on forest and non-forest lands

for increasing the forest/tree cover and to improve the quality of existing forest.

- The **Ministry of Environment, Forest and Climate Change** supports the States/Union Territories for carrying out afforestation activities through this **Centrally Sponsored Scheme.**
- Improving tree cover is critical to **sequester carbon and bolster India's carbon stocks** as part of its international commitments to mitigate greenhouse gas emissions.

What is the Status of Forests in India?

- **About:**
 - As per the **India State of Forest Report-2021**, forest and tree cover in the country increased by **2,261 square kilometres since the last assessment in 2019.**
 - India's total forest and tree cover was **80.9 million hectares**, which accounted for **24.62% of the geographical area of the country.**
 - The report said 17 States and Union Territories had more than 33% of their area under forest cover.
 - Madhya Pradesh had the largest forest cover, followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.
 - The top five States in terms of forest cover as a percentage of their total geographical area were Mizoram (84.53%), Arunachal Pradesh (79.33%), Meghalaya (76%), Manipur (74.34%) and Nagaland (73.90%).
- **Issues Associated with Forests in India:**
 - **Shrinking Forest Cover:** According to the **National Forest Policy of India**, the ideal percentage of total geographical area under forest should be at least **33% to maintain ecological stability.**
 - However, it currently covers just 24.62 % of the country's land and is shrinking rapidly.
 - **Resource Access Conflict:** There is often **conflict between the interests of local communities and those of commercial interests**, such as pharmaceutical industries or timber industries.
 - This can lead to social tensions and even violence, as different groups struggle to access and use the resources of the forests.

Note:

- **Climate Change:** Forest disturbances caused by climate change, including **insect outbreaks**, **invasive species** due to climate led migration, wildfires, and storms, reduce forest productivity and change species distribution.
 - By 2030, 45-64% of forests in India will experience the effects of climate change and rising temperatures.
- **Government Initiatives for Forest Conservation:**
 - **National Afforestation Programme**
 - **Environment Protection Act of 1986**
 - **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006**

Eco-Sensitive Zones

Why in News?

Recently, **Eco-sensitive Zones** have been met with **resistance from protests** claiming that compliance with the **Environmental Protection Act 1986** and the **Wildlife Protection Act 1972** has led authorities to disregard the **rights of forest communities** and **negatively affect their way of life** and livelihood.

What is Eco Sensitive Zones?

- **About:**
 - The **National Wildlife Action Plan (2002-2016)** of the **Ministry of Environment, Forest and Climate Change (MoEFCC)** stipulated that state governments should declare land falling **within 10 km of the boundaries of national parks and wildlife sanctuaries** as **eco-fragile zones** or **Eco-Sensitive Zones (ESZs)** under the **Environmental (Protection) Act, 1986**.
 - While the **10-km rule** is **implemented as a general principle**, the extent of its application can vary. **Areas beyond 10 km can also be notified by the Union government as ESZs**, if they hold larger ecologically important **"sensitive corridors"**.
- **Activities Around ESZs:**
 - **Prohibited Activities:** Commercial mining, saw mills, industries causing pollution (air, water, soil, noise etc), establishment of major **hydroelectric projects (HEP)**, commercial use of wood.
- **Regulated Activities:** Felling of trees, **establishment of hotels and resorts**, **commercial use of natural water**, erection of electrical cables, drastic change of agriculture system, e.g., adoption of heavy technology, pesticides etc, widening of roads.
- **Permitted Activities:** Ongoing agricultural or horticultural practices, **rainwater harvesting**, **organic farming**, **use of renewable energy sources**, adoption of green technology for all activities.
- **Significance of ESZs:**
 - **Minimise the Impact of Development Activities:**
 - To minimise the impact of **urbanisation** and other developmental activities, the areas adjacent to protected areas have been declared as Eco-Sensitive Zones.
 - **In-situ Conservation:**
 - ESZs help in in-situ conservation, which deals with conservation of an endangered species in its natural habitat, for example the conservation of the **One-horned Rhino** of **Kaziranga National Park**, Assam.
 - **Minimise Forest Depletion and Man-Animal Conflict:**
 - Eco-Sensitive Zones minimise forest depletion and man-animal conflict.
 - The protected areas are based on the core and buffer model of management, through which local area communities are also protected and benefitted.
 - **Minimise the Negative Impact on the Fragile Ecosystems:**
 - The purpose of declaring eco-sensitive zones around protected areas is to create some kind of a 'Shock Absorber' for the protected area.
 - They also act as a transition zone from areas of high protection to areas involving lesser protection.
- **Challenges Associated with ESZs:**
 - **Climate change:**
 - **Climate change** has generated land, water and ecological stress on the ESZs.
- For example, **frequent forest fires or the Assam floods** which badly affected the **Kaziranga National Park** and its wildlife.

Note:



○ Encroachment of Forest Rights:

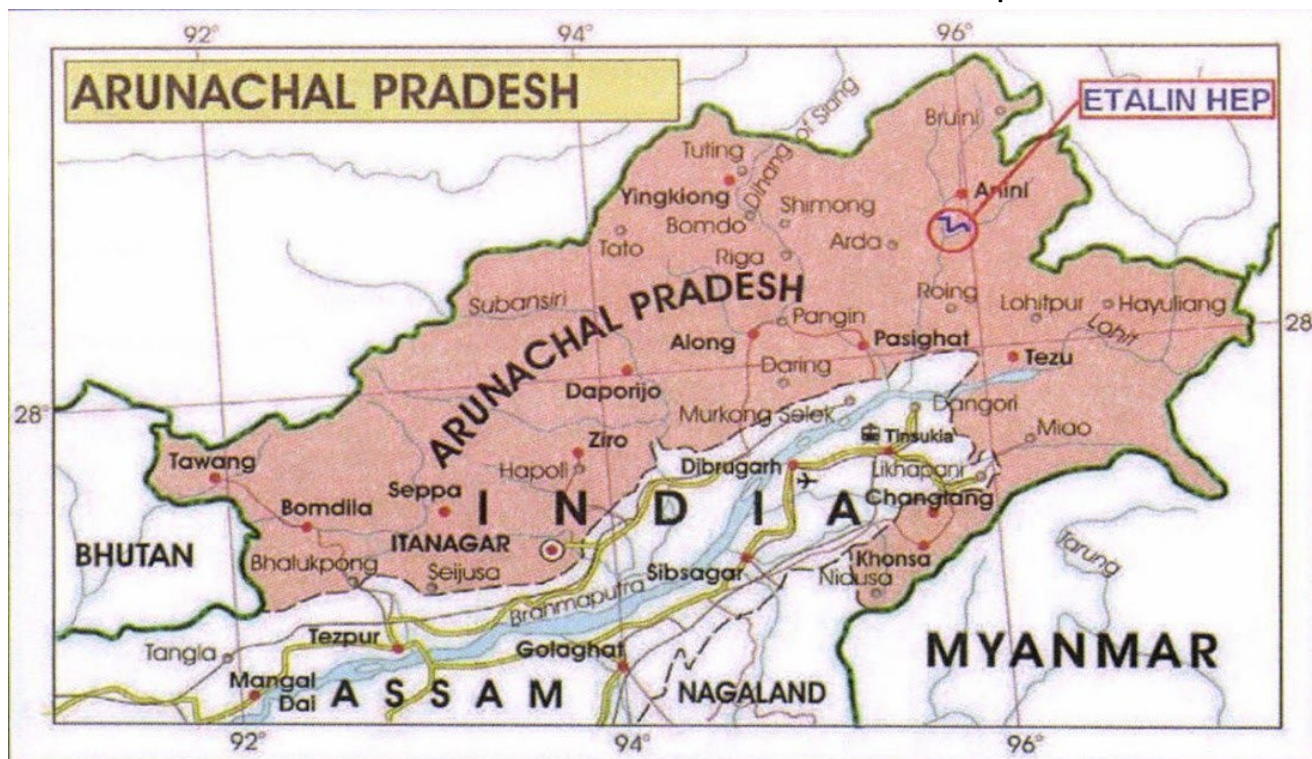
- Sometimes, execution of The Environmental Protection Act 1986 and the Wildlife Protection Act 1972 makes the authorities ignore forest communities' rights and impact their life and livelihood.
- It also includes dilution of rights provided to **gram sabha** for developmental clearances.
- **Recognition of forest rights and gram sabha's consent were preconditions for considering proposals under The Forest Rights Act 2006** to divert forest land for non-forestry purposes – until the MoEFCC did away with them in 2022.

Etalin Hydroelectric Project

Why in News?

Recently, the **Etalin hydroelectric project** in **Arunachal Pradesh** has been scrapped in its present form.

- The plan combined **two run-of-the-river schemes** with limited storage requiring concrete gravity dams on rivers **Tangon and Dri**.
- It ran into several controversies since its inception in 2008 over concerns of **ecological damage**, **forest invasion** and **tribal displacement**.



What is the Significance of Dir and Tangon River?

- The **Dir and Tangon river**, both tributaries of the **Dibang River** (tributary of Brahmaputra) in Arunachal Pradesh, India, have the following significance:
 - **Hydrological:** Both rivers contribute to the **overall hydrology of the region** by providing water for irrigation and hydropower generation.
 - **Ecological:** The Dir and Tangon rivers support a **diverse array of plant and animal life**, including rare and endangered species.

- **Tourist Attraction:** The scenic beauty of the **Dir and Tangon rivers**, along with the Dibang, is a major tourist destination.

What are the Concerns Raised Around the Etalin Hydel Project?

- **Environmental Impact:** The project would involve the construction of a large dam on the Dibang River, which would **submerge a large area of forest and wildlife habitat**.
 - This could lead to the **displacement of local communities**, and have significant impacts on the region's biodiversity.

Note:

- **Displacement of Local Communities:** The project would **displace thousands of people from their homes and livelihoods**, many of whom are from indigenous communities who rely on the Dibang River for their livelihoods.
- **Impact on River Ecosystem:** The project would change the natural flow of the river and affect the **fish migration and breeding**.
 - This would have a negative impact on local communities who rely on fishing for their livelihoods.
- **Geological and Seismic Risks:** The **South Asia Network on Dams, Rivers and People (SANDRP)** highlighted the **geological and seismic risks** and threats to **biodiversity in 2015**, when environmental clearance (EC) to the project was underway.
- **Recent Development of Issue:** The **Forest Advisory Committee (FAC)** has asked the Arunachal Pradesh government to **go back to the drawing board** and submit the plan of project again.

Forest Advisory Committee

- It is a statutory body which was constituted by the **Forest (Conservation) Act 1980**.
- It comes under the **Ministry of Environment, Forests & Climate Change (MoEF&CC)**.
- It considers questions on the **diversion of forest land for non-forest** uses such as mining, industrial projects, townships and advises the government on the issue of granting forest clearances. **However, its role is advisory.**

Concerns Over Aravali Safari Park

Why in News?

Recently, some Environmental Activists have raised concerns over the 10,000-acre **Aravali safari park Project** proposed in Haryana.

What are the Key Points of Safari Park?

- This project will be **the largest such project in the world**. Currently the largest curated safari park outside Africa is in Sharjah, **which opened in February 2022**, with an area of about two thousand acres.

- It aims to **boost tourism and employment opportunities** for the local people.



What are the Concerns?

- The Aravalli safari project is being conceived and designed as a zoo safari and **not a natural jungle safari to see native Aravalli wildlife** in their natural habitat.
- Conservation of the **Aravallis does not even get a mention in the aims of the project** mentioned in the Proposition.
- Vehicular traffic and construction in the area, **the proposed safari park will also disturb the aquifers under the Aravalli hills** that are critical reserves for the water-starved districts.
 - These aquifers are **interconnected** and any disturbance or alterations in the pattern can **significantly alter the groundwater table**.
- The group has especially objected to the **'underwater zone' envisioned in the park since the site is a "water-scarce region"**.
 - In Nuh district, the groundwater table is already below 1,000 feet at many places; the tube wells, borewells and ponds are running dry; Gurugram district has many areas in the 'red zone'.
- The location falls under the category of **'forest', according to many orders by the Supreme Court and the National Green Tribunal**, and is protected under the **Forest Conservation Act 1972**. As such, cutting of trees, clearing of land, construction and **real estate development is prohibited on this land**.
- The group also highlighted that the construction proposed by the Haryana tourism department in May 2022 would be illegal and further damage the already damaged Aravalli ecosystem.

Note:

How are Wildlife and Forests Protected in India?

- **The Wild Life (Protection) Act, 1972:**
 - It provides for stringent punishment for violation of its provisions. The Act also provides for **forfeiture of any equipment, vehicle or weapon that is used for committing wildlife offence(s)**.
 - Protected Areas, viz National Parks, Sanctuaries, Conservation Reserves and Community Reserves have been created in the country covering important habitats to provide better protection to wildlife, including threatened species and their habitat.
- **Wildlife Crime Control Bureau (WCCB):**
 - WCCB coordinates with State/UTs and other enforcement agencies to **gather intelligence about poaching and unlawful trade** in wild animals and animal articles.
 - Alerts and advisories were issued by WCCB on **poaching and illegal trade of wildlife** to the concerned State and Central agencies for preventive action.
- **National Green Tribunal:**
 - It is a specialized judicial body equipped with expertise solely for the purpose of **adjudicating environmental cases in the country**.
- **The Indian Forest Act, 1927:**
 - It seeks to consolidate the **law relating to forests, the transit of forest produce and the duty that can be levied on timber** and other forest produce.
- **The Wild Life (Protection) Amendment Act, 2006:**
 - The Act provides for creating the National Tiger Conservation Authority and the Tiger and Other Endangered Species Crime Control Bureau.
- **The Forest (Conservation) Act, 1980:**
 - It provides a higher level of protection to the **forests and to regulate diversion of forest lands for non-forestry purposes**. FC Act, 1980 – Prior approval of the Central Government is essential for DE-reservation of forest lands and / or diversion of forest lands for non-forestry purposes.
- **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006:**
 - It has been enacted to recognize and vest the forest rights and occupation of forest land in forest-dwelling Scheduled Tribes and other traditional forest dwellers, who have been residing in such forests for generations.

Water Crisis Due to Dam Sedimentation

Why in News?

The **United Nations Institute for Water, Environment and Health** showed in its report that about **50,000 large dams** across the world will lose **24-28% water storage capacity** by **2050** due to sediment trapped in them.

- These **water reservoirs** have already lost about **13-19% capacity** to sedimentation.
- The **United Kingdom, Panama, Ireland, Japan and Seychelles** will experience the highest water storage losses by **2050** from **35-50% of their original capacities**.

What is Sedimentation with Respect to Dams?

- **Sedimentation** in dams refers to the **accumulation of sediments**, such as **sand, gravel, and silt**, at the **bottom of a reservoir** created by a dam.
- This sediment can build up over time, **reducing the overall storage capacity of the reservoir**.
- To maintain the **capacity of the reservoir**, the sediment may need to be removed through a process called **dredging**.

What is Dredging?

- Dredging is the **process of removing sediments**, such as **sand, gravel, and silt**, that has accumulated at the **bottom of a reservoir**.
- It can be done using various methods, such as **mechanical dredging** with a **dredge machine** or **hydraulic dredging** with a **high-pressure water jet**.
- The sediment removed during dredging is typically disposed of in a designated area away from the dam.

What are the Causes of Sedimentation?

- **Erosion Upstream of the Dam:** When soil and rock is washed away from the area upstream of the dam, it can be carried downstream and deposited in the reservoir.
- **Runoff from Urban and Agricultural Areas:** The increased use of land for human activities, such as **urbanization** and agriculture, can lead to increased runoff of sediment into the reservoir.

Note:

- **Natural Processes:** Sedimentation can also occur naturally through processes such as weathering and erosion.
- **Climate Change:** **Climate change** causes more intense and frequent rainfall events and also causes **snowmelt** earlier which can lead to increased erosion and sediment runoff into the reservoir.
- **Deforestation:** Trees help to hold the soil together and prevent **erosion**, so when forests are removed or degraded, there is a greater risk of sediment runoff into the reservoir.
- **Poor Dam Maintenance:** Lack of maintenance and repairs can also lead to sedimentation, as the dam's structure can become damaged, allowing sediment to enter the reservoir.

What are the Consequences of Dam Sedimentation?

- **Environmental:**
 - **Reduced water storage capacity** in the reservoir, which can lead to water **shortages for downstream users** and the loss of habitat for aquatic species.
 - Increased risk of **dam failure** as the sediment can cause the **dam to become unstable**.
- **Economic:**
 - Increased cost of maintenance and **dredging** to remove the sediment.
 - Loss of **hydroelectric power generation** due to **reduced water flow** through the dam.
 - **Reduced irrigation** and **water supply** for agriculture and industry.
 - **Loss of revenue** from recreational activities such as fishing and boating if the reservoir is no longer able to support them.
- **Damage to Dam Structure and Turbines:**
 - The accumulation of sediment at the bottom of the reservoir can cause **scouring, or erosion**, of the dam's foundation, which can weaken its **structural integrity** and increase the **risk of failure**.
 - Sediment can also **clog the turbine intake**, which can **reduce the efficiency of hydroelectric power generation** and require costly maintenance to remove the sediment.
 - The sediment can also cause **abrasion on the turbine blades** which can lead to damage and reduce their efficiency.

- While sediment helps maintain the **aquatic ecosystem**, **poor management** can lead to **nutritional imbalances** causing **eutrophication** and other disruptions in the water pool of the dam, as well as damages in habitations downstream.

Air Pollution in India & NCAP

Why in News?

Under the **National Clean Air Campaign (NCAP)**, analysts found that **progress has been slow**, and **pollution has only incrementally reduced in most cities**.

What is the National Clean Air Programme?

- It was **launched by the Ministry of Environment, Forests and Climate Change (MoEFCC)** in January 2019.
- It is the **first-ever effort in the country to frame a national framework for air quality management** with a time-bound reduction target.
- It **seeks to cut the concentration of coarse** (particulate matter (PM) of diameter 10 micrometer or less, or PM10) **and fine particles** (particulate matter of diameter 2.5 micrometer or less, or **PM2.5**) by at least **20% in the next five years, with 2017 as the base year for comparison**.
- It **covers 132 non-attainment cities** which were identified by the **Central Pollution Control Board (CPCB)**.
 - Non-attainment cities **are those that have fallen short of the National Ambient Air Quality Standards (NAAQS)** for over five years.
 - NAAQs are the standards for ambient air quality with reference to various identified pollutant notified by the CPCB under the Air (Prevention and Control of Pollution) Act, 1981. List of pollutants under NAAQS: PM10, PM2.5, SO2, NO2, CO, NH3, Ozone, Lead, Benzene, Benzo-Pyrene, Arsenic and Nickel.

What are the Target Levels?

- **Current Scenario:** The country's current, annual average **prescribed limits for PM2.5 and PM10** are 40 micrograms/per cubic metre (ug/m3) and 60 micrograms/per cubic metre.

Note:

- **New Targets:** The NCAP initially set a target of reducing key air pollutants PM10 and PM2.5 by 20-30% in 2024, taking the pollution levels in 2017 as the base year to improve upon.
 - In September 2022, however, the **Centre moved the goalposts and set a new target of a 40% reduction** in particulate matter concentration, by 2026.
- **Assess Improvements:** Cities were required to quantify improvement starting from 2020-21, which requires 15% and more reduction in the annual average PM10 concentration and a concurrent increase in clean air quality days to at least 200.
 - **Anything less will be considered low, and the funding will consequently be reduced.**

How Effective has the NCAP Been?

- **Achieving Targets:**
 - An analysis of the four-year performance of the NCAP by the **Centre for Research on Energy and Clean Air (CREA)**, concluded that only 38 of the 131 cities that signed agreements with the Centre, Urban Local Bodies (ULBs), and State Pollution Control Boards **achieved their annual pollution reduction targets.**
- **Recommendations:**
 - The CREA noted that 37 cities have completed the **source apportionment studies** (which list and quantify the significant sources of pollution in a city). However, **most of these reports weren't available in the public domain and no city action plan had been updated** with information from these studies.
 - The CREA estimates that **India will need to install more than 300 manual air quality monitoring stations per year** to reach the NCAP goal of 1,500 monitoring stations by 2024. **Only 180 stations have been installed over the last four years.**

Has NCAP Managed to Reduce Pollution?

- The NCAP Tracker, a **joint project by two organisations** active in air pollution policy has been **monitoring progress in achieving the 2024 clean air targets.**
- Among the non-attainment cities, **the national capital of Delhi ranked the most polluted in 2022.** But Delhi's PM2.5 levels have **improved by over 7% compared to 2019.**

- Most cities in the top 10 most polluted list of 2022 **were from the Indo-Gangetic Plain.**
- Nine of the 10 cities, which were the most polluted in 2019, **have reduced their PM2.5 and PM10 concentrations in 2022.**
- There were 16 NCAP cities and 15 non-NCAP cities that **registered a significant increase in their annual PM2.5 levels** — with nearly identical numbers. This suggested that non-NCAP and NCAP cities were as likely to be polluted, **with the less effectiveness of NCAP.**

What are the Initiatives Taken for Controlling Air Pollution?

- **System of Air Quality and Weather Forecasting and Research (SAFAR) Portal.**
- **Air Quality Index:** AQI has been developed for eight pollutants viz. PM2.5, PM10, Ammonia, Lead, nitrogen oxides, sulphur dioxide, ozone, and carbon monoxide.
- **Graded Response Action Plan** (for Delhi).
- For Reducing Vehicular Pollution:
 - **BS-VI Vehicles,**
 - **Push for Electric Vehicles (EVs),**
 - **Odd-Even Policy** as an emergency measure (for Delhi).
- **New Commission for Air Quality Management**
- Subsidy to farmers for buying **Turbo Happy Seeder (THS) Machine** for reducing stubble burning.
- **National Air Quality Monitoring Programme (NAMP):** Under NAMP, four air pollutants viz. SO₂, NO₂, PM10, and PM2.5 have been identified for regular monitoring at all locations.

New Plateau in the Western Ghats

Why in News?

Recently, a **rare low-altitude basalt plateau** discovered in Maharashtra in the **Western Ghats** can help study the effects of **climate change** on species survival and increase awareness of the conservation needs of rock outcrops and their immense **biodiversity** value in the global context.

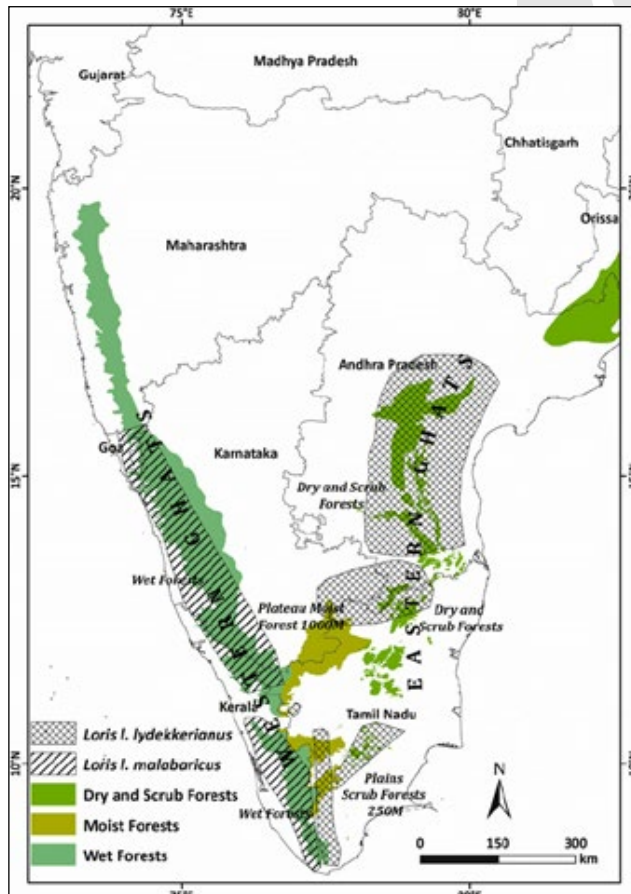
Note:

What are the Important Findings About the Plateau?

- **Low-Altitude Basalt Plateau:** This is the fourth type of plateau to be identified in the region; the **previous three are laterites at high and low altitudes and basalt at high altitudes.**
- **Diverse Biodiversity:** During the survey of the plateau, 76 species of plants and shrubs from 24 different families were reported. This is **considered an important discovery**, as the plateau shares the vegetation with the three other rock outcrops, simultaneously holding a few unique species.
 - This gives a **unique model system to study the species' interactions** in varying environmental conditions.

Note: Rock outcrops have seasonal water availability, limited soil and nutrients, making them ideal laboratories to study the effects of climate change on species survival. Plateaus are thus a **valuable source of insight into how species can survive in extreme conditions.**

Western Ghats: What's Important to Know?



About:

- Western Ghats **consists of a chain of mountains running parallel to India's Western Coast** and passing from the states of Kerala, Maharashtra, Goa, Gujarat, Tamil Nadu and Karnataka.
- The Western Ghats is **one of four global biodiversity hotspots in India.**
 - The other three are the **Himalayas**, the Indo-Burma region and the Sundaland (includes the **Nicobar Islands**).
- It is recognized as a **UNESCO World Heritage Site.**

Significance:

- The Ghats **influence the Indian monsoon weather patterns** that mediate the warm tropical climate of the region.
- They **act as a barrier to rain-laden monsoon winds** that sweep in from the south-west.
- Western Ghats are **home to tropical evergreen forests**, as well as to 325 globally threatened species.
- Plateaus **are the dominant landscapes in the Western Ghats**, significant because of the predominance of endemic species.

Ken-Betwa River Link Project

Why in News?

Recently, the Ministry of Jal Shakti has chaired a meeting on **Ken-Betwa Link Project (KBLP)**, stating that it is the **"flagship" project** of the national government and it "is crucial for the water security and socio-economic development of Bundelkhand region".

- In December 2021, the Union Cabinet approved KBLP at a total cost of Rs 44,605 crore. In this project.
- The project has been **delayed due to political and environmental issues.**

What is the Ken-Betwa Link?

About:

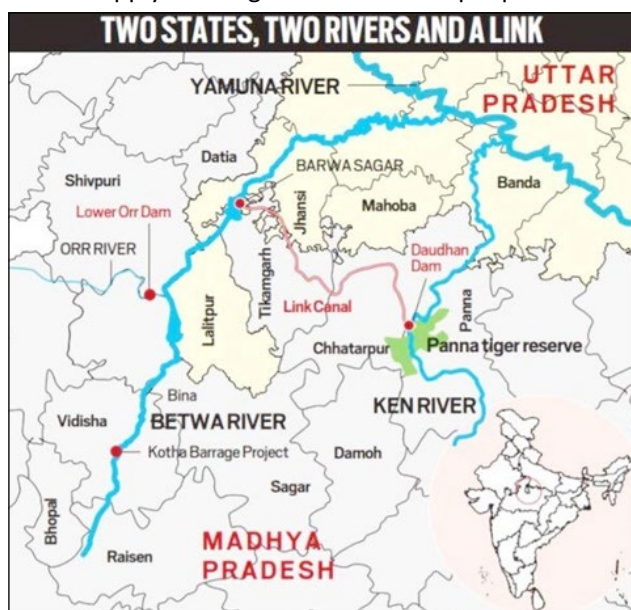
- The **Ken-Betwa Link Project (KBLP)** is the river interlinking project that aims to transfer surplus water from the Ken River in Madhya Pradesh (MP) to Betwa in Uttar Pradesh (UP) to irrigate the **drought-prone Bundelkhand region.**

Note:

- The region spread across the districts of two states mainly Jhansi, Banda, Lalitpur and Mahoba districts of UP and Tikamgarh, Panna and Chhatarpur districts of MP.
- The project involves building a **77-metre tall and a 2-km wide Dhaudhan dam (to be built within Panna Tiger Reserve)** and a 230-km canal.
- Ken-Betwa is **one of the 30 river interlinking projects** conceived across the country.

➤ **Significance:**

- It will not only accelerate the water conservation by construction of a multipurpose dam but will also produce 103 MW of hydropower and will supply drinking water to 62 lakh people.



What are the Concerns Related to the Project?

➤ **Environmental:**

- Because of certain environmental and wildlife conservation concerns like passing of the project through **critical tiger habitat of panna tiger reserve**, the project is stuck in for the approval from **National Green Tribunal (NGT)**, and other higher authorities.

➤ **Economic:**

- There is a huge **economic cost attached with the project implementation** and maintenance, which has been rising due to delays in project implementation.

➤ **Social:**

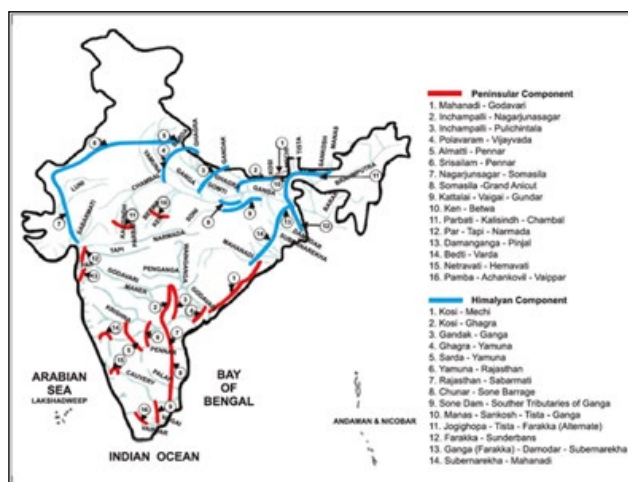
- Reconstruction and rehabilitation caused due to **displacement resulting from the implementation of the project** will involve social cost as well.
- They are also concerned that the **project will endanger the water security of Panna.**

➤ **Legal:**

- There are also **significant legal problems** with the approval granted to the KBLP.
- Approval by the Standing Committee of the National Board for Wildlife to the Ken-Betwa link Project has **not been proved to be necessary for the improvement and better management** of the wildlife therein as provided in Section 35(6) of the Wildlife (Protection) Act, 1972.

What is the National Perspective Plan for Interlinking of Rivers?

- **The National River Linking Project (NRLP)** formally known as the **National Perspective Plan**, envisages the transfer of water from water 'surplus' basins where there is flooding, to water 'deficit' basins where there is drought/scarcity, through inter-basin water transfer projects.
- **Under the National Perspective Plan (NPP)**, the National Water Development Agency (NWDA), has identified 30 links (16 under the Peninsular Component and 14 under the Himalayan Component) for the preparation of feasibility reports (FRs).
- The NPP for transferring water from water-surplus basins to water-deficit basins was prepared in August 1980.



Note:

What are Ken and Betwa Rivers?

- Ken and Betwa rivers originate in MP and are the tributaries of Yamuna.
- Ken meets with Yamuna in Banda district of UP and with Betwa in Hamirpur district of UP.
- Rajghat, Paricha and Matatila dams are over Betwa river.
- Ken River passes through Panna tiger reserve.

Kelp Forests on Decline

Why in News?

A recent study has revealed that **Kelp forests are declining because of climate change.**

What are the Highlights of the Study?

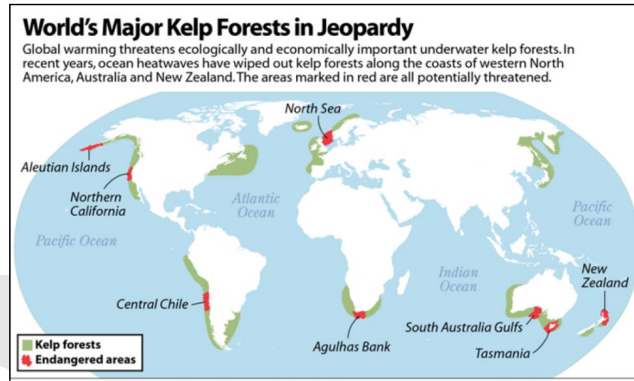
- *Ecklonia radiata*, a **dominant kelp species in the southern hemisphere**, is vulnerable to climate change, especially in regions near the equator.
- Rising temperatures are causing declines in the **species along the eastern Australian coastline and it is expected to decline further in the future globally.**
- In situ protection **may not be possible but its unique genetic diversity** can be preserved through ex situ preservation in culture banks for use in future restoration, hybridization, or adaptation strategies.

What are the Kelp Forests?

- **About:**
 - Kelp forests are underwater ecosystems **formed in shallow water by the dense growth of several different species.**
 - Kelp are **large brown algae that live in cool, relatively shallow waters close to the shore.**
 - They attach to the **seafloor and eventually grow to the water's surface and rely on sunlight to generate food and energy**, kelp forests are always coastal and require shallow, relatively clear water.
 - They provide underwater **habitats to hundreds of species of invertebrates**, fishes, and other algae and have great ecological and economic value.
- **Significance:**
 - It serves as a pertinent food source **for a variety of marine creatures.** Kelps are responsible for

producing up to 60% of the carbon found in coastal invertebrates.

- As a diverse invertebrate and fish ecosystem, **they serve as a habitat for birds to forage.**
 - It releases carbon into the **coastal ecology, increasing its productivity.** New biomass, detritus, and other materials are produced through primary production by kelp.
- **World Distribution of Major Kelp Forests:**



Corals in Thailand Getting Destroyed

Why in News?

Recently, it is reported that a rapidly spreading disease, commonly known as **yellow band disease**, is killing **corals** over vast stretches of the sea floor of **Thailand.**

- Scientists believe **overfishing, pollution and rising water temperatures** because of climate change may be making the reefs more vulnerable to **yellow-band disease.**

What is Yellow Band Disease?

- Yellow-band disease - **named for the colour it turns corals before destroying them** - was first spotted decades ago and has caused widespread damage to reefs in the Caribbean. There is **no known cure.**
- The Yellow Band disease is caused by a **combination of environmental stressors, including increased water temperatures, pollution, and sedimentation**, as well as increased competition for space from other organisms.

Note:

- These factors can weaken the coral and make it more susceptible to infection by pathogens, **such as bacteria and fungi**.
- The disease's impact **cannot be reversed, unlike the effects of coral bleaching**.

What are Coral Reefs?

➤ About:

- **Corals** are marine invertebrates belonging to the class Anthozoa in the phylum **Cnidaria**.
 - They typically live in compact colonies of many identical individual polyps.
 - Coral reefs are underwater ecosystems made up of colonies of coral polyps.
- Coral polyps live in a **symbiotic relationship** with a variety of **photosynthetic algae called zooxanthellae**, which live within their tissues.
 - These algae provide the coral with energy through photosynthesis, while the coral provides the algae with a protected environment and compounds, they need for growth.

➤ Types of Corals:

- **Hard Corals:**
 - They extract **calcium carbonate** from seawater to build hard, white coral exoskeletons.
 - They are in a way the engineers of reef ecosystems and measuring the extent of hard coral is a widely-accepted metric for measuring the condition of coral reefs.
- **Soft Corals:**
 - They attach themselves to such skeletons and older skeletons built by their ancestors.
 - Soft corals are typically found in deeper waters and are less common than hard corals.

➤ Significance:

- **Ecological Importance:** Coral reefs are one of the most diverse and productive ecosystems on Earth, **providing habitat for a wide variety of plant and animal species**.
 - They also play a critical role in regulating the planet's climate by absorbing carbon dioxide and protecting coastlines from erosion and storm damage.
- **Economic Importance:** Coral reefs support a variety of industries, including **fishing, tourism, and recreation**. They also provide resources for medicine and biotechnology.

- **Climate Regulation:** Coral reefs act as natural buffers against the impact of climate change by **absorbing wave energy, protecting coastlines and reducing the impact of storms** and sea level rise.
- **Biodiversity:** Coral reefs are home to a vast array of marine life, including **fish, sharks, crustaceans, mollusks** and many more. They are considered as the **rainforests of the sea**.

➤ Threats:

- **Climate change:** Coral reefs are particularly vulnerable to the effects of climate change, which is **causing ocean acidification and coral bleaching**.
 - Coral bleaching occurs when coral polyps expel the algae (zooxanthellae) living in their tissues, causing the coral to turn completely white.
- **Pollution:** Coral reefs are also **threatened by pollution**, including sewage, agricultural runoff, and industrial discharge.
 - These pollutants can cause coral death and disease, as well as reduce the overall health of the reef ecosystem.
- **Overfishing:** Overfishing can disrupt the **delicate balance of coral reef ecosystems**, which can lead to the decline of coral populations.
- **Coastal Development:** Coastal development, such as the **construction of ports, marinas, and other infrastructure**, can damage coral reefs and reduce the overall health of the reef ecosystem.
- **Invasive Species:** Coral reefs are also threatened by invasive species, such as the **lionfish**, which can outcompete native species and disrupt the overall balance of the reef ecosystem.
- **Initiatives to Protect Corals:**
 - **Technological Intervention:**
 - **Cyromesh:** Storage of the coral larvae at -196°C and can be later reintroduced to the wild
 - **Biorock:** Creating artificial reefs on which coral can grow rapidly
 - **Indian:**
 - National Coastal Mission Programme
 - **Global:**
 - **International Coral Reef Initiative**
 - **The Global Coral Reef R&D Accelerator Platform**

Note:

Japan to Flush Fukushima Wastewater

Why in News?

Japan is expected to start flushing 1.25 million tons of wastewater from the embattled Fukushima nuclear power plant into the **Pacific Ocean** in 2023, as part of a USD 76-billion project to decommission the facility.

- The project received the Japanese cabinet's approval in **2021 and could take three decades to complete.**



What is the Background?

- In March 2011, after a magnitude 9 **earthquake**, a **tsunami** flooded the **Fukushima Daiichi nuclear power plant in Okuma** and damaged its diesel generators.
- The loss of power **suspended coolant supply to reactors at the facility**; the tsunami also disabled backup systems.
- Soon, radioactive materials leaked from reactor pressure vessels, **exploded in the facility's upper levels**, and exposed themselves to the **ambient air, water, soil, and local population.**
- Winds also carried **radioactive material thrown up into the air into the Pacific.** Since then, the **power plant and its surrounding land have been uninhabitable.**
- The water that the Japanese government wants to flush from the plant was **used to cool the reactors**, plus rainwater and groundwater.

- It contains radioactive **isotopes from the damaged reactors and is thus itself radioactive.** Japan has said that it will release this water into the Pacific Ocean over the next 30 years.

What are the Concerns of Releasing Water?

- There is no known threshold below which radiation can be considered safe, therefore any discharge of **radioactive materials will increase the risk of cancer and other known health impacts** to those who are exposed.
- Water released can be poisonous to the fish and anyone who happens to live in the vicinity of the discharge point can be caught precarious.
- Tokyo Electric Power Company (TEPCO) **hasn't removed tritium** from the water because this is very difficult to do.
 - Tritium is "**easily absorbed by the bodies of living creatures**" and "rapidly distributed via blood."
- There were **other radionuclides in the water** that TEPCO's treatment procedure couldn't entirely remove.
 - These include **isotopes of ruthenium and plutonium**, which could persist for longer in the bodies of marine creatures and on the seafloor.

Why Flushing Instead of Treating Water?

- The TEPCO which operates the Fukushima facility, initially planned to treat the wastewater but because of lacking enough room for the water-tanks, it decided to release the water.
- Also, Japan cannot store water for longer than discharge it, because of **Tritium's half-life** (12-13 years).
 - **Half-life is the time a radioactive material takes for its quantity to be halved through radioactive decay.**

Skyglow

Why in News?

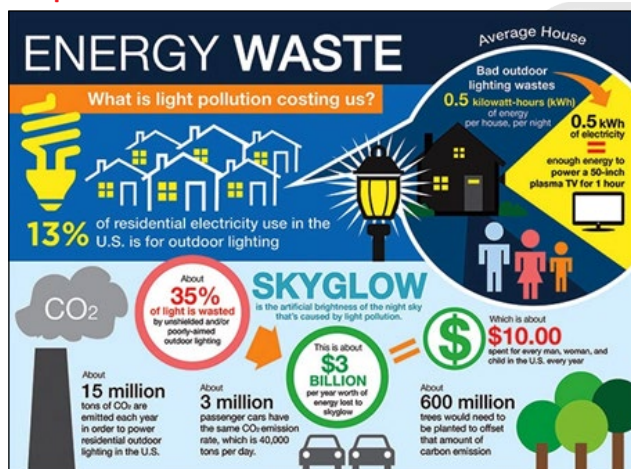
Recently, a new study has found that non-natural light had increased the brightness of **Skyglow**, by **9.2-10% every year between 2011 and 2022** with significant ecological, health and cultural implications.

Note:

- Researchers have analyzed a **global database of what the dimmest star visible from a particular location is**; the database had more than 51,000 entries submitted by citizen scientists.

What is Skyglow?

- The Skyglow, is an **omnipresent sheet of light across the night sky** in and around cities that can block all but the very brightest stars from view.
- The brightening of **the night sky over inhabited areas because of streetlights**, security floodlights and outdoor ornamental lights cause the Skyglow.
- This light floods directly into the eyes of the Nocturnal (active at night) and also into the skies and misleads their path.
- 'Skyglow' is one of the components of **light pollution**.



What is the Scenario of Skyglow?

- **Global**
 - The **Skyglow had brightened around 6.5% over Europe, 10.4% over North America**, and 7.7% over the rest of the world.
 - The finding is significant because it disagrees with **satellite-based data, which has indicated that the rate of increase has been around 2% per year.**
 - The discrepancy is probably the result of the satellites being unable to 'sense' blue light emitted by LEDs and to study light that is emitted parallel to the ground.
- **India:**
 - A 2016 study reported that 19.5% of India's population – the lowest fraction among G20

countries – experiences a **level of skyglow that would at least keep the Milky Way galaxy out of sight** and at most render "dark adaptation for human eyes" impossible.

- The effects **include stimulating the cone cells in human eyes**, which is possible only when an environment is considered to be well-lit.
- A 2017 study reported that between 2012 and 2016, **India's lit area increased by 1.07-1.09%** and the average radiance of "stably lit areas" – e.g., excluding wildfires – increased by 1.05-1.07%.

What are the Implications of Skyglow?

➤ Wastes Energy and Money:

- Lighting that emits too much light or shines when and where it's not needed is wasteful. Wasting energy has huge economic and environmental consequences.

➤ Disrupting the Ecosystem and Wildlife:

- Plants and animals depend on **Earth's daily cycle of light and dark rhythm to govern life-sustaining behaviors** such as reproduction, nourishment, sleep and protection from predators.
- Scientific evidence suggests that artificial light at night has negative and deadly effects on many creatures including amphibians, birds, mammals, insects and plants.
 - Ex: Lit beaches deter sea turtles from coming ashore to nest. Skyglow keeps trees from sensing seasonal variations.
 - Clownfish eggs don't hatch when exposed to artificial light at night, killing the offspring.

➤ Harming Human Health:

- Like most life on Earth, humans adhere to a **Circadian Rhythm** — our biological clock — a sleep-wake pattern governed by the day-night cycle. Artificial light at night can disrupt that cycle.
- A small 2009 review concluded that **circadian disruption** — which altered melatonin levels can cause — **increased the risk of breast cancer among night-shift workers by 40%.**
- The erasure of the night sky acts to erase Indigenous connection to the stars, **acting as a form of ongoing cultural and ecological genocide.**

Note:

Senna Spectabilis

Why in News?

Kerala has come out with a management plan to eradicate ***Senna spectabilis***, the exotic invasive plant that is posing a **severe threat to the State's wildlife habitat**.

- The management plan stipulates that **there should not be an attempt to kill the trees before a detailed reforestation programme** and the resources for implementing it are in place.

What is *Senna spectabilis*?

- *Senna spectabilis* is a **deciduous tree native to tropical areas of America**.
- It grows up to **15 to 20 metres in a short period of time** and distributes thousands of seeds after flowering.
- The thick foliage of the tree **arrests the growth of other indigenous tree and grass species**. Thus, it causes food shortage for the wildlife population, especially herbivores.
- It also adversely affects the germination and growth of the native species.
- It is categorised as '**Least Concern**' under **IUCN Red List**.

What is the Eradication Plan?

- The plan envisages **landscape-level management** of the tree.
- Once the resources and material for landscape restoration are ready, the invasive species has to be removed using a threefold approach for **large trees, large saplings, and small saplings**.
 - The large trees need to be debarked from breast height downwards (1.3 m above ground level), including the collar part of the tree. Once done, the trees should be visited once a month to remove the new growth across the debarked area.
 - The larger saplings can be uprooted using specially designed weed pullers.
 - The third is the removal of small plantlets which need to be removed mechanically.
 - The large trees would take a minimum of 18 months to completely dry up after debarking.

What is an Invasive Species?

- An invasive species is **an organism that causes ecological or economic harm** in a new environment where it is not native.
- They are capable of causing **extinctions of native plants and animals, reducing biodiversity, competing with native organisms for limited resources, and altering habitats**.
- They can be **introduced to an area by ship ballast water, accidental release, and most often, by people**.
- There are many invasive species in India. For eg: **Charru Mussel, Lantana bushes, Indian Bullfrog**, etc.

Indian Star Tortoise

Why in News?

A new study on the **Indian Star Tortoise** (*Geochelone elegans*) has found that **illegal trade** and **unscientific translocations** are causing major losses to the species' **genetic diversity and habitat**.

- The research calls for proper conservation strategy to combat the **fragmented distribution and recommends intensive genetic screening** of the species to implement **scientific breeding**.

What are the Key Facts about Indian Star Tortoise?

- **Habitat:**
 - **Indian star tortoises** are found across the Indian subcontinent, more specifically, in the **Central and Southern parts of India**, in **West Pakistan and in Sri Lanka**.
 - It is typically found in **dry, open habitats such as scrub forests, grasslands, and rocky outcroppings**.
- **Threat:**
 - The species is facing **twin challenges of a threat to its habitat** at one level and loss of its **genetic diversity** at the other.
 - Their highly fragmented habitat of the species is greatly influenced by an **increased level of urbanization and agricultural practices**.
 - Due to **subsequent hybridisation** of these species over the years, Indian star tortoises have **lost genetic diversity**.

Note:



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- Also, according to the **Wildlife Crime Control Bureau**, 90% of the trade of Star Tortoise occurs as part of the international pet market.
- **Protection Status:**
 - **IUCN Red List:** Vulnerable
 - **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 in Species (CITES):** Appendix I

Spot Bellied Eagle Owl

Why in News?

Recently, **Spot Bellied Eagle Owl (*Bubo Nipalensis*)** was spotted for the first time in **Seshachalam forest**, and for the third time in **Andhra Pradesh**.

- It was sighted twice earlier at **Nagarjunasagar Srisailem Tiger Reserve(NSTR)**.

What is a Spot-bellied Eagle Owl?

- **About:**
 - The **Spot-bellied Eagle Owl**, also known as the **Forest eagle-owl** is a large owl species typically found in wooded areas, such as **forests and rocky hillsides**, and are known for their **distinctive spots on their belly**.
 - The spot-bellied eagle-owls are **large, very powerful and bold predatory birds**.
 - The bird makes a strange scream similar to humans and it is hence called the '**Ghost of the Forest**' in India.
- **Distribution:**
 - These eagle-owl species are distributed in **India, Sri Lanka, Nepal, Bhutan, Bangladesh, Myanmar, China, Thailand, Laos, Cambodia and Vietnam**.
- **Prey:**
 - They are known to prey on large birds and also on mammals like **golden jackals, hares, civets and chevrotains**.
- **IUCN and CITES Status:**
 - **International Union for Conservation of Nature(IUCN)** Red list: "Least Concern".

- **CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora):** Appendix II.

Nagarjunasagar Srisailem Tiger Reserve

- The Nagarjunasagar-Srisailem Tiger Sanctuary was declared officially in 1978 and has been recognized by the Project Tiger in 1983.
- **Nagarjunasagar-Srisailem Tiger Reserve** is the largest tiger reserve in India.
- In 1992, it was retitled as **Rajiv Gandhi Wildlife Sanctuary**.
- The Tiger reserve is spread over 5 districts in Andhra Pradesh and Telangana. The area consists mostly of the **Nallamala Hills**.
- The multipurpose reservoirs- **Srisailem and Nagarjunasagar** are located in the reserve.
- The **Krishna River** cuts the basin of this reserve.

Forest (Conservation) Rules 2022

Why in News?

Recently, the **National Commission for Scheduled Tribes (NCST)** Chairperson said that the ST body's position on the **Forest (Conservation) Rules 2022** being **violative of the Forest Rights Act, 2006** "will be the same" even as the Environment Ministry has dismissed these concerns.

What is the Issue?

- **Consent Clause for Diversion of Forest Land:**
 - In September 2022, flagging concerns over the **provision in the new rules that proposes to do away with the consent clause** for diversion of forest land for other purposes, the Commission had **recommended that these rules should be put on hold immediately**.
 - In response, the ministry has insisted that the **rules were framed under the Forest (Conservation) Act, 1980** and that the NCST's apprehension of these rules being in violation of the **Forest Rights Act (FRA), 2006** was "not legally tenable".

Note:

- The Minister added that the two statutory processes were parallel and not dependent on each other.

➤ **Consent of Gram Sabhas:**

- The NCST had **pointed out that the FCR 2022 has done away with the provisions to mandatorily seek consent of Gram Sabhas** before the Stage 1 clearance, leaving this process to be done later and even after Stage 2 clearance.
- According to the government, **FCR 2022 already provides for diversion of forest land "only after fulfilment and compliance of all provisions, including settlement of rights under the Forest Rights Act" and also does not bar or infringe upon the operation of other laws mandating consent of Gram Sabhas.**

What are the Provisions of Forest (Conservation) Rules, 2022?

➤ **Formation of Committees:**

- It constituted an **Advisory Committee, a regional empowered committee** at each of the integrated regional offices and a screening committee at State/Union Territory (UT) government-level.

➤ **Compensatory Afforestation:**

- The applicants for **diverting forest land in a hilly or mountainous state with green cover** covering more than two-thirds of its geographical area, or in a state/UT with forest cover covering more than one-third of its geographical area, will be able to take up compensatory afforestation in other states/UTs where the cover is less than 20%.

➤ **Allows Private Plantations:**

- The rules **make a provision for private parties to cultivate plantations** and sell them as land to companies who need to meet compensatory afforestation targets.
- Prior to the updated rules, state bodies would forward documents to the FAC that would also include information on the status of whether the forest rights of locals in the area were settled.

➤ **No consent of Gram Sabha needed:**

- The new rules state that a project, once approved by the FAC, will then be passed on to the State authorities who will collect the compensatory fund and land, and process it for final approval.

- Previously consent of gram sabha, or the governing body in villages in the area, was required to give written consent to the diversion of the forest.

➤ **Allows building in Forests:**

- Right to construct structures for bonafide purposes including forest protection measures and residential units (up to an area of 250 sq meters as one-time relaxation).

What is the State of Forest in India?

➤ **About:**

- According to **India State of Forest Report, 2021**, the Total Forest and Tree cover is now 7,13,789 square kilometres, 21.71% of the country's geographical area, an increase from 21.67% in 2019.
- Forest Cover (Area-wise): Madhya Pradesh> Arunachal Pradesh> Chhattisgarh> Odisha> Maharashtra.

➤ **Category:**

○ **Reserved Forests:**

- Reserve forests are the **most restricted forests and are constituted by the State Government** on any forest land or wasteland which is the property of the Government.
- In reserved forests, **local people are prohibited**, unless specifically allowed by a Forest Officer in the course of the settlement.

○ **Protected Forests:**

- The **State Government is empowered to constitute any land other than reserved forests as protected forests** over which the Government has proprietary rights and the power to issue rules regarding the use of such forests.
- This power has been used to establish State control over trees, whose timber, fruit or other non-wood products have revenue-raising potential.

○ **Village forest:**

- Village forests are the one in which the **State Government may assign to 'any village community the rights of Government to or over any land** which has been constituted a reserved forest'.

Note:



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- **Degree of Protection:**
 - Reserved forests > Protected forests > Village forests.
- **Constitutional Provisions:**
 - Through the **42nd Amendment Act, 1976 Forests and Protection of Wild Animals and Birds** were transferred from State to Concurrent List along with Education, Weights & Measures and Administration of Justice.
 - **Article 48 A in the Directive Principles of State policy**, mandates that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.
 - **Article 51 A (g)** of the Constitution states that it shall be the **Fundamental Duty** of every citizen to protect and improve the natural environment including forests and Wildlife.

What are the Related Initiatives?

- **Indian Forest Policy, 1952:**
 - It was a simple extension of colonial forest policy. However, it became conscious about the need to increase the forest cover to one-third of the total land area.
- **Forest Conservation Act, 1980:**
 - It stipulated that the central permission is necessary to practice sustainable **agro-forestry** in forest areas. Violation or lack of permit was treated as a **criminal offence**.
- **National Forest Policy, 1988:**
 - The ultimate objective of the **National Forest policy was to maintain environmental stability** and ecological balance through conservation of forests as a natural heritage.
- **National Afforestation Programme :**
 - It has been implemented by the Ministry of Environment, Forest and Climate Change since 2000 for the afforestation of degraded forest lands.
- **Other Related Acts:**
 - The **Wildlife Protection Act of 1972**, The **Environment Protection Act of 1986**, and The **Biodiversity Diversity Act of 2002**.
 - **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006:**

- It has been enacted to recognize and vest the forest rights and occupation of forest land in forest-dwelling Scheduled Tribes and other traditional forest dwellers, who have been residing in such forests for generations.

State of Indian Dams

Why in News?

According to a new study by the **United Nations**, around **3,700 dams in India will lose 26% of their total storage by 2050** due to accumulation of sediments which can undermine water security, irrigation and power generation in future.

- The study was conducted by the **United Nations University Institute on Water, Environment and Health (UNU-INWEH)**, also known as the UN's think tank on water.

What are the Other Highlights of the Study?

- Trapped sediment has already robbed **roughly 50,000 large dams worldwide** of an estimated 13 to 19% of their combined original storage capacity.
- It shows that **6,316 billion cubic metre of initial global storage in 47,403 large dams in 150 countries will decline to 4,665 billion cubic metre**, causing 26% storage loss by 2050.
 - The loss of 1,650 billion cubic metre storage capacity is roughly equal to the annual water use of India, China, Indonesia, France and Canada combined.
- In 2022, the **Asia-Pacific region, the world's most heavily dammed region, is estimated to have lost 13% of its initial dam storage capacity**.
 - It will have lost nearly a quarter (23%) of initial storage capacity by mid-century.
 - The region is **home to 60% of the world's population** and water storage is crucial for sustaining water and food security.
- China, meanwhile, the world's most heavily dammed nation, **has lost about 10% of its storage and will lose a further 10% by 2050**.

What is the State of Indian Dams?

- **About:**
 - India is **ranked third in the world in terms of building large dams**.

Note:



drishti

- Of the over 5,200 large dams built so far, about 1,100 large dams have already reached 50 years of age and some are older than 120 years.
 - The number of **such dams will increase to 4,400 by 2050 i.e., 80% of the nation's large dams face the prospect of becoming obsolete as they will be 50 years to over 150 years old.**
 - The situation with hundreds of thousands of medium and minor dams is even more dangerous as their shelf life is even lower than that of large dams.
- **Examples:** Krishna Raja Sagar dam was built in 1931 and is now 90 years old. Similarly, Mettur dam was constructed in 1934 and is now 87 years old. Both these reservoirs are located in the water scarce **Cauvery river basin.**

➤ Significance:

- Dams provide **multiple benefits including fresh water supply, water storage for irrigation, hydroelectric power generation, flood control, and improved navigation for transportation.**

What are the Issues with Indian Dams?

➤ Built according to the Rainfall Pattern:

- Indian dams are very old and built according to the rainfall pattern of the past decades. Erratic rainfall in recent years has left them vulnerable.
- But the government is equipping the dams with information systems like rainfall alerts, flood alerts, and preparing emergency action plans to avoid all sorts of mishaps.

➤ Decreasing Storage Capacity:

- As dams age, soil replaces the water in the reservoirs. Therefore, the storage capacity cannot be claimed to be the same as it was in the 1900s and 1950s.
- The storage space in Indian reservoirs is receding at a rate faster than anticipated.

➤ Climate change:

- **Climate change** has led to **increased variability in the water availability and uncertainty in future water availability.**

What are the Impacts of Dam Construction?

➤ Environmental Impacts:

- Dams can disrupt the flow of rivers and change the downstream ecology, which can have a

negative impact on plants and animals that rely on the natural flow of the river. Additionally, dams can cause soil erosion, sedimentation and flooding downstream.

➤ Displacement of Communities:

- The **construction of dams often leads to the displacement of local communities.**
- This can result in the **loss of homes, lands, and livelihoods**, which can be particularly devastating for marginalized communities such as indigenous people, farmers and fisherfolk. **Example:**
 - Around 1,500 people were displaced and affected by the **backwaters of Sardar Sarovar Dam.**

➤ Socio-Economic Impacts:

- The construction of dams can also have a **negative impact on the socioeconomic status of local communities.** For example, it can disrupt local fishing and farming activities and lead to a loss of income for many people.

➤ Cost:

- Building dams is a **costly process and can put a strain on the budget of both state and central Government.**

➤ Transparency:

- **Lack of transparency in the decision-making process can lead to a lack of public trust** in dams and the organizations that operate them.

What are the Related Steps taken?

- Under the **7th Schedule** of the Constitution of India, **water and water storage is a state subject.**
 - Therefore, legislating dam safety is the responsibility of state governments.
 - However, the Central Government can enact legislation governing dams in certain scenarios.
- At the national level, the **Central Water Commission (CWC)** provides technical expertise and guidance on all matters related to dams.
 - It is tasked with research into dam safety, developing standards for dam design and operations, and it is involved in the process of granting environmental clearance to dam construction projects.
- **Dam Safety Act 2021** aims at surveillance, inspection, operation and maintenance of all specified dams across the country.

Note:



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- The Act applies to all **specified dams in the country** i.e., those dams having a height of over 15m and between 10m and 15m with certain design and structural conditions.

Recovery of Ozone Layer

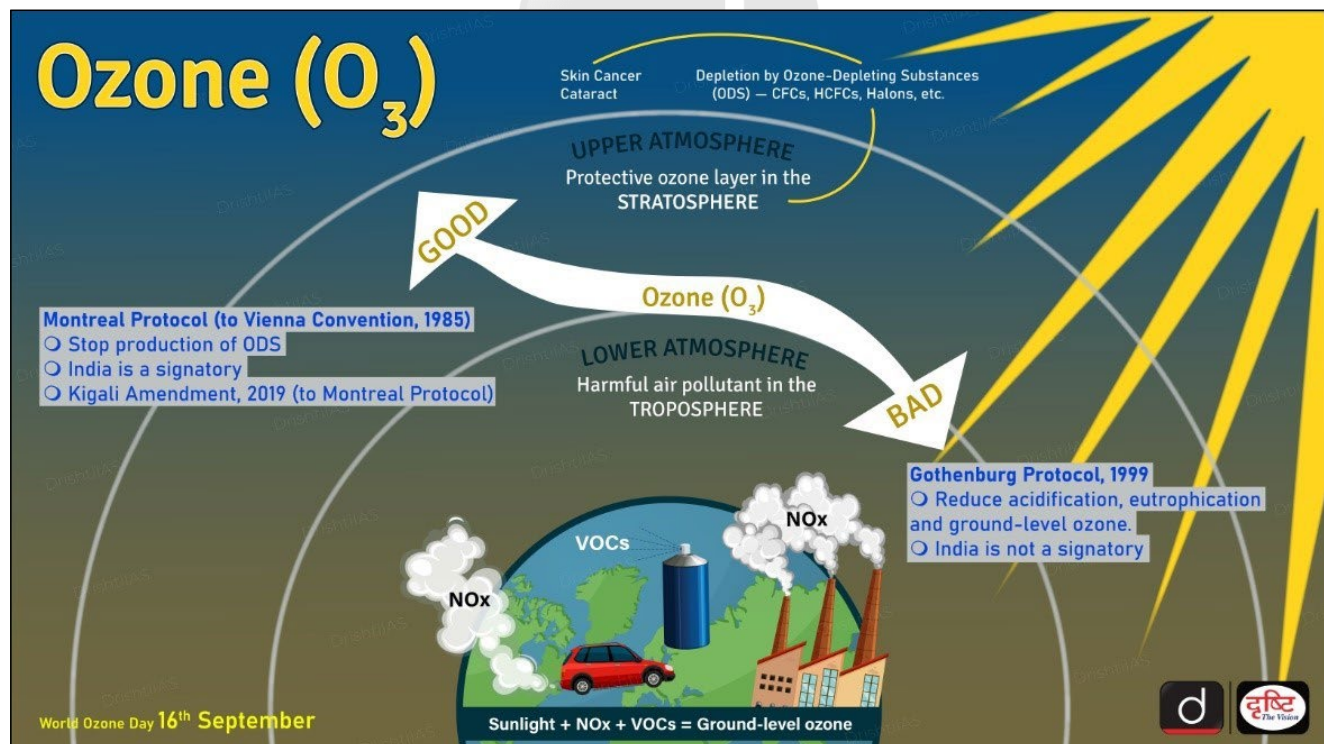
Why in News?

According to a new U.N. report, **earth's protective ozone layer is slowly but noticeably healing at a pace** that would fully mend the hole over Antarctica in about 43 years.

What are the Findings of the Report?

- While this is an achievement, the **scientists warned of the detrimental effects of geoengineering technologies** such as stratospheric aerosol injection on the ozone layer.

- Aerosol sprays, like other commonly used substances such as dry-cleaning solvents, refrigerants and fumigants, contain **Ozone-Depleting Substances (ODS)** including **chlorofluorocarbons (CFCs)**, hydrochlorofluorocarbons (HCFCs), halons, methyl bromide, carbon tetrachloride, and methyl chloroform.
- For the first time, the **Scientific Assessment Panel examined the potential effects on ozone of the intentional addition of aerosols** into the stratosphere, known as Stratospheric Aerosol Injection (SAI).
 - SAI can **increase sunlight reflection, thereby lowering the amount of heat that enters the troposphere**. But this method “could also affect stratospheric temperatures, circulation and ozone production and destruction rates and transport”.



Global Glacier Change in the 21st Century

Why in News?

Recently, a report titled “Global glacier change in the 21st century: Every increase in temperature matters”,

which states half the Earth's glaciers may disappear by 2100.

- The researchers used **two decades of satellite data to map the planet's glaciers with greater precision than ever before**.
- The **United Nation's (UN) Intergovernmental Panel on Climate Change's sixth assessment report**

Note:

released in 2022 also warned that we are running out of time to attain the 1.5°C target.

What are the Findings?

- **Glaciers Melting at Unprecedented Rate:**
 - **Glaciers** are receding at unprecedented rates due to **climate change** and rising temperatures.
 - The amount of ice lost by glaciers between **1994 and 2017 was around 30 trillion tones** and they are now melting at a pace of 1.2 trillion tonnes each year.
 - The glaciers in the Alps, Iceland and Alaska are some of those that are melting at the quickest rates.
 - Half the Earth's glaciers are destined to vanish by 2100, even if we adhere to the **Paris Climate Agreement** goal of limiting global temperature rise to 1.5 degrees Celsius above pre-industrial levels.
 - A minimum of 50 % of the loss will **occur within the next 30 years**. 68% of glaciers will vanish if **global warming continues at the current rate of 2.7°C**.
 - If this happens, by the end of the following century, **there would be practically no glaciers left in central Europe**, western Canada and the United States.
 - Some of these glaciers can be saved from extinction by reducing global warming, the researchers noted.
 - **Glaciers, which hold 70 % of the Earth's freshwater**, currently encompass around 10 % of the planet's land area.
- **Increasing Risk of Disaster:**
 - Melting glaciers raise sea levels dramatically, jeopardizing up to **two billion people's access to water and increasing the risk of natural disasters and extreme weather events** like floods.
 - Global sea level rose by 21 % between 2000 and 2019. This was solely due to meltwater from melting glaciers and ice sheets.
- **Recommendations:**
 - The rapidly increasing glacier mass losses as global temperature increases beyond 1.5C stresses the **urgency of establishing more ambitious climate pledges to preserve the glaciers** in these mountainous regions.

Joshimath Land Subsidence

Why in News?

Due to land subsidence, Joshimath - a key transit point for tourists travelling to Badrinath and Hemkund Sahib - developed cracks, **causing panic and protests among the local population**.

- Joshimath has been declared a **landslide-subsidence zone** and over 60 families living in uninhabitable houses in the sinking town have been evacuated to temporary relief centres.

Where is Joshimath Located?

- Joshimath is a hilly town located on the **Rishikesh-Badrinath National Highway (NH-7)** in **Chamoli district of Uttarakhand**.
- The city serves as a **tourist town as it acts as an overnight rest stop for people visiting Badrinath, Auli, Valley of Flowers, and Hemkund Sahib, among other important religious and tourist locations** in the state.
- Joshimath is also of great strategic importance to the **Indian armed forces and is home to one of the Army's** most important cantonments.
- The town (fall in **high-risk seismic Zone-V**) is traversed by running streams with a high **gradient from Vishnuprayag, a confluence of the Dhauliganga and the Alaknanda rivers**.
- It is home to one of the **four cardinal maths or monasteries established by Adi Shankara - Sringeri in Karnataka, Dwarka in Gujarat, Puri in Odisha and Joshimath near Badrinath in Uttarakhand**.

Why is Joshimath Sinking?

- **Background:**
 - Cracks on walls and buildings were **first reported in 2021**, as Chamoli district of Uttarakhand experienced frequent landslides and flooding.
 - As per reports, the Uttarakhand government's expert panel in 2022 found that several pockets of **Joshimath are "sinking" owing to man-made and natural factors**.
 - It was found that a gradual settling or sudden sinking of the earth's surface due to **the removal or displacement of subsurface materials** — has induced structural defects and damage in almost all wards of the city.

Note:



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➤ **Reasons:**

- **Site of an Ancient landslide:** According to the **1976 Mishra Committee report**, Joshimath lies on a deposit of sand and stone, it's not on the main rock. It lies on an ancient landslide. The report added that undercutting by river currents of Alaknanda and Dhauliganga are also playing their part in bringing landslides.
 - The committee had recommended that **restrictions be placed on heavy construction work, blasting or digging to remove boulders** for road repairs and other construction, felling of trees.
- **Geography:** Scattered rocks in the area are **covered with old landslide debris comprising boulders**, gneissic rocks, and loose soil, with a low bearing capacity.
 - These gneissic rocks are highly weathered and have a low cohesive value with a tendency of high pore pressure when saturated with water, especially during monsoons.
- **Construction Activities:** Increased construction, hydroelectric projects, and the widening of the NH have made the slopes highly unstable in the last couple of decades.
- **Land Erosion:** Due to the running streams from Vishnuprayag and sliding along the natural streams are the other reasons behind the city's fate.

➤ **Impact:**

- At least **66 families have fled the town while 561 houses have reported cracks**. A government official said that over 3000 people have been affected so far.

What can be done to save Joshimath?

- Experts recommend a **complete shutdown of development and hydroelectric projects in the region**. But the urgent need is to relocate the residents to a safer place and then reimagine the town's planning to accommodate the new variables and the changing geographical factors.
- Drainage planning is one of the biggest factors **that needs to be studied and redeveloped**. The city is suffering from poor drainage and sewer management as more and more waste is seeping into the soil, loosening it from within. The irrigation department

has been asked by the state government to look into the issue and create a new plan for the drainage system.

- Experts have also suggested **replantation in the region, especially at the vulnerable sites to retain soil capacity**. There is a need for a coordinated effort between the government and civil bodies with the aid of military organizations like the **Border Roads Organisation (BRO)** to save Joshimath.
- While the state already has weather forecasting technology that can warn people of local events, **its coverage needs to be improved**.
 - Weather forecasting in Uttarakhand is done through satellites and Doppler weather radars (instruments that use electromagnetic energy to find precipitation and determine its location and intensity).
- The state government also **needs to take scientific studies more seriously, which clearly spell out the reasons for the current crisis**. Only then will the state put an end to its development frenzy.

What is Land Subsidence?

- Land subsidence is a gradual settling or sudden sinking of the Earth's surface.
- Subsidence - sinking of the ground because of underground material movement—is most often **caused by the removal of water, oil, natural gas, or mineral resources out of the ground** by pumping, fracking, or mining activities.
- Subsidence can also be caused by **natural events such as earthquakes, soil compaction, glacial isostatic adjustment, erosion**, sinkhole formation, and adding water to fine soils deposited by wind (a natural process known as loess deposits).
- Subsidence can happen over very large areas like whole states or provinces, or very small areas like the corner of your yard.

What is Landslide?

- A landslide is defined as the **movement of a mass of rock, debris, or earth down a slope**.
- They are a type of **mass wasting**, which denotes any downward movement of soil and rock under the direct influence of gravity.
- The term **landslide encompasses five modes of slope movement**: falls, topples, slides, spreads, and flows.

Note:

Asian Waterbird Census

Why in News?

A survey conducted as part of the **Asian Waterbird Census (AWC) 2023** shows the populations of some migratory waterbirds, especially duck species visiting the Alappuzha region of Kerala, are falling.

What are the Highlights of the Survey?

- **Major Missing Species:**
 - Duck species like **Northern Shoveler, Common teal and Eurasian wigeon**, sighted in the previous surveys, were totally missing this time around.
- **Climate Change Impact:**
 - **Climate change** has affected the number of birds visiting the region. However, the precise impact of climate change on bird migration **requires more detailed studies**.

What is the Asian Waterbird Census?

- **About:**
 - It is a **citizen-science programme** supporting conservation and management of **wetlands** and waterbirds worldwide.
 - AWC is part of the global **International Waterbird Census (IWC)** coordinated by **Wetlands International**.
 - AWC **runs in parallel with other regional programmes of the IWC** in Africa, Europe, West Asia, the Neotropics and the Caribbean.
- **AWC in India:**
 - It was **initiated in the Indian subcontinent in 1987** and since then has grown rapidly to cover major regions of Asia, from Afghanistan eastwards to Japan, Southeast Asia and Australasia.
 - In India, AWC is jointly coordinated by the **Bombay Natural History Society (BNHS)** and **Wetlands International**.
- **Significance:**
 - It **gives an idea of the birds at the wetland and the health of the wetland**; the more the waterbirds, the more suitable the wetland is.
 - It helps in **better implementation of the Convention on Migratory Species (CMS)** and the **Convention on Biological Diversity's (CBD)**.

Bird Species Count in Deepor Beel

Why in News?

Recently, Guwahati Wildlife Division of the Assam Forest Department conducted the 2nd Bird Species Count Exercise after February 2022 in **Deepor Beel Wetland**, which is the only **Ramsar Site** in Assam.

- Altogether 26,747 birds belonging to 96 species were recorded during a bird count at the **Deepor Beel wetland**. There were 10,289 individuals across 66 species in 2022.
- The bird count revealed **greater species diversity and an increase in the total number of species**.

What is Deepor Beel?

- **About:**
 - It is one of the largest freshwater lakes in Assam and an **Important Bird Area** by Birdlife International.
 - Deepor Beel has been designated as a **Ramsar Site in November, 2002**
 - It is located towards the southwest of Guwahati city, Assam and is the erstwhile water channel of **River Brahmaputra**.
 - The lake expands up to 30 sq. km in summer and reduces to about 10 sq. km in the winter.
 - The Assam Forest Department manages the 4.1 sq km Deepor Beel Wildlife Sanctuary in the central part of the greater wetland named Deepor 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.
 - In 2021 six young girls from the fishing community from Assam have developed a biodegradable and compostable yoga mat called '**Moorhen Yoga Mat**'.

Note:

- Deepor Beel adjoins the Rani Reserve Forest from where herds of elephants come periodically to forage in the wetland.

➤ **Concerns:**

- Deepor Beel has also suffered contamination because of a garbage dump on its edge at Paschim Boragaon.
- Its 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.

What are the Other Protected Areas in Assam?

- Assam has **7 national parks** and 17 wildlife sanctuaries.



Wayanad Wildlife Sanctuary

Why in News?

Recently, a **Human-Animal Conflict** occurred where a local man was attacked by an **Elephant** and a herd of elephants raided a field of 500 plantains near **Wayanad Wildlife Sanctuary**, Kerala.

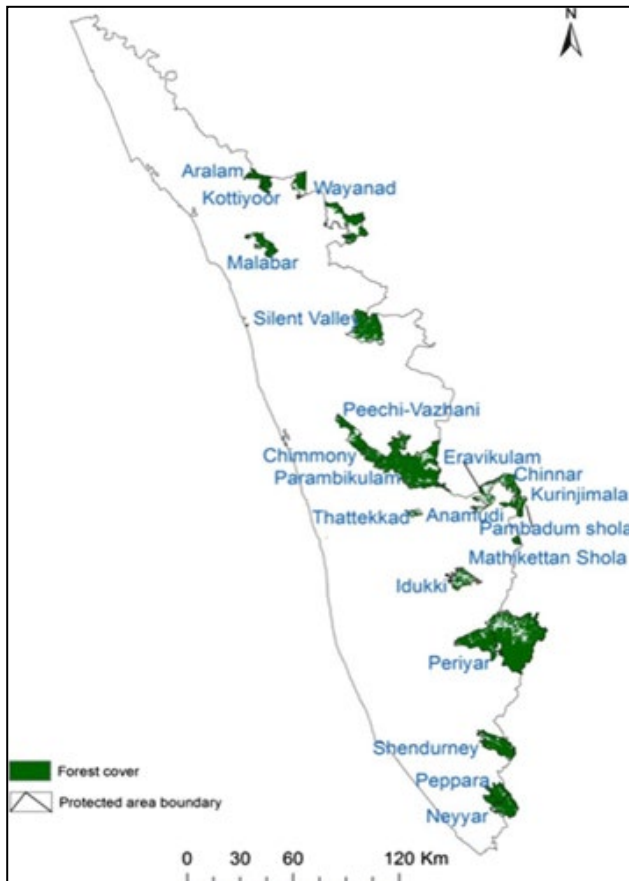
- Human-animal conflict has become a **serious wildlife management problem in Kerala in the last few years**. People living on the fringes of reserve forests and sanctuaries have a heightened sense of insecurity now.

What is Human-Animal Conflict?

- **About:** It refers to struggles that arise when the presence or behavior of **wildlife poses actual or perceived direct**, recurring **threats to human interests or needs**, often leading to disagreements between groups of people and negative impacts on people and/or wildlife.
- **Causes:** Human population expansion, **habitat degradation and fragmentation**, **land use transformation and rising densities of livestock** in protected areas are considered as the major causes of Human-Wildlife conflict.

Note:

What are the Protected Areas in Kerala?



What are the Key Points of Wayanad Wildlife Sanctuary?

- Located in Kerala, Wayanad Wildlife Sanctuary (WWS) is an integral part of the **Nilgiri Biosphere Reserve**. It was established in 1973.
 - Nilgiri Biosphere Reserve was the first from India to be included in the **UNESCO designated World Network of Biosphere Reserves** (designated in 2012).
 - Other wildlife parks within the Reserve are: Mudumalai Wildlife Sanctuary, Bandipur National Park, Nagarhole National Park, Mukurthi National Park and Silent Valley.
- Spread over 344.44 sq km, Wayanad Wildlife Sanctuary 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.

- 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.

Increase in Blackbuck Population

Why in News?

According to a **new study** from the Indian Institute of Science (IISc), **blackbucks** in India have **adapted well** to natural and human-induced challenges to their survival.

- In spite of immense losses in grassland habitats across India, the **data showed an increasing trend in blackbuck population numbers** as compared to the recent past.

What are Blackbucks?

- **About:**
 - The Blackbuck (*Antelope cervicapra*), or the **Indian Antelope**, is a species of antelope native to India and Nepal.
 - It is **widespread** in Rajasthan, Gujarat, Madhya Pradesh, Tamil Nadu, Odisha, and **other areas throughout peninsular India**.
 - It is considered as the **epitome of grassland**.
 - The **blackbuck is a diurnal antelope** (active mainly during the day).
- **Recognition:**
 - It has been **declared as the State Animal of Punjab, Haryana, and Andhra Pradesh**.
- **Cultural Importance:**
 - It is a **symbol of purity for Hinduism** as its skin and horns are regarded as sacred objects. For **Buddhism**, it is a symbol of good luck.
- **Protection Status:**
 - **Wildlife Protection Act 1972:** Schedule I
 - **IUCN Status:** Least Concern
 - **CITES:** Appendix III

Note:

- **Threat:**
 - Habitat Fragmentation, **Deforestation**, **Natural Calamities**, Illegal Hunting.
- **Related Protected Areas:**
 - Velavadar Blackbuck Sanctuary - Gujarat
 - Point Calimere Wildlife Sanctuary - Tamil Nadu
 - In 2017, the Uttar Pradesh State Government approved the plan of setting up the Blackbuck **Conservation Reserve** in the trans-Yamuna belt near Prayagraj. It would be the first conservation reserve dedicated to the blackbuck.
 - **Tal Chhapar Sanctuary**- Rajasthan

Indian Skimmers

Why in News?

As per the **Asian Waterbird Census 2023** (recommended dates for the AWC are 7 – 22 January) which has been started recently, the **Godavari estuary in Andhra Pradesh has become a prime and safe habitat for the Indian Skimmer** (*Rynchops albicollis*).

- Around 250 Indian Skimmers, were sighted in **Coringa Wildlife Sanctuary**.

What are Indian Skimmers?



- **About:**
 - Another common name for Indian skimmers is **Indian scissors bill**.
 - They are **more widespread in winter**; the Indian skimmer is found in the coastal estuaries of western and eastern India.
 - The species can be sighted near the **Chambal River** in Central India, in **few parts of Odisha and in Andhra Pradesh**.
- **Major Threats:**
 - Habitat degradation, excessive and widespread increases in disturbances near the rivers.

- **Protection Status:**
 - **IUCN Red List Status:** Endangered
 - **CITES:** Not listed

Coringa Wildlife Sanctuary:

- The Government declared a part of the Godavari mangrove system as **Coringa Wildlife Sanctuary in 1978** to rehabilitate the **salt water crocodile** and to protect the other endangered species, such as **Olive Ridley turtles** and **Indian Otter**.
- About 120 species of resident and migratory birds depend on this area for breeding and nesting.

Asian Waterbird Census:

- **Every January**, thousands of volunteers across Asia and Australasia visit **wetlands** in their country and count waterbirds. This **citizen-science programme supports the conservation and management of wetlands** and waterbirds worldwide.
- The AWC is an integral **part of the global waterbird monitoring programme, the International Waterbird Census (IWC)**, coordinated by **Wetlands International**.

White Tufted Royal Butterfly

Why in News?

Recently, a team of butterfly observers and researchers **have found the White Tufted Royal Butterfly**, a rare butterfly species in Kannur, Kerala which was **earlier spotted in Agasthyakoodam** in 2017 and **Shendurney Wildlife Sanctuary** in 2018.

- The butterfly is **protected under Schedule 2 of the Wildlife Protection Act, 1972**.

What are the Key Facts About Butterflies?

- **About:**
 - Butterflies are **insects from the order Lepidoptera of phylum Arthropoda** which also includes moths.
 - Adult butterflies **have large, often brightly coloured wings, and conspicuous, fluttering flight**.
 - Recently, a **Himalayan butterfly known as Golden Birdwing** (*Troides aeacus*) has been **discovered as India's largest butterfly** after 88 years.

Note:



➤ Significance:

- **Rich Biodiversity:** The abundance of butterflies in any area represents rich biodiversity.
- **Indicator Species:** The butterfly acts as an indicator species.
 - An indicator species provides information on the overall condition of the ecosystem and of other species in that ecosystem. They reflect the quality and changes in environmental conditions as well as aspects of community composition.
- **Pollinator:** It acts as a pollinator by helping in pollination and conserving several species of plants.

Regenerative Agriculture

Why in News?

Farmers in Madhya Pradesh who follow regenerative farming methods find that they reduce the need for frequent irrigation, which conserves water and energy.

What is Regenerative Agriculture?

➤ Background:

- The **Green Revolution** of the 1960s pulled India from the brink of starvation, but the revolution also made India the world's biggest extractor of groundwater.
 - According to the **UN's World Water Development Report, 2022**, India extracts 251 cubic km or more than a quarter of the world's groundwater withdrawal each year; 90 % of this water is used for agriculture.

- Currently, there is severe and widespread **deficiency of organic carbon and micronutrients in Indian soils**.
- If **agriculture is to continue to feed the country's undernourished population** — 224.5 million, according to the UN's State of Food Security and Nutrition in the World, 2022 — **and drive its economy, it needs to work in harmony with nature, not against it**.
- Farmers, activists and agricultural research organisations across the world are **thus developing methods of chemical-less farming which uses natural inputs and cultivation practices such as crop rotation and diversification**, which fall under the wider umbrella of regenerative agriculture.

➤ About Regenerative Agriculture:

- Regenerative agriculture is a **holistic farming system** that focuses on soil health, food quality, biodiversity improvement, water quality and air quality through methods such as **reducing the use of chemical fertilisers and pesticides, reducing tillage, integrating livestock and using cover crops**.
- It adheres to the **following principles**:
 - **Minimize soil distribution** through conservation tillage
 - **Diversify crops to replenish nutrients** and disrupt pest and disease lifecycles
 - **Retain soil cover** using cover crops
 - **Integrate livestock, which adds manure to the soil** and serves as a source of carbon sinks.

What are the Advantages of Regenerative Agriculture?

➤ Improves Soil Health:

- It goes a step ahead of sustainable agriculture and aspires not only to maintain the resources like soil and water **but also to improve them**.
 - According to the UN Food and Agriculture Organization, **healthy soil helps in better water storage**, transmission, filtering and reduces agricultural run-off.

➤ Water conservation:

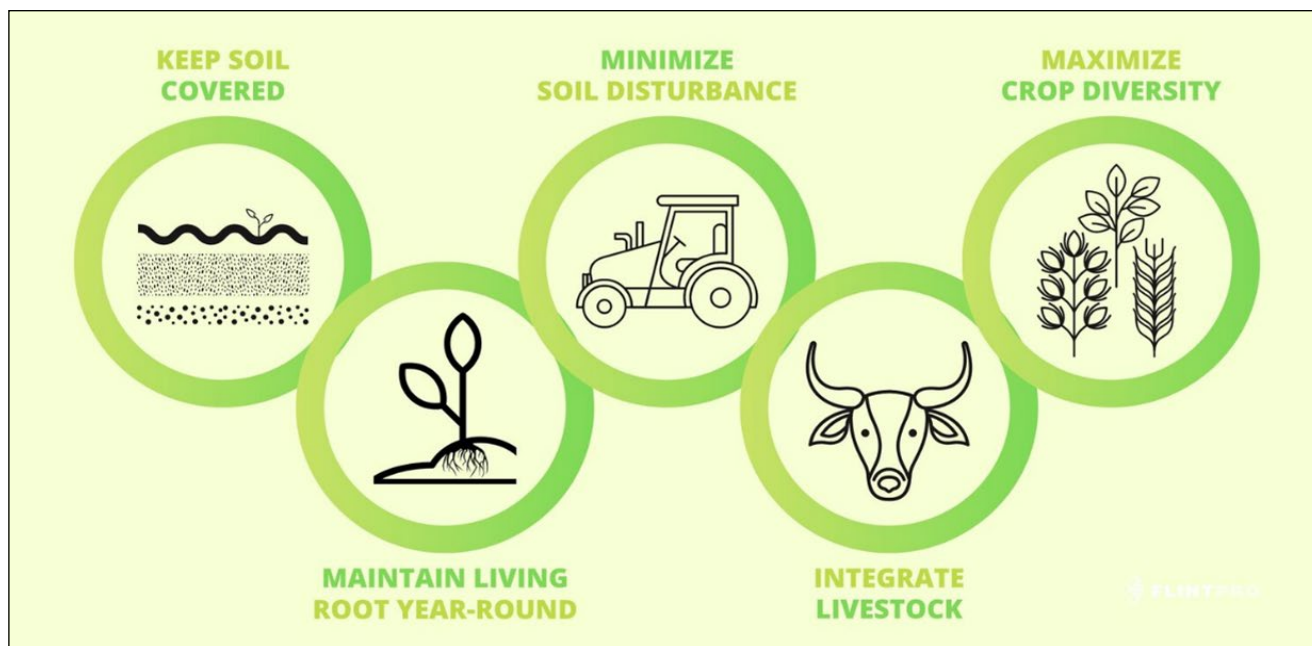
- **Healthy soil helps in improving water-use efficiency** by better water storage, transmission, filtering and reduces agricultural run-off.

Note:

- Studies have established that 1% increase in soil organic matter per 0.4 hectare increases **water storage potential by more than 75,000 litres**.

➤ **Energy Conservation:**

- Regenerative Agriculture practices **conserve energy** used by irrigation aids such as pumps.



What are Indian Efforts to Promote Regenerative Agriculture?

➤ **The National Project on Organic Farming:**

- The National Project on Organic Farming is the country's longest experiment on the practice, ongoing since 2004 and conducted by ICAR-Indian Institute of Farming System Research, Meerut.

➤ **Systematic Rice Intensification:**

- A method in which seeds are spaced at wider distances and organic manure is applied to improve yields.

➤ **Zero-Budget Natural Farming:**

- It is also known as Subhash Palekar Natural Farming and emphasises on preparing and using **inputs made from crop residue, cow dung and urine, fruits, among other things**.

➤ **Samaj Pragati Sahyog:**

- It is a grassroots organisation that promotes **natural methods to control agricultural pests** such as composting and recycling of crop residues, use of farm yard manure, cattle urine and application of tank silt, has also made efforts to this end.

- It has conducted field trials with 1,000 farmers on more than 2,000 ha of land in four districts of Madhya Pradesh and one district of Maharashtra in 2016-18, to measure the water saved.

Ikki Jathre

Why in News?

Recently, a Kerala-based organisation, Thanal launched the **Ikki Jathre or the Festival of Rice in tribal parlance** whereby 300 climate-resilient varieties of traditional rice were planted at **Panavally, Wayanad**.

- Thanal **initiated the Rice Diversity Block (RDB)** at Panavally under the **Save Our Rice campaign in 2009**, with a collection of 30 varieties of rice which now expanded to 300.

What is Ikki Jathre?

- The initiative aims to sensitise people to the **significance of conserving traditional crops that have the ability to withstand harsh climatic conditions**.
- The festival also sets the stage for **knowledge sharing and co-creation of knowledge** between tribal farmers and experts.

Note:

- For the RDB, **most of the varieties were collected** from Kerala, Karnataka, Assam, Tamil Nadu, Arunachal Pradesh, Maharashtra and West Bengal.
 - Also, there are **three traditional rice varieties from Vietnam and Thailand**.

What is Save Our Rice Campaign?

- **About:**
 - Save our rice campaign is a **people's movement to protect the diverse rice cultures**, knowledge, and ensure food sovereignty.
 - **In India, it started in 2004**, and empowers communities **build sustainable food security and livelihood**.
- **Functions:**
 - **Establishing community RDBs and seed banks, conserving and promoting indigenous varieties of paddy seeds.**
 - **Creating awareness about value of rice diversity among urban consumers.**
 - **Facilitating adoption of agro-ecological farming in rice ecosystems, and encouraging farmers, states and local governments to adopt indigenous seeds.**
 - **Enabling active discussions in the media about indigenous seeds and agro ecological farming.**

Sand Battery

Why in News?

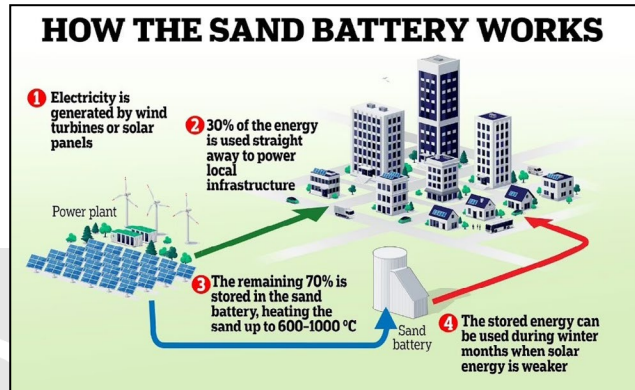
Sand batteries can store a significant extent of thermal energy and can **aid Clean Energy Solutions**.

- **Finland** has installed the **world's first fully working "sand battery"** in its town called **Kankaanpää** capable of storing green power for months at a time. The batteries can also solve the issue of year-round supply.

What is a Sand Battery?

- A "sand battery" is a **high temperature thermal energy storage** that uses sand or sand-like materials as its storage medium. It stores energy in sand as heat.
 - Sand is a very effective medium for retaining heat over a long period, storing power for months at a time.

- Its main purpose is to **work as a high-power and high-capacity reservoir for excess wind and solar energy**. The energy is stored as heat, which can be used to heat homes, or to provide hot steam and high temperature process heat to industries that are often fossil-fuel dependent.
- The sand battery helps to **ambitiously upscale renewables production by ensuring there's always a way to benefit from clean energy**, even if the surplus is massive.



How can it Address Europe's Energy Crisis?

- **Russia** — the supplier of 40 % of the **European Union's** natural gas supply — has **shut off its pipelines to a large extent**.
- Countries in the Northern Hemisphere rely on a **central heating system in winters, with natural gas as the most common heating fuel**. This is unlike developing countries with a tropical climate.
- The sale of heat pumps, considered a renewable source of internal heating, rose by 35 % in the EU. A rise in the sale of **other controversial alternatives, such as wood pellets, accompanied this simultaneously**.
- The world is **increasingly looking at renewable internal heating sources**.
- Thermal storage will reduce reliance on fossil fuels, provide storage for intermittent **renewable energy** and **help balance the grid**.
 - Thermal energy storage is yet to develop as a field in this sense globally fully.
- In such times, finding alternative energy supplies to fill in the gap can be crucial, these **Sand Batteries can prove to be the right step in the right direction**.

Note:

- This patented technology is useful to a country like Finland, one of the countries closest to the North Pole, where the sun sets at around 3 pm in winter months with temperatures as low as minus 30 degrees Celsius.
- It is believed that it could solve the problem of year-round supply, a major issue for green energy.

World Bank Report on Air Pollution

Why in News?

Recently, the **World Bank** released a report titled 'Striving for Clean Air: Air Pollution and Public Health in South Asia'.

- The report details how persisting with policies currently being implemented (largely since 2018) will yield results but not to the desired level.

What are the Highlights of the Report?

- **Airsheds:**
 - Six large airsheds exist in South Asia, where the air quality in one can affect the air quality in another. They are:
 - **West/Central Indo-Gangetic Plain (IGP)** that included Punjab (Pakistan), Punjab (India), Haryana, part of Rajasthan, Chandigarh, Delhi, Uttar Pradesh.
 - **Central/Eastern IGP:** Bihar, West Bengal, Jharkhand, Bangladesh
 - **Middle India:** Odisha/Chhattisgarh
 - **Middle India:** Eastern Gujarat/Western Maharashtra
 - **Northern/Central Indus River Plain:** Pakistan, part of Afghanistan; and
 - **Southern Indus Plain and further west:** South Pakistan, Western Afghanistan extending into Eastern Iran.
 - When the wind direction was predominantly northwest to the southeast, **30% of the air pollution in Indian Punjab came from the Punjab Province in Pakistan** and, on average, 30% of the air pollution in the largest cities of Bangladesh (Dhaka, Chittagong, and Khulna) originated in India. In some years, substantial pollution flowed in the other direction across borders.

Exposure to PM 2.5:

- Currently over **60% of South Asians are exposed to an average 35 µg/m³ of PM_{2.5} annually.**
- In some parts of the IGP it spiked to as much as 100 µg/m³ – nearly 20 times the upper limit of 5 µg/m³ recommended by the **World Health Organisation (WHO).**

Dominant Sources of Air Pollution:

- Large industries, power plants and vehicles are dominant sources of air pollution around the world, but in South Asia, other sources make substantial additional contributions.
- These include **combustion of solid fuels for cooking and heating, emissions from small industries such as brick kilns, burning of municipal and agricultural waste, and cremation.**

What are the Suggestions?

Reducing Airsheds:

- Governmental measures can reduce particulate matter, **but significant reductions in airsheds require coordinated policies across the airsheds.**
 - If Delhi National Capital Territory were to fully implement all air pollution control measures by 2030 while other parts of South Asia continued to follow current policies, it wouldn't keep pollution exposure below 35 µg/m³.
 - However, if other parts of South Asia also adopted all feasible measures it would bring pollution below that number.

Changing Approach:

- South Asian countries including India **need to change their approach in order to improve air quality and reduce pollutants** to levels considered acceptable by the WHO.

Close Coordination Required:

- Curbing air pollution requires not only tackling its specific sources, but **also close coordination across local and national jurisdictional boundaries.**
- **Regional cooperation can help implement cost-effective joint strategies** that leverage the interdependent nature of air quality.
- The most cost-effective one, which calls for full coordination between airsheds, would cut the average exposure of PM 2.5 in South Asia to 30

Note:

$\mu\text{g}/\text{m}^3$ at a cost of USD 278 million per $\mu\text{g}/\text{m}^3$ of reduced exposure and save more than 7,50,000 lives annually.

What is Airsheds?

- The World Bank defines an airshed as a **common geographic area where pollutants get trapped, creating similar air quality for everyone.**

Carbon Markets

Why in news?

- The Parliament has passed the **Energy Conservation (Amendment) Bill, 2022** in order to establish **Carbon Markets** in India and specify a Carbon Trading Scheme.
- The Bill amends the Energy Conservation Act, 2001.

What is the Energy Conservation (Amendment) Bill, 2022?

- **About:**
 - The Bill empowers the Centre to specify a carbon credits trading scheme.
 - Under the Bill, the **central government or an authorised agency will issue carbon credit certificates to companies or even individuals** registered and compliant with the scheme.
 - These carbon credit certificates **will be tradeable in nature**. Other persons would be able to buy carbon credit certificates on a voluntary basis.
- **Concerns:**
 - Bill does not provide **clarity on the mechanism to be used** for the trading of carbon credit certificates— whether it will be like the cap-and-trade schemes or use another method— and **who will regulate such trading**.
 - It is not specified, which is the right ministry to **bring in a scheme of this nature**,
 - While carbon market schemes in other jurisdictions like the U.S., United Kingdom, and Switzerland are framed by their **environment ministries**, the Indian Bill was tabled by the power ministry instead of the **Ministry of Environment, Forest, and Climate Change (MoEFCC)**.

- The Bill does not specify **whether certificates under already existing schemes would also be interchangeable** with carbon credit certificates and tradeable for reducing carbon emissions.
- Two types of tradeable certificates are already issued in India— Renewable Energy Certificates (RECs) and Energy Savings Certificates (ESCs).
- These are issued when companies use renewable energy or save energy, which are **also activities which reduce carbon emissions**.

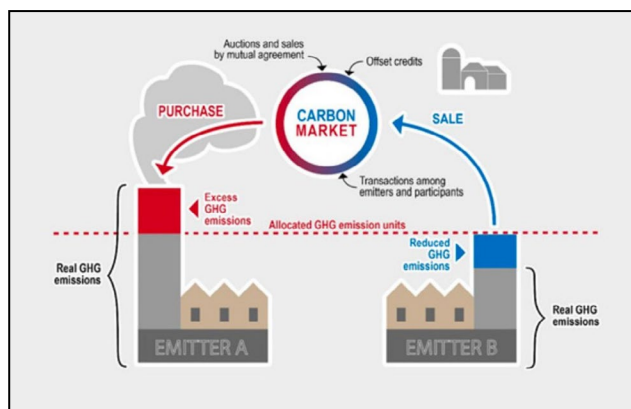
What are Carbon Markets?

- **About:**
 - Carbon markets are a **tool for putting a price on carbon emissions**. It allows the **trade of carbon credits with the overall objective of bringing down emissions**.
 - These markets create incentives to reduce emissions or improve energy efficiency.
 - For example, an industrial unit which outperforms the emission standards stands to gain credits.
 - Another unit which is struggling to attain the prescribed standards can buy these credits and show compliance to these standards. The unit that did better on the standards earns money by selling credits, while the buying unit is able to fulfill its operating obligations.
 - It establishes **trading systems** where **carbon credits or allowances** can be bought and sold.
 - A **carbon credit** is a kind of tradable permit that, per United Nations standards, equals one tonne of carbon dioxide removed, reduced, or sequestered from the atmosphere.
 - **Carbon allowances or caps**, meanwhile, are determined by countries or governments according to their emission reduction targets.
 - **Article 6 of the Paris Agreement** provides for the use of **international carbon markets by countries** to fulfill their **NDCs (Nationally Determined Contributions)**.
 - NDCs are climate commitments by countries setting targets to achieve **net-zero emissions**.

Note:



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➤ Types of Carbon Markets:

○ Compliance Markets:

- Compliance markets are **set up by policies at the national, regional, and/or international level** and are officially regulated.
 - Today, compliance markets mostly operate under a principle called **‘cap-and-trade’**, **most popular in the European Union (EU)**.
 - Under the EU’s emissions trading system (ETS) launched in 2005, member countries set a cap or limit for emissions in different sectors, such as power, oil, manufacturing, agriculture, and waste management. This cap is determined as per the climate targets of countries and is lowered successively to reduce emissions.
- Entities in this sector are issued **annual allowances or permits by governments equal to the emissions they can generate**.
- If companies produce emissions beyond the capped amount, **they have to purchase additional permits**. This makes up the ‘trade’ part of cap-and-trade.
- The market price of carbon gets determined by market forces when purchasers and sellers trade in emissions allowances.

○ Voluntary Markets:

- Voluntary markets are those in which **emitters— corporations, private individuals, and others— buy carbon credits to offset the emission** of one tonne of CO₂ or equivalent greenhouse gases.
- Such carbon credits are **created by activities which reduce CO₂ from the air, such as afforestation**.

- In this market, a corporation looking to compensate for its **unavoidable GHG emissions purchases carbon credits from an entity engaged in projects** that reduce, remove, capture, or avoid emissions.

- For Instance, in the aviation sector, airlines may purchase carbon credits to offset the carbon footprints of the flights they operate. In voluntary markets, credits are verified by private firms as per popular standards. There are also traders and online registries where climate projects are listed and certified credits can be bought.

➤ Status of Global Carbon Markets:

- In 2021, the value of global markets for tradeable carbon allowances or permits **grew by 164% to a record 760 billion euros (USD 851 billion)**, according to an analysis by Refinitiv.
- The EU’s ETS contributed the most to this increase, accounting for 90% of the global value at 683 billion euros.
- As for voluntary carbon markets, **their current global value is comparatively smaller at USD 2 billion**.
- The World Bank estimates that trading in carbon credits could reduce the cost of implementing NDCs by more than half — by as much as USD 250 billion by 2030.

What are the Challenges to Carbon Markets?

➤ Poor Market Transparency:

- The **UNDP (United Nations Development Programme)** points out serious concerns pertaining to carbon markets- ranging from **double counting of greenhouse gas reductions** and **quality and authenticity of climate projects** that generate credits to poor market transparency.

➤ Greenwashing:

- Companies may buy credits, **simply offsetting carbon footprints instead of reducing their overall emissions** or investing in clean technologies.

➤ May Increase Net Emission through ETS:

- As for regulated or compliance markets, **ETSs (Emissions Trading System)** may not automatically reinforce climate mitigation instruments.

Note:

- The **International Monetary Fund (IMF)** points out that including high emission-generating sectors under trading schemes to offset their emissions by buying allowances may increase emissions on net and provide no automatic mechanism for prioritizing cost-effective projects in the offsetting sector.

What is the Related Indian Initiative?

➤ Clean Development Mechanism:

- In India, the clean development mechanism under the Kyoto Protocol provided a primary carbon market for the players.
- The secondary carbon market is covered by the **perform-achieve-trade scheme** (which falls under the energy efficiency category) and the renewable energy certificate.

Black Carbon

Why in News?

In **Lok Sabha**, the Minister of State for Environment, Forest and Climate Change outlined the various measures taken to counter black carbon.

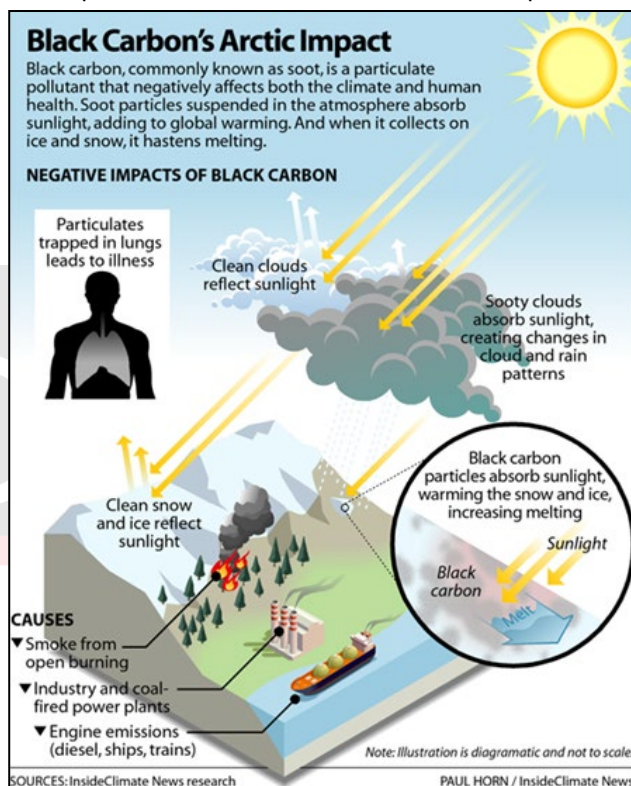
- Under the **Indian Space Research Organization (ISRO)** Geosphere Biosphere Programme, the ISRO operates a network of aerosol observatories and black carbon mass concentration is one of the parameters being measured.

What is Black Carbon?

- **About:** Black Carbon (BC) is a **short-lived pollutant** that is the **second-largest contributor** to warming the planet behind **carbon dioxide (CO₂)**.
 - Unlike other **greenhouse gas emissions**, BC is quickly washed out and can be eliminated from the atmosphere if emissions stop.
 - Unlike historical carbon emissions it is also a localised source with greater local impact.
 - Black carbon is a kind of an aerosol.
- **General Impacts:** Among aerosols (such as brown carbon, sulphates), Black Carbon has been recognized as the **second most important anthropogenic agent for climate change** and the **primary marker to understand the adverse effects caused by air pollution**.

- Black carbon absorbs solar energy, it warms the atmosphere. When it falls to earth with precipitation, it darkens the surface of snow and ice, reducing their albedo (the reflecting power of a surface), warming the snow, and hastening melting.

- **Emission:** It gets **emitted from gas and diesel engines, coal-fired power plants**, and other sources that burn **fossil fuel**. It comprises a significant portion of particulate matter or PM, which is an air pollutant.



What are the Various Measures taken?

- **Pradhan Mantri Ujjwala Yojana:**
 - Under this initiative, the government is promoting use of **cleaner household cooking fuels**.
- **BS VI Emission Norms:**
 - Leapfrogging from BS-IV to **BS-VI norms** for fuel and vehicles from 1st April, 2020.
- **Introducing Cleaner Fuels:**
 - Introduction of cleaner / alternate fuels like gaseous fuel (CNG, LPG etc.), **ethanol blending**.
- **SATAT Scheme:**
 - A new initiative, **"Sustainable Alternative Towards Affordable Transportation (SATAT)**, has

Note:

been launched to set up 5000 **Compressed Bio-Gas (CBG)** production plants and make CBG available in the market for use.

➤ **Managing Crop Residue:**

- Agricultural machines and equipment for in-situ crop residue management in Punjab, Haryana, Uttar Pradesh and NCT of Delhi are promoted under the Central Sector Scheme on **Promoting Agricultural Mechanization** for in-situ Crop Residue Management with 50% subsidy to individual farmers and 80% subsidy to the establishment of Custom Hiring Centres.

➤ **National Clean Air Programme:**

- The Central Government is implementing the **National Clean Air Programme** as a long-term, time-bound, national-level strategy to tackle the air pollution problem across the country in a comprehensive manner.
- The Centre has set a new target of a **40% reduction in particulate matter concentration in cities covered under the scheme by 2026**, updating the earlier goal of 20 to 30% reduction by 2024.

➤ **City specific Clean Air Action Plans:**

- The **Central Pollution Control Board (CPCB)** has identified 131 cities based on ambient air quality levels exceeding national ambient air quality standards, and cities with a million plus population.
- City specific Clean Air Action Plans **have been prepared and rolled out for implementation in these cities.**
- **These plans define time bound targets to control city specific air polluting sources** (soil & road dust, vehicles, domestic fuel, municipal solid waste burning, construction material and industries, etc.).

➤ **FAME Scheme:**

- **Faster Adoption and Manufacturing of Electric Vehicles (FAME)** phase-2 scheme has been rolled out.

Methane Emissions

Why in News?

Recently a study has been published titled- "Wetland emission and atmospheric sink changes explain methane

growth in 2020', which states that low nitrogen oxide pollution and warming wetlands likely **drove global methane emissions to record high levels in 2020.**

What are the Findings?

➤ **Overview:**

- Global methane emissions reached roughly 15 parts per billion (ppb) in 2020 from 9.9 ppb in 2019.
- In 2020, methane emissions from human activities decreased by 1.2 teragrams (Tg) per year.

➤ **Contributors:**

- Methane emissions from **oil and natural gas decreased by 3.1 Tg per year** compared to 2019. Contributions from coal mining decreased by 1.3 Tg per year. Fire emissions, too, dropped by **6.5 Tg per year.**
 - Globally, fire emissions appear to have fallen in 2020 compared to 2019, the researchers wrote in the study.
- Contributions from the **agricultural sector went up by 1.6 Tg per year.**
- Wetland emissions **rose by 6.0 Tg per year.**

➤ **Causes:**

- **Water-logged soils** make conditions ripe for soil microorganisms, **allowing them to produce more methane.**
- Nitrogen oxide levels fell by 6% in 2020 from 2019. Less nitrogen oxide pollution means less hydroxyl and more methane.
 - Nitrogen oxide enters the atmosphere from exhaust gasses of cars and trucks as well as electrical power generation plants.
 - Nitrogen oxide (NOx) **can impact methane levels.** In the troposphere — the upper part of the atmosphere — NOx combines with ozone to form hydroxyl radicals.
 - These radicals, in turn, remove 85 % of methane annually from the atmosphere.
 - The **contribution of hydroxyl radicals in removing methane decreased** by roughly 7.5 Tg per year.
 - Roughly **53 % of the methane growth can be attributed to lower hydroxyl sink**, and the remaining 47 % from natural sources, **predominantly wetlands.**

Note:

What is the Significance of the Study?

- It can help unravel a puzzle concerning **why globally methane increased when many other greenhouse gases like carbon dioxide decreased** during 2020.
- The results have **significant implications for our ability to reliably predict methane changes in a future world** with lower anthropogenic emissions of pollutants like nitrogen oxides and also if we have a wetter world.

What is Methane?

- **About:**
 - Methane is the **simplest hydrocarbon, consisting of one carbon atom and four hydrogen atoms (CH₄)**.
 - It is flammable, and is used as a fuel worldwide.
 - Methane is a powerful **greenhouse gas**.
 - Methane has more than **80 times the warming power of carbon dioxide** over the first 20 years of its lifetime in the atmosphere.
 - The common **sources of methane are oil and natural gas systems**, agricultural activities, coal mining and wastes.
- **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.

Kunming-Montreal Global Biodiversity Framework

Why in News?

Recently, at the 15th Conference of Parties (COP15) to the UN Convention on Biological Diversity “**Kunming-Montreal Global Biodiversity Framework**” (GBF) was adopted.

- GBF includes 4 goals and 23 targets for achievement by 2030.

- The U.N. biodiversity conference concluded in Canada’s Montreal.
- The first part of **COP 15 took place in Kunming, China and reinforced the commitment to address the biodiversity crisis and the Kunming Declaration** was adopted by over 100 countries.

What are the Key Targets of the GBF?

- **30x30 Deal:**
 - **Restore 30% degraded ecosystems** globally (on land and sea) by 2030.
 - **Conserve and manage 30% areas** (terrestrial, inland water, and coastal and marine) by 2030.
- **Stop the extinction of known species, and by 2050** reduce tenfold the extinction risk and rate of all species (including unknown).
- **Reduce risk from pesticides by at least 50% by 2030.**
- Reduce nutrients lost to the environment by at least 50% by 2030.
- **Reduce pollution risks and negative impacts of pollution** from all sources by 2030 to levels that are not harmful to biodiversity and ecosystem functions.
- **Reduce global footprint of consumption by 2030, including through significantly reducing overconsumption and waste generation and halving food waste.**
- **Sustainably manage areas under agriculture, aquaculture, fisheries, and forestry** and substantially increase agroecology and other biodiversity-friendly practices.
- Tackle climate change through nature-based solutions.
- Reduce the rate of introduction and establishment of invasive alien species by at least 50% by 2030.
- Secure the safe, legal and sustainable use and trade of wild species by 2030.
- Green up urban spaces.

What are the Other Major Outcomes of COP15?

- **Money for Nature:**
 - Signatories aim to **ensure USD200 billion per year is channelled to conservation initiatives, from public and private sources.**


Note:


- Wealthier countries should contribute at least USD20 billions of this every year by 2025, and at least USD30 billion a year by 2030.
- **Big Companies Report Impacts on Biodiversity:**
 - Companies should analyse and report how their operations affect and are affected by biodiversity issues.
 - The parties agreed to large companies and financial institutions being subject to “requirements” to make disclosures regarding their operations, supply chains and portfolios.
- **Harmful Subsidies:**
 - **Countries committed to identify subsidies that deplete biodiversity by 2025**, and then eliminate, phase out or reform them.
- They agreed to slash those incentives by at least USD500 billion a year by 2030 and increase incentives that are positive for conservation.
- **Monitoring and reporting progress:**
 - All the agreed aims will be supported by processes to monitor progress in the future, in a bid to prevent this agreement meeting the same fate as similar targets that were agreed in Aichi, Japan, in 2010, and never met.
 - **National action plans will be set and reviewed**, following a similar format used for greenhouse gas emissions under U.N.-led efforts to curb climate change. Some observers objected to the lack of a deadline for countries to submit these plans.


Decoding the 23 targets set at COP15

A total of 196 countries have signed a historic deal to protect 30% of the world for nature by 2030 in Montreal

REDUCING THREATS TO BIODIVERSITY	MEETING HUMAN REQUIREMENTS THROUGH SUSTAINABLE USE	TOOLS AND SOLUTIONS FOR IMPLEMENTATION AND MAINSTREAMING
1) Halting biodiversity loss: Bringing the loss of areas of high biodiversity importance close to zero, while respecting the rights of indigenous people 2) Effective restoration: At least 30% of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration 3) Mapping linkages: Sustainable use of above areas is consistent with conservation outcomes 4) Saving endangered species: Urgent steps to halt human induced extinction of threatened species; maintain their diversity through in situ and ex situ conservation 5) Protecting wild species: Sustainable, safe and legal use of wild species; preventing overexploitation 6) Invasive alien species: Mitigating their impacts by reducing rates of introduction by 50%; controlling them in priority sites such as islands 7) Tackling pollution: Reduce pollution risks to levels that are not harmful to biodiversity and ecosystem functions 8) Climate crisis: Minimise impact of climate change and ocean acidification through nature-based solutions	9) Serving humans: Ensure use of wild species yields benefits for humans, especially for those most dependent on biodiversity 10) Ecosystem productivity: Sustainable management of areas under agriculture, aquaculture, fisheries and forestry for resilience and long-term productivity 11) Handling nature's contributions: Restore, maintain and enhance nature's contributions to people through regulation of air, water, and climate 12) Biodiversity in urban fabric: Increase the area and quality and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas 13) Sharing genetic resources: Take effective legal, policy, administrative and capacity-building measures to ensure equal sharing of benefits of genetic resources	14) Policy-making: Integration of biodiversity and its values into policies across all levels of govt, other sectors 15) Legal perils for businesses: Regular assessments by transnational firms of their risks, dependencies, impacts on biodiversity; report on compliance with regulations 16) Making eco-friendly choices: Encouraging people to make sustainable consumption choices, reduce global footprint of consumption 17) Biosecurity measures: Adopting such steps for handling of biotechnology and distribution of its benefits 18) Removal of harmful incentives: Identify by 2025, and eliminate/reform incentives harmful for biodiversity; cut them by \$500 bn per year by 2030 19) Biodiversity finance: Increasing financial resources, mobilising \$200 billion per year by 2030 20) Technical cooperation: Strengthen capacity-building and development, access to and transfer of technology 21) Sharing knowledge: Access to information by decision makers, practitioners and public; access to technologies of indigenous peoples only with their consent 22) Equal representation: Ensuring equitable representation in decision-making 23) Gender based review: A gender-responsive approach by recognising women's rights and access to natural resources


 Monitored wildlife populations have seen a 69% drop on average since '70, say WWF, LPF


 Indigenous rights have been included in one-third of the new framework's targets


 Signatories aim to ensure \$200bn per year is channelled to conservation initiatives

How India Presented its Demands at the Conference?

- India called for an **urgent need to create a new and dedicated fund to help developing countries successfully implement a post-2020 global framework** to halt and reverse biodiversity loss.
 - So far, the **Global Environment Facility** which caters to multiple conventions, including the

UNFCCC and **UN Convention to Combat Desertification**, remains the only source of funding for biodiversity conservation.

- India also said that **conservation of biodiversity must also be based on 'Common but Differentiated Responsibilities and Respective Capabilities' (CBDR)** as climate change also impacts nature.
- According to India, **developing countries bear most of the burden of implementing the targets for**

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conserving biodiversity and, therefore, require adequate funding and technology transfer.

What is the Convention on Biological Diversity (CBD)?

- CBD is a legally binding treaty to conserve biodiversity that **has been in force since 1993** and has been ratified by 196 nations.
- It **sets out guidelines for countries to protect biodiversity**, ensure sustainable use, and promote fair and equitable benefit sharing.
- It aims at achieving a **historic deal to halt and reverse biodiversity loss on par with the 2015 Paris Agreement on climate change**.
- The **CBD Secretariat is based in Montreal, Canada**.
- The Parties (Countries) under CBD, **meet at regular intervals and these meetings are called Conference of Parties (COP)**.
- In 2000, a supplementary agreement to the **Convention known as the Cartagena Protocol on Biosafety** was adopted. It came into force on 11th September 2003.
 - The Protocol seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology.
- The **Nagoya Protocol** on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) was adopted in 2010 in **Nagoya, Japan at COP10**. It entered into force on 12th October 2014.
 - It not only applies to genetic resources that are covered by the CBD, and to the benefits arising from their utilization but also covers traditional knowledge (TK) associated with genetic resources that are covered by the CBD and the benefits arising from its utilization.
- The **COP-10 also adopted a ten-year framework for action** by all countries to save biodiversity. Officially known as **"Strategic Plan for Biodiversity 2011-2020"**, it provided a set of 20 ambitious yet achievable targets collectively known as the **Aichi Targets for biodiversity**.
- India enacted **Biological Diversity Act in 2002** for giving effect to the provisions of the CBD.

Tal Chhappar Sanctuary

Why in News?

Recently, the famous **Tal Chhappar Blackbuck Sanctuary in Churu, Rajasthan** received a **protective cover** against a proposed move of the State government to reduce the size of its **Eco Sensitive Zone (ESZ)**.

The **World Wildlife Fund for Nature (WWF)** has also **taken up a major project for the conservation of raptors** in the sanctuary, spread in an area measuring 7.19 sq. Km.



What are the Key Facts about Tal Chhappar Sanctuary?

- About:
 - The Tal Chhappar Sanctuary is situated on the **border of the Great Indian Thar Desert**.
 - Tal Chhappar is a **distinctive shelter** of the most graceful Antelope seen in India, **"the Blackbuck"**.
 - It was given the **status of a sanctuary in 1966**.
 - Tal Chhappar was a **hunting reserve of the erstwhile royal family of Bikaner**.
 - The **"Tal"** word is Rajasthani word means **plane land**.
 - This Sanctuary has **nearly flat territory and combined thin low-lying region**. It has got **open and wide grasslands** with spread **Acacia and Prosopis plants** that offer it a look of a **characteristic Savanna**.
- Fauna:
 - Tal Chhappar is an **ideal place to see Blackbucks** which are more than a thousand in number here. It is a **good place to see the desert animals and reptile species**.

Note:

- The sanctuary is host to about **4,000 blackbucks**, **over 40 species of raptors** and **more than 300 species of resident and migratory birds**.
- Migratory birds in the sanctuary are **harriers**, **eastern imperial eagle**, **tawny eagle**, **short-toed eagle**, sparrow, and little green bee-eaters, black ibis and demoiselle cranes. Other than that, skylarks, crested larks, ring doves, and brown doves can be seen throughout the year.

What are Blackbucks?

- **About:**
 - The **Blackbuck (*Antelope cervicapra*)**, or the **Indian Antelope**, is a species of antelope **native to India and Nepal**.
 - It is widespread in Rajasthan, Gujarat, Madhya Pradesh, Tamil Nadu, Odisha, and other areas throughout peninsular India.
 - It is **considered as the epitome of grassland**.
 - The blackbuck is a **diurnal antelope (active mainly during the day)**.
 - It has been **declared as the State Animal** of Punjab, Haryana, and Andhra Pradesh.
 - **Cultural Importance:** It is a **symbol of purity for Hinduism** as its skin and horns are regarded as a sacred object. For **Buddhism**, it is a symbol of **good luck**.
- **Protection Status:**
 - **Wildlife Protection Act 1972:** Schedule I
 - **IUCN Status:** Least Concern
 - **CITES:** Appendix III
- **Threat:**
 - Habitat Fragmentation, Deforestation, Natural Calamities, Illegal Hunting.
- **Related Protected Areas:**
 - Velavadar Blackbuck Sanctuary - Gujarat
 - Point Calimere Wildlife Sanctuary - Tamil Nadu
 - In 2017, the **Uttar Pradesh** State Government approved the plan of setting up the **Blackbuck Conservation Reserve** in the trans-Yamuna belt near Prayagraj. It would be the first conservation reserve dedicated to the blackbuck.

What are Eco-Sensitive Zones (ESZs)?

- ESZs are **areas notified by the Ministry of Environment, Forest, and Climate Change (CC)**, under the **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.
- In June, 2022, the **Supreme Court** directed that every protected forest, national park and wildlife sanctuary across the country should **have a mandatory eco-sensitive zone (ESZ) of a minimum one km** starting from their demarcated boundaries.

Butterflies Adaptation and Evolution Processes

Why in News?

A new study has **thrown light on many interesting aspects of butterflies' adaptation and evolution processes**.

- The study was conducted on several species of butterflies and their imitative traits in the **Western Ghats** in Karnataka.

What are the Highlights of the Study?

- The findings were categorised into three:
 - **Model Species:** Those that are toxic to predators.
 - **Batesian Mimicry Species:** Those that evolved traits of unpalatable species (poisonous) to avoid predators.
 - **Non-mimetic Species:** Those that are closely related to Batesian mimics but did not evolve mimicry trait.
- The unpalatable one is called models and the palatable one is called mimics.
- **Butterflies that have evolved to make use of mimicry** evolve faster than the species that don't make use of mimicry.
- Batesian mimics adapt to avoiding predators by **evolving similar wing colour patterns and flight behaviours**.
- Analyses revealed that **not only had colour patterns evolved at a much faster rate**, but that members of mimetic communities had evolved at a faster rate than their close relatives.
 - Butterflies exhibit a wide range of colours and colour patterns, suggesting that the **genetic architecture underlying wing patterns and colour pigments** are relatively malleable and susceptible to change.

Note:



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Cryomesh and Frozen Coral

Why in News?

While working on Australia's **Great Barrier Reef**, scientists have successfully trialed a new method for **freezing and storing coral** in their first trial.

What is the Need for Freezing Coral?

- As rising ocean temperatures destabilize the delicate ecosystems of Coral, therefore scientists are striving to **protect coral reefs**.
- The Great Barrier Reef has suffered **four bleaching events in the last seven years**, including the first-ever bleach during a **La Niña phenomenon**, which typically brings cooler temperatures.
- Scientists used the cryomesh to **freeze coral larvae at the Australian Institute of Marine Sciences (AIMS)**.

What is the Methodology of Freezing Coral?

- **Cryomesh:**
 - Cryomesh was devised by a team from the University of Minnesota's College of Science and Engineering.
 - This is lightweight and can be manufactured cheaply.
 - It better **preserves coral and has the properties of cryoplates**.
 - The mesh technology will help store coral larvae at -196°C (-320.8°F).
- **Significance:**
 - This cryogenically frozen coral **can be stored and later reintroduced to the wild**.
 - But current **process requires sophisticated equipment** including lasers, however a new lightweight "**cryomesh**" **can be manufactured cheaply and better preserves coral**.

Stubble Burning

Why in News?

According to the **Commission for Air Quality Management (CAQM)**, fire count from **Stubble Burning** in Delhi and the **NCR (National Capital Region)** has reduced by 31.5% in 2022 as compared to 2021.

- As compared to 2021, stubble burning decreased in Punjab, Haryana, and Uttar Pradesh by 30%, 47.60%, and 21.435% respectively in 2022. The fire counts are based on information from **NASA (National Aeronautics and Space Administration)** Satellites.

What caused the Reduction in Stubble Burning?

- State governments went for **both in-situ and ex-situ management and a special campaign** was started to honour the farmers **who did not burn stubble**.
 - **In-Situ Treatment of Stubble:** For example, crop residue management by zero-tiller machine and Use of bio-decomposers (e.g., **Pusa bio-decomposer**).
 - **Ex-Situ (off-site) Treatment:** For example, Use of rice straw as cattle fodder.
- About **10 million tonnes of straw had been managed through in-situ management**, which is about 25% more than last year in Punjab.
 - Similarly, 1.8 million tonnes of straw had been managed through the ex-situ method, which is more than 33% over the previous year.
- Punjab had chalked out an **action plan for three years**, which has been shared with the central government.

What is Stubble Burning?

- **About:**
 - Stubble (parali) burning is a **method of removing paddy crop residues** from the field to sow wheat from the last week of September to November, coinciding with the withdrawal of **southwest monsoon**.
 - Stubble burning is a **process of setting on fire the straw stubble**, left after the harvesting of grains, like paddy, wheat, etc. It is usually required in areas that use the combined harvesting method which leaves crop residue behind.
 - It is a **common practice in October and November across North West India**, but primarily in Punjab, Haryana, and Uttar Pradesh.
- **Effects of Stubble Burning:**
 - **Pollution:**
 - Emits large amounts of toxic **pollutants in the atmosphere which contain harmful gases like methane (CH₄), Carbon Monoxide (CO),**

Note:



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Volatile Organic compounds (VOC) and carcinogenic polycyclic aromatic hydrocarbons.

- These pollutants disperse in the surroundings, may undergo a physical and chemical transformation and eventually adversely affect human health by causing a thick blanket of smog.
- **Soil Fertility:**
 - Burning husk on the ground destroys the nutrients in the soil, making it less fertile.
- **Heat Penetration:**
 - The heat generated by stubble burning penetrates into the soil, leading to the loss of moisture and useful microbes.
- **Alternatives to Stubble Burning:**
 - **Use of Technology-** For example Turbo Happy Seeder (THS) machine, which can uproot the stubble and also sow seeds in the area cleared. The stubble can then be used as mulch for the field.

What is Other Related Initiative?

- The State Governments of Punjab, National Capital Region (NCR) States and the Government of National Capital Territory of Delhi (GNCTD) have developed **detailed monitorable action plans** based on the framework by the CAQM to tackle the problem of air pollution.

What is CAQM?

- CAQM is a **statutory body** formed under the **Commission for Air Quality Management in National Capital Region and Adjoining Areas, Act 2021**.
 - Earlier, the commission was formed through the promulgation of the Commission for Air Quality Management in National Capital Region and Adjoining Areas Ordinance, 2021.
- The Commission for Air Quality Management in the **National Capital Region and Adjoining Areas, Act 2021** also dissolved the Environment Pollution Prevention and Control Authority (EPCA) established in the NCR in 1998.
- It has been set up for **Air Quality Management in National Capital Region and Adjoining Areas** for better co-ordination, research, identification and resolution of problems surrounding the air quality index and for matters connected therewith or incidental thereto.

Global Water Resources Report 2021: WMO

Why in News?

Recently, **WMO (World Meteorological Organization)** has released its first annual **State of Global Water Resources Report 2021**.

What is this Report About?

- The aim of this annual report is to **support monitoring and management of global freshwater resources** in an era of growing demand and limited supplies.
- The report **focuses on three major areas:**
 - **Streamflow**, the volume of water flowing through a river channel at any given time.
 - **Terrestrial water storage (TWS)** — all water on the land surface and in the sub-surface.
 - **The cryosphere** (frozen water).

What are the Findings of the Report?

- **Overview:**
 - Between 2001 and 2018, UN-Water reported that a **staggering 74% of all natural disasters were water-related**.
 - The recent UN climate change conference, **COP27**, in Egypt, urged governments to further **integrate water into adaptation efforts**, the first-time water has been referenced in a COP outcome document in recognition of its critical importance.
 - **3.6 billion people have inadequate access to water at least one month per year** and this is expected to increase to more than five billion by 2050.
 - Large areas of the **globe recorded drier-than-normal conditions in 2021**, which was a year in which precipitation patterns were **influenced by climate change and a La Niña event**.
 - The area with below-average streamflow was **approximately two times larger than the above-average area**, in comparison to the 30-year hydrological average.

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➤ Region wise Streamflow:

- **Drought:** Areas that were unusually dry included **South America's** Rio de la Plata area, where a persistent **drought** has affected the region since 2019.
- **Below Normal:** In Africa, major rivers such as the Niger, Volta, Nile and Congo had **below-average water flow in 2021**. The same trend was observed in **rivers in parts of Russia, West Siberia and in Central Asia**.
- **Above Normal:** On the other hand, there were **above-normal river volumes in some North American basins**, the North Amazon and South Africa, as well as in China's Amur River basin, and northern India.

➤ Terrestrial Cover:

- **Below Normal:** Aside from river flow variations, **overall terrestrial water storage was classified as below normal** on the west coast of the United States, in central South America and Patagonia, North Africa and Madagascar, Central Asia and the Middle East, Pakistan and North India.
- **Above Normal:** It was **above normal in Central Africa**, northern South America – specifically the Amazon Basin – and northern China.

➤ Cryosphere:

- Mountains are often called natural “water towers” because they are the source of **rivers and freshwater supplies for an estimated 1.9 billion people**.
- Changes to **cryosphere water resources affect food security**, human health, ecosystem integrity and maintenance, and lead to significant impacts on economic and social development.

What is the Scenario of India?

- There is more evidence of the **worsening impact of global warming on the Indo-Gangetic Plain (IGP)** that straddles eastern Pakistan, northern India, southern Nepal and the whole of Bangladesh.
- The Ganga-Brahmaputra and Indus basins that form the Plain, recorded more **water flowing in the river channels due to glacial melt** even as their total water storage declined in 2021.
- This will be **extremely worrying news since the IGP supports nearly half a billion people** across the four countries.

Green Cooling Solutions in India by 2040

Why in News?

According to the report ‘**Climate Investment Opportunities in India's Cooling Sector**’ released by the **World Bank Group**, investment opportunities in India's cooling sector through less carbon-intensive technologies could add up to USD 1.6 trillion.

What are the Highlights of the Report?

- The report analyzed the **India Cooling Action Plan (ICAP)** launched in 2019 and came up with suggestions for prioritizing the government's investment opportunities in the cooling sector.
- The report does not focus on air conditioning because only 40% of Indians will have air conditioning by 2040 — which is currently around 8% — and the rest for whom passive cooling technologies have to be the focus.
- Investment opportunities across three different sectors — **construction, cold chains and refrigerants** — have the potential to **reduce greenhouse gas (GHG) emissions** significantly and also **create nearly 3.7 million jobs**.
- Around 34 million people in the country **might lose their jobs because of heat stress** and subsequent decline in productivity.
- The world is already **on a path where there would be many more intense heat waves** like the one India witnessed in 2022
- Heat stress is set to increase drastically in a world **on its way to a two-three degree rise in temperatures**.

What are the Recommendations?

- **Sustainable Space Cooling:**
 - Sustainable space cooling solutions may **reduce annual GHG emissions by 213 metric tonnes** of carbon dioxide equivalent by 2040.
 - This can be achieved by **increasing the efficiency of cooling technologies** — air conditioners, ceiling fans and chillers — which can save 30% energy by 2037-38.

Note:



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- **Passive Cooling Strategies:**
 - Passive cooling strategies for buildings in cities can reduce **energy usage by 20-30% by 2038**.
 - A drop in the temperature of a building by one degree Celsius **could lower peak electricity demand** for cooling by two-four per cent.
- **Thermal Comfort:**
 - Government should include a thermal **comfort programme** in its affordable housing Programme, **Pradhan Mantri Awas Yojana (PMAY)**.
 - Thermal comfort through passive cooling technologies in these households could benefit over **11 million urban households and 29 million households in rural areas** that the government wants to construct.
- **District Cooling Systems (DCS):**
 - DCS are centralized cooling techniques **for clusters of buildings** instead of individual buildings, which is much more efficient.
 - District cooling should be made **mandatory for real estate complexes** that are of high density.
 - DCS generates chilled water in a central plant **which can then be distributed to multiple buildings** via underground insulated pipes.
- **Cold Chain and Refrigeration:**
 - It is suggested to use concessional finance from Multilateral Development Banks like the World Bank for investments in **strategies to plug the gaps in the cold chain distribution networks**.
 - Such investments can help **reduce food loss by about 76%** and decrease carbon emissions by 16%.

What is ICAP?

- It seeks to **recognize “cooling and related areas”** as a thrust area of research under the National S&T Programme.
- It is part of India’s national strategy for cooling, whose objective is to reduce country-wide demand for cooling **by 25 % by 2037-2038**.
- It also seeks to reduce cooling energy requirements by 25% to 40% by 2037-38.
- Training and certification of 1,00,000 servicing sector technicians by 2022-23, in synergy with **Skill India Mission**.

State of Finance for Nature Report

Why in News?

Recently, the second edition of the State of Finance for Nature report was released.

- The report was released jointly by the **UN Environment Programme (UNEP)** along with the Economics of Land Degradation initiative of the Federal Ministry for Economic Cooperation and Development (BMZ) of Germany, the **United Nations Convention to Combat Desertification (UNCCD)** and the European Commission.

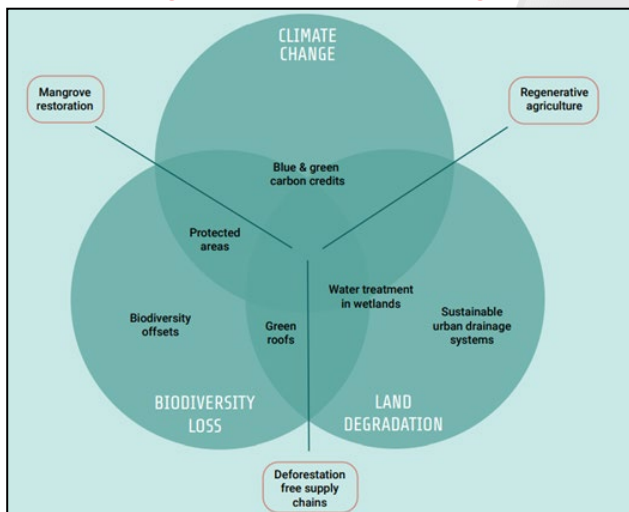
What are the Findings of the Report?

- **Current Financial Flows:**
 - Current public and private financial flows to NbS **are estimated to be USD 154 billion per year**.
 - Public funds make up 83% of the total and the private sector contributes approximately 17%.
- **Changes in NbS Finance Flows:**
 - Total finance flows to NbS have **increased by USD 3.9 billion from USD 150 billion (SFN 2021) to USD 154 billion per year**.
 - This represents year-on-year growth in investment of 2.6% in real terms across the sum of public and private financial flows.
- **Investment in Marine NbS and Protected Areas:**
 - **SFN 2022 broadened the scope by including marine nature-based solutions** and detailed assessment of protected area finance.
 - **Finance flows to marine NbS are roughly USD 14 billion**, 9% of total (terrestrial and marine).
 - Annual domestic government expenditure in marine NbS is over USD 10 billion per year, including spending on marine protected areas, sustainable management of fisheries and research and development of fisheries.
- **Nature-negative Financial Flows:**
 - Public financial support for nature-negative activities ranges from USD 500 to 1,100 billion per year at present, which is three to seven times larger than current investments in NbS.

Note:

What is Nature-based Solution(NbS)?

- The **NbS** refers to sustainable management and use of nature to tackle socio-environmental challenges, which range from disaster risk reduction, climate change and biodiversity loss to food and water security as well as human health.
- **NbS creates harmony between people and nature**, enables ecological development and represents a holistic, people-centred response to climate change.
 - Thus, NbS underpin the **Sustainable Development Goals**, as they support vital ecosystem services, biodiversity, and access to fresh water, improved livelihoods, healthy diets and food security (organic agriculture) from sustainable food systems.
 - Also, NbS are an essential component of the overall global effort to achieve the goals of the **Paris Agreement on Climate Change**.



Binturong

Why in News?

The police and forest officials in **Manipur's Ukhrul town** have been scanning "gambling dens" following reports of **wild animals (dead or alive)** such as **Binturong** being offered as prizes for raffle draws (a lottery in which the prizes are goods rather than money).

- Different types of birds such as the grey-sided thrush and tragopans (often called horned pheasants) have also been spotted.
- Blyth's tragopan is the **State bird of Nagaland**.

What are the Key Facts about Binturong?

- **About:**
 - Binturong, (*Arctictis binturong*), also called bear cat or cat bear, catlike omnivore of the civet family (Viverridae), found in dense forests of Southeast Asia.
 - It has long shaggy hair, tufted ears, and a long, bushy, prehensile tail. The colour generally is black with a sprinkling of whitish hairs.
 - The binturong is **principally nocturnal and crepuscular** (that is, active during twilight).
 - It is found most often among the trees, using its prehensile tail as an aid in climbing. It feeds mainly on fruit, such as figs, but it also takes eggs and small animals.
 - In some areas binturongs are tamed and have been reported as being affectionate pets.
- **Distribution:**
 - Its **range extends from Nepal, India, and Bhutan southward to the Indonesian islands of Sumatra and Java** and eastward to Borneo.
- **Conservation:**
 - **IUCN Red List:** Vulnerable
 - **CITES listing:** Appendix III
 - **Indian Wildlife Protection Act, 1972:** Schedule I

What are the Key Facts about Blyth's Tragopan?

- **Distribution:**
 - Bhutan, China, India, Myanmar.
- **Conservation:**
 - **IUCN Red List:** Vulnerable
 - **CITES listing:** Appendix I
 - **Indian Wildlife Protection Act, 1972:** Schedule I

Pharmaceutical Pollution

Why in News?

According to a research paper, **Pharmaceutical Pollution** is an **overlooked but urgent issue** that needs coordinated action from across the pharmaceutical, healthcare and environmental sectors.

- **Almost half, or 43% of the world's rivers are contaminated** with active pharmaceutical ingredients in concentrations that can have disastrous ramifications on health.

Note:

What is Pharmaceutical Pollution?

➤ About:

- **Pharmaceutical** plants are often incapable of filtering out all the chemical compounds used in their manufacturing process and as such, the chemicals will seep into the surrounding freshwater systems and eventually into the oceans, lakes, streams, and rivers.
- **Wastewater** from pharmaceutical manufacturers is also sometimes discharged into open fields and nearby water bodies, thereby increasing the pharmaceutical waste or their by-product load in the environment, landfills, or dumping areas. All this is basically known as pharmaceutical pollution.

➤ Effects:

- **Effects on Fish and Aquatic Life:**
 - Estrogen found in birth control pills and postmenopausal hormone treatments, have a feminizing effect on male fish and can alter female-to-male ratios.
- **Disruption of Sewage Treatment Process:**
 - Antibiotics present in the sewage treatment systems can, therefore, inhibit the activities of the sewage bacteria, and therefore seriously affect the organic matter decomposition.
- **Effect on Drinking Water:**
 - Chronic exposure to these compounds could result in serious health issues.
- **Long-term Effects on the Environment:**
 - Some pharmaceutical compounds can persist for long in the environment and in water supplies.
 - These bioaccumulate, enter a cell and move up food chains, becoming more concentrated in the process. This can have disastrous effects on life and environment, in the long run.

What is the Status of Pharmaceutical Pollution in India?

➤ World's Third-Largest Producer:

- India is the world's third-largest producer of pharmaceuticals, in which about 3000 drug companies and about 10500 manufacturing units are involved.

➤ Bulk Drug Capital of India:

- In India, the dominant pharma industries are located in the city of Hyderabad (known as the 'Bulk Drug Capital of India').
- It accounts for more than about 800 pharma/biotech units.

➤ Multi-Drug Resistance Infections:

- It has been estimated that about 60000 newborns die annually in India because of multidrug-resistance infections, where pharmaceutical water pollution with antimicrobial drugs is responsible for that.

What are the Related Government Initiatives?

➤ National Action Plan for Antimicrobial Resistance

2017: It was proposed to tackle the problem related to limits on antibiotics in industrial waste.

- **Zero Liquid Discharge Policy:** Central Pollution Control Board (CPCB) has introduced guidelines to various pharma industries to achieve zero liquid discharge.

➤ Around 86 of the 220 bulk drug makers in Hyderabad have zero liquid discharge facilities, which showed that they could recycle almost all the liquid effluent.

- **Continuous Monitoring of Effluents:** The Ministry of Environment, Forest, and Climate Change (MoEFCC) has also announced that industries must install devices to monitor the effluent continuously.

Three Himalayan Medicinal Plants Enter IUCN Red List

Why in News?

Three medicinal plant species (*Meizotropis pellita*, *Fritillaria cirrhosa*, *Dactylorhiza hatagirea*) found in the Himalayas have been added to the IUCN Red List of Threatened Species following a recent assessment.

- This assessment in the Himalayan region shows deforestation, habitat loss, forest fires, illegal trade and climate change pose a serious threat to the species. The fresh data is expected to aid conservation efforts in the region.

Note:

What are the Key Highlights of these Species?

➤ Meizotropis pellita:

○ About:

- It is **commonly known as Patwa**, is a perennial shrub with a **restricted distribution that is endemic to Uttarakhand**.

○ Enlisting in IUCN:

- The study stated that the **species is listed as 'critically endangered'** based on its limited area of occupancy (less than 10 sq. km).
- The species is **threatened by deforestation, habitat fragmentation and forest fires**.

○ Significance:

- The essential oil extracted from the leaves of the species possesses **strong antioxidants** and can be a **promising natural substitute for synthetic antioxidants in pharmaceutical industries**.

➤ Fritillaria cirrhosa:

○ About:

- It is **commonly known as Himalayan fritillary**, is a perennial bulbous herb.

○ Enlisting in IUCN:

- Considering the rate of decline, long generation length, poor germination potential, high trade value, extensive harvesting pressure and illegal trade, the **species is listed as 'vulnerable'**.

○ Significance:

- In China, the species is used for the treatment of bronchial disorders and pneumonia. The plant is also a **strong cough suppressant and a source of expectorant drugs** in traditional Chinese medicine.

➤ Dactylorhiza hatagirea:

○ About:

- It is **commonly known as Salampanja**, is a perennial tuberous species endemic to the Hindu Kush and Himalayan ranges of Afghanistan, Bhutan, China, India, Nepal, and Pakistan.

○ Enlisting in IUCN:

- It is threatened by habitat loss, livestock grazing, deforestation, and climate change, **the species is listed as 'endangered'**.

○ Significance:

- It is **extensively used in Ayurveda, Siddha, Unani** and other alternative systems of medicine to cure dysentery, gastritis, chronic fever, cough and stomach aches.

NMCG & Namami Gange Programme

Why in News?

Recently, the Union Minister for Jal Shakti chaired the **10th meeting of the Empowered Task Force (ETF) of National Mission for Clean Ganga (NMCG)**.

- As part of its flagship **Namami Gange programme**, the Union government has shifted its focus from improving sanitation to conservation, tourism, and economic development of the Ganga River.

What are the Recent Developments in Ganga Rejuvenation?

- Ministry of Tourism working on a **comprehensive plan for development of tourism circuits** along Ganga in line with **Arth Ganga**.
 - 'Arth Ganga' implies a sustainable development model with a focus on economic activities related to Ganga.
- Exhibitions & Fairs across 75 towns along Ganga River planned as part of **Azadi ka Amrit Mahotsav**.
- Ministry of Agriculture & Farmers' Welfare (MoA&FW) **undertaking various steps to build organic farming and natural farming** corridors along River Ganga
 - Eco-agriculture being promoted** besides efforts to improve water-use efficiency in Ganga villages by MoA&FW.
- Ministry of Housing and Urban Affairs focusing on mapping of urban drains and **management of solid and liquid waste in Ganga towns** under **SBM 2.0** and **AMRUT 2.0**.
- The **Ministry of Environment, Forests and Climate Change** mulling scaling up of afforestation activities in the Ganga belt and a detailed plan to take **'Project Dolphin'** forward is also underway.

What is NMCG?

➤ About:

- It is being implemented by the National Council for Rejuvenation, Protection and Management of

Note:



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River Ganga also known as the **National Ganga Council**.

- This mission was established on 12th August 2011 under the **Societies Registration Act, 1860** as a registered society.

➤ **Objectives:**

- The mission **incorporates rehabilitating and boosting the existing STPs (Sewage Treatment Plants)** and instant short-term steps to curb pollution at exit points on the riverfront in order to check the inflow of sewage.
- To **maintain the continuity of the water flow** without changing the natural season variations.
- To **restore and maintain the surface flow and groundwater**.
- To regenerate and maintain the natural vegetation of the area.
- To conserve and **regenerate the aquatic biodiversity** as well as the riparian biodiversity of the river Ganga basin.
- To allow participation of the public in the process of protection, rejuvenation and management of the river.

What is Namami Gange Programme?

➤ **About:**

- Namami Gange Programme is an Integrated Conservation Mission, **approved as a 'Flagship Programme' by the Union Government in June 2014** to accomplish the twin objectives of effective abatement of pollution and conservation and rejuvenation of National River Ganga.
- It is being operated under the Department of Water Resources, River Development and Ganga Rejuvenation, **Ministry of Jal Shakti**.
- The program is being **implemented by the NMCG and its state counterpart organizations** i.e State Program Management Groups (SPMGs).
- In **phase 2 of Namami Gange Programme (2021-26)**, the states will focus on expeditious completion of projects and preparation of bankable Detailed Project Report (DPR) for projects in Ganga tributary towns, cutting down delays.
 - Focus is also being given to the **revival of small rivers and wetlands**.
 - For future, each Ganga district is to develop scientific plan and health card for at least 10

wetlands and adopt policies for reuse of treated water and other by products.

➤ **Main Pillars:**

- Sewage Treatment Infrastructure
- River-Front Development
- River-Surface Cleaning
- Biodiversity
- Afforestation
- Public Awareness
- Industrial Effluent Monitoring
- Ganga Gram

What are the Other Related Initiatives?

- **Ganga Action Plan:** It was the first River Action Plan that was taken up by the Ministry of Environment, Forest and Climate Change in 1985, to improve the water quality by the interception, diversion, and treatment of domestic sewage.
 - The National River Conservation Plan is an extension to the Ganga Action Plan. It aims at cleaning the Ganga river under Ganga Action Plan phase-2.
- **National River Ganga Basin Authority (NRGBA):** It was formed by the Government of India in the year 2009 under Section-3 of the Environment Protection Act, 1986.
 - It declared the Ganga as the 'National River' of India.
- **Clean Ganga Fund:** In 2014, it was formed for cleaning up of the Ganga, setting up of waste treatment plants, and conservation of biotic diversity of the river.
- **Bhuvan-Ganga Web App:** It ensures involvement of the public in monitoring of pollution entering into the river Ganga.
- **Ban on Waste Disposal:** In 2017, the **National Green Tribunal** banned the disposal of any waste in the Ganga.

Indo-French Partnership on Kaziranga Project

Why in News?

India and France are collaborating on **Kaziranga Project**.

Note:



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- **Agence Française de Développement (AFD) of France has committed funding of €80.2 million for a 10-year period, between 2014-2024.**

What is Kaziranga Project?

- The **Kaziranga project is a part of a larger Assam Project on Forest and Biodiversity Conservation (APFBC).**
 - The Assam government, with the support of AFD, launched the **APFBC in 2012**, to restore forest ecosystems, protect wildlife and enhance the livelihood of the forest-dependent communities.
- The project conceptualised the **reforestation of 33,500 hectares of land and the training of 10,000 community members** in alternate livelihoods by 2024.

What are Key Facts about Kaziranga National Park?

- **Location:**
 - It is located in the State of Assam and covers **42,996 Hectare (ha).**
 - It is the **single largest undisturbed and representative area** in the Brahmaputra Valley floodplain.
- **Legal Status:**
 - It was declared as a **National Park in 1974.**
 - It has been declared a **tiger reserve since 2007.** It has a total tiger reserve area of 1,030 sq km with a core area of 430 sq. km.
- **International Status:**
 - It was declared a **UNESCO World Heritage Site** in 1985.
 - It is recognized as an Important Bird Area by BirdLife International.
- **Biodiversity:**
 - It is the home of the **world's most one-horned rhinos.**
 - **Pobitora Wildlife Sanctuary** has the highest density of one-horned rhinos in the world and second highest number of Rhinos in Assam after Kaziranga National Park.
 - Much of the focus of conservation efforts in Kaziranga are **focused on the 'big four' species - Rhino, Elephant, Royal Bengal tiger and Asiatic water buffalo.**

- Kaziranga is also home to **9 of the 14 species** of primates found in the Indian subcontinent.

Rivers and Highways:

- National Highway 37 passes through the park area.
- The park also has more than 250 seasonal water bodies, besides the Diphlu River running through it.

Global Status of Black Soils: FAO

Why in News?

The **Food and Agriculture Organization (FAO)** marked **World Soil Day 2022 (5th December)** with the launch of its first **Global Status on Black Soils**, which are at greater risk than ever due to the climate crisis, biodiversity loss and land use change.

What are the Findings?

➤ Significance of Black Soil:

- The ability of the soils to remove carbon from the atmosphere and lock it up in soil organic matter (called **carbon sequestration**) has been proposed as an important solution to mitigate human-induced climate change.
- The inherent fertility of the soils **makes them the food basket for many countries and are considered essential** to the global food supply.
- Black soils have the **potential to provide 10% of the total Soil Organic Carbon (SOC) sequestration globally** if they receive proper attention.
 - Europe and Eurasia have the **highest potential at over 65%** and Latin America and the Caribbean at around 10%.
- However, despite representing a small portion of the world's soils, **black soils were key for food security** and the global economy.

➤ Status of Black Soils:

- Black soils are quickly **losing their SOC stocks.** They have lost 20 to 50% of their original SOC stock, with the carbon being released into the atmosphere mostly as **carbon dioxide**, exacerbating **global warming.**

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- **Causes of Losses in Black Soil:**
 - Land-use change, unsustainable management practices **erosion processes**, as well as nutrient imbalances, acidification and biodiversity loss and excessive use of agrochemicals are to blame.
- **Food and Fertilizer Crisis:**
 - Smallholder farmers, particularly from vulnerable countries across Africa, Latin America and Asia, **lack access to organic and inorganic fertilizers** and are currently facing a 300% increase in fertilizer prices.
 - Today, reduced availability and soaring fertilizer prices are driving increased food prices and food insecurity.
- **Suggestions:**
 - Preserving natural vegetation on black soils such as grasslands, forests and wetlands and adopting sustainable soil management approaches on cropped black soils are needed.
 - There is a need to work together to **produce safe, nutritious and micronutrient-rich food in a sustainable way** that avoids soil degradation, reduces greenhouse gas emissions and decreases agrifood systems pollution."

What is Black Soil?

- Black soils are characterised by a **thick, dark-coloured soil horizon rich in organic matter**.
 - They are found in Russia (327 million hectares), Kazakhstan (108 M ha), China (50 M ha), Argentina, Mongolia, Ukraine etc.
- Black soils are extremely **fertile and can produce high agricultural yields** due to their elevated moisture storage capacity.
- Black soils are **rich in iron, lime, calcium, potassium, aluminum and magnesium** but **deficient in nitrogen, phosphorous**.
- They constitute 5.6 % of global soils and contain 8.2 % of the world's **SOC stocks**, approximately **56 billion tonnes of carbon**.
 - Soil organic carbon is a **measurable component of soil organic matter**, which makes up just **2–10% of most soil's mass and has an important role in the physical, chemical and biological function** of agricultural soils.
 - SOC refers **only to the carbon component** of organic compounds.

- With their inherent fertility, they are the **food basket for many countries and are considered essential to the global food supply**.

What is World Soil Day (WSD)?

- It was recommended by the **International Union of Soil Sciences (IUSS) in 2002**.
- The **FAO** has supported the formal establishment of WSD as a global awareness-raising platform under the leadership of the Kingdom of Thailand within the framework of the Global Soil Partnership.
- 5th December 2014 was designated as the first official WSD by the **UN General Assembly (UNGA)**.
 - The day was chosen because it corresponds with the official birthday of H.M. King Bhumibol Adulyadej, the King of Thailand, who officially sanctioned the event.
- World Soil Day **enjoins individuals to consider sustainably managing soil resources**. The main goal of the day is to increase public awareness of the significant environmental issues that soil degradation can lead to, such as erosion, the loss of organic matter, and a drop in soil fertility.
- The **theme** for World Soil Day 2022 is "Soils, where food begins".

What are the Initiatives to Improve Soil Health?

- **Soil Health Card Scheme**
- **Organic Farming**
- **Paramparagat Krishi Vikas Yojana**
- **Fertilizer Self-Sufficiency**
- **Digital Agriculture**
- **Carbon Farming**
- The Nutrient Based Subsidy (NBS) Scheme

Biodiversity Framework & Indigenous People

Why in News?

Recently, at the 15th Conference of Parties (COP15) to the **United Nations Convention on Biological Diversity (CBD)**, a group representing **indigenous people** stressed that the **Post-2020 Global Biodiversity Framework (GBF)**

Note:

must work on respecting, promoting and supporting the rights of **indigenous peoples and local communities (IPCL)**.

- Members of the **International Indigenous Forum on Biodiversity (IIFB)** have also stressed upon the rights of indigenous people.

What are the Key Areas Stressed by Indigenous People?

- The rights of indigenous peoples and local communities, who have always been the **most effective guardians of biodiversity**, also need to be recognised and protected.
- The framework should follow a “**human rights-based approach**”, by respecting, protecting and fulfilling the rights, and particularly indigenous and collective rights, and **gender equity**” by actively seeking ways to support and promote indigenous communities and their rights.
- The implementation of the post-2020 GBF must include **traditional knowledge**, practices and technologies while respecting the principles of free, prior and informed consent.

What is the Role of Indigenous People in Biodiversity Conservation?

- **Conserving Natural Flora:**
 - The **magico-religious belief** of plants’ tribal communities as a god and goddess habitat leads to their conservation in their natural habitat.
 - Further, a wide variety of plants such as crop plants, wild fruits, seeds, bulb, roots and tubers are **conserved by the ethnic and indigenous people** as they have to depend on these sources for edible purposes.
- **Application of Traditional Knowledge:**
 - Indigenous people and biodiversity **complement each other**.
 - Over time, the rural communities have gathered a **pool of indigenous knowledge** for the **cultivation of the medicinal plants** and their propagation.
 - These plants conserved are **antidotes to snake bites** and **scorpion bites** or even for **broken bones** or **orthopaedic** treatments.

Conserving the Sacred Groves:

- India’s ethnic people have played a vital role in **preserving the biodiversity** of several virgin forests and have conserved flora and fauna in sacred groves of tribals.

What are the Difficulties Faced by Indigenous People?

- Disruption After Designation of the Status of World Heritage Site:
 - The approach adopted to **isolate the indigenous people** from their natural habitats to protect biodiversity is the **root cause of conflict between them and conservationists**.
 - With the announcement of **natural habitat as a World Heritage Site**, the **United Nations Educational, Scientific and Cultural Organization (UNESCO)** takes charge of the region’s conservation.
- **Lax Implementation of the Forest Rights Act:**
 - Many states in India have a dismal record in implementing the **Forest Rights Act (FRA)**.
 - FRA’s constitutionality has been challenged in the **Supreme Court** several times by various conservation organisations.
- **Development vs Conservation:**
 - Often, the combined stretch of land claimed by Indigenous people has been taken away for building dams, mining, laying railway lines and roads, power plants, etc.
 - Moreover, forcibly removing tribal peoples from their land will only result in environmental damage and violate human rights.

What is the Post-2020 Global Biodiversity Framework?

- **About:**
 - The post-2020 global biodiversity framework builds on the **Strategic Plan for Biodiversity 2011-2020**.
 - As the **United Nations Decade on Biodiversity 2011-2020** comes to an end, the **International Union for Conservation of Nature (IUCN)** actively supports the development of what needs to be an ambitious new global biodiversity framework.

Note:

➤ **Goals and Targets:**

- The new frameworks have four goals to achieve by 2050.
 - To halt the extinction and decline of biodiversity.
 - To enhance and retain nature's services to humans by conserving.
 - To ensure fair and equitable benefits to all from use of genetic resources.
 - To close the gap between available financial and other means of implementation and those necessary to achieve the 2050 Vision.
- **2030 Action Targets:** The framework has **21 action-oriented targets** for urgent action over the decade to 2030, which includes:
 - To bring **at least 30% of land and sea** under the world's protected areas.
 - A **50% greater reduction in the rate of introduction of invasive alien species**, and controls or eradication of such species to eliminate or reduce their impacts.
 - **Reducing nutrients lost to the environment** by at least half, and pesticides by at least two thirds, and eliminating the discharge of plastic waste.
 - Nature-based contributions to global **climate change mitigation efforts** of at least 10 GtCO₂e (gigatonnes of equivalent carbon dioxide) per year, and that all mitigation and adaptation efforts avoid negative impacts on biodiversity.

Compensation to Climate Change

Why in News?

At the G-20 summit in Bali, **rich nations including the U.S, Japan, and Canada have pledged USD 20 billion to wean Indonesia off coal and reach carbon neutrality by 2050.**

What is the Importance of Compensation?

- Between 1900 and now, **developed countries have benefited from industrial development**, which also led to **Greenhouse Gas (GHG) emissions**.
 - Data from the Global Carbon Project shows that between 1751 and 2017, 47% of the CO₂ emissions came from the U.S. and the EU-28. In total, just 29 countries.

- Developing countries **were relatively late in starting out** on economic development.
 - They may be **contributing to emissions now**, but that is a weak reason to ask them to stop economic development.
 - **For Example:** A farmer in rural Africa can claim that his country has not added to emissions historically, but because of the U.S. or Russia's industrialisation, his agriculture yields are declining. Or an urban worker in South America has to work, without choice, in unforgiving heat wave conditions caused by the developed world's emissions of the past.

What are the Consequences of the State of Emission?

- According to the UN Environment Programme's annual **emissions gap report for 2022**, the **international community is falling far short of the Paris goals**, with no credible pathway to 1.5°C in place.

Where about India's Emissions?

- According to the '**Emissions Gap Report 2022**', **India is among the top seven emitters** (others being China, the EU-27, Indonesia, Brazil, the Russian Federation and the U.S.).
 - These seven, plus international transport, accounted for 55% of global GHG emissions in 2020.
 - Collectively, **G-20 members** are responsible for 75% of global GHG emissions.
 - **Some GHG emissions are unavoidable.** In the context of India's population, **its emissions are far lesser per head, than for others.**
 - **World average per capita GHG emissions were 6.3 tonnes of CO₂ equivalent (tCO₂e) in 2020.**
 - The U.S. is way above this level at 14, followed by 13 in the Russian Federation and 9.7 in China. India remains far below the world average at 2.4.

What are the Related Steps by India?

- India announced that it will reach **carbon neutrality by 2070**.
- India has also **committed to generate 500 GW of renewable energy capacity by 2030**, bringing down emission intensity of **Gross Domestic Product (GDP)**, as well as raising **forest cover**.

Note:

- In last year's coal agreement, India drafted the language.
 - It was **changed from "phase-out" to "phase-down" of coal.**
 - It reflects the country's ground realities of large energy requirements, met predominantly by thermal power, to spur economic development.

Loss and Damage Funding for Climate Damages

Why in News?

At the recently concluded **COP27 summit**, delegates from the **United Nations** agreed to create a **'Loss and Damages' fund** which will compensate the most vulnerable countries for their losses due to climate-related disasters.

What is 'Loss and Damage' Funding?

- 'Loss and Damage' refers to impacts of climate change that cannot be avoided either by mitigation (cutting **greenhouse gas emissions**) or adaptation (modifying practices to buffer against climate change impacts).
- They also include **not only economic damage to property but also loss of livelihoods**, and the destruction of biodiversity and sites that have cultural importance.
- This **broadens the scope for affected nations** to claim compensation.

How has the Concept of Loss and Damage Evolved?

- Since the **United Nations Framework Convention on Climate Change** was formed in the early 1990s, loss and damage due to climate change have been debated.
- The **Least Developed Countries** Group has **long aimed to establish accountability and compensation for loss and destruction.**
 - However, historically blamed for the climate catastrophe, **rich countries have overlooked the concerns of vulnerable countries.**

- **Warsaw International Mechanism on Loss and Damages (WIM)** was founded in 2013 without funding after extensive pressure from developing countries.
 - However, during the **2021 COP26 climate summit in Glasgow**, a 3-year task force was established to consider a funding arrangement for loss and damage.
- So far, **Canada, Denmark, Germany, New Zealand, Scotland** and the **Belgian province of Wallonia** have all expressed interest in loss and damage funding.

Mobilising Green Funds

Why in News?

Recently, at the **United Nations Framework Convention on Climate Change Conference (UNFCCC) of Parties 27** in Sharm el-Sheikh (Egypt), countries agreed that a **complete transformation of the international financial system** was needed to significantly scale up resources for **Climate Action**.

- The money **currently being channelised for climate action** is barely 1%-10% of the estimated requirements.

What is Climate Finance?

- It refers to local, national, or transnational financing—**drawn from public, private and alternative sources of financing**—that seeks to support mitigation and adaptation actions that will address **climate change**.
- The UNFCCC, **Kyoto Protocol**, and the **Paris Agreement** call for financial assistance from Parties with **more financial resources** (Developed Countries) to those that are **less endowed and more vulnerable** (Developing Countries).
- This is in accordance with the principle of **"Common but Differentiated Responsibility and Respective Capabilities"** (CBDR).
 - CBDR is a principle within the UNFCCC that acknowledges different capabilities and differing responsibilities of individual countries in addressing climate change. The principle of CBDR is enshrined in Earth Summit 1992, held in Rio de Janeiro, Brazil.

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How much Fund is Needed for Climate Action?

- The global transition to a low-carbon economy would likely require about USD 4-6 trillion every year till 2050.
- About USD 4 trillion would need to be invested annually in the renewable energy sector till 2030 if the net-zero emissions targets were to be achieved.
- The cumulative requirement of the developing countries, just for implementing their climate action plans, was about USD 6 trillion between 2022-2030.
 - It means that at least 5% of the global Gross Domestic Product (GDP) would need to be directed into climate action every year.
 - The USD 100 billion amount that the developed countries have promised to mobilise every year represents practically the entire money in play right now.
 - Even this USD 100 billion has not yet been fully realised.
 - Developed countries say they would reach this target by 2023. As of now, all that is flowing in is about USD 50-80 billion every year.

How can Tax be a source to the Climate Fund?

- Bulk of the additional financial resources to fight climate change would come from the pockets of the common citizen, in the form of taxes.
- The use of petrol and diesel, and other fossil fuels can be taxed.
- The production of coal is already being taxed for several years in India, and it has been generating valuable resources for the government, which has utilized it mainly for investing in clean technologies.
 - These funds have also been utilised for works in the Clean Ganga Mission and during the Covid-19 pandemic.
- Newer forms of Carbon Tax are likely to be imposed on businesses as well.
 - In many cases, these would filter down to the common person of the country.

What are India's Initiatives for Climate Finance?

- **National Adaptation Fund for Climate Change (NAFCC):**
 - NAFCC was established in 2015 to meet the cost of adaptation to climate change for the State and

Union Territories of India that are particularly vulnerable to the adverse effects of climate change.

➤ National Clean Energy Fund:

- The Fund was created to promote clean energy, and funded through an initial carbon tax on the use of coal by industries.
- It is governed by an Inter-Ministerial Group with the Finance Secretary as the Chairman.
- Its mandate is to fund research and development of innovative clean energy technology in the fossil and non-fossil fuel-based sectors.

➤ National Adaptation Fund:

- The fund was established in 2014 with a corpus of Rs. 100 crores with the aim of bridging the gap between the need and the available funds.
- The fund is operated under the Ministry of Environment, Forests, and Climate Change (MoEF&CC).

State of the Climate in Asia 2021

Why in News?

Recently, the State of the Climate in Asia 2021 report was published by the World Meteorological Organization and the UN Economic and Social Commission for Asia and the Pacific (ESCAP).

What are the Findings of the Report?

- **Floods and storms accounted for 80% of the natural disasters** that struck Asia in 2021.
 - Asian countries incurred financial losses worth USD 35.6 billion in 2021 because of natural disasters. Flooding was the event with "by far the greatest impact in Asia in terms of fatalities and economic damage."
 - This showed that the economic impact of such disasters is on the rise compared to the average of the last twenty years.
- **India suffered a total loss of USD 3.2 billion from flooding** and the country faced heavy rains and flash floods during the monsoon season between June and September 2021.
 - These events resulted in about 1,300 casualties and damaged crops and properties.

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- The country was **only second to China in the Asian continent in this regard.**
- Similarly, **storms also caused significant economic damage**, especially in India (USD 4.4 billion), followed by China (USD 3 billion) and Japan (USD 2 billion).
- During 2021, **India experienced five cyclonic storms (Tauktae, Yaas, Gulab, Shaheen, Jawad)** with maximum sustained wind speeds of ≥ 34 knots.
 - Additionally, in 2021, **thunderstorms and lightning claimed around 800 lives** in different parts of the country.

What are the Reasons for these Disasters?

- **Arabian Sea and Kuroshio Current's Rapid Warming:**
 - Due to the **Arabian Sea and Kuroshio Current's rapid warming**, these regions are warming **three times faster than the average global upper-ocean temperature.**
 - Ocean warming could contribute to **sea level rise**, alter storm paths and ocean currents and increase stratification.
 - **Upper-ocean warming is important because it directly affects the atmosphere** in terms of convection, winds, cyclones and so on.
 - The deep ocean does not affect the atmosphere directly.
 - The Arabian Sea is unique because it has pathways to receive excess heat through atmospheric tunnels and bridges and mixed warm water from various oceans is pumped into it.
 - But in the case of the Kuroshio Current system, **the current system takes warm water from the tropics and stronger winds force more heat into the current.**
- **La Nina:**
 - The last two years were also **La Nina** years and during this time, the pressure patterns set up in India go from North to South, which drives circulations from Eurasia and China.
 - This can **cause excessive rainfall patterns over parts of India**, particularly in the Southern Peninsular, which gets the Northeast monsoon. The excess last year was related to the La Nina pressure pattern.

Leith's Soft-shelled Turtle

Why in News?

At its **19th Meeting in Panama**, the Conference of Parties to CITES adopted **India's proposal to move Leith's Softshell Turtle from Appendix II to Appendix I.**

- India's proposal for inclusion of **Jeypore Hill Gecko** (*Cyrtodactylus jeyporensis*) in Appendix II.

What is the Significance of the Listing?

- The CITES Appendix I listing of this Turtle species **would ensure that legal international trade in the species** does not take place for commercial purposes.
- It would also **ensure that international trade in captive-bred specimens only takes place from registered facilities** and further that higher and more proportionate penalties are provided for illegal trade of the species.
- The listing of the Leith's soft-shell turtle, thereby, **strengthens its CITES protection status to ensure better survival of the species.**

What is Leith's Soft-Shelled Turtle?

- **About:**
 - Leith's Softshell Turtle (*Nilssonia leithii*) is a **large freshwater soft-shelled turtle** which is endemic to peninsular India and it inhabits rivers and reservoirs.
- **Threats:**
 - The species has been subject to intensive exploitation over the past 30 years.
 - It has been poached and illegally consumed within India. It has also been illegally traded abroad for meat and for its calipee.
 - The population of this turtle species is **estimated to have declined by 90% over the past 30 years** such that the species is now difficult to find.
- **Protection Status:**
 - The **International Union for Conservation of Nature (IUCN) Red List:** Critically Endangered
 - **Wildlife Protection Act (WPA):** Schedule IV
 - **CITES:** Appendix I

Note:

Cryosphere Loss

Why in News?

At **COP27**, a broad coalition of 18 governments joined together to create a new high-level group 'Ambition on Melting Ice (AMI) on Sea-level Rise and Mountain Water Resources'.

What is AMI Group?

- The "AMI" group aims to **ensure impacts of cryosphere loss is understood by political leaders and the public**, and not only within mountain and polar regions, but throughout the planet.
- The founding governments of the group include Chile (co-chair), Iceland (co-chair), Peru, Czech Republic, Nepal, Finland, Senegal, Kyrgyz Republic, Samoa, Georgia, Switzerland, New Zealand, Monaco, Vanuatu, Sweden, Tanzania, Liberia, Norway and Mexico.

What is the Declaration of the Group?

- **Impact of Climate Change:**
 - **Climate change** has already caused dramatic changes in the global cryosphere, Earth's snow and ice regions.
 - Lives and livelihoods are **threatened by, and some already lost from**, these changes. Indigenous peoples in both the Arctic and mountain regions have been among the earliest affected.
 - The **IPCC Sixth Assessment Cycle reports**, including the Special Report on Ocean and Cryosphere in a Changing Climate, conclude that such changes in the cryosphere will **worsen with each additional increment of global warming and greenhouse gas emissions in the atmosphere**.
 - The consequences will **occur both within and far beyond those in polar and mountain regions**.
 - In polar fisheries, in addition to warming these include rapid acidification of polar oceans, which scientists say will reach a critical threshold at 450ppm – a level we are on track to reach in just 12 years.
- **Suggestions:**
 - Protecting the cryosphere through vigorous climate action is not a matter for mountain and

polar nations alone: it is a matter of **urgent global concern**, because the greatest impacts on human communities lie well outside these regions.

- Rapid decreases in global greenhouse gas emissions, to keep alive the possibility of limiting global warming to 1.5°C, **are our best option to limit cryosphere losses** and the resulting chain of potential catastrophes.
- The need to make pre-2030 emissions reductions a matter of **urgency is an imperative for the benefit of all our societies**.

What is the Cryosphere?

- **About:**
 - The cryosphere is the part of the **Earth's climate system that includes solid precipitation, snow, sea ice, lake and river ice, icebergs, glaciers and ice caps**, ice sheets, ice shelves, permafrost, and seasonally frozen ground.
 - The term "cryosphere" traces its origins to the **Greek word 'kryos' for frost or ice cold**.
 - The cryosphere extends globally, existing seasonally or perennially at most latitudes, not just in the **Arctic, Antarctic, and mountain regions, and in approximately one hundred countries**.
 - The largest continental ice sheets are found in Antarctica.
 - Approximately **70% of the Earth's freshwater exists as snow or ice**.
- **Impacts of Cryosphere on Global Climate:**
 - **Albedo:**
 - Snow and ice have high **albedo**. They reflect most of the light without being absorbed and helps in cooling of the earth. Thus, presence or absence of snow and ice affects the **heating and cooling of Earth's surface**.
 - This influences the **entire planet's energy balance**.
 - **Feedback Loop:**
 - Melting of ice **reduces the reflective surface**, and, the ocean and land are darker in color, which absorb more solar radiation, and then **release the heat to the atmosphere**.
 - This **causes more warming and so more ice melts**. This is known as a feedback loop.

Note:

- **Permafrost:**
 - Permafrost is potentially a major source of **methane** and carbon dioxide.
 - The **permafrost** of the polar region has trapped **tons of carbon inside its soil**.
 - If 'feedback loop' aggravates, the carbon is released **in form of methane- a powerful greenhouse gas**- which causes the global warming.
 - Permafrost contains about 1,400 to 1,600 billion tons of carbon.
 - In terms of **carbon budgets**, in the 1.5°C climate warming scenario, the melting of permafrost is **estimated to result in a range of 150–200 Gt CO₂-eq emissions, while at 2+°C degrees would result in at about 220–300 Gt CO₂-eq by 2100, comparable to the total emissions of countries like Canada or the entire EU.**
- **Melting of Cryosphere:**
 - Melting of cryosphere affects the volume of water in oceans. Any changes in the water cycle, **affects global energy / heat budget, and thereby global climate.**
 - The emission of GHGs and changes in albedo from a melting Arctic are projected to more than double the Arctic's contribution to global warming by 2100.

Arittapatti Biodiversity Heritage Site

Why in News?

Recently, the **Tamil Nadu Government** issued a notification declaring **Arittapatti in Melur block**, Madurai district, a **Biodiversity Heritage Site (BHS)**.

- It is Tamil Nadu's first and India's 35th Biodiversity Heritage Site.

What are the Key Facts about Arittapatti?

- Arittapatti village is **rich in ecological and historical significance**, it houses around **250 species of birds** including three important **raptors; birds of prey namely:**
 - Laggar Falcon
 - Shaheen Falcon

- Bonelli's Eagle
- It is also home to wildlife such as the **Indian Pangolin, Slender Loris and Pythons**.
- The biodiversity-rich area is surrounded by a **chain of seven hillocks or inselbergs** that serve as a watershed, charging '**72 lakes, 200 natural springs and three check dams.**'
 - **The Anaikondan Lake**, built during the reign of **Pandiyan kings in the 16th century** is one among them.
 - Several **megalithic structures, rock-cut temples, Tamil Brahmi inscriptions and Jain beds** add to the historical significance of the region.

What is a Biodiversity Heritage Site?

- **About:**
 - Biodiversity heritage sites are well-defined areas that are unique, ecologically fragile ecosystems with **high diversity of wild and domesticated species, presence of rare and threatened species, and keystone species.**
- **Legal Provision:**
 - As per provision under **Section 37(1) of 'Biological Diversity Act, 2002'**, The **State Government** may, from time to time in **consultation with the local bodies**, notify in the Official Gazette, **areas of biodiversity importance** as under this Act.
- **Restrictions:**
 - Creation of BHS may **not put any restriction on the prevailing practices and usages** of the local communities, other than those **voluntarily decided by them**. The purpose is to **enhance the quality of life of the local communities** through conservation measures.
- **First BHS of India:**
 - **Nallur Tamarind Grove** in Bengaluru, Karnataka was the first Biodiversity Heritage Site of India, declared in 2007.
- **Last Five Additions to BHS:**
 - Debbari or Chabimura in Tripura (September 2022)
 - Betlingshib & its surroundings in Tripura (September 2022)
 - Hajong Tortoise Lake in Assam (August 2022)
 - Borjuli Wild Rice Site in Assam (August 2022)
 - Amarkantak in Madhya Pradesh (July 2022)

Note:



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Global Offshore Wind Alliance

Recently, nine new countries sign up for Global Offshore Wind Alliance at COP27.

- **Nine new countries:** Belgium, Colombia, Germany, Ireland, Japan, the Netherlands, Norway, the UK, and the US.
- Australia announces to sign up with global offshore wind alliance.

What is Global Offshore Wind Alliance (GOWA)?

- It was established **to ramp up of offshore wind** in order to tackle the climate and energy security crises.
- It was set up by the **International Renewable Energy Agency (IRENA)**, Denmark and the **Global Wind Energy Council**.
 - GWEC was established in 2005 to **provide a credible and representative forum** for the entire wind energy sector at an international level.
- Several **organizations are supporting the alliance** and promoting offshore wind in their respective regions.
 - Both IRENA and the International Energy Agency (IEA) **expect that offshore wind capacity will need to exceed 2000 GW in 2050**, from just over 60 GW today, to limit the rise in global temperatures to 1.5 degree Celsius and achieve **net zero**.
 - To reach this target, **GOWA will aim to contribute to accelerating growth** to reach a total of at least 380 GW installed capacity by the end of 2030.

What is Offshore Wind Energy?

- **About:**
 - **Wind energy today typically comes in two different "types": onshore wind farms** which are large installations of wind turbines located on land, and offshore wind farms which are installations located in bodies of water.
 - **Offshore wind energy refers to the deployment of wind farms** inside the water bodies. They utilise the sea winds to generate electricity. These wind farms either use fixed-foundation turbines or floating wind turbines.

- A fixed-foundation turbine is built in shallow water, whereas a floating wind turbine is built in deeper waters where its foundation is anchored in the seabed. Floating wind farms are still in their infancy.
 - Offshore wind farms must be at least 200 nautical miles from the shore and 50 feet deep in the ocean.
 - Offshore wind turbines produce electricity which is returned to shore through cables buried in the ocean floor.
- **Status of Wind Energy in India:**
 - India's electricity generation from wind reached **39.2 gigawatts (GW) a year in March 2021**. An addition of another 20 GW over the next five years is expected to happen soon.
 - The compound annual growth rate for wind generation has been 11.39% between 2010 and 2020, and for installed capacity, it has been 8.78%.
 - More than **95% of commercially exploitable resources are located** in seven states: Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu.
- **Policies related to Wind Energy:**
 - **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.

What are the Benefits of Offshore Wind Energy?

- **Wind speed over water bodies is high** and is consistent in direction. As a result, offshore wind farms generate more electricity per installed capacity.
- **Fewer offshore turbines are required to produce the same capacity of energy** as compared to onshore ones.

Note:

- Offshore wind farms have a **higher CUF (capacity utilisation factor)** than onshore wind farms. Therefore, offshore wind power allows for longer operating hours.
 - A wind turbine's CUF is equal to the average output power divided by the maximum power capabilities.
- It's possible to build **bigger and taller offshore windmills**, resulting in increased energy harvest.
- Furthermore, the **wind flow is not restricted by hills or buildings**.

Leadership for Industry Transition Summit

Why in News?

India and Sweden hosted the **Leadership for Industry Transition (LeadIT) Summit**, on the sidelines of **COP27 at Sharm El Sheikh** in Egypt.

- The summit was followed by the public launch of the LeadIT Summit Statement 2022 in the India Pavilion at COP27.

What are the Highlights of the Summit?

- LeadIT members re-emphasized the commitment to pursuing the **low-carbon transition**.
- The event included roundtable discussions that focused on **finance and other cross-sectoral issues** and views on the requirements for successful low-carbon transitions.
- The members also committed to providing **technical assistance to new members and emerging economies**. The importance of de-risking investments in the transition of heavy industries in emerging and developing countries was also highlighted.
- The summit concluded with the adoption of the summit statement by the members of LeadIT.

What is LeadIT?

- **About:**
 - The LeadIT initiative lays specific focus on hard to abate sectors that are key stakeholders in the global climate action and require specific interventions.

- It gathers countries and companies that are committed to action to achieve the **Paris Agreement**.
- It was launched by the governments of Sweden and India at the **UN Climate Action Summit in 2019** and is supported by the **World Economic Forum**.
- LeadIT members subscribe to the notion that energy-intensive industries can and must progress on low-carbon pathways, aiming to achieve **net-zero carbon emissions by 2050**.
- **Members:**
 - The total membership of LeadIT is 37 including countries and companies together.
 - Japan and South Africa, the latest members of the initiative.

Carbon Border Tax

Why in News?

Recently, a consortium of countries that includes India has jointly opposed the Carbon Border Taxes proposed by the **European Union (EU)** at 27th edition of the **Conference of Parties (COP)** in Sharm El Sheikh, Egypt.

What is a Carbon Border Tax?

- A carbon border adjustment tax is a **duty on imports based on the amount of carbon emissions** resulting from the production of the product in question. As a price on carbon, it discourages emissions. As a trade-related measure, it affects production and exports.
- The proposal is part of the European Commission's European Green Deal that endeavours to make Europe the first climate-neutral continent by 2050.
- A carbon border tax is **arguably an improvement from a national carbon tax**.
 - A national carbon tax is a fee that a government imposes on any company within the country that burns fossil fuels.

What are the Causes Behind Imposing Carbon Tax?

- **EU and Climate Change Mitigation:** The EU has declared to cut its carbon emissions by at least 55%

Note:



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by 2030 compared to 1990 levels. Till date, these levels have fallen by 24%.

- However, emissions from imports contributing to 20% of the EU's CO₂ emissions are increasing.
- Such a carbon tax would incentivise other countries to reduce GHG emissions and further shrink the EU's carbon footprint.

➤ **Carbon Leakage:** The Emissions Trading System of the EU makes operating within the region expensive for certain businesses.

- The EU authorities fear that these businesses might prefer to relocate to countries that have more relaxed or no emission limits.
 - This is known as 'carbon leakage' and it increases the total emissions in the world.

What are the Issues?

➤ **Response of the BASIC Countries:** The **BASIC (Brazil, South Africa, India and China) countries'** grouping had opposed the EU's proposal in a joint-statement terming it "discriminatory" and against the principles of equity and '**Common but Differentiated Responsibilities and Respective Capabilities**' (CBDR-RC).

- These principles acknowledge that richer countries have a responsibility of providing financial and technological assistance to developing and vulnerable countries to fight climate change.
 - **Impact on India:** The EU is India's third largest trading partner. By increasing the prices of Indian-made goods in the EU, this tax would make Indian goods less attractive for buyers and could shrink demand.
- The tax would create serious near-term challenges for companies with larger greenhouse gas footprint.
 - **Non-Consensual with Rio Declaration:** The EU's notion of having a uniform standard all over the world for the environment is not borne out by the global consensus contained in the **Article 12 of the Rio Declaration** which says that the standards applicable to developed countries cannot be applied to developing countries.
 - **Change in the Climate-Change Regime:** The greenhouse content of these imports would also have to be adjusted in the greenhouse gas

inventories of the importing countries which essentially implies that GHG inventories would have to be reckoned not on the production basis but at the point of consumption basis.

- This would turn the entire climate change regime upside down.
 - **Protectionist Policy:** The policy can also be regarded as a disguised form of protectionism.
- Protectionism refers to government policies that restrict international trade to help domestic industries. Such policies are usually implemented with the goal of improving economic activity within a domestic economy.
- There is the risk that it becomes a **protectionist device, unduly shielding local industries from foreign competition** in so-called 'green protectionism'.

Red Crowned Roofed Turtle

Why in News?

India has proposed to protect the **Red-Crowned Roofed turtle** at the 19th Conference of the Parties to **CITES (Convention on International Trade in Endangered Species)** in Panama.

What are the Highlights of the Conference?

- India has raised a proposal to the United Nations Convention on International Trade in Endangered Species on Wild Fauna and Flora for the addition of the riverine species to **Appendix I from current Appendix II**.
 - The species covered by CITES are listed in **three Appendices as per the degree of protection** they need:
 - **Appendix I** includes species threatened with extinction.
 - **Appendix II** includes species not necessarily threatened with extinction but (where trade must be controlled).
 - **Appendix III** contains species that are protected in at least one country, which has asked other CITES parties for assistance in controlling the trade.
 - The 19th Conference of the Parties to CITES is being asked to consider stricter trade

Note:

regulations for nearly six hundred species of animals and plants believed to be under increased threat of extinction from international trade.

What is a Red Crowned Roofed Turtle?

- **Scientific Name:** *Batagur kachuga*.
- **Common Names:** Bengal roof turtle, Red-crowned roofed turtle.
- **About:**
 - Red Crowned Roofed Turtle is one of the **24 species endemic to India**, is characterised by the bright colours such as red, yellow, white and blue on the faces and necks of the males.
- **Distribution:**
 - It is a **freshwater turtle species found in deep flowing rivers** with terrestrial nesting sites.
 - The Red-crowned roofed turtle is **native to India, Bangladesh and Nepal**.
 - 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 Gharial Sanctuary is the only area with a substantial population of the species**, but even this Protected Area and habitat are under threat.
- **Threats:**
 - The species is highly **susceptible to entanglement in fishing nets and major hydrological projects and their impacts** on river flow dynamics and nesting beaches, and water pollution.
 - 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 are the main threats to these species.
 - Sand mining and **growing of seasonal crops** along Ganga River are majorly affecting the sandbars along the river that are used by the species for nesting.
 - Overharvesting the animal for **illegal consumption and illegal international trade** are other reasons for its extinction threat.
 - Over 11,000 tortoises and freshwater turtles have been seized in India from 2009-2019, found a study by TRAFFIC, a global NGO

working on trade in wild animals and plants and their conservation.

➤ Conservation Status:

- The **International Union for Conservation of Nature (IUCN) Red List**: Critically Endangered
- **Wildlife Protection Act (WPA)**: Schedule I
- **CITES** : Appendix II

Recommendations for Carbon Removals Mechanism

Why in News?

At the **CoP 27**, many concerns were raised over recommendations to include carbon removals for **carbon-trading** mechanisms under the **United Nations**.

- As per the civil society groups, **carbon removals do not align** with the **1.5-degree goal of the Paris Agreement**.

What are the Related Provisions of the Paris Agreement?

➤ Article 2.1:

- Article 2.1 of the 2015 Paris Agreement aims to hold **increasing temperatures to "well below 2°C above pre-industrial levels"** while "pursuing efforts" towards the more ambitious limit of 1.5°C.

➤ Article 6.4:

- It establishes a mechanism under the UN to **allow countries to voluntarily cooperate to meet their climate targets**.
 - A country that has **earned credits** by **reducing greenhouse gas emissions** can sell them to another country to help it meet its climate target.
- Under Article 6.4, a **supervisory body** has also been constituted, **tasked with making recommendations on carbon removals**, including reporting, monitoring and addressing concerns over the technology and social impacts.

What is Understood by Carbon Removal?

➤ About Carbon Removal:

- 'Carbon removal' means removing carbon dioxide from the atmosphere. It can be **land-based like afforestation or reforestation**, direct air capture

Note:



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(where big machines suck CO₂), soil carbon sequestration using no-till agriculture and other practices, **sequestering carbon from biofuel**, and the like.

➤ **Ocean-based Removal:**

- Oceans have a **vast potential for storing carbon dioxide naturally**. It is a quick process of removing carbon from the atmosphere.
 - Nutrients like iron can increase photosynthesis among phytoplankton, **which then incorporate carbon into their system**. The remaining uneaten planktons sink to the bottom and lock up the carbon.
- Some ocean-based removals **include pumping CO₂ into the ocean by spreading iron (ocean fertilisation)** or pumping nutrient-rich waters from the depths to the surface and pumping surface waters downward to transport carbon to the ocean depths.

➤ **Supervisory Body's Recommendations about Carbon Removal:**

- The supervisory body has proposed methodologies under land-based, and engineering-based approaches, such as direct air capture and ocean fertilisation for 'removals'.

Muli Bamboo

Why in News?

Recently, a research study observed and **listed a large variety of animal visitors/predators** attracted by the fruit and flowers of **Muli Bamboo (Melocanna baccifera)**.

- The study found that **predation is mainly due to the high content of sugars**.
- The **highest-ever fruit production** in a bamboo clump of this species was also reported.

What is Muli Bamboo?

➤ **About:**

- Muli is the **tropical evergreen species of bamboo**.
- It is the **largest fruit-producing bamboo** and is native to the northeast India-Myanmar region.
- It accounts for **90% of the bamboo forests found in the north-eastern state**.

- It can be recognised easily by **diffused clump habit**.
- The plant is also grown as an **ornamental**.
- **'Mautam'** is a strange ecological phenomenon associated with Muli Bamboo that **occurs once every 48 years**.

➤ **Mautam:**

- **'Mautam'** means **'Bamboo death'** in Mizo (mau means bamboo and tam means death).
- During **'Mautam'**, the **cyclical, mass bamboo flowering and large fruit production occurs**.
- This **attracts animal visitors/predators** including pollen predators (honey bees), fruit predators (millipedes, slugs and snails, fruit borers, monkeys, rats, porcupines, wild boars and palm civets), seedling predators (rabbits, deer), and insect/pest predators (ants, mantis).
- **Black rats greatly relish the fleshy, berry-like fruit** of the Muli Bamboo and during this period, the black rats also **multiply rapidly**, a phenomenon dubbed as **'Rat Flood'**.
 - **Once the fruits are gone**, they start quickly **eating-up standing crops**.
 - **This leads to famines** claiming thousands of human lives.
- Due to the occurrence of **'Mautam'**, Muli bamboo is **locally known as 'Mautak'**.

Great Knot

Why in News?

A Great knot has flown over 9,000 kilometers from Russia for a winter sojourn on Kerala's coast.

- The migratory bird that traversed the **Central Asian Flyway (CAF)** is only one of the two — the other has been sighted at Jamnagar in Gujarat.

What are the Key Points about the Great knot?

➤ **Physical Appearance:**

- A medium-sized bulky wader with a straight, dark-brown bill and yellowish-brown legs.
- It has a striped crown with an indistinct white eyebrow. Its upperparts are grey, with dark feather tips; its underparts are white.
- The rump is pure white, the tail is tipped with grey.

Note:

- Breeding plumage consists of darker upperparts with black and chestnut markings.
- **Scientific Name:**
 - *Calidris tenuirostris*
- **Protection Status:**
 - **IUCN Status:** Endangered
- **Distribution:**
 - This species breeds in **north-east Siberia, Russia, wintering mainly in Australia**, but also **throughout the coastline of South-East Asia** and on the coasts of India, Bangladesh, Pakistan, and the eastern coast of the Arabian Peninsula.
 - In India, it is found along the coastal regions of Gujarat and Andhra Pradesh.
 - The **Yellow Sea of North Korea, South Korea and China is a particularly important stop-over site** on migration in both spring and autumn.
- **Habitat and Ecology:**
 - Occurs within **sheltered, coastal habitats** containing large, intertidal mudflats or sandflats, including **inlets, bays, harbours, estuaries and lagoons**.
 - Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.

What is the Central Asian Flyway (CAF)?

- It is a migration route, **covering over 30 countries**, for different waterbirds linking their northernmost breeding grounds in **Russia** (Siberia) to the southernmost non-breeding (wintering) grounds in **West and South Asia**, the **Maldives** and **British Indian Ocean Territory**.
- CAF is among the **nine flyways in the world** and three of the nine flyways that pass through the Indian Subcontinent. The other two are:
 - **East Asian Australasian Flyway (EAAF)** and **Asian East African Flyway (AEAF)**.
 - **India has a strategic role in the flyway**, as it **provides critical stopover sites** to over **90% of the bird species** known to use this migratory route.
 - Flyways are the area used by a group of birds during their annual cycle which includes their breeding areas, stop over areas and wintering areas.

Olive Ridley Turtles

Why in News?

Pairs of **Olive Ridley Sea turtles** have begun emerging on the sea waters off **Gahirmatha Marine Sanctuary** along the Odisha coast, marking the **commencement of the annual mass nesting of these endangered marine species**.

What are Olive Ridley Turtles?

- **About:**
 - The Olive ridley turtles are among the **smallest and most abundant of all sea turtles** found in the world.
 - These turtles are **carnivores** and get their name from their **olive-coloured 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:** Schedule 1
 - **IUCN Red List:** Vulnerable
 - **CITES:** Appendix I
- **Threats:**
 - **Human Consumption:** They are extensively poached for their meat, shell and leather, and eggs.
 - **Marine Pollution and Waste:** An ever-increasing debris of plastics, fishing nets, discarded nets, polythene and other garbage dumped by tourists and fishing workers threaten all sea turtles and degrades their habitats.
 - **Fishing Trawlers:** Overexploitation of marine resources by use of trawlers often violates the rule to not fish 20 kilometers within a marine sanctuary.

Note:



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- There were injury marks on many dead turtles indicating they could have been trapped under trawls or gill nets.

➤ 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.

○ Tagging:

- The tagging of the endangered Olive Ridley turtles using non-corrosive metal tags is done to enable scientists to chart their movements and also know the areas they visit in order to protect the species and their habitats.

Climate Change Performance Index 2023

Why in News?

India has ranked 8th in the Climate Change Performance Index (CCPI) 2023.

- India ranked 10th in CCPI, 2022.

What is CCPI?

➤ About:

○ Published by:

- Germanwatch, the New Climate Institute and the Climate Action Network annually since 2005.

○ Scope:

- It is an independent monitoring tool for tracking the climate protection performance of 57 countries and the European Union.

- These countries collectively account for more than 92% of global Greenhouse Gas (GHG) Emissions.

○ Aim:

- It aims to enhance transparency in international climate politics and enables comparison of climate protection efforts and progress made by individual countries.

○ Criteria:

- The CCPI looks at four categories, with 14 indicators: GHG Emissions (40% of the overall score), Renewable Energy (20%), Energy Use (20%), and Climate Policy (20%).

➤ CCPI 2023:

○ Overall Performance (Country-wise):

- No country performs well enough in all index categories to achieve an overall very high rating.
 - The first three overall positions therefore remain empty.
- Denmark, Sweden, Chile and Morocco were the only four small countries that were ranked above India as 4th, 5th, 6th and 7th respectively.
- The ranking given by CCPI places India as the only G-20 country in the top 10 rankers.
- The United Kingdom ranked 11th in CCPI 2023.
- China falls ranked 51st in CCPI 2023 and received an overall very low rating.
- The United States (US) rises three ranks to 52nd that's still overall very low rating.
- The Islamic Republic of Iran ranked 63rd, hence, placing it last in the CCPI 2023.

○ India's Status:

• Performance:

- India+ has been ranked amongst top 5 countries in the world, and the best among the G20 countries.
- India's rank is the best amongst all large economies.
- India earns a high rating in the GHG Emissions and Energy Use categories, with a medium for Climate Policy and Renewable Energy.
- The country is on track to meet its 2030 emissions targets (compatible with a well-below 2°C scenario).

Note:

- However, the **renewable energy pathway is not on track for the 2030 target.**
 - **Concerns:**
 - Since the last CCPI, India has updated its **Nationally Determined Contribution (NDC)** and announced a **net zero target for 2070**. However, **roadmaps and concrete action plans for achieving the targets are missing.**
 - India is among the **nine countries responsible for 90% of global coal production**. It also **plans to increase its oil, gas, and oil production by over 5% by 2030.**
- This is **incompatible with the 1.5°C target.**
 - **Suggestions:**
 - The experts suggested to lay stress on a **just and inclusive energy transition**, as well as

the need for **decentralised renewable energy** and capacities for **rooftop photovoltaics**.

- A **carbon pricing mechanism**, the need for **more capacities at the subnational level**, and **concrete action plans** for achieving the targets are **key demands**.

India's Net Zero Strategy

Why in News?

Recently, India **submitted its Long-Term Low Emission Development Strategy** to the **United Nations Framework Convention on Climate Change (UNFCCC)** at ongoing **27th Conference of Parties (COP27)** in **Sharm el-Sheikh, Egypt**.

India's road to 'net zero'

At COP-27, India announced its long-term strategy to transition to a 'low emissions' pathway to become carbon neutral by 2070

KEY MILESTONES

- The National Hydrogen Mission, launched in 2021, aims to make India a green hydrogen hub
- At least a three-fold increase in nuclear capacity by 2032
- Achieving an ethanol blending target of 20% by 2025

- Maximising the use of electric vehicles, increase public transport
- Increased climate finance to be provided by developed nations
- The long-term strategy aims at keeping global temperatures well below 2 degrees Celsius and, ambitiously, 1.5 degrees Celsius by the century-end



Environment Minister Bhupender Yadav at the COP-27 summit in Egypt on Monday. REUTERS

What is a Long-Term Low Emissions Development Strategy?

- The LT-LEDS are **qualitative in nature and are a requirement emanating from the 2015 Paris Agreement**.
 - Under the Paris agreement, **countries must explain how they will transition their economies beyond achieving near-term Nationally Determined Contributions (NDCs) targets** and work towards the larger climate objective of cutting emissions by 45% by 2030 and achieve net zero around 2050.

- The Strategy is **based on four key considerations** that underpin India's long-term low-carbon development strategy.
 - India has contributed little to **global warming**, its historical contribution to cumulative global **GreenHouse Gases emissions** being minuscule despite having a share of ~17% of the world's population
 - India has significant energy needs for development
 - India is **committed to pursuing low-carbon strategies for development** and is actively pursuing them, as per national circumstances

Note:



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- India needs to build climate resilience
- The LT-LEDS is also informed by the vision of **LIFE, Lifestyle for the Environment**.
- LiFE calls for a world-wide paradigm shift from mindless and destructive consumption to mindful and deliberate utilization.

What are the Features of the LT-LEDS?

- The strategy will **focus on rational utilization of national resources** with due regard to energy security.
 - The transitions from fossil fuels will be undertaken in a just, smooth, sustainable and all-inclusive manner.
 - The **strategy will promote increased use of biofuels**, especially **ethanol blending** in petrol, the drive to increase electric vehicle penetration, and the increased use of **green hydrogen fuel** are expected to drive the low carbon development of the transport sector.
 - India aspires to **maximize the use of electric vehicles, ethanol blending to reach 20% by 2025**, and a strong modal shift to public transport for passenger and freight.
 - Low-base, future sustainable, and climate-resilient urban development will be driven by smart city initiatives, integrated planning of cities for mainstreaming adaptation and enhancing energy and resource efficiency, effective green building codes and rapid developments in innovative solid and liquid waste management.
 - The **industrial sector will continue in the perspective of 'Aatmanirbhar Bharat' and 'Make in India'**.
 - India will also **focus on improving energy efficiency by the Perform, Achieve and Trade (PAT) scheme, the National Hydrogen Mission**, increasing electrification, enhancing material efficiency, and recycling and ways to reduce emissions.

What is Net Zero Target?

- It is **referred to as carbon neutrality**, which does not mean that a country would bring down its emissions to zero.

- Rather, it is a **state in which a country's emissions are compensated by the absorption and removal of greenhouse gases** from the atmosphere.
 - Further, absorption of the emissions can be increased by creating more carbon sinks such as forests.
 - While the removal of gases from the atmosphere requires futuristic technologies such as carbon capture and storage.
- More than 70 countries have promised to become Net Zero by the middle of the century i.e., by 2050.
- India has promised to cut its emissions to net zero by 2070 at the **conference of parties-26(COP)** summit.

Amazon Rainforest

Why in News?

According to a new report '**Living Amazon Report 2022**' by the **World Wildlife Fund (WWF)**, **some 35% of the rainforest is either totally lost or highly degraded**.

- The report was released at the **27th Conference of Parties (COP27)** to the United Nations Framework Convention on Climate Change in Sharm El-Sheikh, Egypt.
- The report **outlined the current status of the Amazon biome and basin**, summarised key pressures and drivers of change and outlined a conservation strategy.

What are the Highlights of the Report?

- Vast tracts of the Amazon rainforest, which serve as **carbon sinks and the planet's lungs**, are in crisis.
 - Some **35% of the rainforest is either totally lost or highly degraded**, while another 18% have been converted for other purposes.
- Amazon forests are **threatened due to deforestation, fires and degradation**.
- Surface water has been lost and rivers are increasingly disconnected and polluted.
 - This immense pressure will irreversibly damage the Amazon and the planet in general very shortly.
 - Economic activities, most notably extensive cattle ranching and agriculture, illegal activities and poorly planned infrastructure, threaten

Note:

the region and cause deforestation and degradation throughout the biome, with many areas severely affected.

- **Nearly 600 infrastructure projects are in operation along rivers** in the Amazon.
- Some 20 planned road projects, 400 operating or planned dams and numerous mining projects continue to dump chemicals such as mercury into the rivers.

What are the Amazon Rainforests?

- These are **large tropical rainforests occupying the drainage basin of the Amazon River** and its tributaries in northern South America and covering an area of 6,000,000 square km.
 - Tropical forests are closed-canopy forests growing within 28 degrees north or south of the equator.
 - They are very wet places, receiving more than 200 cm rainfall per year, either seasonally or throughout the year.
 - Temperatures are uniformly high - between 20°C and 35°C.
 - Such forests are found in Asia, Australia, Africa, South America, Central America, Mexico and on many of the Pacific Islands.
- Comprising about **40% of Brazil's total area**, it is bounded by the Guiana Highlands to the north, the Andes Mountains to the west, the Brazilian central plateau to the south, and the Atlantic Ocean to the east.

Waste Water Management

Why in News?

Almost half, or **43% of the world's rivers are contaminated with active pharmaceutical ingredients** in concentrations that can have disastrous effect on health.

- The pharmaceutical industry must prioritise **waste water management** and **process controls to limit antibiotic pollution** and **Antimicrobial Resistance (AMR)**.
 - Widescale pharmaceutical pollution has been reported across the different states of India, particularly in pharmaceutical hubs like **Himachal Pradesh, Andhra Pradesh, and Telangana**.

What is Waste Water?

➤ About:

- Wastewater is the **polluted form of water generated from rainwater runoff and human activities** and is also called sewage.
- It is typically categorized by the manner in which it is generated—**specifically, as domestic sewage, industrial sewage, or storm sewage (stormwater)**.

➤ Waste Water Treatment:

- Wastewater treatment, also called **sewage treatment**, is the **removal of impurities from wastewater, or sewage**, before it reaches aquifers or natural bodies of water such as rivers, lakes, estuaries, and oceans.
- On-site **Sewage Treatment Plants (STPs)** treat and purify wastewater and render it suitable for reuse.
 - STPs remove contaminants from waste water primarily from household sewage.

What is the Status of Waste Water Management in India?

➤ About:

- According to a report published by **Central Pollution Control Board (CPCB)** in 2021, India's **current water treatment capacity is 27.3% and the sewage treatment capacity is 18.6 %** (with another 5.2 % capacity being added).
 - Although India's waste and sewage treatment capacity is **higher than the global average of around 20%**, it is **far from adequate**, and **without swift measures** and not scaling up the sewage treatment capacity may have serious consequences.
- As per government statistics, **62.5% of wastewater in urban India remained untreated or partially treated**.
- According to a 2019 research report, **most of the sewage treatment plants** established under the **Ganga Action Plan** and **Yamuna Action Plan** are **not working**, and out of the **33000 million litres per day (MLD)** of waste generated, only **7000 MLD** is collected and treated.
- **Regulation:**
 - **The Water (Prevention and Control of Pollution) Act, 1974, (Amended in 1988)**

Note:



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- This legislation was introduced to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water.
- **The Water (Prevention and Control of Pollution) Cess Act, 1977, (Amended in 2003)**
 - It aims to provide for the levy and collection of a cess on water consumed by persons carrying on certain industries and by local authorities.
- **The Environment (Protection) Act, 1986**
 - It empowers the Central government to prescribe sewage and effluent discharge standards, investigate and ensure compliance, and conduct research.
 - This Act applies to all kinds of environmental pollution, including water, land, air, and noise.
- **Government Initiatives:**
 - The Indian government shifted its focus to **solid waste, sludge and greywater management** under the **Swachh Bharat Mission 2.0 (SBM 2.0)**.
 - Following a sustained focus on achieving **Open Defecation-Free (ODF) status**, the **Ministry of Housing and Urban Affairs (MoHUA)** developed detailed criteria for cities to achieve **ODF+, ODF++ and Water+ statuses**.
 - Under **Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Mission**, sewerage & septage management projects were launched by MoHUA.

Severe Climate Disasters of 2022 and COP27

Why in News?

While the developing and vulnerable nations continue to demand climate finance at COP27, it is **important to realise that the lives have also been severely affected by global catastrophes, especially in the year 2022.**

How have Past Global Catastrophes Devastated the Planet?

- **Pakistan Floods:**
 - Pakistan **recorded 62% less than normal rainfall in the month of March, 2022** and the warmest April preceding the monsoon season.

- Glaciers melted as a result of these heat waves, which led rivers to swell. Access to basic necessities became difficult for 33 million people of Pakistan's 220 million population.
- Extreme rainfall further triggered the most devastating floods from June to September.
 - The flood was the worst in the country's recent history.
 - Over 1,500 people were killed, with millions being displaced and developing serious health issues such as skin infections, **malaria** and **diarrhoea**.
- **Hurricane Ian in the US:**
 - NASA data revealed that **warm ocean waters in the Gulf of Mexico powered Hurricane Ian in the US towards the end of September, 2022** making it one of the strongest hurricanes to hit the country in recent memory.
 - It **resulted in the loss of 101 lives** and monetary losses of more than USD 100 billion.
 - The disaster was the costliest climate-induced disaster of the year.
 - The **escalation brought severe floods**, relentless rains and strong winds to southwestern Florida.
- **European Droughts**
 - In June and July, 2022, **Europe was hit by two extreme heat waves**, which claimed approximately 16,000 lives.
 - This year's drought is likely to be the worst in 500 years.
 - Water levels in Europe's biggest rivers – Rhine, Po, Loire, and Danube – shrunk, and dry conditions continue to prevail in different parts of the continent.
- **Spain and Portugal:**
 - An atmospheric high-pressure system, which causes dry air to descend over subtropical regions in the Northern Hemisphere during winter and spring seasons, called **Azores high**, has the ability to block wet weather outlets.
 - This caused dry conditions in Iberian Peninsula in southwestern Europe, and the Mediterranean region.
 - Spain and Portugal hence faced the driest weather in 1,200 years, along with wildfires.

Note:

➤ **Natural Disasters in India:**

- India recorded **natural disasters almost every day in 2022.**
- India recorded **“extreme weather events on 241 of 273 days”** in the first nine months of the year.
 - Thunderstorms, persistent rains, **cyclones, droughts, heat waves, lightning, floods** and **landslides** occurred all throughout these months.
 - **Himachal Pradesh recorded the highest number of deaths** followed by Assam and Madhya Pradesh.
- Overall, these **disasters claimed about “2,755 lives, affected 1.8 million hectares (ha) of crop area**, destroyed over 416,667 houses and killed close to 70,000 livestock.”

What are the Major Outcomes of the COP27?

- **“Loss and Damage” Fund for Vulnerable Countries:**
 - The United Nations Climate Change Conference COP27 **signed an agreement to provide “loss and damage” funding to vulnerable countries.**
- **Technology:**
 - At COP27, a **new five-year work program was launched to promote climate technology solutions** in developing countries.
- **Mitigation:**
 - A mitigation work programme was **launched aimed at urgently scaling up mitigation ambition and implementation.**
 - The **work programme will start immediately following COP27** and continue until 2030, with at least two global dialogues held each year.
 - Governments were also **requested to revisit and strengthen the 2030 targets** in their national climate plans by the end of 2023, as well as accelerate efforts to phase down unabated coal power and phase-out inefficient fossil fuel subsidies.
- **Global Stocktake:**
 - Delegates at the UN Climate Change Conference COP27 wrapped up the second technical dialogue of the first global stocktake, a mechanism to raise ambition under the **Paris Agreement.**
 - Prior to the conclusion of the stocktake at COP28 next year, the UN Secretary-General will convene a ‘climate ambition summit’ in 2023.

➤ **Sharm-El-Sheikh Adaptation Agenda:**

- It outlines **30 Adaptation Outcomes to enhance resilience** for 4 billion people living in the most climate vulnerable communities by 2030.
- **Action on Water Adaptation and Resilience Initiative (AWARe):**
 - It has been launched to reflect the importance of water as both a key climate change problem and a potential solution.
- **African Carbon Market Initiative (ACMI):**
 - It was launched to support the growth of carbon credit production and create jobs in Africa.
- **The Global Renewables Alliance:**
 - It brings together, for the first time, **all the technologies required for the energy transition in order to ensure an accelerated energy transition.**
 - As well as ensuring targets are met, the Alliance also aims to position renewable energy as a pillar of sustainable development and economic growth.

Russia's Nuclear-Powered Icebreaker

Why in News?

Recently, Russia touted its Arctic power at a flag-raising ceremony and dock launch for two nuclear-powered icebreakers that will ensure year-round navigation in the Western Arctic.

What is the Significance of the Russian Icebreakers?

- **To Strengthen Russia's Status as a Great Arctic power:**
 - Both icebreakers were laid down as part of Russia's large-scale, systematic work to re-equip and replenish the domestic icebreaker fleet, to **strengthen Russia's status as a “great Arctic power.”**
- **For Studying Arctic Region:**
 - For Russia, it is essential to study and develop the Arctic, **to ensure safe, sustainable navigation in this region, and to increase traffic along the northern sea route.**

Note:

➤ **Cut Down Time to Reach Asia:**

- For Russia, the opening of the Northern Sea Route will cut down time to reach Asia by up to two weeks compared to the current route via the Suez Canal

Development of Great Nicobar

Why in News?

Recently, the Ministry of Environment, Forest and Climate Change has given environmental clearance for the ambitious **Rs 72,000 crore development project** on the strategically important **Great Nicobar Island**.

- The project is to be implemented in **three phases over the next 30 years**.

What is the Proposal?

- A greenfield city has been proposed, including an **International Container Trans-shipment Terminal (ICTT)**, a greenfield international airport, and a power plant.
- The port will be controlled by the **Indian Navy**, while the airport will have dual **military-civilian functions** and will cater to tourism as well.
- A total 166.1 sq km along the southeastern and southern coasts of the island have been **identified**

for project along a coastal strip of width between 2 km and 4 km.

- Some 130 sq km of forests have been **sanctioned for diversion**, and 9.64 lakh trees are likely to be felled.

What is the Purpose of Developing this Island?

Economic Reasons:

- Great Nicobar is **equidistant from Colombo to the southwest and Port Klang** and Singapore to the southeast, and positioned close to the East-West international shipping corridor, through which a very large part of the world's shipping trade passes.
- The proposed ICTT can potentially become a **hub for cargo ships traveling on this route**.
- As per the NITI Aayog report, the proposed port will allow **Great Nicobar to participate in the regional and global maritime economy** by becoming a major player in cargo transshipment.

Strategic Reasons:

- The proposal to develop Great Nicobar was first floated in the 1970s, and its importance for **national security and consolidation of the Indian Ocean Region** has been **repeatedly underlined**.
- Increasing Chinese assertion in the **Bay of Bengal** and the **Indo-Pacific** has added great urgency to this imperative in recent years.



What are the Related Concerns?

- The proposed massive infrastructure development in an ecologically important and fragile region **has alarmed many environmentalists**.
- The loss of tree cover will not only affect the flora and fauna on the island, it will **also lead to increased runoff and sediment deposits** in the ocean, impacting the coral reefs in the area.

Note:

- Environmentalists have also flagged the **loss of mangroves on the island as a result of the development project.**

What are the Government's steps to address the concerns?

- The **Zoological Survey of India** is currently in the process of assessing how much of the reef will have to be relocated for the project.
 - India has successfully translocated a **coral reef** from the **Gulf of Mannar** to the **Gulf of Kutch** earlier.
 - A conservation plan for the leatherback turtle is also being put in place.
 - As per the government, the project site is outside the **eco-sensitive zones of Campbell Bay and Galathea National Park.**

India Abstains to Vote Against Reopening Ivory Trade

Why in News?

Recently, India has decided not to vote against a proposal to re-open the international trade in ivory at the ongoing conference of the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).**

What is the Tussle over Ivory?

- The **ivory trade** was globally **banned in 1989 when all African elephant populations were put in CITES Appendix I.**
- The African elephant of Namibia, Botswana and Zimbabwe were **transferred to Appendix II** in 1997 and South Africa's in 2000.
- CITES allowed Namibia, along with Zimbabwe, Botswana and South Africa, to **perform one-time sales of ivory** accumulated from natural elephant deaths and poacher seizures in 1999 and 2008.
 - Following that, Namibia's proposal to enable a regular form of restricted ivory trade by delisting the elephant populations of the 4 nations from CITES Appendix II was rejected at the CoP17 (2016) and CoP18 (2019).

- Zimbabwe moved the **idea at CoP19**, but it was defeated once more.
- Namibia and other southern African governments say that their elephant populations have recovered and that their stored ivory can produce much-needed revenue for elephant conservation, if sold worldwide.
- Opponents of the trade argue **that every sort of supply increases demand**, and that substantial increases in elephant poaching were observed around the world when the CITES permitted one-time sales in 1999 and 2008.

What is India's Stance?

- India has been a **vocal opponent of the international ivory trade** for over three decades.
- It is the first time **India has not voted against a request to reopen** the ivory trade since joining the CITES in 1976.
 - At the same CoP19, Namibia voted against India's proposal to allow sustainable commercial use of North Indian rosewood - **Dalbergia sissoo**, which was also defeated.
- While the word **"ivory" was not mentioned**, Namibia sought India's backing, for its longstanding proposal to allow trade in ivory.

CCUS Policy Framework and its Deployment

Why in News?

Recently, **NITI Aayog** has released a study report, titled **'Carbon Capture, Utilisation, and Storage (CCUS) Policy Framework and its Deployment Mechanism in India'.**

- The report explores the importance of Carbon Capture, Utilisation, and Storage as an emission reduction strategy to achieve deep decarbonization from the hard-to-abate sectors.

What are the Key Highlights of the Report?

- **About:**
 - CCUS can provide a **wide variety of opportunities to convert the captured CO₂ to different value-**

Note:

added products like green urea, food and beverage form application, building materials, chemicals (methanol and ethanol), polymers (including bio-plastics) and enhanced oil recovery (EOR) with wide market opportunities in India, thus contributing substantially to a circular economy.

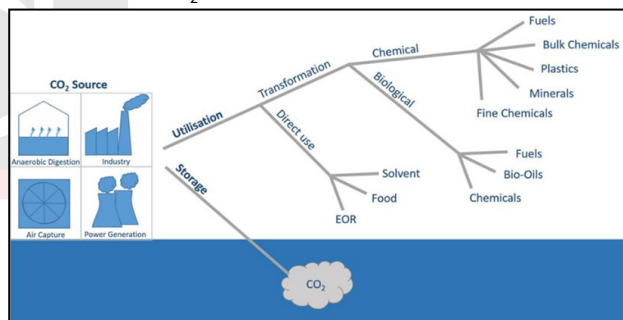
- CCUS projects will also lead to a **significant employment generation**. It estimates that about 750 mtpa of carbon capture by 2050 can create employment opportunities of **about 8-10 million on full time equivalent (FTE) basis in a phased manner**.
- **Suggestions:**
 - Broad **level policy interventions needed** across various sectors for its application.
 - As, India has updated its NDC targets for achieving 50% of its total installed capacity from non-fossil-based energy sources, 45% reduction in emission intensity by 2030 and taking steps towards achieving Net Zero by 2070, the role of **CCUS becomes important as reduction strategy to achieve decarbonization** from the hard-to abate sectors.
 - India's dependency on fossil-based Energy Resources is likely to continue in future, hence **CCUS policy in Indian Context is needed**.

What is Carbon Capture, Utilization, and Storage?

- CCUS encompasses **methods and technologies to remove CO₂ from the flue gas and from the atmosphere**, followed by recycling the CO₂ for utilization and determining safe and permanent storage options.
- CO₂ captured using CCUS technologies is converted **into fuel** (methane and methanol), refrigerants and building materials.
- CCUS is considered an important tool to help countries halve their emissions by 2030 and reach net-zero by 2050.
 - These goals are crucial to meet the **Paris Agreement targets** for restricting global warming to 2 degrees Celsius (°C), and preferable to 1.5°C, over pre-industrial levels.

What are Applications of CCUS?

- **Mitigating Climate Change:** Despite the adoption of alternative energy sources and energy efficient systems to reduce the rate of CO₂ emissions, the cumulative amount of CO₂ in the atmosphere needs to be reduced to limit the detrimental impacts of climate change.
- **Agriculture:** Capturing CO₂ from biogenic sources such as plants and soil to boost crop growth in a greenhouse could work.
- **Industrial Use:** Combining CO₂ with steel slag - an industrial byproduct of the steel manufacturing process — to make construction materials compatible with the Paris Agreement goals.
- **Enhanced Oil Recovery:** CCU is already making inroads into India. For instance, Oil and Natural Gas Corporation signed a MoU with Indian Oil Corporation Limited (IOCL) for Enhanced Oil Recovery (EOR) by injecting CO₂.



What are the Challenges associated with CCUS?

- **Expensive:** Carbon capture involves the development of **sorbents that can effectively bind to the CO₂ present in flue gas or the atmosphere**, which is expensive.
- **Lesser Demand for Recycled CO₂:** Converting CO₂ into useful chemicals of commercial importance, or utilizing CO₂ for oil extraction or remediation of alkaline **industrial wastes, would add economic value to this greenhouse gas**.
 - However, the demand for CO₂ is limited compared to the vast amount of CO₂ that needs to be removed from the atmosphere, to reduce the detrimental environmental impacts of climate change.

Note:

Life of Plastic

Why in News?

Recently, the document titled “**The Plastic Life-Cycle**” has stated that **India is not collecting and recycling its polymer waste properly.**

- The document highlighted that **unless the entire life cycle of plastic**, from source to disposal, is not together considered as the root cause of the pollution it causes, **the problem is not going away.**

What is Plastic Waste?

- **About:**
 - Unlike **other forms of waste** like paper, food peels, leaves etc., **which are biodegradable** (capable of being decomposed by bacteria or other living organisms) in nature, plastic waste **because of its non-biodegradable nature** persists into the environment, for hundreds (or even thousands) of years.
- **Major Polluting Plastic Waste:**
 - **Microplastics** are small plastic pieces of **less than five millimeters** in size.
 - Microplastic includes **microbeads** (solid plastic particles of less than one millimeter in their largest dimension) that are used in **cosmetics and personal care products, industrial scrubbers**, microfibers used in textiles and virgin resin pellets used in plastic manufacturing processes.
 - Due to sun exposure and physical wear, large pieces of plastic that were not recycled break up to produce microplastics.
 - **Single-use plastic** is a disposable material that can be **used only once before it is either thrown away or recycled**, like plastic bags, water bottles, soda bottles, straws, plastic plates, cups, most food packaging and coffee stirrers are sources of single use plastic.

What are the Challenges Faced by India in Plastic Waste Management?

- **Management of plastic waste** involves **two distinct steps:**
 - Collection and recycling

- End-of-life disposal.
- **Both are not executed properly in India.**
 - **Improper Implementation and Monitoring:**
- The collection of plastic waste is the **responsibility of local government bodies**, producers, importers and brand owners.
 - However, plastic waste in India is collected mostly by ragpickers, rather than the authorities.
- As per a statistical analysis done by Centre for Science and Environment using Central Pollution Control Board (CPCB) 's data, **India is merely recycling (through mechanical recycling) 12% of its plastic waste.**
 - **Burning of Waste:**
- Close to 20% of plastic waste is channelised for end-of-life solutions like co-incineration, plastic-to-fuel and road making, which means India is burning 20% of plastic waste.

What is India Doing for Plastic Waste Management?

- **National Dashboard on Elimination of Single Use Plastic and Plastic Waste Management:**
 - India launched a nationwide awareness campaign on **Single Use Plastics on World Environment Day in June 2022.**
 - A mobile app for **Single Use Plastics Grievance Redressal** was also launched to empower citizens to check sale/usage/manufacturing of SUP in their area and tackle the plastic menace.
- **Plastic Waste Management Amendment Rules, 2022:**
 - It prohibits the manufacture, import, stocking, distribution, sale and use of several **single-use plastic items as of July 1, 2022.**
 - It has also mandated **Extended Producer Responsibility (EPR)** that incorporates circularity by making manufacturers of products responsible for collecting and processing their products upon the end of the products' lifetime.
- **India Plastics Pact:**
 - It is the first of its kind in Asia. The Plastics Pact is an **ambitious and collaborative initiative to bring stakeholders together** to reduce, reuse and recycle plastics within the material's value chain.

Note:



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- **Mascot 'Prakriti':**
 - To spread awareness among masses about small changes that can be sustainably adopted in lifestyle for a better environment.
- **Project REPLAN:**
 - **Project REPLAN (stands for REducing PLastic in Nature)** launched by **Khadi and Village Industries Commission (KVIC)** aims to reduce consumption of plastic bags by providing a more sustainable alternative.

Himalayan Yak

Why in News?

The **Food Safety and Standard Authority of India (FSSAI)** has approved the **Himalayan Yak** as a 'food animal'.

- The move is expected to **help check decline in the population of the high-altitude bovine animal** by making it a part of the conventional milk and meat industry.
- Food Animals are those that are raised and used for food production or consumption by humans.

What are the Key Facts of Himalayan Yak?

- **About:**
 - The Yak belongs to the **Bovini tribe, which also includes bison, buffaloes, and cattle**. It can tolerate temperatures as low as -40 degrees Celsius.
 - Adapted for living at high altitudes, they have long hair that hangs off their sides like a curtain, sometimes touching the ground.
 - Yaks are highly valued by Himalayan peoples. According to Tibetan legend, the first yaks were domesticated by Tibetan **Buddhism** founder Guru Rinpoche.
 - They are also known as the lifeline of pastoral nomads in high altitudes of the Indian **Himalayan region**.
 - Yaks are **traditionally reared under a transhumance system** which is primitive, unorganised and full of hardship.
- **Habitat:**
 - They are endemic to the **Tibetan Plateau and the adjacent high-altitude regions**.

- Yaks are most comfortable above 14,000 feet. They climb to an elevation of 20,000 feet when foraging and usually don't descend any lower than 12,000 feet.

- The yak-rearing states of India are **Arunachal Pradesh, Sikkim, Uttarakhand, Himachal Pradesh and Jammu & Kashmir**.

➤ Population in India:

- The countrywide population trend shows that the yak population has been decreasing at an alarming rate. According to a census in 2019, India has some 58,000 yaks – a drop of about 25% from the last livestock census conducted in 2012.
- It is **mainly because yak milk and meat are not a part of the conventional dairy and meat industry**, their sale is limited to local consumers.

➤ Threats:

- **Climate Change:**
 - The increasing trend of environmental temperature at high altitudes is resulting in heat stress in yak during warmer months of the year. This, in turn, is affecting the rhythms of physiological responses of the animal.
- **Inbreeding:**
 - As wars and conflicts have led to the closing of borders, the yaks outside borders are thought to be suffering from inbreeding due to the lack of availability of new yak germplasm from the original yak area.
- **Protection Status of Wild Yak (Bos mutus):**
 - **IUCN Red list status:** Vulnerable
 - IUCN considers the wild species of yak under *Bos mutus*, while the domestic form is considered under *Bos grunniens*.
 - **CITES:** Appendix I
 - **Indian Wildlife (Protection) Act of 1972:** Schedule I

Black Corals

Why in News?

Recently, some researchers have discovered **five new species of Black Corals** living as deep as 2,500 feet (762 metres) below the surface in the **Great Barrier Reef** and Coral Sea off the coast of Australia.

Note:

What are Black Corals?

- Black corals (**Anthozoa: Antipatharia**) can be found growing **both in shallow waters and down to depths of over 26,000 feet (8,000 metres)**, and some individual corals can live for over 4,000 years.
- However, the taxonomy of **black corals is poorly known** compared to many other anthozoan groups
- Many of these corals are branched and look like feathers, fans or bushes, while others are straight like a whip.
- Unlike their colourful, shallow-water cousins that rely on the sun and photosynthesis for energy, black corals are filter feeders and eat tiny **zooplankton that are abundant in deep waters**.
- Similarly, to shallow-water corals that build colourful reefs full of fish, black corals act as important habitats where fish and invertebrates feed and hide from predators.

Newly Discovered Species of Honeybee

Why in News?

Recently, a new species of endemic honeybee named *Apis karinjodian* has been discovered in the **Western Ghats** after a gap of more than 200 years.

- The **last honeybee described from India was *Apis indica* in 1798 by Fabricius.**
- The new find has increased the species of honeybees in the world to 11.

What are the Key Specifications about the Species?

- **About:**
 - **Common Name:** Indian black honeybee.
 - *Apis karinjodian* has **evolved from *Apis cerana* morphotypes** that got acclimatised to the hot and humid environment of the Western Ghats.
 - Indian black honeybees are able to **produce a thicker honey which allows for increased honey production.**
 - Till date, **only a single species, *Apis cerana*** was noted across the plains of central and southern India and Sri Lanka as a 'fairly uniform population' in the Indian subcontinent.

- The research has **given a new direction to apiculture in the country by showing the presence of three species** of cavity nesting honey bees, namely *Apis indica*, *Apis cerana*, and *Apis karinjodian*.

Distribution:

- The distribution of *Apis karinjodian* ranges from the **central Western Ghats and Nilgiris to the southern Western Ghats**, covering the States of Goa, Karnataka, Kerala and parts of Tamil Nadu.

Protection:

- **IUCN Red List:** Near Threatened (NT)

Adaptation Gap Report 2022

Why in News?

According to the **United Nations Environment Programme's (UNEP)** Adaptation Gap Report, 2022, global efforts in adaptation planning, financing and implementation are **not enough to prepare vulnerable communities around the world to adapt to the rising risks from the impacts of climate change.**

- The report found some progress on adaptation plans from national governments, but **they are not backed by finance.**

What are the Findings of the Report?

- A third of the 197 parties to the **United Nations Framework Convention on Climate Change (UNFCCC)** have incorporated quantified and time-bound targets on adaptation. And **90% of them have considered gender and disadvantaged groups.**
- International adaptation **finance flows are 5-10 times lower than required** and this gap continues to grow. Finance for adaptation **increased to USD 29 billion in 2020, a 4% increase over 2019.**
 - This is when developing countries' estimated **annual adaptation needs are USD 160-USD 340 billion by 2030 and USD 315-USD 565 billion by 2050.**

What are the Steps Suggested by the Report?

- **A Nature-based Approach:** The report highlighted that the best way was to link actions on mitigation and adaptation in terms of planning, financing and implementation, which would provide co-benefits.

Note:



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- One example of this could be **nature-based solutions**.
- **Climate Adaptation:** Countries need to back the strong words in the Glasgow Climate Pact with strong action to increase adaptation investments and outcomes, starting at **COP27**.
- **Other Strategies:** The adaptation gap must be addressed in four critical ways:
 - **Increase Financing for Adaptation:** There is a need for developed countries to provide a clear roadmap for their promise of doubling finance for adaptation to USD 40 billion, which was decided at **COP 26** in Glasgow.
 - **A New Business Model:** The world urgently needs a new business model for **turning adaptation priorities into investable projects** as there is a mismatch between what governments propose and what financiers consider investable.
 - **Need for Data Implementation:** The availability of climate risk data and information, an issue for adaptation planning in many developing countries.
 - **Modified Warning Systems:** The implementation and operationalisation of early warning systems against extreme weather events and slow onset changes such as sea level rise.

What are India's Initiatives regarding Climate Finance?

- **National Adaptation Fund for Climate Change (NAFCC):**
 - It was **established in 2015** to meet the cost of adaptation to climate change for the State and Union Territories of India **that are particularly vulnerable to the adverse effects of climate change**.
- **National Clean Energy Fund:**
 - The Fund was created to promote clean energy, and funded through an initial **carbon tax** on the use of coal by industries.
 - It is **governed by an Inter-Ministerial Group** with the Finance Secretary as the Chairman.
 - Its mandate is to fund research and development of innovative **clean energy technology** in the fossil and non-fossil fuel-based sectors.
- **National Adaptation Fund:**
 - The fund was **established in 2014** with a corpus of Rs. 100 crores with the aim of **bridging the gap between the need and the available funds**.

- The fund is operated under the Ministry of Environment, Forests, and Climate Change (MoEF&CC).

International Day for Biosphere Reserves

Why in News?

From 2022 onwards, 3rd November will be celebrated as 'The International Day for Biosphere Reserves'.

What are Biosphere Reserves (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 Man and the Biosphere (MAB) Programme** by the Director-General of UNESCO following the decisions of the MAB International Coordinating Council (MAB ICC).
 - The **MAB Programme** is an intergovernmental scientific programme that aims to establish a scientific basis for enhancing the relationship between people and their environments.
 - Their status is internationally recognized.
- **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.

Note:

- **Transition Area:** The transition area is where communities foster socio-culturally and ecologically sustainable economic and human activities.

What is the Status of Biosphere Reserves in India/World?

- **In India:**
 - India at present has **18 notified biosphere reserves** spanning 60,000 sq km.
 - The **first biosphere reserve in India** was the blue mountains of the Nilgiris stretching over Tamil Nadu, Karnataka and Kerala.
 - The **largest biosphere reserve is the Gulf of Kachchh (Gujarat)** and the smallest is **Dibru-Saikhowa (Assam)**.
 - Other bigger biosphere reserves are the **Gulf of Mannar (Tamil Nadu)**, **Sunderbans (West Bengal)**, and Cold Desert (Himachal Pradesh).
- **Around the World:**
 - **About:**
 - There are **738 biosphere reserves in 134 countries**, including 22 transboundary sites, according to UNESCO.
 - **Region-Wise:**
 - The highest number of reserves are in **Europe and North America** followed by Asia and the Pacific, Latin America and the Caribbean, Africa and Arab states.
 - In **South Asia**, over 30 biosphere reserves have been established. The first one was the **Hurulu Biosphere Reserve, in Sri Lanka**, with 25,500 hectares of tropical dry evergreen forest.

Rainbow & Climate Change

Why in News?

Recently, a research has found out that the **changes in cloud cover and liquid precipitation** due to **increased greenhouse gas emissions** are projected to lead to a **net increase in mean global annual rainbow days**.

- Mean days of rainbows are expected to go up globally by **4.0–4.9%** in a year by 2100.

What has the Study Revealed about Rainbows?

- **Areas with Lesser Rainbows:**
 - Around 21–34% of land areas will lose rainbow days.
 - Areas that will lose rainbow days are projected to have **lower total precipitation by 2100**, except those in **Central Africa, Madagascar and central South America**.
 - All are projected to have **more annual dry days** and **less total annual cloud cover**.
- **Areas with Higher Rainbows:**
 - Around 66–79% will gain rainbow days under **higher emission futures**.
 - India is one of the countries where the **number of rainbow days will increase**.
 - African countries like Mali, Niger, Chad, Sudan and Ethiopia are also likely to experience more rainbow days.
 - Rainbow gain hotspots are mostly **located at higher latitudes or at very high elevations**, like the Tibetan Plateau, where warming is predicted to lead to less snow and more rain.
 - Two rainbow gain hotspots namely, **eastern Borneo and northern Japan**, will see overall precipitation increase but more dry days per year.

How is Rainbow & Climate Change Inter-related?

- **About:**
 - A rainbow is a **common atmospheric optical phenomenon**. It is a multicoloured arc in the sky that results **when water droplets refract sunlight**.
 - When sunlight **hits a rain droplet**, some of the light is **reflected**. The **electromagnetic spectrum** is made of light with many different wavelengths, and **each is reflected at a different angle**. Thus, spectrum is separated, producing a rainbow.
 - Rainbows can also be viewed around **fog, sea spray, or waterfalls**.
 - It is an optical illusion; **it does not actually exist in a specific spot in the sky**.
 - Rainbows are the result of the **refraction and reflection of light**.
 - Both refraction and reflection are phenomena that involve **a change in a wave's direction**.

Note:



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- A **refracted** wave may appear “bent”, while a **reflected** wave might seem to “bounce back” from a surface or other wavefront.
- The colors on a primary rainbow are always in order of their wavelength, from **longest to shortest**: red, orange, yellow, green, blue, indigo and violet.
- **Linkage with Climate Change:**
 - Human activities such as **burning fossil fuels** are warming the atmosphere, which **changes patterns and amounts of rainfall and cloud cover**.
 - Climate change will **alter the distribution of rainbow occurrence** by affecting **evaporation and convergence of moisture**.
 - This alters patterns of **precipitation and cloud cover**.

Tokhu Emong Festival

Why in News?

Nagaland is undertaking four-day **Tokhu Emong Bird Count (TEBC)**, the first avian documentation exercise to go beyond Amur falcons.

- The exercise has been **timed with the post-harvest Tokhu Emong festival of the Lothas**, the Naga community that dominates Wokha district of Nagaland.

What is Tokhu Emong Festival?

- A perfect blend of religion, culture and entertainment, ‘Tokhu Emong’ is **widely celebrated in Wokha district**.
- **Celebrated on 7th November every year**, this color-filled festival stretches over to 9 days.
- ‘Tokhu’ means **moving from house to house, collecting tokens and gifts** in form of natural resources and food. However, the meaning of ‘Emong’ is to **put a halt for the appointed time**.
- Significant attraction of this festival includes **community songs, dances, feast, fun and frolic**.
- Through the commencement of this festival, **people relive the stories of their ancestors composed decades before**.
- During the festival, **gracious offerings are made to the ‘Sky God’ and ‘Earth God’ seeking for blessings**.

What are Amur Falcons?

- Amur falcons, the **world’s longest travelling raptors** start travelling with the onset of winters.
- The raptors **breed in southeastern Siberia and northern China**, and **migrate in millions across India and then over the Indian Ocean to southern Africa** before returning to Mongolia and Siberia.
 - Their 22,000-kilometre **migratory route is one of the longest** amongst all avian species.
- They get their **name from the Amur River** that forms the **border between Russia and China**.
- **Doyang Lake in Wokha, Nagaland** is better known as a **stopover for the Amur falcons during their annual migration from their breeding grounds to warmer South Africa**.
 - Thus, **Nagaland (Pangti Village)** is also known as the “**Falcon Capital of the World**,”.
- The birds are the **least concern** under the **International Union for Conservation of Nature (IUCN) Red List**, but the species is **protected under the Indian Wildlife Protection Act, 1972, and the Convention on Migratory Species**, to which India is a signatory (which means it is mandatory to protect the birds).

Early Warning System in Himalayan Region

Why in News?

Recently, the National Geophysical Research Institute (NGRI) of the Council of Scientific and Industrial Research (CSIR) has begun field studies to put in place an **Early-Warning System in the Himalayan states** against major and sudden **floods, rockslides, landslips, glacier lake bursts and avalanches**.

What are the Early Warning Systems?

- **Early Warning System is an integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment**, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events.
- It helps **reducing harm to people and damage to assets ahead of impending hazards**, including **storms, tsunamis, droughts**, and heatwaves, to name a few.

Note:

- Multi-hazard early warning systems **address several hazards that may occur alone or simultaneously.**
- **Increasing the availability of multi-hazard early warning systems and disaster risk information is one of seven global targets set by the Sendai Framework for Disaster Risk Reduction 2015-2030.**

Center Restricts use of Glyphosate

Why in News?

The Ministry of Agriculture and Farmers Welfare has restricted the use of glyphosate, **a widely used herbicide**, citing health hazards for humans and animals.

- The new notification mandates that all certificates of registration for the chemical that companies have to get for its manufacture or sale have now to be returned to the registration committee.
- Failure to do so will result in appropriate action being taken under the **Insecticides Act of 1968.**

What is Glyphosate?

- **About:**
 - It is an Herbicide, **developed in 1970.**
 - Herbicide is an agent, usually chemical, for killing or inhibiting the growth of unwanted plants, such as residential or agricultural weeds and invasive species
 - Its **scientific name is N-(phosphonomethyl) glycine** under the **International Union of Pure and Applied Chemistry (IUPAC)** system of nomenclature.
- **Application:**
 - It is applied to the leaves of plants to kill weeds.
- **Usage in India:**
 - Glyphosate was highly accepted by **the tea planters** in the past two decades. It has a very good market size in the tea sector of West Bengal and Assam.
 - Presently, **its consumption is highest in Maharashtra** as it is becoming a key herbicide in sugarcane, maize and many fruit crops.

What are the Concerns?

- **Health Impacts:**
 - Health impacts of glyphosate range from **cancer, reproductive and developmental toxicity to neurotoxicity and immunotoxicity.**
 - Symptoms include irritation, swelling, burning of the skin, oral and nasal discomfort, unpleasant taste and blurred vision.
 - Some 35 countries have **banned or restricted** the use of glyphosate.
 - These include Sri Lanka, Netherlands, France, Colombia, Canada, Israel and Argentina.
- **Illegal Use:**
 - In India, glyphosate has been approved for use only in tea plantations and non-plantation areas accompanying the tea crop. Use of the substance anywhere else is illegal.
- **Threatens Agro Ecological nature of Farms:**
 - Allowing continued use of glyphosate in India will contribute to **widespread use of illegal herbicide tolerant crops.**

Mudumalai Tiger Reserve

Why in News?

The Forest Department is coming up with a **comprehensive strategy to deal with the spread of the invasive species like *Senna spectabilis*** which continues to spread rapidly in the buffer zone of the **Mudumalai Tiger Reserve (MTR)** in Nilgiris hill district.

- Invasive weeds such as ***Senna spectabilis*** and ***Lantana camara***, as well as wattle, had taken over vast swathes of the Nilgiris.
- The invasive weed has a **negative effect on local biodiversity**, crowding out native species and limiting food availability for wildlife.

What are the Key

Facts about Mudumalai Tiger Reserve?

- **About:**
 - At the tri-junction of three states, namely **Karnataka, Kerala, and Tamil Nadu**, it is located in the Nilgiris District of Tamil Nadu.
 - It has a common boundary with **Wayanad Wildlife Sanctuary** (Kerala) on the West, **Bandipur Tiger Reserve** (Karnataka) on the North, together

Note:

forming a large conservation landscape for flagship species such as Tiger and **Asian Elephant**.

- Mudumalai tiger reserve is among the 14 Indian tiger reserves that were awarded the **Conservation Assured | Tiger Standards (CA|TS) status** for effective management of target species.
- The climate of Mudumalai is moderate. It experiences cold weather during the month of December or the beginning of January and hot weather is experienced during the months of March and April.
- **Important Flora and Fauna:**
 - It has tall grasses, commonly referred to as "Elephant Grass", Bamboo of the giant variety, valuable timber species like Teak, Rosewood, etc.
 - There are **several species of endemic flora**. Such a varied habitat is inhabited by a variety of animals which include tigers, elephants, Indian Gaur, Panther, Sambar, Spotted Deer, Barking Deer, Mouse Deer, Common Langur, Malabar Giant Squirrel, Wild Dog, Mongoose, Jungle Cat, Hyena, among others.
 - This reserve has a wide variety of more than 260 species of birds.
 - **8% of bird species found in India** are recorded in Mudumalai.

Not on Track to Achieve Forest Goals

Why in News?

According to a new report, the **world is not on track to achieve forest goals of ending and reversing deforestation by 2030**.

- Ending deforestation is **critical for a credible pathway to the Paris Agreement's goal** of limiting warming by 1.5°C.

What are the Highlights of the Report?

- **Only 24% of the necessary commitments for emissions reductions** have been made so far.
- **Forest-based actions** can make an essential contribution to meeting the Paris Agreement's ambition. It can provide nearly **27% of the solution** to help avert climate catastrophe.

- Forest-based solutions provide a crucial annual mitigation potential of around four gigatonnes by 2030.
- Indigenous peoples and local communities play a key role in achieving these outcomes.
- High-Forest-Low-Deforestation (HFLD) countries store 18% of tropical forest carbon worldwide and their access to sufficient climate finance must be rapidly improved.
- **But current forest climate finance mechanisms are not adequate for rewarding their historical conservation** and resisting increasing pressures to deforest.

What are the Suggestions Given by the Report?

- Existing commitments must be transformed into reality and new commitments must urgently be made to **finance forests**, or we are at extreme risk of missing the milestone.
 - Only half of these commitments have been realised through **emissions reduction purchase agreements**. Funding for these commitments has not yet been disbursed.
- The countries must have **financial aid to scale up their actions** to develop and implement ambitious forest-based climate solutions.
- The **actions to protect, sustainably manage and restore forests** can deliver cost-effective climate change mitigation. These actions can also reverse declines in biodiversity and enhance resilience to climate change.
- **Emission reduction must be achieved every year post-2025 for the 2030 goals** to remain within reach.

Mangrove Alliance for Climate

Why in News?

During the **COP27 climate summit** in Sharm El Sheikh, Egypt, the **UAE and Indonesia** announced the "**Mangrove Alliance for Climate**."

What is the Mangrove Alliance for Climate (MAC)?

- It includes **UAE, Indonesia, India, Sri Lanka, Australia, Japan, and Spain**.

Note:

- It seeks to **educate and spread awareness worldwide on the role of mangroves in curbing global warming** and its potential as a solution for climate change.
- However, the **intergovernmental alliance works on a voluntary basis** which means that there are no real checks and balances to hold members accountable.
- Instead, the parties will decide their own commitments and deadlines regarding planting and restoring mangroves.
- The members will also share expertise and support each other in researching, managing and protecting coastal areas.

What are Mangroves?

- **About:**
 - Mangroves are defined as **assemblages of salt tolerant trees and shrubs** that grow in the intertidal regions of the tropical and subtropical coastlines.
 - They grow **luxuriantly in the places where freshwater mixes with seawater** and where sediment is composed of accumulated deposits of mud.
- **Features:**
 - **Saline Environment:** They can **survive under extreme hostile environments** such as high salt and low oxygen conditions.
 - **Low oxygen:** Underground tissue of any plant needs oxygen for respiration. But in a mangrove environment, the oxygen in soil is limited or nil.
 - For the purpose of breathing, they develop special roots called pneumatophores.
 - **Survival in Extreme Conditions:** With their roots submerged in water, mangrove trees thrive in hot, muddy, salty conditions that would quickly kill most plants.
 - **Viviparous:** Their **seeds germinate while still attached to the parent tree**. Once germinated, the seedling grows into a propagule.
 - A propagule is a vegetative structure that can become detached from a plant and give rise to a new plant. Examples include a bud, sucker, or spore.
- **Significance:**
 - **Mangroves trap and cycle various organic materials**, chemical elements, and important nutrients in the coastal ecosystem.

- They **provide one of the basic food chain resources** for marine organisms.
- They **provide physical habitat and nursery grounds** for a wide variety of marine organisms, many of which have important recreational or commercial value.
- Mangroves also serve as **storm buffers by reducing wind and wave action** in shallow shoreline areas.
- **Area Covered:**
 - **Global Mangrove Cover:**
 - The total mangrove cover in the world is one 1,50,000 sq kms.
 - Asia has the largest number of mangroves worldwide.
 - South Asia comprises 6.8% of the world's mangrove cover.
 - **Indian Mangrove Cover:**
 - India's contribution is **45.8% total mangrove cover in South Asia**.
 - According to the **Indian State Forest Report 2021**, Mangrove cover in India is 4992 sq. Km which is 0.15% of the country's total geographical area.
 - **Largest Mangrove Forest: Sundarbans** in West Bengal are the largest mangrove forest regions in the world. It is listed as a **UNESCO World Heritage Site**.
 - It is followed by **Gujarat and Andaman, and Nicobar Islands**.

What are the Challenges with Mangrove Conservation?

- **Commercialisation of Coastal Areas:**
 - Aquaculture, coastal development, rice and palm oil farming and industrial activities are **rapidly replacing these salt-tolerant trees and the ecosystems they support**.
- **Shrimp Farms:**
 - The emergence of shrimp farms have **caused at least 35% of the overall loss of mangrove forests**.
 - The rise of shrimp farming is a response to the increasing appetite for shrimp in the United States, Europe, Japan and China in recent decades.

Note:

- **Temperature Related Issues:**
 - A fluctuation of ten degrees in a short period of time is enough stress to damage the plant and freezing temperatures for even a few hours can kill some mangrove species.
- **Soil Related Issues:**
 - The soil where mangroves are rooted poses a challenge for plants as it is severely lacking in oxygen.
- **Excessive Human Intervention:**
 - During past changes in sea level, mangroves were able to move further inland, but in many places human development is now a barrier that limits how far a mangrove forest can migrate.
 - Mangroves also frequently suffer from oil spills.

Methane Alert and Response System

Why in News?

Recently the **United Nations (UN)** has decided to set up a **satellite-based** monitoring system “**MARS: Methane Alert and Response System**” for tracking **methane emissions** and alerting governments and corporations to respond.

- The MARS initiative is intended to **strengthen the efforts to cut methane emissions**.

What is Methane Alert and Response System (MARS)?

- **About:**
- The **MARS** was launched at the **27th Conference of Parties (COP27)** to the **United Nations Framework Convention on Climate Change** in Sharm El-Sheikh, Egypt.
- The data-to-action platform was set up as part of the **UN Environment Programme’s (UNEP)** International Methane Emissions Observatory (IMEO) strategy to get **policy-relevant data** into the right hands for emissions mitigation.
- The system will be the **first publicly available global system** to connect methane detection to notification processes transparently.

- **Objectives:**
 - MARS will integrate data from a large number of **existing and future satellites** that have the ability to **detect methane emission events** anywhere in the world, and send out notifications to the relevant stakeholders to act on it.
 - MARS will **track the large point emission sources**, mainly in the **fossil fuel** industry, but with time, would be able to detect emissions from **coal**, waste, livestock and rice fields as well.

Rhino Horns are Shrinking

Why in News?

According to a recent study, the horns of **Rhinoceroses** may have become smaller over time due to **selective pressure of hunting**.

- The study used an interesting research approach—analyzing **artwork and photographs of the animal** spanning more than five centuries.
- The study relied on a repository of images maintained by the **Netherlands-based Rhino Research Center (RRC)**.

What are the Key Facts about Rhino?

- **About:**
 - There are **five species of rhino** – white and black rhinos in Africa, and the greater one-horned, Javan, and Sumatran rhino species in Asia.
 - **IUCN Red List Status:**
 - **Black Rhino:** Critically endangered. Smaller of the two African species.
 - **White Rhino:** Near Threatened. Researchers have created an embryo of the northern white rhino by using In Vitro Fertilization (IVF) process.
 - **One-Horned Rhino:** Vulnerable
 - **Javan:** Critically Endangered
 - **Sumatran Rhino:** Critically Endangered. It has gone extinct in Malaysia.
- **Indian Rhino:**
 - **About**
 - Only the **Great One-Horned Rhino** is found in India.
 - Also known as Indian rhino, it is the **largest of the rhino species**.

Note:

- It is identified by a single black horn and a grey-brown hide with skin folds.
- They primarily graze, with a diet consisting almost entirely of grasses as well as leaves, branches of shrubs and trees, fruit, and aquatic plants.
- **Habitat:**
 - The species is restricted to small habitats in Indo-Nepal terai and northern West Bengal and Assam.
 - In India, rhinos are mainly found in Assam, West Bengal and Uttar Pradesh.
 - Assam has an estimated 2,640 rhinos in four protected areas, i.e. **Pabitora Wildlife Reserve**, Rajiv Gandhi Orang National Park, Kaziranga National Park, and **Manas National Park**.
 - About 2,400 of them are in the **Kaziranga National Park and Tiger Reserve (KNPTR)**.
- **Protection Status:**
 - **IUCN Red List:** Vulnerable.
 - **CITES:** Appendix I.
 - **Wildlife Protection Act, 1972:** Schedule I.
- **Threats:**
 - Poaching for the horns
 - Habitat loss
 - Population density
 - Decreasing Genetic diversity.

What are the Conservation Efforts in India?

- 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.
- In 2019, the Ministry of Environment Forest and Climate Change (MoEFCC) has begun a project to create **DNA profiles of all rhinos** in the country.
- **National Rhino Conservation Strategy:** It was launched in 2019 to conserve the greater one-horned rhinoceros.
- **Indian Rhino Vision 2020:** Launched in 2005, it 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.

World Heritage Glaciers under Threat: UNESCO

Why in News?

Recently, a study conducted by **UNESCO (United Nations Educational, Scientific and Cultural Organization)** has found that a third of the **glaciers on the UNESCO World Heritage list is under threat**, regardless of efforts to limit temperature increases.

- A glacier is a large, **perennial accumulation of crystalline ice**, snow, rock, sediment, and water that originates on land and moves down slope under the influence of its own weight and gravity. They are sensitive indicators of changing climate.

What are the Findings?

- **Threat to Glaciers:**
 - 50 UNESCO World Heritage sites are **home to glaciers, representing almost 10% of the Earth's total glacierized area**.
 - They include the highest (next to Mt Everest), the longest (in Alaska), and the last remaining glaciers in Africa.
 - These glaciers have been retreating at an accelerated rate **since 2000 due to CO₂ emissions**, which are **warming temperatures**.
 - They are currently losing **58 billion tons of ice every year** – equivalent to the combined annual water use of France and Spain – and are responsible for nearly 5% of observed global sea-level rise.
 - The glaciers under threat are in **Africa, Asia, Europe, Latin America, North America and Oceania**.
 - **Africa:** All World Heritage sites in Africa will very likely be **gone by 2050, including Kilimanjaro National Park and Mount Kenya**.
 - **Asia:** Glaciers in Three Parallel Rivers of **Yunnan Protected Areas (China)** – highest mass loss relative to 2000 (57.2%) and also the fastest melting glacier on the List.
 - **Europe:** Glaciers in **Pyrenees Mont Perdu (France, Spain)** – very likely to disappear by 2050.

Note:

➤ Significance of Glaciers:

- Half of humanity depends directly or indirectly on glaciers as their water source for domestic use, agriculture, and power.
- Glaciers are also pillars of biodiversity, feeding many ecosystems.
- When glaciers melt rapidly, millions of people face **water scarcity and the increased risk of natural disasters** such as flooding, and millions more may be displaced by the resulting rise in sea levels.

The Waste-to-Energy Programme

Why in News?

Recently, the Central Government has issued guidelines for rolling out its **waste-to-energy programme**, paving the way for companies to produce **biogas** and **bioCNG**, and **electricity** from **urban, industrial and agricultural waste and residues**.

What is the Waste-to-Energy Program?

➤ About:

- The program is part of an umbrella scheme, the **National Bioenergy Programme**.
- The government will offer **financial assistance** to project developers, while implementing agencies, including inspection firms, will be paid **service charges** for commissioning the waste-to-energy plants.

➤ Implementing Agency:

- **Indian Renewable Energy Development Agency (IREDA)** will be the implementing agency for the program.
 - IREDA will be paid a **service charge of 1% of Central Financial Assistance (CFA)** to process applications, besides **1% for the CFA** (minimum ₹50,000) for implementing, and monitoring the performance once the plants are commissioned.
- **Financial Assistance:**
 - The Centre will provide **financial assistance** of Rs 75 lakh per MW for new biogas plants and Rs 50 lakh per MW for existing units.
 - If the waste-to-energy plants are set up in special category states, such as the **North East, Himachal Pradesh, Sikkim, Jammu and Kashmir, Ladakh,**

Lakshadweep, Uttarakhand, and Andaman & Nicobar Islands, the eligible CFA will be **20% higher than the standard CFA pattern**.

What is National Bioenergy Programme?

➤ About:

- The **Ministry of New and Renewable Energy (MNRE)** has notified the National Bioenergy Programme.

➤ Sub-Schemes:

- **Waste to Energy Programme.**
- **Biomass Programme:**
 - Scheme to Support Manufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse) based cogeneration in Industries to support setting up of pellets and briquettes for use in power generation and non-bagasse-based power generation projects.
- **Biogas Programme:**
 - To support setting up of family and medium size Biogas in rural areas.

What is Biogas & BioCNG?

➤ Biogas:

- It mainly comprises **hydro-carbon** which is **combustible** and can produce heat and energy when burnt.
- Biogas is produced through a **biochemical process** in which certain types of **bacteria convert the biological wastes into useful bio-gas**.
- Since the useful gas originates from a biological process, **it has been termed as bio-gas**.
 - Methane gas is the **main constituent of biogas**.

➤ BioCNG:

- **Bio-CNG** is a **renewable fuel** obtained by purifying **biogas** – in contrast to **Compressed Natural Gas (CNG)**, a non-renewable source of energy. Biogas is produced when **microbes break down organic matter** like food, crop residue, waste water, etc.
- It is similar to natural gas in terms of its composition and properties, and is a cleaner alternative to fuels such as petrol and diesel.

What are the Benefits of Bio Energy?

➤ Pollution Free Cities:

- The biogas solution can help make our **cities clean and pollution-free**.

Note:



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- Leaching of toxic substances from landfills contaminates the groundwater.

➤ **Handling Organic Waste:**

- Installing large-scale municipal biogas systems can help cities **handle organic waste efficiently** to overcome the environmental and socio-economic challenges posed by overburdened landfills.

➤ **Helpful for Women:**

- Switching to biogas could be good for women because **they won't be exposed to harmful smoke and pollution**.

➤ **Will Transform Energy Dependence:**

- Biogas can play a critical role in **transforming the energy dependence of rural and agricultural communities**, which majorly depends on burning wood, dung, charcoal, coal and other fossil fuels for their energy needs.

What are Government's Initiatives for Promoting Biogas & Waste Management?

➤ **Biogas:**

- **SATAT Scheme**
- The Indian government and Niti Aayog have outlined roadmaps to hasten our transition towards green fuels and promote LNG, hydrogen and methanol.

➤ **Waste Management:**

- **National Dashboard on Elimination of Single Use Plastic and Plastic Waste Management**
- **Project REPLAN**
- **Solid Waste Management Rules, 2016**

New Species of Estuarine Crab

Why in News?

Recently, researchers have discovered a new species of **Estuarine Crab** at the **Mangroves** of Parangipettai near the **Vellar River estuary** (an area where river meets the ocean) in **Cuddalore district, Tamil Nadu**.

- The species has been named '**Pseudohelice Annamalai**' in recognition of **Annamalai University's 100 years of service** in education and research.

What are the Key Facts about Pseudohelice Annamalai?

➤ **About:**

- This is the first ever record of this genus, **Pseudohelice**, collected from high intertidal areas in front of the **Centre of Advanced Study (CAS)**.
 - Till date, **only two species**, namely "**Pseudohelice Subquadrata**" and "**Pseudohelice Latreilli**" have been confirmed within this genus.

➤ **Geography:**

- The species discovered is distributed around the **Indian subcontinent and the eastern Indian Ocean**.

➤ **Features:**

- **Pseudohelice annamalai** is distinguished by **dark purple to dark grey colouring**, with irregular light brown, yellowish brown, or white patches on the posterior carapace with light brown chelipeds.
- The new species is **small** and has a maximum width of up to 20 mm.
- This species is **not aggressive** and can move fast like other intertidal crabs.

➤ **Habitat:**

- The species inhabits **muddy banks of mangroves**, and the **burrows were located near the pneumatophores of Avicennia mangroves**.
- Burrows have a depth of 25-30 cm and are branched, with larger pellets around the entrance.

➤ **Significance:**

- The occurrence of Pseudohelice in India **links the distribution gap between the western Indian Ocean and the western Pacific Ocean**.
- The new species provides additional **evidence of the geographic isolation of the eastern Indian Ocean** for some marine organisms.

Dynamic Ground Water Resource Assessment, 2022

Why in News?

Recently, the Union Minister of Jal Shakti released the Dynamic Ground Water Resource Assessment Report for the entire country for the year 2022.

Note:



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What are the Highlights of the Assessment?

➤ Findings:

- The total annual ground water recharge is 437.60 Billion Cubic Meters (BCM) and the annual ground water extraction is 239.16 BCM.
 - Assessment indicates an increase in ground water recharge.
 - By comparison, an assessment in 2020 found that the annual groundwater recharge was 436 bcm and extraction 245 bcm.
 - Groundwater Recharge is a (hydrologic) process where the water from the surface of the earth seeps downwards and gets collected in aquifers. So, the process is also known as deep drainage or deep percolation.
 - The 2022 assessment suggests that groundwater extraction is the lowest since 2004, when it was 231 bcm.
- Further, out of the total 7089 assessment units in the country, 1006 units have been categorized as 'Over-exploited'.
- About 87% of total annual groundwater extraction i.e., 208.49 bcm is for irrigation use. Only 30.69 bcm is for Domestic & Industrial use, which is about 13 % of the total extraction.

➤ State wise Groundwater Extraction:

- The overall stage of groundwater extraction in the country is 60.08%.
- The stage of ground water extraction is very high in the states of Haryana, Punjab, Rajasthan, Dadra & Nagar Haveli and Daman & Diu where it is more than 100%.
- In the states of Delhi, Tamil Nadu, Uttar Pradesh, Karnataka and UTs of Chandigarh, Lakshadweep and Puducherry, the stage of ground water extraction is between 60-100%.
- In the rest of the states, the stage of ground water extraction is below 60 %.

What is the Status of Groundwater in India?

➤ About:

- India is the largest user of groundwater with a fourth of the total global withdrawal. Indian cities cater to about 48% of its water supply from groundwater.

- There are over 4,400 statutory towns and cities in India, with around 400 million residents, which will increase by up to 300 million by 2050.

➤ Issues with Groundwater Depletion:

- The unmanaged groundwater and increasing population may result in seasonal water shortages by 2050 for an estimated 3.1 billion people and perpetual water shortage for almost a billion.
- Further, water and food security will also be compromised and lead to poverty in the cities despite having good infrastructure development.

India's First Sovereign Green Bonds Framework

Why in News?

Recently, the Union Minister for Finance & Corporate Affairs has approved the final Sovereign Green Bonds Framework of India.

- Sovereign Green Bonds will be issued for mobilising resources for green projects.

What is Sovereign Green Bonds Framework?

- The Framework comes close on the footsteps of India's commitments under "Panchamrit" as elucidated by the Prime Minister at Conference of Parties (COP) 26 at Glasgow in November 2021.
- It will further strengthen India's commitment towards its Nationally Determined Contribution (NDCs) targets, adopted under the Paris Agreement.
- Green Finance Working Committee (GFWC) was constituted to validate key decisions on issuance of Sovereign Green Bonds.
- The framework has been rated 'Medium Green', with a "Good" governance score by a Norway-based independent second opinion provider CICERO.
 - The 'Medium Green' rating is assigned 'to projects and solutions that represent significant steps towards the long-term vision, but are not quite there yet.'
- All fossil fuel-related projects have been kept out of the framework, along with biomass-based renewable energy projects that rely on feedstock from 'protected areas'.

Note:



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What are Sovereign Green Bonds?

➤ About:

- **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 utilized for various purposes at the discretion of the issuer.

➤ Benefits of Sovereign Green Bonds:

- **Sovereign green issuance** sends a powerful signal of **intent around climate action** and **sustainable development** to governments and regulators.
- With the **International Energy Agency's (IEA)** 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.
- Development of a sovereign green benchmark could eventually **lead to the creation of a vibrant ecosystem** of raising green bonds from international investors.

➤ Status:

○ Global Status:

- **The Environmental, Social and Governance (ESG)** funds are estimated at USD 40 trillion with Europe accounting for about half this.
- It is estimated that by 2025, ESG assets will account for about one-third of the total global assets under management.
- The ESG debt funds pie is around USD 2 trillion, of which over 80% is "environmental" or green bonds, and the rest social and sustainability bonds.

○ National Status:

- According to the Climate Bonds Initiative, an international organization working to mobilize global capital for climate action, **Indian entities have issued green bonds for over USD 18 billion**.

Wetlands Conservation

Why in News?

In this **Anthropocene** era, human interference can be seen in every component of Earth's ecosystem. Due to such human-mediated changes, the loss of Shallow Wetlands such as lakes, ponds are becoming a major concern.

- The **Anthropocene Epoch** is an unofficial unit of geologic time, used to describe the **most recent period in Earth's history** when human activity started to have a significant impact on the planet's climate and ecosystem.

What are the Shallow Water Wetlands?

➤ About:

- These wetlands are **areas of permanent or semi-permanent water** with little flow. They include vernal ponds, spring pools, salt lakes and volcanic crater lakes.
- They are of enormous ecological importance and human need (such as drinking water and inland fisheries).
- Because of its shallow nature, **sunlight penetrates the bottom of the water body**.
- The temperature is isothermal, with a continuous mixing process (circulating top-to-bottom on a regular basis, **especially in a tropical country like India**).

➤ Concerns:

- Over time, these water bodies **get filled by sediments coming from the catchment**.
- Hence, the depth of the water column gradually declines. It is quite obvious that a small change in the temperature and rainfall pattern would have a cascade of ecological effects on this type of water body.
- From 1901-2018, **India's average temperature has risen by 0.7 degrees Celsius**. The rise is attributed to greenhouse gas-induced warming as well as land-use and land-cover change, according to a 2020 report by the Union Ministry of Earth Sciences.
- Such changes in temperature and heat distribution across the regional scale will have an impact on the rainfall pattern. Therefore, there is an **increasing threat to India's natural ecosystems**,

Note:



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freshwater resources, and agriculture, which ultimately impact biodiversity, food, water security, public health and society as a whole.

- An example of **Surajpur Bird Sanctuary** (an urban wetland in Yamuna River basin) -In October 2019, the water level in Surajpur wetlands was low with high algal production as well as smell and odour issues.

What is the Importance of Wetlands?

- **Highly Productive Ecosystems:** Wetlands are highly productive ecosystems that provide the world with nearly two-third of fish harvest.
- **Integral Role in the Ecology of the Watershed:** The combination of shallow water, high levels of nutrients are ideal for the development of organisms that form the base of the food web and feed many species of fish, amphibians, shellfish and insects.
- **Carbon Sequestration:** Wetlands' microbes, plants and wildlife are part of global cycles for water, nitrogen and sulphur. Wetlands store carbon within their plant communities and soil instead of releasing it to the atmosphere as carbon dioxide.
- **Lowering Flood Heights and Reduces Soil Erosion:** Wetlands function as natural barriers that trap and slowly release surface water, rain, snowmelt, groundwater and flood waters. Wetland vegetation also slow the speed of flood waters lowering flood heights and reduces soil erosion.
- **Critical to Human and Planet Life:** More than one billion people depend on them for a living and 40% of the world's species live and breed in wetlands.

What are the Threats to Wetlands?

- **Urbanisation:** Wetlands near urban centres are under increasing developmental pressure for residential, industrial and commercial facilities. Urban wetlands are essential for preserving public water supplies.
 - Delhi has more than 1,000 lakes, wetlands and ponds, according to the estimates of the Delhi Wetland Authority.
 - But most of these are threatened by **rampant encroachment (both planned and unplanned), pollution through dumping of solid waste** and construction debris.
- **Agriculture:** Vast stretches of wetlands have been converted to paddy fields. Construction of a large

number of reservoirs, canals and dams to provide for irrigation significantly altered the hydrology of the associated wetlands.

- **Pollution:** Wetlands act as natural water filters. However, they can only clean up the fertilizers and pesticides from agricultural runoff but not mercury from industrial sources and other types of pollution.
 - There is growing concern about the effect of industrial pollution on drinking water supplies and the biological diversity of wetlands.
- **Climate Change:** Increased air temperature, shifts in precipitation, increased frequency of storms, droughts, and **floods, increased atmospheric carbon dioxide** concentration, and sea level rise could also affect wetlands.
- **Dredging:** The removal of material from a wetland or river bed. Dredging of streams lowers the surrounding water table and dries up adjacent wetlands.
- **Draining:** Water is drained from wetlands by cutting ditches into the ground which collect and transport water out of the wetland. This lowers the water table and dries out the wetland.

What are the Efforts towards Wetlands Conservation?

- **Initiatives at Global Level:**
 - The **United Nations declared 2021-2030 the Decade on Ecosystem Restoration** with the aim to conserve and restore the terrestrial, aquatic and marine ecosystems.
 - **Ramsar Convention**
 - **Montreux Record**
 - **World Wetlands Day**
- **Initiatives at National Level:**
 - **Wetlands (Conservation and Management) Rules, 2017.**
 - **Action Plan of MoEFCC**

Provisional State of Global Climate Report, 2022

Why in News?

Recently, the **World Meteorological Organization (WMO)** released the provisional State of the Global Climate report, 2022.

Note:

- The full and final report is expected to be published in April, 2023.

What is the WMO State of the Global Climate report?

- The report is **produced on an annual basis**, complementing the most recent long assessment cycle provided by the **sixth IPCC Assessment Report**.
- The report provides an authoritative voice on the current state of the climate using key climate indicators and reporting on extreme events and their impacts.

What are the Highlights of the Report?

- **Increase in Concentration of Greenhouse Gases:**
 - The concentrations of three main **greenhouse gases**, carbon dioxide (CO₂), methane (CH₄) and Nitrous oxide (NO₂), were all at record highs in 2021. **Xenotransplantation**
 - The **emissions of methane, which is 25 times more potent than carbon dioxide** in causing global warming, in fact, increased at the fastest pace ever.
 - At the **climate change conference in Glasgow**, **countries had pledged to cut global methane emissions** by at least 30% by the year 2030.
- **Temperature:**
 - The **global average temperature in 2022 is estimated to be about 1.15 °C above** the 1850-1900 average.
 - 2015 to 2022 are likely to be the **eight warmest years on record**.
 - **La Niña** (a cooling of sea-surface waters in the equatorial Pacific Ocean) conditions have dominated since late 2020 and are expected to continue until the end of 2022.
 - **Continuing La Niña** has kept **global temperatures relatively low for the past two years** - albeit higher than the last significant La Niña in 2011.
- **Glaciers and Ice:**
 - In the European Alps, **glacier melt records were shattered in 2022**. Average thickness losses of between 3 and over 4 metres were measured throughout the Alps, substantially more than in the previous record year 2003.

- In Switzerland, **6% of the glacier ice volume was lost between 2021 and 2022**, according to initial measurements.
- For the first time in history, **no snow outlasted the summer season even at the very highest measurement sites** and thus no accumulation of fresh ice occurred.

➤ **Sea Level Rise:**

- **Global mean sea level has risen by an estimated 3.4 ± 0.3 mm per year** over the 30 years (1993-2022) of the satellite altimeter record.
- The rate has **doubled between 1993-2002 and 2013-2022** and sea level increased by about 5 mm between January 2021 and August 2022.

➤ **Ocean Heat:**

- The **ocean stores around 90% of the accumulated heat** from human emissions of greenhouse gases.
- The **upper 2000m of the ocean continued to warm to record levels in 2021**.
- Overall, **55% of the ocean surface experienced at least one marine heatwave** in 2022.
- In contrast only 22% of the ocean surface experienced a marine cold spell. Marine heatwaves are becoming more frequent, in contrast to cold waves.

➤ **Extreme Weather:**

- In East Africa, **rainfall has been below average in four consecutive wet seasons**, the longest in 40 years, with indications that the current season could also be dry.
- Record breaking rain in July and August, 2022 led to extensive flooding in Pakistan.
 - The **flooding came hard on the heels of an extreme heatwave** in March and April in both India and Pakistan.
- **Large parts of the northern hemisphere were exceptionally hot and dry.**
 - China had the most extensive and long-lasting heatwave since national records began and the second-driest summer on record.
- Large parts of **Europe sweltered in repeated episodes of extreme heat.**
 - The United Kingdom saw a new national record on 19th July, 2022 when the temperature topped more than 40°C for the first time.

Note:

What are the Steps taken to tackle Climate change?

- **National:**
 - **NAPCCC:**
 - To counter the emerging threats from climate change, India released its **National Action Plan to Combat Climate Change (NAPCC)**. It has 8 sub missions including **National Solar Mission**, **National Water Mission** etc.
 - **India Cooling Action Plan:** It provides an integrated approach towards cooling and related areas including reduction in the cooling demand. This would help reduce emissions thereby combating global warming.
- **Global:**
 - **Paris Agreement:**
 - It seeks to keep the rise in global temperatures “well below” 2°C from pre-industrial times, while “pursuing efforts” to limit it to 1.5°C.
 - **UN SDGs:**
 - These are 17 broad goals for achieving sustainable development in the society. Amongst them **Goal 13 exclusively focuses on tackling climate change.**
 - **Glasgow Pact:**
 - It was finally adopted by 197 parties in 2021 during the COP26 negotiations.
 - It has emphasized that stronger action in the current decade was most **critical for achieving the 1.5-degree target.**

Sandalwood Spike Disease

Why in News?

Recently, a study showed that **Sandalwood Spike Disease (SSD)** is posing a severe threat on the **Commercial Cultivation of Sandalwood.**

What is Sandalwood Spike Disease?

- **About:**
 - It is an infectious disease which is caused by **phytoplasma.**
 - Phytoplasmas are **bacterial parasites of plant tissues** — which are transmitted by insect vectors and involved in plant-to-plant transmission.

- There is no cure **as of now for the infection.**
 - Presently, there is **no option but to cut down and remove the infected tree** to prevent the spread of the disease.
- The disease was **first reported in Kodagu, Karnataka in 1899.**
 - More than a million sandalwood trees were removed in the Kodagu and Mysore region between 1903 and 1916.
- **Concerns:**
 - About 1% to 5% of sandalwood trees are lost every year due to the disease, scientists warn that it could wipe out the entire natural population if measures are not taken to prevent its spread.
 - Another concern is, **any delay in arresting the trend may result in the disease spreading to cultivated sandalwood trees.**
- **Recent Steps:**
 - In an effort to combat the killer disease, the **Institute of Wood Science and Technology (IWST)**, Bangalore joined hands with the Pune-based National Centre for Cell Sciences **for a three-year study**, initiated by the Union Ministry of AYUSH with a financial allocation of Rs. 50 lakhs.
 - IWST is a Centre of Excellence for Sandalwood Research and Wood Science.

What is Indian Sandalwood?

- **About:**
 - *Santalum album*, commonly known as Indian Sandalwood, is a **dry deciduous forest species native to China, India, Indonesia, Australia, and the Philippines.**
 - Sandalwood has been long **associated with the Indian heritage & culture, as the country contributed 85% of the world's sandalwood trade** erstwhile. However, lately this has been declining at a fast rate.
 - This small tropical tree grows to 20m high with red wood and a variety of dark colors of bark (dark brown, reddish and dark grey).
 - Because it is strong and durable, *S. album* is mostly harvested for its timber.
- **IUCN Red List Status:** Vulnerable
- **Uses:**
 - In India, it is also called “**Chandan**” and “**Srigandha**”. Sandalwood has a special place in

Note:

Indian tradition **where it is being used from cradle to cremation.**

- Sandalwood heartwood, which is close-grained, is used for fine furniture and carving. The heartwood and roots also **contain 'sandal oil'** which is valued for use in perfumes, incense, cosmetics, soaps, and medicines. The bark contains tannin, which is used for dye.
- Sandalwood essential **oil has antiseptic, anti-inflammatory, antispasmodic and astringent properties.**
 - It is used in aromatherapy to reduce stress, hypertension and heals wounds and treats skin blemishes.

➤ Major Growing Areas:

- In India, sandalwood is mostly grown in Andhra Pradesh, Telangana, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, and Tamil Nadu.

2022 Forest Declaration Assessment

Why in News?

Recently, the 2022 Forest Declaration Assessment was published, showing that the **Deforestation** rates worldwide declined only modestly in 2021 by 6.3 % compared to the 2018-20 baseline.

- Some 145 countries affirmed their commitment to halt and reverse forest loss and land degradation by 2030 at the 26th UN Climate Change Conference of the Parties (**COP26 in Glasgow (2021)**).
- Forest Declaration Assessment publishes annual updates on progress toward global forest goals.
 - In 2014, the **New York Declaration on Forests (NYDF)** was adopted as a political declaration calling for the end of natural forest loss and the restoration of 350 million hectares of degraded landscapes and forestlands by 2030.

What are the Findings?

➤ Overview

- Not a Single Global Indicator is on Track' to Reverse Deforestation by 2030.
- To be on course to halt deforestation completely by 2030, a 10% annual reduction is needed.

- While afforestation and restoration efforts have been commendable, more forest area is being lost than gained.
- Global **forest loss decreased in 2021**, but the crucial climate goal of stopping deforestation by 2030 would still be missed.

➤ Contributors to Deforestation:

- **Brazil was the world's largest** contributor to deforestation in 2021.
 - The country marked a **3% rise in the** rate of deforestation in 2021 compared to the baseline 2018-2020.
 - Although **Brazil didn't show a large increase, its total deforestation rates each year remained high** — making it the world's largest contributor.
- **Bolivia and the Democratic Republic of the Congo** underwent deforestation at 6 % and 3 %, respectively.

➤ Gain in Tree Cover:

- Global tree cover increased by 130.9 million hectares over the past two decades.
- Three-quarters of the global gain was concentrated in 13 countries.
- The most significant improvements were observed in **Russia (28.4 %), Canada, the United States, Brazil, and China.**
 - China showed the largest net gain in tree cover — 2.1 million hectares (Mha). India also marked a gain of 0.87 Mha in tree cover.
- Globally, 118.6 Mha of the total tree cover gain is likely due to natural regeneration and assisted **natural regeneration that occurred outside plantations.**

➤ Reduction in Deforestation:

- **Gabon** reduced deforestation by 28% in 2021 compared to 2018-20.
 - The country **implemented measures to combat illegal logging** and the enforcement of protected areas.
- **Indonesia** reduced deforestation **after implementing the forest moratorium** and improved enforcement measures.
 - The moratorium, which covers around 66 million hectares of primary forest and peatland (terrestrial wetland ecosystems), was first

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introduced in 2011 and has been renewed regularly as part of the **efforts to reduce emissions from fires caused by deforestation.**

- In **Brazil**, the decline in deforestation rates between 2004 and 2012 can be partly attributed to the **coordinated implementation of the Action Plan for the Prevention and Control of Deforestation** in the Amazon.
 - It created protected areas and effective monitoring systems.
- Recent years have seen legal interventions in the European Union, Ecuador and India to protect forests.
 - In 2021, a constitutional court in Ecuador **upheld the rights of nature enshrined in the country's constitution.**
- **Recommendation:**
 - It is essential to note that tree cover gain does not cancel out tree loss.
 - Forest cover gains **don't negate the impacts of forest loss** in terms of carbon storage, biodiversity, or ecosystem services. The highest priority efforts should be directed towards **safeguarding primary forests from losses in the first place.**
 - Forest finance **needs to be on track to meet global goals** to halt and reverse deforestation by 2030.
 - It will cost up to USD 460 billion per year to protect, restore and enhance forests on a global scale.
 - Currently, domestic and international mitigation finance for forests averages USD 2.3 billion per year — less than 1 % of the required.
 - Forest funding must increase by up to **200 times to meet 2030 goals.**
 - Forests are the backbone of our economies and crucial to our wellbeing. It is now more important than ever **to speed up action and concerted efforts to halt deforestation and scale up restoration in a way that benefits people, nature and climate.**
 - This means more ground-up inclusive solutions, stronger collaboration and coordination among the **public and private sectors and the civil society, and moving from commitments to implementation.**

Emissions Gap Report 2022: UNEP

Why in News?

Ahead of COP27, the **United Nations Environment Programme (UNEP)** released a report titled '**Emissions Gap Report 2022: The Closing Window — Climate Crisis Calls for Rapid Transformation of Societies**'.

- This is the **13th edition** of the **UNEP Emissions Gap Report**. It assesses the gap between anticipated emissions in 2030 and levels consistent with the 1.5°C and 2°C targets of the **Paris Agreement**. Every year, the report features ways to bridge the gap.

What are the Findings?

- **The top 7 emitters** (China, the EU27, India, Indonesia, Brazil, the Russian Federation and the United States of America) plus international transport accounted for 55% of global GHG emissions in 2020.
 - For these countries GHG emissions rebounded in 2021, **exceeding pre-pandemic 2019 levels.**
- **Collectively, G20 members** are responsible for 75% of global **GHG (Greenhouse Gas Emission)** emissions.
- The global average per capita GHG emissions was **6.3 tonnes of CO₂ equivalent (tCO₂e) in 2020.**
 - India remains **far below the world average at 2.4 tCO₂e.**
- World is falling **short of the goals set forth in the Paris Climate Agreement** adopted in 2015, with no **credible pathway to 1.5°C in place.**
 - The Paris Agreement defined a global warming limit of 2°C above pre-industrial levels (preferably 1.5°C), which if exceeded, can result in **extreme weather events** such as extreme **heat waves, droughts, water stress**, etc.
- National pledges since **COP26 (Glasgow, UK)** make a **negligible difference to predict 2030 emissions.**

What are the Recommendations?

- The world needs to reduce greenhouse gasses by unprecedented levels **over the next eight years.**
- There is a need for **alternative technologies in heavy industry**, to reverse the rise in carbon intensity of global steel production.

Note:



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- Urgent transformation is needed to deliver the **enormous cuts needed to limit GHG emissions by 2030**.
- Unconditional and conditional **NDCs (Nationally Determined Contributions)** are expected to reduce global emissions by 5% and 10%, respectively, by 2030, when compared to current policies.
- To be on the most cost-effective path to limiting global warming to 2°C or 1.5°C, these percentages must reach 30% and 45%.

Lancet Countdown on Health and Climate Change

Why in News?

Recently a report was released titled **Lancet countdown on health and climate change: health at the mercy of fossil fuels**, showing that from 2000-2004 to 2017-2021, **heat-related deaths increased by 55% in India**.

- This report comes ahead of this year's **United Nations climate change conference (COP27)**, to be held in Sharm El Sheikh, Egypt.
- The report represents the **work of 99 experts from 51 institutions**, including the **World Health Organization (WHO)** and the **World Meteorological Organization (WMO)**.

What is Lancet Countdown on Health and Climate Change Report?

- The Lancet Countdown on Health and Climate Change, published annually, is an **international, multidisciplinary collaboration, dedicated to monitoring the evolving health profile of climate change**, and providing an independent assessment of the delivery of commitments made by governments worldwide under the **Paris Agreement**.
- The countries considered in the modelling study represent **50% of the world's population and 70% of the world's emissions** – Brazil, China, Germany, India, Indonesia, Nigeria, South Africa, the UK and the US.
- The Lancet Countdown report was established following the 2015 Lancet Commission on Health and Climate Change.

- It tracks **43 indicators across five key domains**:
 - Climate Change impacts, Exposures and Vulnerability; adaptation, Planning, and resilience for health; mitigation actions and health co-benefits; economics and finance and public and political engagement.

What are the Findings of the Report?

- **Subsidies Causing Global Problems:**
 - Subsidies to fossil fuel consumption in **many countries are causing global problems, including deterioration of air quality**, decline in food output and increased risk of infectious disease linked to higher carbon emissions.
 - In 2021, 80% of the countries reviewed provided some form of fossil fuel subsidy, totaling USD 400 billion.
 - In 2019, India spent a net USD 34 billion on fossil fuel subsidies, accounting for 5% of total national health spending.
 - **Over 3,30,000 people died in India in 2020** as a result of exposure to **fossil fuel pollutants**.
 - **Effects of Rising Temperature on Age Groups:**
 - From 2012-2021, infants under one year old experienced an average of 72 million more person-days of heatwaves per year, compared to 1985-2005.
 - **Adults over the age of 65 in India** experienced 301 million more person-days during the same time period.
 - From 2000-2004 to 2017-2021, heat-related deaths **increased by 55% in India**.
- **Impact on GDP:**
 - In 2021, Indians lost **167.2 billion potential labour hours** due to heat exposure with income losses equivalent to about 5.4% of national GDP.
- **Dengue Transmission:**
 - From 1951-1960 to 2012-2021, the number of months suitable for dengue transmission by Aedes Aegypti rose by 1.69%, reaching 5.6 months each year.

Green Crackers

Why in News?

Recently, a lot of the pollution observed during Diwali can be attributed to the burning of firecrackers or fireworks.

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What are the Green Crackers?

- **Green crackers** are dubbed as 'eco-friendly' crackers and are known to cause less air and noise pollution as compared to traditional firecrackers.
- These crackers were **first designed by the National Environmental and Engineering Research Institute (NEERI)**, under the aegis of the Council for Scientific and Industrial Research (CSIR) in 2018.
 - NEERI is a constituent of CSIR to conduct research and developmental studies in environmental science and engineering.
- These crackers replace certain hazardous agents in traditional crackers with less polluting substances with the aim to reduce the noise intensity and emissions.
- Most green crackers **do not contain barium nitrate**, which is the most dangerous ingredient in conventional crackers.
- Green crackers **use alternative chemicals such as potassium nitrate and aluminium** instead of magnesium and barium as well as carbon instead of arsenic and other harmful pollutants.
- Regular crackers also produce 160-200 decibels of sound, while that from green crackers are limited to about 100-130 decibels.

How can one Identify Green crackers?

- Presently, three brands of green crackers are available for purchase:
 - **SWAS - Safe Water Releaser:** These crackers do not use sulphur or potassium nitrate, and thus release water vapour instead of certain key pollutants. It also deploys the use of diluents, and thus is able to control particulate matter (PM) emissions by upto 30%.
 - **STAR – Safe Thermite Cracker:** Just like SWAS, STAR also does not contain sulphur and potassium nitrate, and besides controlling particulate dust emissions, it also has lower sound intensity.
 - **SAFAL – Safe Minimal Aluminium:** It replaces aluminium content with magnesium and thus produces reduced levels of pollutants.
- All three brands of green crackers **can currently only be produced by licensed manufacturers, approved by the CSIR.** Additionally, the **Petroleum and Explosives Safety Organisation (PESO)** is tasked with

certifying that the crackers are made without arsenic, mercury, and barium, and are not loud beyond a certain threshold.

- Furthermore, green crackers can be differentiated from conventional crackers in retail stores by a **green logo printed on their boxes**, along with a Quick Response (QR) coding system.

What is Petroleum and Explosives Safety Organisation?

- PESO is an office under the Department for Promotion of Industry and Internal Trade, **Ministry of Commerce and Industries.**
- It was established in 1898 as a nodal agency for **regulating safety of substances such as explosives, compressed gases and petroleum.**
- Its head office is located in **Nagpur, Maharashtra.**

What are the Concerns regarding Green Crackers?

- Since green crackers **can only be legally manufactured by firms that have signed agreements with the CSIR**, no small-scale business or cottage business house can manufacture green crackers, which coupled with a ban on traditional fireworks, would leave very many unemployed this time of the year.
- There is a **general lack of awareness amongst both the sellers and the public** on how to identify the right green crackers. In fact, experts have cautioned against purchasing green crackers from street vendors as the items may not be credible.
- It is also revealed that most customers prefer 'traditional' crackers due to a **lack of availability of green crackers**, or due to their higher prices.

Second Species of the Genus Allmania

Why in News?

Recently, a **new species of the genus Allmania** named **Allmania multiflora** has been identified.

What are the Key Highlights about the New Species?

- **About:**
 - **Allmania multiflora** grows to a height of about **60 cm** and is **only the second species** of this genus discovered to date.

Note:

- The first species, *Allmania nodiflora*, was originally published under the genus *Celosia* as *Celosia nodiflora* in 1753. Specimens found in Ceylon (Sri Lanka) were first described as *Allmania nodiflora* in 1834.
- Shorter tepals and wider gynoeceum (parts of the flower), shorter bracts and in the diameter of the seeds are among the characteristics that distinguishes it from *Allmania nodiflora*. Flowering and fruiting occurs from May to September.
 - The species is quite special from both the botanical and conservation points of view.
 - *Allmania multiflora* has been so named for having a higher number of florets within an inflorescence.
 - *Allmania multiflora* is an annual herb, erect, with branches arising from the base.
 - The stem is red to violet at the base and green above.

➤ **Protection Status:**

- **IUCN:** Critically Endangered.

➤ **Threats:**

- It could be accidentally exploited by local people as a vegetable along with amaranths.
- Its habitat, granite hillocks, too faced various forms of threats today.

Great Indian Bustards (GIBs)

Why in News?

The recent sighting Great Indian Bustards (GIBs) deep in Pakistan's Cholistan desert has given rise to speculation that the endangered birds might have flown across the international border from India's Desert National Park (DNP).

What are the Key Points About Great Indian Bustard (GIB)?

➤ **About:**

- The Great Indian Bustard (*Ardeotis nigriceps*), the **State bird of Rajasthan**, 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**.

➤ **Threat:**

- 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 (IUCN): 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 I**

➤ **Measures taken to protect GIB:**

- **Species Recovery Programme:**
 - It is kept under the species recovery programme under the **Integrated Development of Wildlife Habitats** of the Ministry of Environment, Forests and Climate Change (MoEFCC).
- **National Bustard Recovery Plans:**
 - It is currently being implemented by conservation agencies.
- **Conservation Breeding Facility:**
 - MoEF&CC, Rajasthan government and Wildlife Institute of India (WII) have also established a conservation breeding facility in **Desert National Park at Jaisalmer** in June 2019.
 - The objective of the programme is to build up a captive population of Great Indian Bustards and to release the chicks in the wild for increasing the population.
- **Project Great Indian Bustard:**
 - It has been launched by the Rajasthan government with an aim of constructing breeding enclosures for the species and developing infrastructure to reduce human pressure on its habitats.
- **Eco-Friendly Measures:**
 - Task Force for suggesting eco-friendly measures to mitigate impacts of power transmission lines and other power transmission infrastructures on wildlife including the Great Indian Bustard.

Note:

What are the Key Point**About Desert National Park?**

- It is situated on the western border of India within **Jaisalmer & Barmer Districts** of Rajasthan.
- Great Indian Bustards, Rajasthan State animal (Chinkara) and State tree (khejri) and State flower (Rohida) are found naturally at this park.
- It was declared a **UNESCO World Heritage Site in 1980** and National Park in 1992.

New Varieties of Neelakurinji Flowers

Why in News?

Recently, **6 new varieties of Neelakurinji Flowers** have been identified in the **Kallippara hills in Santhanpara** region of Western Ghats.

- Neelakurinji Flowers are in full bloom on a vast area on the Kallippara hills in Idukki, Kerala.

What are Neelakurinji Flowers?**About:**

- In Neelakurinji, '**Neela**' means blue, and '**Kurinji**' refers to the flowers.
 - At maturity, the light blue color of the flowers changes to purple bluish.
 - The flowers give the '**Nilgiri Mountain Range**' its name.
 - The plant is named after the famous **Kunthi River** which flows through Kerala's **Silent Valley National Park**, where the plant occurs abundantly
 - It usually grows at an **elevation of 1,300-2,400m**.

Scientific Name:

- *Strobilanthes Kunthiana*

New Varieties Discovered:

- The types of neelakurinji flowers that have been identified from the hill ranges include:
 - **Strobilanthes Anamallai**
 - **Strobilanthes Heyneanus**
 - **Strobilanthes Pulneyensis**
 - **Strobilanthes Neosper**

Habitat:

- All neelakurinji species are **endemic to the Shola Forest of Western Ghats**.
- According to statistics, there are more than 40 different varieties of neelakurinji in India.

Flower Bloom:

- Flower Bloom takes place **once in 12 years** as the **pollination of flowers** needs a longer period.
 - It bloomed for the last time in 2006. The next bloom was expected to happen in 2018, but because of **forest fires**, Neelakurinji were not seen that year.

Other Facts:

- Tamil Nadu's '**Paliyan**' tribe used the Neelakurinji flowers to calculate age.
- There are almost 250 Neelakurinji species in the world.

E-Waste Day

Why in News?

International E-Waste Day is held on October 14 every year since 2018 as an opportunity to reflect on the impacts of e-waste.

- This year's theme is '**Recycle it all, no matter how small**'.
- Roughly 5.3 billion mobile/smartphones will drop out of use in 2022, according to **non-profit Waste Electrical and Electronic Equipment (WEEE) Forum**, which started the day in 2018.

What is WEEE Forum?

- It is the world's largest multi-national centre of competence as regards operational know-how concerning the management of waste electrical and electronic equipment (or 'WEEE', for short).
- It is a **not-for-profit association of 46 WEEE producer responsibility organisations** across the world and was founded in April 2002.
- Through exchange of best practice and access to its reputable knowledge base toolbox, the WEEE Forum enables its members to improve their operations and be known as **promoters of the circular economy**.

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What is E-Waste?

- E-Waste is short for Electronic-Waste and the term is **used to describe old, end-of-life or discarded electronic appliances**. It includes their components, consumables, parts and spares.
- Laws to manage e-waste have been in place in India since 2011, mandating that only authorised dismantlers and recyclers collect e-waste. **E-waste (Management) Rules, 2016** was enacted in 2017.
- **India's first e-waste clinic** for segregating, processing and disposal of waste from household and commercial units has been set-up in **Bhopal, Madhya Pradesh**.
- Originally, the **Basel Convention** (1992) did not mention e-waste but later it addressed the issues of e-waste in 2006 (COP8).
 - The **Nairobi Declaration** was adopted at COP9 of the Basel Convention on the Control of the Trans-boundary Movement of Hazardous Waste. It aimed at creating innovative solutions for the environmentally sound management of electronic wastes.

What are the Challenges Related to the Management of E-Waste in India?

- **Less Involvement of People:** A key factor in used electronic devices not being given for recycling was because consumers themselves did not do so. However, in recent years, countries around the world have been attempting to pass effective '**right to repair**' laws.
- **Involvement of Child Labor:** In India, about 4.5 lakh child laborers in the age group of 10-14 are observed to be engaged in various E-waste activities and that too without adequate protection and safeguards in various yards and recycling workshops.
- **Ineffective Legislation:** There is the absence of any public information on most State Pollution Control Boards (SPCBs)/PCC websites.
- **Health Hazards:** E-waste contains over 1,000 toxic materials, which contaminate soil and groundwater.
- **Lack of Incentive Schemes:** No clear guidelines are there for the unorganized sector to handle E-waste. Also, no incentives are mentioned to lure people engaged to adopt a formal path for handling E-waste.
- **E-waste Imports:** Cross-border flow of waste equipment into India- 80% of E-waste in developed

countries meant for recycling is sent to developing countries such as India, China, Ghana, and Nigeria.

- **The Reluctance of Authorities' Involved:** Lack of coordination between various authorities responsible for E-waste management and disposal including the non-involvement of municipalities.
- **Security Implications:** End of life computers often contain sensitive personal information and bank account details which, if not deleted leave opportunity for fraud.

What are the Provisions regarding E-waste in India?

- India has a formal set of rules for electronic waste management, first announced these rules in 2016 and amended it in 2018.
 - Recently, the Ministry of Environment, Forest and Climate Change has released the **draft notification for Electronic Waste Management**.
- The Ministry of Environment, Forest and Climate Change notified the **E-Waste Management Rules, 2016** in supersession of the E-waste (Management & Handling) Rules, 2011.
- Over 21 products (Schedule-I) were included under the purview of the rule. It included Compact Fluorescent Lamp (CFL) and other mercury containing lamps, as well as other such equipment.
- For the first time, the rules brought the producers under **Extended Producer Responsibility (EPR)**, along with targets. Producers have been made responsible for the collection of E-waste and for its exchange.
- Various producers can have a separate Producer Responsibility Organisation (PRO) and ensure collection of E-waste, as well as its disposal in an environmentally sound manner.
- **Deposit Refund Scheme** has been introduced as an additional economic instrument wherein the **producer charges an additional amount as a deposit** at the time of sale of the electrical and electronic equipment and returns it to the consumer along with interest when the end-of-life electrical and electronic equipment is returned.
- The **role of State Governments** has been also introduced **to ensure safety, health and skill development of the workers** involved in dismantling and recycling operations.

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- A provision of penalty for violation of rules has also been introduced.
- **Urban Local Bodies** (Municipal Committee/Council/ Corporation) have been **assigned the duty to collect and channelize** the orphan products to authorized dismantlers or recyclers.
- Allocation of proper space to existing and upcoming industrial units for e-waste dismantling and recycling.

Glaciers in the Alps Melting Faster than Ever

Why in News?

A new study revealed that, in 2022 Switzerland's glaciers have lost an **average of 6.2 % of their ice**.

What are the Findings?

- **Saharan Sand and a Huge Heatwave:**
 - Across the Alps, the preceding winter had very limited snowfall and therefore glaciers were not well insulated against the forthcoming summer melt season.
 - Spring was particularly harsh as natural atmospheric weather patterns carried Saharan dust to Europe and blanketed the Alpine landscape.
 - Since dust absorbs more solar energy than snow the now orange-tinted snow melted faster.
 - A major heat wave **saw temperature records breaking across Europe**, with parts of the UK reaching 40° Celsius for the first time.
 - The last time glaciers had an extreme melt season was in 2003, when 3.8 % of glacier ice **melted across Switzerland**.
- **Unprecedented Alps Glacier Melt:**
 - The extent of glacier melting depends on the **altitude at which it is located**, the steeper the glacier tongue is the **heavier it is covered with debris**.
 - In Switzerland, **these glacial meltwaters are used for hydropower**.
 - Austrian glaciers have also lost more glacial ice in 2022 than they have in 70 years of observations and therefore it is quite clear that severe melt has been the norm in 2022.

- So, one consequence is that **melting glaciers help to compensate for low rainfall in times of drought**, filling reservoirs to supply the nation's energy supply.
- Melting glaciers have **created more than 1,000 new lakes across** the mountains.
- This year, for the first time ever, the **frozen ground (Permafrost)** that binds rocks together — was **thawing and causing almost constant rockfalls**.

Indian Bison (Gaur)

Why in News?

Recently, **Sri Lanka asked India to translocate 6 Indian Bisons** to reintroduce them in the island from where they became extinct by the end of 17th century.

- If the project is cleared, it would be the first such agreement between India and Sri Lanka.

What are the Important Facts about Indian Bison?

- **About:**
 - The **Indian Bison or Gaur (*Bos gaurus*)** is the **tallest species of wild cattle found in India and largest extant bovine**.
 - There are about **13,000 to 30,000 gaurs in the world** with approximately **85% of the population present in India**.
 - The **first-ever population estimation exercise** of the Indian gaur carried out in the **Nilgiris Forest Division** in February 2020 estimated around **2,000 Indian gaurs to be inhabiting the division**.
- **Geography:**
 - It is native to **South and Southeast Asia**.
 - In **India**, they are very much **prevalent in the Western Ghats**.
 - They are primarily found in **Nagarhole National Park**, **Bandipur National Park**, Masinagudi National Park and **Biligirirangana Hills (BR Hills)**.
 - It is also found in **Burma and Thailand**.
- **Habitat:**
 - They prefer **evergreen forests and moist deciduous forests**.

Note:



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- However, they can survive in **dry deciduous forests** also.
- They are **not found** in the **Himalayas** with an altitude **greater than 6,000 ft.**
 - They generally stick to the **foothills only.**
- **Food Habits:**
 - The Indian Bison is a **grazing animal** and generally feeds in the **early morning and in the late evenings.**
- **Conservation Status:**
 - **Vulnerable** in **IUCN Red List.**
 - Included in the **Schedule I** of the **Wild Life Protection Act, 1972.**
- **Threats:**
 - **Food Scarcity:** Due to the destruction in the grasslands, planting of commercially important trees, invasive plant species and indiscriminate grazing of domestic animals
 - **Poaching:** For their commercial value as well as due to the high demand of gaur meat.
 - **Habitat Loss:** Due to deforestation and commercial plantations.
 - **Human-Animal Conflict:** Due to living in proximity with human habitations.

Giraffe

Why in News?

About 150 years ago, British colonists brought batches of northern giraffes from their other colonial possessions in Africa.

What are the Key Points About Giraffes?

- **General:**
 - **Physiological Characteristics:**
 - Giraffe, (genus Giraffa) are any of the four species in the genus Giraffa of long-necked cud-chewing hoofed mammals of **Africa**, with long legs and a **coat pattern of irregular brown patches** on a light background.
 - Using prehensile (**grabby**) tongues almost half a metre long, they are able to browse foliage almost six metres from the ground.
 - **Both sexes have a pair of horns**, though males possess other bony protuberances on the skull.

- **Eating Habits:**
 - Giraffes prefer to eat new shoots and leaves, mainly from the **thorny acacia tree.**
 - Giraffes **obtain most water from their food**, though in the dry season **they drink at least every three days.**
- **Geographical Location:**
 - Giraffes are a **common sight in grasslands and open woodlands in East Africa.**
- **Indian Giraffe:**
 - The **largest captive herd of the northern Giraffe** (29 individuals) in India is at the **Alipore Zoological Garden in Kolkata.**
 - A recent genealogical study has confirmed that the individuals in this facility, at least, are most likely the **Nubian giraffes** or the **Rothschild giraffe.**
 - The Nubian giraffe is the nominate subspecies of giraffe which used to be widespread everywhere in Northeast Africa. However, **95% of the population of Nubian Giraffe has declined in the past 3 decades.**
 - Rothschild's giraffe is **one of the tallest subspecies**, growing up to 6m tall. Its colouring is unique compared to other giraffes as their markings stop halfway down their legs.
- **IUCN Red List Status:**
 - Nubian giraffes - Critically Endangered
 - Rothschild giraffe – Endangered

Sukapaika River

Why in News?

The Sukapaika River which stopped flowing 70 years ago, is **set to be rejuvenated** as the Odisha government has started working on its revival plan following a recent direction from the **National Green Tribunal (NGT).**

What are the Key Points of Sukapaika River?

- Sukapaika is **one of the several distributaries of the mighty Mahanadi river in Odisha.**
- It **branches away from the Mahanadi at Ayatpur village** in Cuttack district and flows for about 40 kilometres (km) before rejoining its parent river at Tarapur in the same district.

Note:



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- Sukapaika river is an **important system of the Mahanadi to control floodwater** and maintain the flow in the river as well as the Bay of Bengal.

What are the Key Points of Mahanadi River?

- **About:**
 - The Mahanadi River system is the **third largest of peninsular India after Godavari and Krishna**, and the largest river of Odisha state.
 - The catchment area of the river extends to Chhattisgarh, Madhya Pradesh, Odisha, Jharkhand and Maharashtra.
 - Its basin is bounded by the Central India hills on the north, by the Eastern Ghats on the south and east and by the **Maikala range** in the west.
- **Source:**
 - It rises from a place near Sihawa, in the Dhamtari district of Chhattisgarh.
- **Major Tributaries:**
 - The Seonath, the Hasdeo, the Mand and the Ib joins Mahanadi from left whereas the Ong, the Tel and the Jonk joins it from right.
- **Major Dams/Projects on Mahanadi:**
 - **Hirakud Dam:** This is the longest dam of India.
 - Ravishankar Sagar, Dudhawa Reservoir, Sondur Reservoir, Hasdeo Bango and Tandula are other major projects.
- **Industries:**
 - Mahanadi basin, because of its rich mineral resource and adequate power resource, has a favourable industrial climate.
 - Iron and Steel plant at Bhilai
 - Aluminium factories at Hirakud and Korba
 - Paper mill near Cuttack
 - Cement factory at Sundargarh.
 - Other industries based primarily on agricultural produce are sugar and textile mills.
 - Mining of coal, iron and manganese are other industrial activities.

Blue Flag Certification

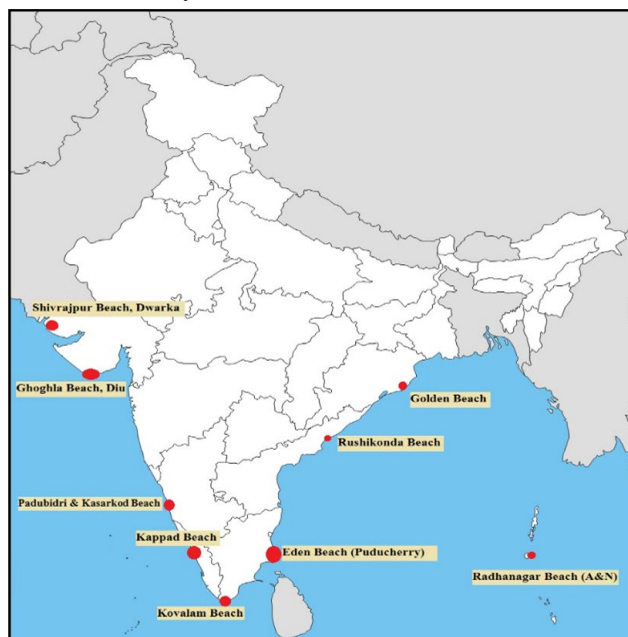
Why in News?

Recently, the Blue Flag certification has been accorded to two new beaches - **Minicoy Thundi Beach and Kadmat Beach**- both in **Lakshadweep**.

- This takes the number of beaches certified under the Blue Flag certification to 12.

What is Blue Flag Certification?

- **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)**.



Note:

What is 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** are 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.

Impact of Heatwaves on Children: UNICEF

Why in News?

Recently, **UNICEF (United Nations Children's Fund)** released a report titled "**Coldest Year of the Rest of Their Lives - Protecting children from the escalating impacts of heatwaves**", showing that nearly all the children across the world will be exposed to more frequent and severe heat waves by 2050.

- UNICEF is a special program of the **United Nations (UN)** devoted to aiding national efforts to improve the health, nutrition, education, and general welfare of children.

What are the Findings of the UNICEF Report?

- **Current Scenario:**
 - Around **559 million children** are exposed to high **heatwave** frequency and around 624 million children are exposed to **one of three other high heat measures** - High heatwave duration, High heatwave severity and Extreme high temperatures.
 - One in four children lives in areas where the average heatwave event **lasts 4.7 days or longer as of 2020.**

- This percentage will **rise to over three in four children** under a low-emission scenario **by 2050.**
 - Children in southern, western and south-eastern Asia, eastern and southern Europe and northern Africa experience **heatwaves of longer duration.**

➤ Future Impact

- The number of children exposed to high heat waves **will quadruple to over two billion** by 2050 — up from 24% of children in 2020.
 - This amounts to an increase of about 1.5 billion children.
- Virtually every child on earth will face severe heat waves even under a **low greenhouse gas emission scenario** — with an estimated 1.7°C of warming in 2050.
- At 2.4 degrees of warming, 94% of children will be exposed with only **small areas of southern America**, central Africa, Australasia and **Asia not exposed to high heatwave duration.**

➤ Higher Vulnerability of Children:

- Heat Waves with longer duration pose more risks for children as they spend more time outdoors than adults for — **sports and other activities** — **putting them at greater risk for heat injury.**

➤ Impact on Health:

- High temperatures are linked to **increased mental health problems in children** and adolescents, including post-traumatic stress disorder (PTSD) and depression.
- Extreme heat will essentially affect children's education and future livelihoods.
- Heatwave risks to health include — heat stroke, heat stress, allergy, **chronic respiratory conditions**, asthma, **mosquito-borne disease**, **cardiovascular disease**, **undernutrition** and diarrhoea.

➤ Threatens Children's Safety:

- Communities are forced to search for and compete over food and water resources as pastures and household income dry up. The **resulting migration, displacement and conflict expose children to serious physical harm** and violence risks.

Note:



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Note:

- In July 2022, the UN-backed agencies issued **guidelines to provide the first-ever global policy framework to protect children displaced** due to climate change.
- It contains a set of **nine principles** that address the unique vulnerabilities of children who have been uprooted.
- The principles are based on the **Convention on the Rights of the Child** and are informed by existing operational guidelines and frameworks.

What are the Recommendations?

- There is a need to ensure that the **vulnerable have the resources to adopt the critical social services** required to protect them.
- It is high time Countries must act now by:
 - **Protecting children** from climate devastation by **encouraging social services**
 - **Preparing children** to live in a climate-changed world
 - **Prioritising children** and youth in **climate finance** and resources
 - **Preventing a climate catastrophe** by reducing greenhouse gas emissions
- The 27th Conference of Parties (COP-27) to the **United Nations Framework Convention on Climate Change** must unlock progress on loss and damage, placing the resilience of children and their communities at the centre of discussions on action and support.

Benefits of Biogas**Why in News?**

Countries around the world are turning to **biogas** and biomethane to enhance their energy security.

What is Biogas?

- **About:**
 - **Biogas**, a renewable fuel produced using the **anaerobic digestion** process from organic feedstock, is primarily composed of methane (50-65%), carbon dioxide (30-40%), hydrogen sulfide (1-2.5%) and a tiny fraction of moisture.

- It contributes to all 17 of the United Nation's **Sustainable Development Goals** and can also be converted to produce numerous sustainable transportation fuels.

➤ **Variants:**

- **Compressed Bio Gas (CBG):** The upgraded or high-purity biogas (after removal of unwanted components like carbon dioxide, hydrogen sulphide and moisture) compressed at 250 bar pressure results in a fuel called **compressed biogas (CBG)**. This has properties similar to **compressed natural gas (CNG)** and could be directly used to power CNG engines.

- **Drawback:** Its existence in the gaseous form, which demands bigger volumes for transportation. Therefore, it is considered more suitable to power small-sized vehicles, though heavy engines have been used for short-distance driving.

- **Liquefied Bio Gas (LBG):** If the biogas-derived methane is liquefied by cooling it at -162 degrees Celsius, the fuel thus obtained is **liquefied biogas (LBG)**. It has a higher energy density that lowers storage space requirements.

- At atmospheric pressure, the energy density of liquid methane is roughly 600 times more than that of gaseous methane and 2.5 times greater than that of methane at 250 bar.

- **Advantages:** It can become a viable **alternative fuel for heavy-duty road transportation** since it has a comparatively high energy density.

- It is becoming attractive to the shipping industry in addition to being utilised in heavy-duty vehicles.

➤ **Applications:**

- Biogas can be converted to produce numerous sustainable transportation fuels.
- In addition to being used directly as fuel, biomethane can also be **transformed into other fuels such as hydrogen and methanol**. The primary method for producing hydrogen encourages the reforming of light hydrocarbons, particularly methane, which makes up a significant portion of biogas.
- Gasification is performed by limiting the amount of oxygen and steam present in the reaction and heating the bio-methane to high temperatures (usually over 600°C).

Note:



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- **Syngas**, a mixture of hydrogen and carbon monoxide, is created as a result of this process. The hydrogen produced after the removal of carbon monoxide could be used in fuel cells to generate power.
- Methanol can also be generated from syngas. **Methanol** is an effective fuel; it emits less particulate matter and nitrogen oxide (NO_x) than gasoline. It can be used also as a transportation fuel by blending or entirely replacing gasoline. It's more affordable than LNG.

Conserving Vultures

Why in News?

According to a recent study, **vultures mostly forage outside Protected Areas (PAs)** and if threats such as poison-laced carcasses are removed from these places, the decline in vulture populations can be stemmed.

What are the Findings of the Report?

➤ About:

- **Vultures avoided areas with high livestock density** when feeding, which suggests that vultures did not use cattle as a main food source and avoided areas with high human habitation.
- The finding of the study regarding cattle not being the main food source of vultures did not hold true for India.
 - The drastic crash in vulture populations in India was due to the use of diclofenac in veterinary treatment, mainly on cattle. So clearly, vultures fed on livestock.
- **Suggestions for Conservation:**
 - Understanding their habitat use, and even more importantly their behaviour while in certain habitats, like outside of protected areas, is thus critical for their conservation.
 - It is vital to identify and remove threats near nesting and roosting sites, and to provide them with food and water.

What about the Vultures Species in India?

➤ About:

- It is one of the **22 species of large carrion-eating birds** that live predominantly in the tropics and subtropics.

- They act an **important function as nature's garbage collectors** and help to keep the environment clean of waste.
 - Vultures also play a valuable role in keeping wildlife diseases in check.
- **India is home to 9 species of Vulture** namely the Oriental white-backed, Long-billed, Slender-billed, Himalayan, Red-headed, Egyptian, Bearded, Cinereous and the Eurasian Griffon.
 - Most of these 9 species face dangers of extinction.
 - Bearded, Long-billed, Slender-billed, Oriental white-backed are protected in the Schedule-1 of the **Wildlife Protection Act 1972**. Rest are protected under 'Schedule IV'.

➤ **International Union for Conservation of Nature (IUCN):**

○ Threats:

- Poisoning from diclofenac that is used as a medicine for livestock.
- Loss of Natural Habitats due to anthropogenic activities.
- Food Dearth and Contaminated Food.
- Electrocution by Power lines.

➤ **Conservation Efforts:**

- Recently, the Ministry for Environment, Forests and Climate Change launched a **Vulture Action Plan 2020-25** for the conservation of vultures in the country.
 - It will ensure minimum use of Diclofenac and prevent the poisoning of the principal food of vultures, the cattle carcasses.
- To study the cause of deaths of vultures in India, a **Vulture Care Centre (VCC) was set up at Pinjore, Haryana in 2001**.
- Later in 2004, the VCC was upgraded to being the first Vulture Conservation and Breeding Centre (VCBC) in India.
 - At present, there are nine Vulture Conservation and Breeding Centres (VCBC) in India, of which three are directly administered by the **Bombay Natural History Society (BNHS)**.

Note:

Namdapha National Park

Why in News?

The Changlang district administration has declared cultivation of large cardamom in the Namdapha National Park (NP) illegal.

What are the Key

Points About Namdapha National Park?

➤ About:

- Namdapha is in fact the name of a river originating in the park and it meets Noa-Dehing river.
 - The Noa-Dehing river, is a tributary of the Brahmaputra and flows in a North-South direction in the middle of the National Park.

➤ Climate:

- Enjoys the sub-tropical climate. The mountainous part has a mountain type of climate while the low-lying plains and valleys experience tropical climate.

➤ Location:

- It is located in the State of **Arunachal Pradesh** and it covers 1,985 sq km.
- It lies in close proximity to Indo-Myanmar-China trijunction.
- The park is located between the **Dapha bum range of the Mishmi Hills** and the **Patkai range**.
- It the **fourth largest national park in India**.
 - The first three are **Hemis National Park** in Ladakh, **Desert National Park** in Rajasthan, and **Gangotri National Park** in Uttarakhand.

➤ Legal Status:

- It was established as a national park in 1983, and it was declared as a Tiger Reserve in the same year of 1983 in the same year.
- It is also on the **Tentative Lists of UNESCO World Heritage Sites in India**.

➤ Biodiversity:

- This protected area has more than 1000 floral species and more than 1400 faunal species.
- It is also a part of **biodiversity hotspot**.
- It is **only park in the World to have the four Feline species of big cat** namely the **Tiger (Panthera Tigris)**, **Leopard (Panthera Pardus)**, **Snow Leopard**

(**Panthera Uncia**) and **Clouded Leopard** (**Neofelis Nebulosa**).

- It is also famous for **Critically Endangered species** like the Namdapha flying squirrel, species that was last spotted in 1981.
- **Hoolock Gibbons**, the only 'ape' species found in India is found in this National Park.
 - **Vegetation:** The **vegetation** is characteristic of **tropical evergreen forests** (**Tropical Rain Forests**)

What are the Other

Protected Areas in Arunachal Pradesh?

- **Pakke Wildlife Sanctuary.**
- **Moulung National Park**
- **Kamlang Wildlife Sanctuary.**
- **Itanagar Wildlife Sanctuary.**
- **Eagle Nest Wildlife Sanctuary.**

World Sloth Bear Day

Why in News?

The first **World Sloth Bear Day** was observed on **October 12, 2022** to generate awareness and strengthen conservation efforts around the unique bear species endemic to the Indian subcontinent.

- It was proposed by **Wildlife SOS India**, an organisation involved in sloth bear conservation and protection for over two decades and **the (International Union for Conservation of Nature) IUCN-Species Survival Commission (SSC) sloth bear expert team** accepted and declared the day to be celebrated worldwide.

What is Sloth Bear?

➤ About:

- Sloth Bear is one of the 8 bear species found across the globe.
- Sloth bears primarily **eat termites and ants**, and unlike other bear species, they routinely carry their cubs on their backs.
- They are also very fond of honey, hence their alternative name of **"honey bear"**.
- Sloth bears **do not hibernate**.
- They are agile and considered one of the most formidable wild animals.

Note:



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- They are also known as the **least researched bear species**.
- **Scientific Name:** *Melursus Ursinus*.
- **Habitat:** Presently Sloth bears are only found in the Indian subcontinent, Nepal and a sub-species in Sri Lanka.
 - About 90% of the global Sloth Bear population is found in India.
- **Conservation Status:**
 - **IUCN Red List:** Vulnerable.
 - **Wildlife protection Act (1972):** Schedule I.
 - **Convention on International Trade in Endangered Species (CITES):** Appendix I.
- **Threats:**
 - An ethnic group named **Kalandars**, who were mostly poor performed a practice known as a **dancing bear**, where the **captured sloth bears are tortured to make them dance**.
 - According to several reports, their population has dropped by 40 to 50% over the last three decades mainly **due to habitat loss, habitat fragmentation, poaching and increasing human-bear conflict**.

World Migratory Bird Day 2022

Why in News?

World Migratory Bird Day was recently celebrated on 08 October 2022.

What is World Migratory Bird Day (WMBD)?

- **About:** It is a **bi-annual global campaign** organised to raise awareness about migratory birds, the need for their conservation, and the importance of the preservation of their habitat.
 - It is celebrated on the second Saturday in May and then in October. This year it was celebrated on 14 May and 8 October 2022.
 - WMBD is **organized by** a collaborative partnership among **two UN treaties** - the **Convention on the Conservation of Migratory Species of Wild Animals (CMS)** and the African-Eurasian Migratory Waterbird Agreement (**AEWA**), and the non-profit organization, Environment for the Americas (**EFTA**).

- The 2022 global campaign is also being actively supported by other dedicated organizations, including the **East Asian Australasian Flyway Partnership (EAAFP)** and Bird Life International (BLI).

Theme:

- The theme of World Migratory Bird Day 2022 is **"Light Pollution"**
 - WMBD 2022 is addressing the growing issue of light pollution on these birds and actions on a global scale to help migrate these birds safely.
- **Artificial lights are the cause of significant threats to migratory birds such as:**
 - Distortion while flying at night
 - Collisions with buildings
 - Disruptions - in their ability to migrate long distances and in their internal clock.

What is Light Pollution?

About:

- As per CMS, **"light pollution refers to artificial light that alters the natural patterns of light and dark in ecosystems"**.
 - The use of artificial light at night is increasing all over the world. **From 2012 to 2016, artificially lit outdoor areas increased by 2.2% per year**, in 2022, this number could be much greater.
 - Today, **more than 80% of the world's population lives under a "lit sky"**, a figure closer to 99% in Europe and North America.

Impact of Light Pollution on Birds:

- It can **alter birds' behaviours**, including migration, foraging and vocal communication.
 - It also **affects their activity levels and their energy expenditure**, especially those which migrate at night.
- It attracts and **disorients nocturnally migrating birds**, which may end up circling in illuminated areas.
 - This unnatural light-induced behaviour can mean they end up **depleting their energy reserves** and puts them at **risk of exhaustion, predation and lethal collision**.
- **Long distance migratory birds**, such as the blackpoll warbler, the Asian stubtail and the

Note:

oriental plover may start and end their migrations in areas with relatively low levels of light pollution, but **during migration they may fly over areas of intense urban development where they experience high levels of artificial light.**

Post-Facto Environmental Clearances

Why in News?

Recently, the Supreme Court has concluded that ex post facto (after being started) **Environmental Clearances (EC)** are acceptable.

- The court has concluded in response to a claim that a **bio-medical treatment facility** was set up and run without an EC and it raises concern over Environmental Degradation.

What is an Ex Post Facto Environment Clearance?

- Ex post facto environmental clearance refers to **allowing functioning of an industry or project which has started operating without obtaining the green clearance** and disclosing the probable environmental impacts of the project.
- A bench of SC observed that the **Environment (Protection) Act, 1986**, did not absolutely prohibit the grant of **ex post facto environmental clearance**.
 - It should not be granted routinely, **but in exceptional circumstances** taking into account all relevant environmental factors.

What are the Related Concerns?

- A post facto assessment **defeats the very purpose of Environment Impact Assessment (EIA)** because irreversible ecological damage **will already have been committed** with the commencement of operations.
 - The **Food and Agriculture Organisation (FAO)** of the United Nations **defines the purpose of EIA as alerting decision makers**, regulatory agencies and the public of environmental consequences of projects "so that those projects can be modified, if need be, to **prevent environmental deterioration**, to avoid construction errors and to forestall economic losses caused by negative side effects.

- The industries are encouraged to commence operations **without bothering for clearance and eventually get regularization by paying the penalty** amount. It is likely to open a **floodgate of violations and give rise to a situation** where damage to the environment is irreversible.

What is the Environment Impact Assessment?

- It can be defined as the study for predicting the effect of a proposed activity/project on the environment.
- It is statutory **under the Environment Protection Act, 1986** for some projects.
- Process:
 - **Screening** based upon scales of investment, type of development, and location of the development is done to see whether a project requires an environmental clearance as per the statutory notifications.
 - **Scoping** is a process of detailing the Terms of Reference (ToR) of EIA, that is the main issues or problems in the development of a project.
 - **Impact Prediction** involves mapping the environmental consequences of the significant aspects of the project and its alternatives.
- The public mandatorily needs to be informed and consulted on the proposed development after the completion of the EIA report.

What is the Environment Clearance Process?

- An EIA report is prepared to get **Environment Clearance (EC) for a project**.
- A process of '**Public Hearing**' is conducted **before the issue** of 'Consent to Establish (NOC)' by state regulators. Concerns of people living in the proposed project area are heard.
- An application form with **EIA report, details of public hearing and NOC is submitted for environmental clearance** with the **Ministry of Environment and Forests and Climate Change (MoEFCC)** if the project falls under Project A category or the state government if the project falls under Project B category.
 - **Category A projects** require **mandatory environmental clearance** and thus they do not undergo the screening process.
 - **Category B projects undergo a screening process** and they are classified into two types.

Note:



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- **Category B1** projects (Mandatorily requires EIA).
 - **Category B2** projects (Do not require EIA).
- The documents submitted are then analyzed by an **Expert Appraisal Committee (EAC) under the Ministry**. The recommendations of the Committee get processed in the MoEFCC for final approval or rejection.

Global Methane Pledge: GMCCA Forum

Why in News?

Global Methane, Climate and Clean Air (GMCCA) Forum 2022 is being held in Washington, DC, USA to discuss **opportunities to protect the climate** and improve air quality with a special focus on **methane** by adhering to the **Global Methane Pledge**.

What is the Agenda of the Forum?

- The Forum is a joint event sponsored by the **Global Methane Initiative (GMI)** and the **UNEP-convened Climate and Clean Air Coalition (CCAC)**.
- **GMI** is an **international public-private partnership** focused on reducing barriers to the **recovery and use of methane** as a clean energy source. It 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 of GMI**.
 - High-level plenary sessions will be held on **global efforts to reduce methane and other short-lived climate pollutants**.
 - The forum will outline **policy, political and scientific arguments for global ambition on methane action**. They also aim to define a path forward.

What is the Global Methane Pledge?

- **About:**
 - The Global Methane Pledge was launched at **COP (Conference of Parties) 26 in November 2021** to catalyse action to reduce methane emissions.
 - It was led by the **United States and the European Union**.

- It has 111 country participants who together are **responsible for 45% of global human-caused methane emissions**.
 - India, which is not a part of the Global Methane Pledge, is **among the top five methane emitters globally**. Most emissions can be traced back to agriculture.
- By joining the Pledge, **countries commit to work together in order to collectively reduce methane emissions** by at least 30% below 2020 levels by 2030.
- **Concern:**
 - Methane has contributed to about **one-third of the current anthropogenic greenhouse gas-driven warming**.
 - Methane enters the atmosphere due to **leaks in oil and gas industries**, rearing livestock and the decomposition of waste in landfills.
 - Currently, only 2 % of global climate finance goes to methane.
 - If the Global Methane Pledge is not adhered to, Methane emissions will **likely increase by 13 % by 2030**.

Corbett Tiger Reserve: Uttarakhand

Why in News?

Over 6,000 trees were illegally cut for the proposed Pakhro tiger safari project in **Corbett Tiger Reserve (CTR)**, according to a report of the **Forest Survey of India (FSI)**.

- The FSI has come up with an observation that the area cleared under CTR is estimated as **16.21 hectare (ha)** for the Safari Project.
- **Pakhro tiger safari** will be spread over an area of 106 hectares, when completed, it would have **been the State's first tiger safari** that would have tigers in enclosures to **ensure "100% sighting"**.

What are the Key Points of Corbett Tiger Reserve?

- **About:**
 - It is located in **the Nainital district of Uttarakhand**. The **Project Tiger** was launched in 1973 in **Corbett National Park (first National Park of India)**, which is part of Corbett Tiger Reserve.

Note:



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- The national park was established in 1936 as Hailey National Park to protect the endangered Bengal tiger.
- It is named after Jim Corbett who played a key role in its establishment.
- The core area forms the **Corbett National Park while the buffer contains reserve forests** as well as the Sonanadi Wildlife Sanctuary.
- The entire area of the reserve is mountainous and falls in the Shivalik and Outer Himalaya geological provinces.
- **Ramganga, Sonanadi, Mandal, Palain and Kosi** are the major rivers flowing through the Reserve.
- Sprawling over **500 square kilometres**, CTR is home to 230 tigers and has the world's highest tiger density — at 14 tigers per hundred square kilometres.
- **Flora:**
 - Dense moist deciduous forests are found. According to the **botanical survey of India**, Corbett has 600 species of plants – trees, shrubs, ferns, grass, climbers, herbs, and bamboo. Sal, Khair, and Sissoo are the most visible trees found in Corbett.
- **Fauna:**
 - Apart from tigers, Corbett also has leopards. Other mammals such as jungle cats, barking deer, spotted deer, sambar deer, sloth etc. are also found there.
- **Other Major Protected Areas of Uttarakhand:**
 - **Nanda Devi National Park.**
 - Valley of Flowers National Park.
 - Valley of Flowers National Park and Nanda Devi National Park together are a **UNESCO World Heritage Site.**
 - **Rajaji National Park.**
 - **Gangotri National Park.**
 - Govind National Park.

India lags in Biomass Co-firing Targets

Why in News?

The Ministry of Power is considering cutting coal supply to plants, which do not comply with biomass cofiring Norms.

- The Power Ministry in October 2021 had decreed that all thermal power plants ensure 5% compliance by October 2022.
- In 2020-21, only eight power plants **had co-fired biomass pellets**, and this number had risen to 39 recently.

What is Biomass Co-firing?

- **About:**
 - Biomass co-firing is the practice of substituting a part of the fuel with biomass at **coal thermal plants.**
 - Coal and biomass are combusted together in boilers that have been designed to burn coal. For this purpose, the existing coal power plant has to be partly reconstructed and retrofitted.
 - Co-firing is an option to convert biomass to electricity, in an efficient and clean way, and to reduce **GHG (Green house Gases) emissions** of the power plant.
 - Biomass co-firing is a globally accepted cost-effective method for **decarbonising** a coal fleets.
 - India is a country where biomass is usually burnt on the field which reflects apathy towards resolving the problem of clean coal using a very simple solution that is readily available.
- **Significance:**
 - Biomass co-firing is an effective way to curb emissions from open burning of crop residue, it also reorganization the process of electricity generation using coal.
 - Substituting 5-7 % of coal with biomass in coal-based power plants can save 38 million tonnes of carbon dioxide emissions.
 - It can help cut emissions from combustion of fossil fuels, **address** India's burgeoning problem of **farm stubble burning** to some extent, reduce waste burden while also creating jobs in rural areas.
 - India has large biomass availability as well as rapid growth in coal-fired capacity.
- **Challenges:**
 - The existing infrastructure is not robust enough to substitute **5-7% of coal with biomass in coal-based power plants, which indeed** can save 38 million Tonnes of carbon dioxide emissions.

Note:

- Around 95,000-96,000 tonnes of biomass pellets are required per day for co-firing, but India's pellet manufacturing capacity is 7,000 tonnes per day at present despite a surplus 228 million tonnes of agricultural residue available in the country.
 - This huge gap is due to the seasonal availability and unreliable supply of biomass pellets to the utility.
- It is challenging to store biomass pellets for long durations at the plant sites since they absorb moisture from air quickly, rendering them useless for co-firing.
- Only pellets with up to 14% of moisture can be used for combustion along with coal.

What is Biomass?

- Biomass is plant or animal material used as fuel to produce electricity or heat. Examples are wood, energy crops and waste from forests, yards, or farms.
- Biomass has always been an important energy source for the country considering the benefits it offers.

Climate Tipping Points

Why in News?

According to a major study, the climate crisis has driven the world to the brink of multiple "disastrous" tipping points.

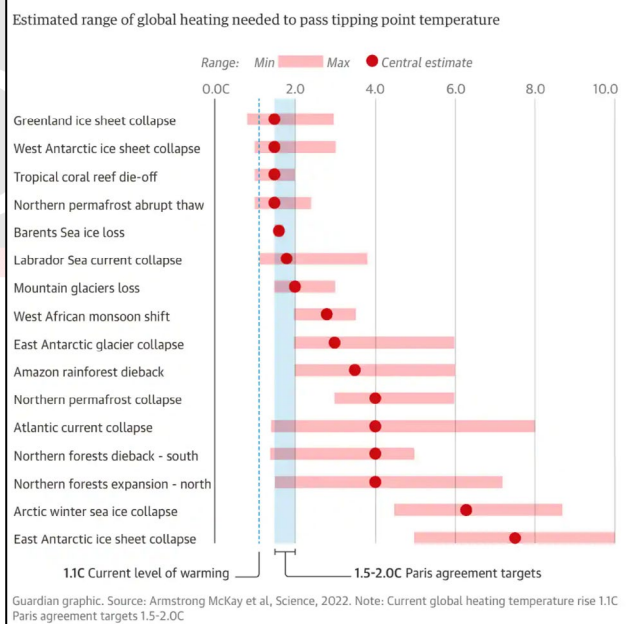
- Climate Tipping Points or CTPs are **markers of a larger climate system** which when triggered beyond a threshold, perpetuates warming on its own.

What are the New Findings of the Study?

- According to the Study, five dangerous tipping points may already have been passed due to the 1.1 °C of global heating caused by humanity to date.
 - These include the collapse of **Greenland's ice cap**, eventually producing a huge **sea level rise**, the collapse of a key current in the north Atlantic, disrupting rain upon which billions of people depend for food, and an abrupt melting of carbon-rich **permafrost**.
- At 1.5 °C, **five tipping points become possible**, including changes to vast northern forests and the loss of almost all mountain glaciers, the die-off of tropical **coral reefs** and changes to the west African monsoon.

- In total, the researchers found evidence for 16 tipping points, with the final six requiring global heating of at least 2 °C to be triggered.
 - The tipping points would take effect on timescales varying from a few years to centuries.
- At more than 2°C, the **nine global tipping points identified** are the collapse of Greenland, West Antarctic, and two parts of the east Antarctic ice sheets, the partial and total collapse of **Atlantic Meridional Overturning Circulation (AMOC)**, Amazon dieback, permafrost collapse and winter sea ice loss in the Arctic.
- Other potential tipping points still being studied include the loss of ocean oxygen and major shifts in the Indian summer monsoon.

The risk of climate tipping points is rising rapidly as the world heats up



Galápagos Islands

Why in News?

According to a recent study, **Cold ocean currents** have sheltered the Galápagos Islands from global warming.

- The islands are protected from an otherwise warming the Pacific Ocean by a cold, eastward equatorial ocean current.

Note:

- The equatorial undercurrent in the Pacific Ocean is bound to the equator by the force of the planet's rotation. Under the ocean's surface, a swift circulation of cold, nutrient-rich water flows from west to east.

What is Galapagos Archipelago?

➤ Location:



- The Galapagos Islands, spread over almost 60,000 sq km, are a **part of Ecuador**.
- These are located in the **Pacific Ocean** around 1,000 km away from the South American continent.
- **Protection Status:**
 - Ecuador made a part of the **Galapagos a wildlife sanctuary** in 1935, and the sanctuary became the **Galapagos National Park** in 1959.
 - In 1978, the islands became **UNESCO's first World Heritage Site**.

New Tiger Reserve in Uttar Pradesh

Why in News?

Recently, **Uttar Pradesh (UP)** approved the notification of the state's **fourth tiger reserve in the Ranipur Wildlife Sanctuary (RWS)** in Chitrakoot district.

- This will be the 54th Tiger Reserve in India. **Guru Ghasidas National Park of Chhattisgarh** is the 53rd Tiger Reserve in India.
- A **Ranipur Tiger Conservation Foundation** will also be established for the protection and conservation of tigers in the region.

What are the Key Highlights about Ranipur Wildlife Sanctuary (RWS)?

➤ About:

- RWS **founded in 1977**, has no resident tiger. However, it is an **important corridor for the movement of tigers**, according to the Status of tigers, co-predators and prey in India report by the **National Tiger Conservation Authority (NTCA)**.
- The Ranipur Tiger Reserve will be the **fourth in UP**.
- It will also be the **first in the Bundelkhand region of the state**.

➤ Flora:

- There is **dry deciduous forest** of Bamboo, Palash, Khair, Mahua, Dhau, Saal, Tendu, etc.

➤ Fauna:

- **Blackbuck, Chinkara**, Sambar, Cheetal, Bear, **Leopard**, Wolf, Wild dog, Blue bull, etc.

➤ Other Tiger Reserves in UP:

- **Dudhwa National Park**
- **Pilibhit Tiger Reserve**
- Amargarh Tiger Reserve

Dibang Hydel Project

Why in News?

Recently, the **National Green Tribunal (NGT)** has dismissed the case **it took up suo motu on the grant of forest clearance** for the 3000-MW Dibang hydel project without meeting the precondition of declaring a National Park.

- The Tribunal did so after it was informed by Arunachal Pradesh that the local people are not willing to part away their land for declaration of National Park.

What are the Key

Points of Dibang Hydro Power Project?

- It is a flood control cum **hydroelectric power project** planned to be developed on the Dibang River, a **tributary of Brahmaputra River**, in Arunachal Pradesh.
- The Dam site is located about 1.5 km upstream of the confluence of **Ashu Pani and Dibang rivers** and about 43 km from Roing, District Headquarter.

Note:

- The project would moderate flooding in the areas downstream of the Dibang Dam during the entire monsoon period to the extent of 3000 cumecs.
- It will be developed with an estimated investment of USD 4 billion.
- The Dibang hydropower project is expected to generate up to 11,222 million units (MU) of electricity a year.

World Environmental Health Day

Why in News?

World Environmental Health Day 2022 is observed annually on September 26 to spread awareness globally regarding the health of the environment.

- The central idea behind celebrating this day is that the health of the human race is irrevocably intertwined with the health of the environment.

What are the Key Highlights of World Environmental Health Day?

- **History:**
 - The day was first observed by the **International Federation of Environmental Health (IFEH)** in the year 2011. The main aim is the well-being of people across the globe.
 - The IFEH is wholly dedicated to the development and dissemination of knowledge on the protection and subsequent improvement of environmental health.
- **Theme:**
 - The theme for this year is ‘**Strengthening Environmental Health Systems for the implementation of the Sustainable Development Goals.**’
- **Significance:**
 - It is necessary that the world understands there is an integral connection between the environment, health and the economy. It is therefore **important to invest in healthy and green recovery**, close to all communities.
 - It becomes all the more important for the human race to pay attention to the environment and try to create balance.

- The World Health Organization launched the “**Manifesto for a healthy recovery of COVID-19**”, with the objective of taking advantage of the momentum that we are facing worldwide.
- **Environmental Health plays** a pivotal role in the implementation of the SDGs. It is interesting to note that Environmental Health fits into 7 SDGs, 19 targets and 30 indicators of the SDGs.

India at Global Clean Energy Action Forum

Why in News?

Recently, at the **Global Clean Energy Action Forum-2022** at Pittsburgh, Pennsylvania in the United States, India’s representative has said that “**sustainable biofuels play a key role to reduce GreenHouse Gas (GHG) emissions from the transport sector.**”

What do we need to know about the Global Clean Energy Action Forum 2022?

- **About:**
 - The US, for the first time, hosted **Global Clean Energy Action Forum**, a joint convening of the **13th Clean Energy Ministerial (CEM 13)** and the **7th Mission Innovation Ministerial (MI-7)**, from 21st to 23rd September 2022.
- **Theme:**
 - The theme for CEM13/MI-7 is **Rapid Innovation and Deployment**.
 - This means **accelerating the pace and scale of innovation** through collaboration and shared strategies for the **deployment of clean energy technologies**.
- **Objectives of the Forum:**
 - Define **international clean energy leadership and collaboration** in 2022 through an interactive, inspiring, and impactful event spotlighting global leaders fulfilling their climate pledges.
 - Focus on actions that deliver a low-cost, **zero-emissions energy future** that provides opportunities for all, especially good-paying jobs.
 - Demonstrate progress in moving along the **innovation-to-deployment continuum** at an unprecedented pace and scale to meet climate goals, and to innovate with a purpose.

Note:



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➤ India's Stand at the Forum:

- **At International Collaboration to Accelerate Clean Energy:**
 - India has reported **establishing 5 Bioenergy Centers** with an interdisciplinary team working on advanced sustainable biofuels using modern biotechnology tools.
 - In April 2022, India hosted the **Mission Innovation Annual Gathering** at New Delhi, the **Mission Integrated Biorefineries** was launched by Co-leads India and Netherlands, uniting key members to accelerate innovation for renewable fuels, chemicals, and materials for a low-carbon future.
- **At India Clean Energy Showcase:**
 - India, being one of the founding members of the **Clean Energy Ministerial (CEM)** will be hosting **CEM-14 in 2023 in Bengaluru** along with its Presidency of G-20 in the same year.
- India is among the few countries in the world to design a **Cooling Action Plan (CAP)** with a long-term vision (spanning a 20-year period from 2017-18 to 2037-38) that addresses **cooling requirements across sectors**.
- India has committed to an ambitious **Nationally Determined Contributions (NDCs)** of reducing emission intensity **by 33-35% in 2030** against the levels of 2005.
- India is implementing the largest **Renewable Energy (RE) expansion program** in the world envisaging a **5-fold increase in the overall RE capacity** in the country from 32 GW in 2014 to 175 GW by 2022, and further to 500 GW of renewable power in the country by 2030.

What is the Clean Energy Ministerial and Mission Innovation Ministerial?

➤ **Clean Energy Ministerial:**

- **Establishment:**
 - It was **established in December 2009** at the **UN's Framework Convention on Climate Change conference of parties** in Copenhagen.
- **Purpose:**
 - CEM is a **high-level global forum to promote policies and programs** that advance **clean energy** technology, to **share lessons learned and best practices**, and to encourage the transition to a global clean energy economy.

○ **Focus Areas:**

- The CEM is focused on **three global climate and energy policy goals**:
 - Improve energy efficiency worldwide.
 - Enhance clean energy supply.
 - Expand clean energy access.

○ **Members:**

- 29 countries are part of CEM.
- India is also a member country.

➤ **Mission Innovation Ministerial:**

○ **About:**

- Mission Innovation (MI) is a **global initiative catalysing a decade of action and investment** in research, development and demonstration to make clean energy affordable, attractive and accessible for all. This will accelerate progress towards the Paris Agreement goals and pathways to net zero.

○ **Mission:**

- Zero-Emission Shipping
- Green Powered Future
- Clean Hydrogen
- Removal of Carbon Dioxide
- Urban Transitions
- Net Zero Industries
- Integrated Biorefineries

Breakthrough Agenda Report 2022

Why in News?

Recently, **The Breakthrough Agenda Report 2022** was released by the **International Energy Agency (IEA)**, the **International Renewable Energy Agency (IRENA)** and the UN Climate Change High-Level Champions, focusing on international collaboration to drive faster reductions in **greenhouse gas emissions**.

What are the Key Points of the Report?

➤ **About:**

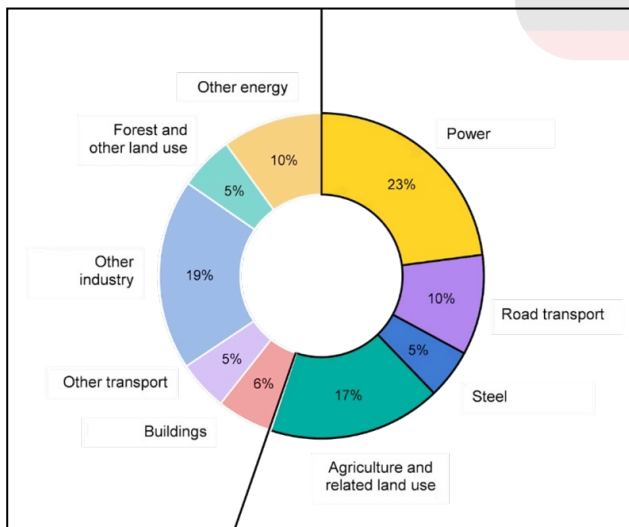
- It assesses **progress on reducing emissions** in five key sectors – power, hydrogen, road transport, steel and agriculture.

Note:

- It is a first-of-its-kind **annual progress report**, requested by world leaders at the UN Climate Change Conference **COP26 in November 2021** as part of the launch of the Breakthrough Agenda.
- The Breakthrough Agenda currently covers more than two-thirds of the global economy, with endorsement from 45 world leaders, including those of the **G7**, China and India.

➤ **Findings:**

- There is an increase in **practical international cooperation** in recent years, and progress in **deploying the technologies needed**, including a forecast increase in global renewable capacity of 8% in 2022 – pushing through the 300GW mark for the first time and equivalent to **powering approximately 225 million homes**.
- The five sectors analyzed in the report together account for nearly **60% of global greenhouse gas (GHG) emissions**, and may deliver the bulk of the **emission reductions needed by 2030** in a pathway that would make a significant contribution to limiting global **warming to a maximum of 1.5°C**, in line with the **Paris Agreement** goals.



- World is in the midst of the **first truly global energy crisis**, with devastating knock-on consequences across the world economy, especially in developing countries.
 - The energy crisis has emerged in oil, gas and electricity markets and aggravated by **Pandemic, Oil Prices and Russia-Ukraine conflict**.

- The energy and climate crisis has **exposed the weaknesses and vulnerabilities of a system** heavily reliant on fuels of the 20th century.

Stubble Burning

Why in News?

Recently, the Delhi government announced that it would spray **Pusa bio-decomposer** free of cost over 5,000 acres of paddy fields in the city as this would **help in controlling stubble burning and air pollution during winter**.

What is Pusa Bio-Decomposer?

➤ **About:**

- It is essentially a **fungi-based liquid solution** that can soften hard stubble to the extent that it can be easily mixed with soil in the field to act as compost.
 - The fungi thrive at 30-32 degree Celsius, which is the temperature prevailing when paddy is harvested and wheat is sown.
- It produces **enzymes to digest cellulose, lignin and pectin in paddy straw**.
- It is developed by the **Indian Council of Agricultural Research (ICAR)** and named after ICAR's campus at Pusa in Delhi,
- It rapidly **converts crop residues, animal waste, dung and other waste into organic manure**.
- It is an inexpensive and effective technology for agricultural waste and crop residue management.

➤ **Benefits:**

- The decomposer **improves the fertility and productivity of the soil** as the stubble works as manure and compost for the crops and **lesser fertiliser consumption** is required in the future.
 - The soil loses its richness due to stubble burning and it also destroys the useful bacteria and fungi in the soil, apart from causing harm to the environment.
- It is an **efficient and effective, cheaper, doable and practical technique** to stop stubble burning.
- It is an **eco-friendly and environmentally** useful technology and will contribute to achieve **Swachh Bharat Mission**.

Note:



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What is Stubble Burning?

➤ About:

- Stubble (parali) burning is a method of removing paddy crop residues from the field to sow wheat from the last week of September to November, coinciding with the withdrawal of **southwest monsoon**.
- Stubble burning is a process of setting on fire the straw stubble, left after the harvesting of grains, like paddy, wheat, etc. It is usually required in areas that use the combined harvesting method which leaves crop residue behind.
- It is a common practice in **October and November across North West India**, but primarily in Punjab, Haryana, and Uttar Pradesh.

➤ Effects of Stubble Burning:

○ Pollution:

- Emits large amounts of **toxic pollutants in the atmosphere which contain harmful gases** like methane (CH_4), Carbon Monoxide (CO), Volatile Organic compounds (VOC) and carcinogenic polycyclic aromatic hydrocarbons.
- These pollutants disperse in the surroundings, may undergo a physical and chemical transformation and eventually adversely affect human health by causing a **thick blanket of smog**.

○ Soil Fertility:

- Burning husk on the ground **destroys the nutrients in the soil**, making it less fertile.

○ Heat Penetration:

- The heat generated by stubble burning **penetrates into the soil, leading to the loss of moisture** and useful microbes.

➤ Alternatives to Stubble Burning:

- **In-Situ Treatment of Stubble:** For example, crop residue management by zero-tiller machine and Use of bio-decomposers.
- **Ex-Situ (off-site) Treatment:** For example, Use of rice straw as cattle fodder.
- **Use of Technology-** For example **Turbo Happy Seeder (THS) machine**, which can uproot the stubble and also sow seeds in the area cleared. The stubble can then be used as mulch for the field.

Shallow Water Mining

Why in News?

Recently, a group of researchers has suggested that **Shallow Water Mining** is in direct conflict with **Biodiversity Conservation and Sustainability Goals**, as the activity poses **severe environmental risks**.

What is Shallow Water Mining?

- Shallow-water mining takes place **at depths less than 200 metres** and it has been touted as **less destructive than terrestrial mining** and less risky than mining in **Deep-Water Ecosystems**.
- It is considered a relatively low-risk and low-cost option to satisfy the demand for metals and minerals. Also, technology for shallow-water mining already exists.
- Shallow-water mining projects are already underway in **Namibia and Indonesia**, and projects have been **proposed in Mexico, New Zealand, and Sweden**.

What are the Findings?

➤ About:

- Shallow Water Mining is not a sustainable substitute for **Deep-Sea Mining**.
 - The part of the ocean that lies **below a depth of 200 meters is defined as the deep sea**, and the process of extracting minerals from this area is known as **deep-sea mining**.
- Mining metals from the shallow-water ocean floor **requires removing large amounts of sediment**.
- **Removing these sediments, which takes thousands of years to accumulate, means jeopardizing** organisms that call it home.

➤ Impact:

- As shallow-water ecosystems are already under stress due to pollution, and the impacts of **climate change**, even seemingly small-scale mining activities **can drastically affect marine ecosystems, especially at local scales**.
- Mineral mining alters habitats as well as causes **local biodiversity loss and changes in species communities**.

Note:

- The indirect effects of mining, such as the **spread of seabed material and harmful substances released** from the seafloor and the **clouding of water, contribute to impairing the state of the marine environment**.
- The overall environmental effects of shallow-water mining are similar to those of **operations where the seafloor is excavated**, such as dredging. This means that **it can take decades for the ecosystems to recover**.

What are the Suggestions?

- Shallow-water mining activities should not be considered the **“silver bullet to resolve the growing global need for metals”** until the environmental and socioeconomic impacts are thoroughly investigated.
- Without this information, one could not understand the potential risks of the mining activity for deep-ocean biodiversity, ecosystems and human well-being.
- The precautionary principle should be **applied to mining in shallow marine areas**. They believe **operations should not be permitted until their risks have been fully mapped**.

Asiatic Caracal

Why in News?

Caracal, which was used by India's nobility in the **sport of coursing like the cheetah**, is struggling to survive, although both species had a similar distribution in the past.

What are the Key Points of Caracal?

- **Scientific Name:** *Caracal Caracal Schmitzi*
- **About:**
 - The Asiatic caracal is a medium-sized and locally threatened cat species, which has been widely reported to be on the **brink of extinction in India**.
 - It is also known by its Persian name Siyahgosh or 'black ears'.
- **Distribution:**
 - They are found mostly in Rajasthan, Gujarat and Madhya Pradesh and are located in **Kutch, the Malwa Plateau, the Aravalli hill range**.

- Besides India, the caracal is found in several dozen countries across **Africa, the Middle East, Central and South Asia**.

➤ Habitats:

- It occurs in semi-deserts, steppes, savannah, scrubland, dry forest and moist woodland or evergreen forest.
- It prefers open terrain and drier, scrubby, arid habitats and needs cover.

➤ Threats:

- Large-scale hunting, illegal trading and **loss of natural habitats** are considered significant threats to the species.

➤ Protection Status:

- **IUCN Red List:** Least Concern
- **Wildlife Protection Act, 1972:** Schedule I
- **CITES:** Appendix I

➤ Conservation Initiatives:

- In 2021, the **National Board for Wildlife** and the Ministry of Environment, Forest and Climate Change included Caracal in the list of Critically Endangered species under critically endangered species recovery programme.

What is a Species Recovery Programme?

- It is one of the three components of the **Integrated Development of Wildlife Habitats (IDWH)**.
- IDWH was started in 2008-09 as a Centrally sponsored Scheme. It is meant for providing support to protected areas (national parks, wildlife sanctuaries, conservation reserves and community reserves except tiger reserves), protection of wildlife outside protected areas and recovery programmes for saving critically endangered species and habitats.
- There are **22 species** on the **critically endangered species recovery programme**.
 - Snow Leopard, Bustard (including Floricans), Dolphin, Hangul, Nilgiri Tahr, Marine Turtles, Dugongs, Edible Nest Swiftlet, Asian Wild Buffalo, Nicobar Megapode, Manipur Brow-antlered Deer, Vultures, Malabar Civet, Indian Rhinoceros, Asiatic Lion, Swamp Deer, Jerdon's Courser, the Northern River Terrapin, Clouded Leopard, Arabian Sea Humpback Whale, Red Panda and Caracal.

Note:



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White Fly

Why in News?

Recently, there has been a rise in the number of white fly attacks on cotton in various states like Punjab and Rajasthan.

What do we Know about White Fly?

➤ About:

- **Whitefly** is a **serious pest of cotton that lowers yield by feeding on the underside of the leaf** and spreading diseases like **Cotton Leaf Curl Virus**.
- They feed on the sap of the leaves and release fluid onto the leaves on which a black fungus grows, this affects photosynthesis, the food-making process of the plant, and so lowers the strength of the plant.

➤ Spread:

- The **first reported invasive spiralling whitefly (*Aleurodicus dispersus*)** is now distributed throughout India.
- Similarly, the **rugose spiralling whitefly (*Aleurodicus rugioperculatus*)** which was reported in Pollachi, Tamil Nadu in 2016 has now spread throughout the country.
- *Aleurodicus dispersus* and *Aleurodicus rugioperculatus* have been **reported on over 320 and 40 plant species**, respectively.
- Most of the whitefly species are **native to the Caribbean islands or Central America**.

➤ Reasons for Spread:

- The host range of all of the invasive whiteflies has been increasing due to their **polyphagous nature** (ability to feed on various kinds of food) and **prolific breeding** (produces a large number of offsprings).
- The **increasing import of plants and increasing globalization and movement of people** have aided the spread of different varieties and their subsequent growth into invasive species.

➤ Concerns:

- **Damage to Crops:**
 - Whiteflies reduce the production yield and also damage crops. Approximately **1.35 lakh hectares of coconut and oil palm** in India are affected by the rugose spiralling whitefly.

- **Other invasive whiteflies** were also found to **expand their host range on valuable plant species**, especially coconut, banana, mango, sapota, guava, cashew, oil palm, and ornamental plants such as bottle palm, false bird of paradise, butterfly palm and important medicinal plants.

○ Ineffectiveness of Insecticides:

- Whiteflies have been difficult to control by using available synthetic insecticides.

➤ Controlling Whiteflies:

- They are currently being controlled by naturally occurring insect predators, parasitoids (natural enemies of pests, provide biological control of pests in greenhouses and crop fields) and entomopathogenic fungi (fungi that can kill insects).

International Day of Clean Air for Blue Skies

Why in News?

Recently, the Ministry of Environment, Forest and Climate Change (MoEF&C) organized **3rd International Day of Clean Air for blue skies** as '**Swachh Vayu Diwas ("Swachh Vayu Neel Gagan")**' today to raise awareness and facilitate actions to improve **air quality under National Clean Air Programme (NCAP)**.

20 cities selected out of 131 for its **National Clean Air Programme (NCAP)** have attained the **National Ambient Air Quality Standards** (60 microgram per cubic meter) in 2021-22, compared to their 2017 levels.

What are the Key Points?

➤ Theme:

- The theme is "The Air We Share".
- It highlights the **need for immediate and strategic international and regional cooperation for more efficient implementation** of mitigation policies and actions to tackle air pollution.

➤ About:

- During its **74th session**, the **United Nations General Assembly** adopted a resolution to hold an **International Day of Clean Air for Blue Skies on 19th December, 2019**.

Note:



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- The resolution also encouraged the **United Nations Environment Programme (UNEP)** to facilitate the day's observance in collaboration with other relevant stakeholders.
- In the lead-up to the passing of the resolution, the Climate and Clean Air Coalition collaborated with UNEP and the Republic of Korea to advocate for the day.
- **Significance:**
 - The United Nations commemorates the International Day of Clear Air for Blue Skies by hosting summits with member states.
 - Attendees put forth **their perspectives and discuss the data on the impacts of air pollution** and air quality around the globe.

Cloud Seeding

Why in News?

Recently, the United Arab Emirates (UAE) which is located in **one of the hottest and driest regions on earth**, has been leading the effort to **seed clouds and increase precipitation**, which remains at less than 100 millimetres a year on average.

UAE combined **shooting water-attracting salt flares with releasing salt nanoparticles**, a newer technology, into the clouds to **stimulate and accelerate the condensation process** and hopefully produce droplets big enough to then fall as rain.

What is Cloud Seeding?

- **About:**
 - Cloud seeding is the process of **spreading either dry ice or more commonly, silver iodide aerosols**, into the upper part of clouds to try to **stimulate the precipitation process** and form rain.
 - Cloud seeding uses **planes to spray clouds with chemicals** to condense smaller particles into larger rain droplets.
 - Cloud seeding **increases rainfall rates** by approximately 10% to 30% per year and cloud seeding operations **cost much less than the desalination process**.

- **Cloud Seeding Methods:**
 - **Hygroscopic Cloud Seeding:**
 - Disperses salts through flares or explosives in the lower portions of clouds. The salt grows in size as water joins with them.
- **Static Cloud Seeding:**
 - It involves spreading a **chemical like silver iodide into clouds**. The silver iodide provides a crystal around which moisture can condense.
- **Dynamic Cloud Seeding:**
 - It aims to boost vertical air currents, which encourages more water to pass through the clouds, translating into more rain.
 - The process is considered more complex than static cloud seeding because it depends on a sequence of events working properly.
- **Applications of Cloud Seeding:**
 - **Agriculture:**
 - It creates rain, providing relief to **drought-stricken areas**.
 - E.g.: 'Project Varshadhari' in Karnataka in 2017.
 - **Power Generation:**
 - Cloud seeding experiments have shown to augment production of **hydroelectricity** during the last 40 years in Tasmania, Australia.
 - **Water Pollution Control:**
 - Cloud seeding can help to **maintain minimum summer flows** of the rivers and **dilute the impact of treated wastewater** discharges from municipalities and industries.
 - **Fog Dispersal, Hail Suppression, and Cyclone Modification:**
 - During the winter the cloud seeding programme is used to **increase the mountain snowpack** so that additional runoff is received during the spring melt season.
 - **Tackle Air Pollution:**
 - Cloud seeding can potentially be used to **settle down toxic air pollutants** through the rain.
 - E.g.: Recently, the **Central Pollution Control Board** along with other researchers mulled the **use of cloud seeding to tackle Delhi's air pollution**.
 - **Tourism:**
 - Cloud seeding can transform **typically dry areas much more hospitable to enhance tourism**.

Note:

Extension of Sulfur Dioxide Emission Norms

Why in News?

The Ministry of Power (MoP) has extended the deadline for **coal-fired power plants** to **install Flue Gas Desulphurisation (FGD)** to cut **sulphur emissions by two years**.

What is the Background?

- India had initially set a **2017 deadline for thermal power plants to install FGD** units to cut Sulphur emissions.
- Removal of Sulfur Dioxide is called **Flue-gas Desulphurization (FGD)**.
- It seeks to remove gaseous pollutants viz. SO_2 from exhaust flue gases generated in furnaces, boilers, and other industrial processes due to thermal processing, treatment, and combustion.
- The deadline was later changed to **varying deadlines for different regions, ending in 2022**, and further extended last year to a **period ending 2025**.
- Power plants will be forcibly retired if they do not comply to norms on sulphur emissions by end-2027.
- Plants near populous regions and the capital New Delhi will have to pay penalties to operate from end-2024, while utilities in less polluting areas **will be penalized after end-2026**.
- Higher costs, lack of funds, Covid-19 related delays and geopolitical tension with China, which has restricted trade, are cited as the reasons for the extension.

Why is the installation of FGD Units Important?

- Indian cities have some of the world's most polluted air. India currently emits almost **twice the amount of SO_2 than** the next highest country, **Russia**.
- Thermal utilities, which produce 75% of the country's power, account for some 80% of industrial emissions of sulphur and nitrous-oxides, **which cause lung diseases, acid rain and smog**.
- Every single day delay in implementation of prescribed norms and not installing the FGD system is causing **huge health and economic damage to our society**.

- The high levels of damaging SO_2 pollution in India are avoidable much sooner as **flue-gas desulphurisation systems have proved successful in reducing emission levels in China**, the country responsible for the highest level in 2005.

Sea Turtle Poaching

Why in News?

According to a new study, **more than 1.1 million sea turtles have been illegally killed** and, in some cases, trafficked from 1990 to 2020.

The sea turtle species that faced the most exploitation in the 30-year-period were Green (56%) and Hawksbill Sea Turtles (39%).

What are the Key Highlights of the Study?

Marginal Decline in Poaching: There has been a decline of 28% in the poaching of marine creatures, with over 44,000 turtles targeted annually over the last decade.

Exploitation: The reptiles faced exploitation in 65 countries/territories and 44 marine **turtle regional management units (RMU)** in the world despite various protection laws.

Illegal Trade of Species: Southeast Asia and Madagascar were major hotspots for illegal sea turtle trade, particularly for the **critically endangered Hawksbills**.

Vietnam was the most common country of origin for illegal sea turtle trafficking, while China and Japan served as destinations for nearly all trafficked sea turtle products.

They are slaughtered for their eggs, meat, skin, and shell and they also face habitat destruction and accidental capture or bycatch in fishing gear.

Effects of Climate change: The **Climate change** has an impact on turtle nesting sites — it alters sand temperatures, which affects the sex of hatchlings.

Because incubation temperature of turtle eggs determines the animal's sex, a warmer nest results in more females. Increasing temperatures in Queensland's north, (Australia), linked to climate change, have led to virtually **no male Green Sea turtles being born**.

Note:

➤ Initiatives:

- **Global:** In 2017, residents in eastern Indonesia's Maluku Province harvested up to 75% of leatherback turtle eggs laid on one turtle nesting beach.
- Education and community outreach done by organisations like the non-governmental organisation **World Wide Fund** has helped in reducing turtle egg harvesting by 10%.
- **Indian:** There are plans to tag 30,000 **Olive Ridley turtles in Odisha**, it will help scientists study them and draft conservation plans.

What do We Need to Know about Sea Turtles?

➤ About:

- Sea turtles are **marine reptiles with streamlined bodies** and large flippers that are well-adapted to life in the ocean.
- The sea turtle family includes the **Hawksbill, Loggerhead, Leatherback, Green and Olive ridley turtle**.
- These five species are found worldwide, mainly in tropical and subtropical waters.
- Other than the five species, there are **two more types of sea turtles** that have restricted ranges.
- **Kemp's Ridley** is found mainly in the Gulf of Mexico and the **Flatback Turtle** around northern Australia and southern Papua New Guinea.

➤ Conservation Status:

- **The International Union for Conservation of Nature (IUCN) Status:**
 - Flatback Turtle: Data Deficient
 - Green Turtle: **Endangered**
 - Hawksbill Turtle: **Critically Endangered**
 - Kemp's Ridley: **Critically Endangered**
 - Loggerhead Turtle: **Vulnerable**
 - **Olive Ridley: Vulnerable**
 - Leatherback Turtle: **Vulnerable**
- **The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) status:**
 - All seven species of sea turtles are currently listed as **Appendix- I** under CITES.

Climate Reparation

Why in News?

Recently, Pakistan is witnessing the **worst flooding disaster in its history**, therefore it has begun **demanding reparations, or compensation**, from the rich countries that are mainly responsible for causing climate change.

What is Climate Reparation?

Climate reparations refer to a **call for money to be paid by the developed countries to the developing countries** as a means of addressing the historical contributions that the Developed countries have made (and continue to make) toward climate change.

Who is Responsible for Climate Change?

- **Historical Emissions:** Historical **responsibility of the Western nations** is important because carbon dioxide remains in the atmosphere for hundreds of years, and it is the **cumulative accumulation of this carbon dioxide that causes global warming**.
- **Polluter Pays Principle:** The concept of the **Polluter Pays principle** makes the **polluter liable for paying** not just for the cost of remedial action, but also for compensating the victims of environmental damage caused by their actions.
- The **United States and the European Union**, including the UK, account for **over 50% of all emissions** during the present time.
- If **Russia, Canada, Japan, and Australia** too are included, the combined contribution goes past **65% or almost two-thirds of all emissions**.
- Further, a country like India, currently the **third largest emitter, accounts for only 3% of historical emissions**. Whereas, China, which is the world's **biggest emitter for over 15 years now, has contributed about 11% to total emissions since 1850**.
- **Global Impact:** The impacts of climate change are **much more severe on the poorer nations** because of their geographical locations and weaker capacity to cope.
- This is what is giving rise to demands for loss and damage compensation, countries that have had

Note:



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negligible contributions to historical emissions and have severe limitations of resources are the ones that face the most devastating impacts of climate change.

- **Impact on India:** The economic loss from **cyclone Amphan** in India and Bangladesh in 2020 has been assessed at **USD 15 billion**.

What did the International Conventions say about Climate Responsibility?

- **Admission of Responsibility:** The **UN Framework Convention on Climate Change (UNFCCC)**, the 1994 international agreement that **lays down the broad principles of the global effort** to fight climate change, explicitly acknowledges this **differentiated responsibility of nations**.
- It makes it very clear that **rich countries must provide both finance and technology** to developing nations to help them tackle climate change.
- The rich countries agreed to provide USD 100 billion to the developing world every year as a result of this mandate.
- **Present Status:** The promise of USD 100 billion in assistance to developing countries is yet to be completed.
- According to a recent report by the **UN Office for the Coordination of Humanitarian Efforts (UNOCHA)**, prepared for the **UN General Assembly**, annual funding requests related to **climate-linked disasters**

averaged **USD 15.5 billion** in the three-year period between 2019 and 2021.

- The United States alone is estimated to have “inflicted more than USD 1.9 trillion in damages to other countries” due to its emissions.
- **Non-Economic Losses:** There are non-economic losses, including **loss of lives, displacement and migration, health impacts, and damage to cultural heritage**.
- **Economic Losses:** The unavoidable annual economic losses from climate change were projected to reach somewhere between USD 290 billion to USD 580 billion by the year 2030.
- **Initiatives:** The **developing countries and NGOs** managed to establish a separate channel for loss and damages at international climate change negotiations.
- Therefore, the **Warsaw International Mechanism (WIM) for Loss and Damages**, set up in 2013, was the first formal acknowledgment of the need to compensate developing countries struck by climate disasters.

India's Climate Pledges

Why in News?

Recently, a study has ranked **India's updated climate pledge to the Paris Agreement** fifth in compliance and fourth in ambition.

INDIA'S CLIMATE TARGETS: EXISTING AND NEW

Target (for 2030)	Existing: First NDC (2015)	New: Updated NDC (2022)	Progress
Emission intensity reduction	33-35 per cent from 2005 levels	45 per cent from 2005 levels	24 per cent reduction achieved in 2016 itself. Estimated to have reached 30 per cent
Share of non-fossil fuels in installed electricity capacity	40 per cent	50 per cent	41.5 per cent achieved by the end of June this year
Carbon sink	Creation of 2.5 to 3 billion tonnes of additional sink through afforestation	Same as earlier	Not clear.

What are the Key Highlights of the Study?

- **About:**
 - The study was published in the scientific journal **Nature Climate Change**.
 - It included eight countries — **India, the US, China, Australia, Saudi Arabia, Russia, Australia and Brazil** — and the **European Union**.
 - Nearly all signatories to the **Paris Agreement** updated their climate commitments during the

Note:

26th session of the **United Nations Conference on Climate Change (COP 26)**.

➤ **Outcomes:**

- **European Union (EU)** took the lead while the United States was ranked last in compliance and second to last in ambition.
- **Compliance:** In the compliance category, the EU took the lead which was followed by China, Australia, South Africa, India, Russia, Saudi Arabia, Brazil and the US.

➤ **Ambition:**

- In the Ambition category, the EU was followed by China, South Africa, India, Australia, Brazil, Russia, the United States and Saudi Arabia.

➤ **Parameters:**

- Nations likely to meet their climate pledges or the **Nationally Determined Contributions (NDC)** were ranked high in compliance.
- The countries with bold commitments were ranked high in ambition.

➤ **Statistical Analysis:**

- Nations with more **stable governments are more likely to have bold and highly credible pledges**.
- Besides, China and other **non-democracies are also likely to honour their commitments**.
- Their administrative and political systems enable them to implement complex national policies.

➤ **India's Performance:**

- It has been ranked fifth in compliance and fourth in ambition.

Hydrogen Fuel Cell

Why in News?

Recently, Germany launched the **world's first fleet of fully hydrogen-powered trains**, these are **emissions-free trains** that can reach speeds of 140 kilometres per hour and can run about 1,000 km before the tank runs dry.

What are the Key Points of Hydrogen Fuel Cell?

➤ **About:**

- Hydrogen fuel cells are a **clean, reliable, quiet, and efficient source of high-quality electric power**.

- They use hydrogen as a fuel to drive an electrochemical process that produces electricity, with water and heat as the only by-products.
- **Hydrogen** is one of the most abundant elements on earth for a **cleaner alternative fuel option**.

What are the Types of Hydrogen based on the process of its formation?

- **Green hydrogen** is produced by **electrolysis of water using renewable energy (like Solar, Wind)** and has a **lower carbon footprint**.

- Electricity splits water into hydrogen and oxygen.

- **By Products:** Water, Water Vapor.

- **Brown hydrogen** is produced **using coal** where the emissions are released into the air.

- **Grey hydrogen** is produced from **natural gas** where the associated **emissions are released into the air**.

- **Blue hydrogen** is produced from natural gas, where the **emissions are captured** using carbon capture and storage.

➤ **Significance:**

- **Best Zero Emission Solutions:** It is one of the **best Zero Emission solutions**. It is completely **environment friendly with no tailpipe emissions** other than water.

- **Tailpipe emissions:** Emission of something such as gas or radiation into the atmosphere.

- **Quiet operation:** The fact that the fuel cells make little noise means that they can be used in challenging contexts, such as in hospital buildings.

- **Easier scaling:** Operation times of fuel cells are longer than those of batteries, with fuel cells, only the amount of fuel needs to be doubled to double the operation time, while batteries require the capacity of the components to be doubled to achieve the same.

➤ **Issues:**

- **High Cost:** Green hydrogen makes up **only 0.03% of global hydrogen production** and it is up to five times more expensive than 'grey' hydrogen produced from natural gas or worse, 'brown' hydrogen produced from coal.

- **Hydrogen Storage:** Storage and transportation of hydrogen is more complex than that required for fossil fuels. This implies additional costs to consider for hydrogen fuel cells as a source of energy.

Note:



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- **Hydrogen Extraction:** Despite being the most abundant element in the Universe, hydrogen does not exist on its own so needs to be extracted from water via electrolysis or separated from **carbon fossil fuels**.
- Both of these processes require a significant amount of energy to achieve. This energy can be more than that gained from the hydrogen itself as well as being expensive.
- In addition, this extraction typically requires the use of fossil fuels, which in the absence of carbon capture and storage (CCS) **undermines the green credentials of hydrogen**.
- **Indian Scenario:**
 - **Initiatives Taken:** The Union Budget for 2021-22 has announced a **National Hydrogen Energy Mission (NHM)** that will draw up a road map for using hydrogen as an energy source.
- **Other Initiatives for Renewable Energy:**
 - **Jawaharlal Nehru National Solar Mission (JNNSM).**
 - **International Solar Alliance.**
 - **PM- KUSUM.**
 - **National Wind-Solar Hybrid Policy.**
 - **Rooftop Solar Scheme.**
- There is a potential for India **to save more than 24 million tonnes of CO2 emissions every year** and 2,400 million litres of diesel fuel (and associated costs) if the **trains are switched to hydrogen**.
 - India currently has around 13,500 trains running every day, around 5,000 (37%) of these are diesel locomotives and the rest is fully electrified.

Plea on Western Ghats

Why in News?

Recently, the Supreme Court has dismissed a **Public Interest Litigation (PIL)**, which challenged the **Gadgil and Kasturirangan Committees** on **Western Ghats Ecologically Sensitive Area (ESA)**.

What are Eco-Sensitive Areas?

- Eco-Sensitive Areas (ESAs) are areas notified by the Ministry of Environment, Forest and Climate Change (MoEFCC) **around Protected Areas, National Parks**

and Wildlife Sanctuaries under the **Environment Protection Act 1986**.

- The basic aim is **to regulate certain activities around National Parks and Wildlife Sanctuaries** so as to minimize the negative impacts of such activities on the fragile ecosystem encompassing the protected areas.

What was the PIL?

- The petitioner had pleaded to the apex court to not implement the recommendations of the Western Ghats Ecologically Expert Panel (**Gadgil Committee Report**) and the **High-Level Working Group (Kasturirangan Committee Report)**.
- It asked the court to **declare the 2018 draft notification** by the Union Ministry of Environment, Forest and Climate Change (MoEF&CC) **as ultra vires** (beyond its legal power or authority) as it may lead to the **violation of the Right To Life of the citizens** hailing from the Western Ghats, especially Kerala.
- The **petition pushed** for the implementation of the 2014 report of the **expert committee set up** by the former Chief Minister of Kerala.
- The report recommended implementing changes in clauses of the **Environmentally Fragile Land (EFL)** in the Western Ghats, stating the **lapses occurred in determining the EFL areas**.

What did SC Rule?

- But the apex court dismissed the petition stating that the MoEF&CC draft notification it challenged in 2018, was followed by a **fifth draft notification** that was issued in July 2022.
- The draft notification issued in July prohibits activities like **mining, thermal power plants, and all 'Red' category industries** from coming up in the ESA.
- The Court did not find **any reason to exercise its jurisdiction under Article 32** of the Constitution of India.

What do the Committees say?

- **Gadgil Committee:**
 - Also known as the **Western Ghats Ecology Expert Panel (WGEEP)**, it recommended that all of the Western Ghats be declared as the Ecological Sensitive Areas (ESA) with only limited development allowed in graded zones.

Note:

- It classified the whole of the Western Ghats, spread across six states and covering 44 districts and 142 talukas, as an **Eco-Sensitive Zone (ESZ)**.
- **Kasturirangan Committee:**
 - It sought to **balance development and environment protection** in contrast to the system proposed by the Gadgil report.
 - The **Kasturirangan committee** recommended that instead of the total area of Western Ghats, only **37% of the total area should be brought under ESA** and a complete ban on mining, quarrying and sand mining be imposed in ESA.

Forests and Jurisdictions

Why in News?

Recently, the **Ministry of Environment, Forest and Climate Change** has objected to Chhattisgarh for its transfer of land without following due process from its Forest to the Revenue Department.

What is the Background?

- In March 2022, Chhattisgarh Chief Minister announced in his Budget speech that the state government has transferred over 300 sq km — an area larger than Raipur — in the Bastar region from the Forest department to the Revenue department to ensure easy availability of land for setting up industries and building infrastructure.
- In August 2022, the Union Environment Ministry's Integrated Regional Office asked the state to stop the transfer of land, saying it was in violation of the **Forest Conservation Act, 1980** and multiple Supreme Court orders, and return the land already transferred.
- The move has now run into a hurdle, even as paperwork is underway for transferring more land to other parts of the state.

What is a Forest?

- **About:**
 - At present, in India, there is **no clear nationally-accepted definition of 'forest'**.
 - States are **responsible for determining** their definition of forests.

- The prerogative of the states to define forests stems from a 1996 Supreme Court order called the **T.N. Godavarman Thirumulkpad vs the Union of India judgment**.
- In the judgement, the Supreme Court **interpreted that the word "forest"** must be understood according to its "dictionary meaning".
- This description **covers all statutorily recognised forests**, whether designated as reserved, protected or otherwise.
- **Jurisdiction:**
 - Forests are included in the **Concurrent List in the (Seventh Schedule)** of the Constitution of India.
 - Through the **42nd Amendment Act, 1976** Forests and Protection of Wild Animals and Birds were transferred from **State to Concurrent List**.
 - State Forest Departments have jurisdiction over two types of forests notified under the **Indian Forest (IF) Act, 1927: Reserve Forests (RF)**, where no rights are allowed unless specified; and **Protected Forests (PF)**, where no rights are barred unless specified. Certain forests, such as villages or nagarpalika forests, are managed by state Revenue Departments.
- **Legislations:**
 - **Article 51 A (g)** of the Constitution states that it shall be the **fundamental duty** of every citizen to protect and improve the natural environment including forests and Wildlife.
 - **Article 48 A** in the **Directive Principles of State policy**, mandates that the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.

What is Forest Clearance?

- The **Forest Conservation Act, 1980**, applies to all kinds of forests, whether under the control of the Forest or the Revenue Department, and **it requires statutory clearance before forests can be used for any non-forest purpose** such as industry, mining, or construction.
- Another type of Clearance is Environment Clearance, which is a long-drawn process that is **mandatory for projects beyond a certain size and often involves an environment impact assessment** of a potential project and sometimes public hearings involving the local populace who might be affected by the project.

Note:



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What is Undemarcated Protected Forest?

- **Undemarcated Protected Forests** are also called the Orange areas, i.e. are the result of an **administrative logjam that remained a bone of contention** between the Revenue and the Forest departments since the abolition of the zamindari system in 1951.
- Undemarcated protected forests cannot be used for **non-forest purposes without clearance** under the Forest Conservation (FC) Act, 1980.

Greening Initiatives of India's Coal Sector

Why in News?

Ministry of Coal seeks to bring more than **2400 hectare of area in and around coalfields** under green cover.

It has been aimed to plant more than **50 lakh saplings** for the year 2022-23.

Why are the Key

Highlights of the Greening Initiatives?

- **Identified Areas:**
 - The identified areas include reclaimed **mined out areas of coal companies and areas outside of leasehold** - amenable for plantation and made available by State Government agencies.
- **Achievement:**
 - As of now, greening drive is in full swing in coal mining areas and **about 1000 hectares of land has already been covered** through block plantation, avenue plantation, grassland creation, bamboo plantation and high-tech cultivation by 15th August, 2022.
 - Example: **paddy field and coconut plantation in Mine -I reclamation area of NLCIL in Tamil Nadu** and **Bio-reclamation at Nigahi Area of NCL in Singrauli, Madhya Pradesh.**
- **Significance:**
 - **Afforestation is a proven way of restoration of lands damaged** by anthropogenic activities and must for **achieving satisfactory rehabilitation** of a mined landscape.

- The greening initiatives of the coal sector **support India's Nationally Determined Contribution (NDC) commitment to create additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent** through additional forest and tree cover by 2030.

➤ India has recently revised its NDCs.

- Greening initiatives help in **minimizing the footprints of coal mining, prevents soil erosion, stabilises the climate**, preserves wild life and enhances quality of air & watersheds.
- On a global scale, these **mitigate climate change through carbon sequestration** and also results in economic growth of the region.
- Through **greening initiatives**, the Indian coal industry seeks to **secure availability of coal to meet the demand of various sectors of the economy while minimising the impact of mining on the environment** and to improve the quality of life for local residents.

Bhitarkanika National Park

Why in News?

Recently, the **Bhitarkanika National Park** have reached a saturation point in the population of crocodile which could lead to more human-Crocodile conflict.

What is Bhitarkanika National Park?

- **About:**
 - Bhitarkanika National Park is spread in a vast area of 672 Kms in **Orissa**.
 - It is the second largest **Mangrove ecosystems** of India.
 - The National Park is essentially a network of creeks and canals which are inundated with waters from rivers **Brahmani, Baitarani, Dhamra and Patasala** forming a unique ecosystem.
 - Its proximity to **Bay of Bengal** makes the soil of the area enriched with salts, the vegetation and the species of the sanctuary is comprised of those which are mainly found in the tropical and subtropical inter tidal regions.
 - **It is the breeding place for the endangered Salt Water Crocodiles.**

Note:

- The Gahirmatha Beach which forms the boundary of the sanctuary in the east is the **largest colony of the Olive Ridley Sea Turtles**.
- The other unique phenomenon is the **Bagagahana or the heronry near Surajpore** creek.
- Thousands of birds colonise the creek for nesting and the aerial acrobatics performed prior to mating make for an impressive sight.
- Bhitarkanika is also home to **eight varieties of Kingfisher birds** which is also a rarity.

What are the Issues?

- **Rising conflict:**
 - Almost, 50 people have been killed by crocodiles since 2012 in and around the park, while 25 crocodiles died during the same time after entering human settlements or getting caught in fishing nets.
- **Territorial Reptile:**
 - Crocodile is a **territorial aquatic reptile**, that means too many crocodiles can't live in a small area as there will be **increased competition for food, mating partners, basking sites**.
- **Historical perspective:**
 - The **Union Ministry of Forest and Environment** in 1991 had directed the state forest department to stop the crocodile rearing programme in Bhitarkanika due to the saturation point reached by crocodile population.
 - However, the government **stopped funding** for the crocodile breeding and rearing project in 1990.
 - Further, the forest department had stopped the crocodile breeding and release programme in 1995 in the park as the crocodile population had reached around 1,000, from 94 in 1975.

What is Crocodile Conservation Project?

- The **crocodile conservation project in Bhitarkanika** was started in 1975.
- Its main objective was **to protect the reptiles' natural habitats and to rebuild the population quickly through captive breeding** as the survival rate of crocodile hatchlings in nature is low because of predation.
- Since Odisha is recognized for the existence of all the **three species of Indian crocodilians**, the Gharial and

Saltwater crocodile conservation programme was first implemented in Odisha in early 1975 and subsequently, the Mugger conservation programme was initiated.

- The **UNDP/ FAO** provided funds and other technical support through the Government of India.

Snailfish to Survive Sub-Zero Temperatures

Why in News?

Recently, a study has found a **Snailfish** that lives in an **iceberg habitat in Greenland** can survive in icy Arctic waters due to the presence of antifreeze proteins in its bloodstream.

What are Snailfish?

- **About:**
 - The name **snailfish** can refer to any of the more than 400 species found in the family Liparidae.
 - Sometimes they're also called **sea snails**—not to be confused with gastropod sea snails (which are the animals).
 - The Snailfish releases **biofluorescence, which allows it to glow green and red in the dark arctic waters**.
 - Snailfish is the only polar fish reported to have biofluorescence.
 - Biofluorescence is the ability of an organism to convert blue light into green, red, or yellow light.
 - It is rarely found in Arctic fish due to prolonged periods of darkness in the region.
- **Habitat:**
 - They are found all over the world, including in **Antarctica**.
 - Although they're found in shallow waters, the deep-sea species are the ones that stand out.

What are the Key highlights of the Study?

- Snailfish found on an iceberg habitat in Greenland can survive in icy Arctic waters due to the presence of 'antifreeze' proteins in their bloodstream.
- Further, scientists also discovered the most highly expressed genes were related to **antifreeze proteins**.

Note:

- This extraordinary feature, which is rare among sea organisms, allows snailfish to prevent ice crystals from accumulating in their cells and body fluid.
- The **climate change** could affect its survivability, as with rising ocean temperature icebergs would melt at a faster rate.
- The increase **biodiversity** that warmer waters bring to higher latitudes can increase competition, thereby jeopardizing its position in the food chain.
- The findings demonstrate how marine life can sustain in sub-zero temperatures using their unique **adaptation** mechanisms.

Conserving India's Coastal Ecosystems

Why in News?

Recently, the **Comptroller and Auditor General (CAG)** of India tabled a report in Parliament on whether steps taken by the Union Environment Ministry to **conserve India's coastal ecosystems have been successful**.

This latest report **contains the observations from an audit of Conservation of Coastal Ecosystems from 2015-20**.

Why did the CAG conduct this Audit?

- The CAG has a **constitutional mandate to investigate and report** on publicly funded programmes.
- The CAG **conducted "pre-audit studies"** and found that there were large-scale Coastal Regulation Zone (CRZ) violations in the coastal stretches.
 - **Coastal land up to 500 metres from the High Tide Line (HTL)** and a stage of 100m along banks of creeks, lagoons, estuaries, backwater and rivers subject to tidal fluctuations is called Coastal Regulation Zone (CRZ).
 - The media reported **incidents of illegal construction activities** (reducing beach space) and effluent discharged by local bodies, industries, and aquaculture farms that prompted a detailed investigation.

How is the Center

Responsible for Conserving the Coastline?

➤ About:

- The government has issued notifications under the **Environment Protection Act, 1986**, to regulate activities along India's coasts particularly regarding construction.
- The **Coastal Regulation Zone Notification (CRZ) 2019**, implemented by the Ministry, classifies the coastal area into different zones to manage infrastructure activities and regulate them.
- The **three institutions responsible for the implementation of the CRZ** are:
- **National Coastal Zone Management Authority (NCZMA)** at the Centre
- **State/Union Territory Coastal Zone Management Authorities (SCZMAs/UTCZMAs)** in every coastal State and Union Territory and
- **District Level Committees (DLCs)** in every district that has a coastal stretch and where the CRZ notification is applicable.

➤ Role of the Bodies:

- These bodies examine if **CRZ clearances granted by the government are as per procedure**, if project developers once given the go-ahead are complying with conditions, and if the project development objectives under the **Integrated Coastal Zone Management Programme (ICZMP)** are successful.
- They also **evaluate the measures taken up by the government** towards achieving the targets under **Sustainable Development Goals**.

What did the Audit Find?

➤ NCZMA as a Permanent Body:

- The **Environment Ministry hadn't notified NCZMA as a permanent body** and it was being reconstituted every few years.
- In the absence of **defined membership**, it was functioning as an ad-hoc body.

➤ Role of Expert Appraisal Committees:

- There were **instances of the Expert Appraisal Committees** not being present during project deliberations.

Note:

- EAC is a **committee of scientific experts and senior bureaucrats** who evaluate the feasibility of an infrastructure project and its environmental consequences.
- There **were also instances of the members of the EAC** being fewer than half of the total strength during the deliberations.
- **SCZMAs not Constituted:**
 - At state-level where the State Coastal Zone Management Authorities (SCZMAs) take decisions, the **central auditor observed the instances where SCZMA granted clearance on its own without recommending the projects** to relevant authorities.
 - Further, **SCZMAs had recommended many projects** without the submission of mandatory documents.
- **Approval of Projects despite Inadequacies:**
 - There were **instances of projects being approved despite inadequacies** in the **Environment Impact Assessment (EIA)** reports.
 - These included **non-accredited consultants preparing the EIA**, using outdated data, not evaluating environmental impacts of the project, not appraising the disasters which the project area was prone to and so forth.

What Problems did the CAG find in the States?

- Tamil Nadu didn't have a **strategy in place to conserve the Gulf of Mannar Islands**.
- In Goa, there was no system for monitoring coral reefs and no management plans to conserve **turtle** nesting sites.
- In Gujarat, instruments procured to study the physiochemical parameters of soil and water of the

inertial area of the **Gulf of Kutch** weren't used.

- Sea patrolling in **Gahirmatha Sanctuary**, in Kendrapara, Odisha did not happen.

New Addition to the Ramsar Sites List

Why in News?

Recently, India has **added 11 more Ramsar sites**, or wetlands that are of international importance, **taking the number of such sites to 75**.

Tamil Nadu has maximum no. of Ramsar sites (14), followed by UP which has 10 nos. of Ramsar sites.

What is Ramsar Site?

➤ About:

- A Ramsar site is a **wetland of international importance** under the **Ramsar Convention**, which is also known as the **'Convention on Wetlands'** — an intergovernmental environmental treaty established by **United Nations Educational, Scientific and Cultural Organization (UNESCO)** in **1971**, and named after the city of Ramsar in Iran, where the convention was signed that year.
- Earlier, **India designated 10 new wetlands of international importance:**
- Koonthankulam Bird Sanctuary, Gulf of Mannar Marine Biosphere Reserve, Vembannur Wetland Complex, Vellode Bird Sanctuary, Vedanthangal Bird Sanctuary, Udhayamarthandapuram Bird Sanctuary, Satkosia Gorge, Nanda Lake, Ranganathittu Bird Sanctuary, Sirpur Wetland.

Which New Sites have been added?

Name	States	Specifications
Tampara Lake	Odisha	It is among the most prominent freshwater lakes in Odisha, situated in Ganjam district. The wetland is an important habitat for vulnerable species such as Cyprinus carpio , common pochard (<i>Aythya ferina</i>), and river tern (<i>Sterna aurantia</i>).
Hirakud Reservoir	Odisha	It is the largest earthen dam in Odisha started operating in 1957. Out of the known 54 species of fish from the reservoir, one has been classed as being endangered, six near threatened and 21 fish species of economic importance . It also provides important hydrological services by moderating floods in the Mahanadi delta , the ecological and socio-economic hub of the east coast of India.

Note:

Ansupa Lake	Odisha	<p>It is the largest freshwater lake of Odisha situated in Banki sub-division of Cuttack district.</p> <p>The wetland is an oxbow lake formed by River Mahanadi.</p> <p>It provides a safe habitat to:</p> <p>Three threatened bird species- <i>Rynchops albicollis</i> (EN), <i>Sterna acuticauda</i> (EN) and <i>Sterna aurantia</i> (VU)</p> <p>Three threatened fish species- <i>Clarias magur</i> (Clariidae) (EN), <i>Cyprinus carpio</i> (Cyprinidae) (VU) and <i>Wallago attu</i> (VU).</p>
Yashwant Sagar	Madhya Pradesh	<p>Yashwant Sagar is one of the two Important Bird Areas (IBA) in the Indore region as well as one of the most important birding sites in Malwa region of Madhya Pradesh.</p> <p>It is considered to be a stronghold of the vulnerable Sarus Crane in central India.</p> <p>Due to its vast shallow reed beds, the wetland is considered heaven to a large number of winter migratory birds.</p>
Chitrangudi Bird Sanctuary	Tamil Nadu	<p>Locally, it is known as "Chitrangudi Kanmoli".</p> <p>The wetland has been a protected area since 1989 and declared as Bird Sanctuary, coming under the jurisdiction of Tamil Nadu Forest Department, Ramanathapuram division.</p> <p>It is an ideal habitat for winter migratory birds. Around 50 birds belonging to 30 families have been reported from the site.</p> <p>Notable waterbirds spotted from the site area include:</p> <p>spot-billed pelican, little egret, grey heron, large egret, open billed stork, purple, and pond herons.</p>
Suchindram Theroor Wetland Complex	Tamil Nadu	<p>Suchindrum Theroor Wetland complex is part of the Suchindrum-Theroor Manakudi Conservation Reserve.</p> <p>It is declared an Important Bird Area (IBA) and lies at the southern tip of the Central Asian flyway of migratory birds.</p> <p>Copper plate inscriptions from the 9th century mention Pasumkulam, Venchikulam, Nedumarthukulam, Perumkulam, Elemchikulam and Konadunkulam.</p>
Vaduvur Bird Sanctuary	Tamil Nadu	<p>It is a large human-made irrigation tank and shelter for migratory birds as it provides a suitable environment for food, shelter, and breeding ground.</p> <p>Indian Pond Heron Ardeola grayii occurred in most of the surveyed tanks.</p> <p>Large concentrations of wintering waterfowl such as Eurasian Wigeon Anas penelope, Northern Pintail Anas acuta, Garganey Anas querquedula were recorded in tanks.</p>
Kanjirankulam Bird Sanctuary	Tamil Nadu	<p>It is notable as a nesting site for several migratory heron species that roost in the prominent growth of babul trees.</p> <p>The breeding population of migratory waterbirds arrive here between October and February and include: painted stork, white ibis, black ibis, little egret, great egret.</p> <p>The site qualifies as an Important Bird and Biodiversity Area IBA as the threatened Spot-billed Pelican Pelecanus philippensis breeds here.</p> <p>The wetland exhibits rich biodiversity including many globally near-threatened species including:</p> <p>Spot-billed Pelican, Oriental Darter, Oriental white Ibis and Painted Stork and also commonly occurring shore and water birds like greenshank, plovers, stilts and forest birds like bee-eaters, bulbuls, cuckoos, starlings, barbets, etc.</p>

Note:



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Thane Creek	Maharashtra	It has been declared as Thane Creek Flamingo Sanctuary . Thane creek is fringed by mangroves on both banks & comprises around 20% of the total Indian mangrove species . The area is an important part of the wetland complex of the Central Asian Flyway of the birds and has been categorized as an Important Bird Area (IBA) .
Hygam Wetland Conservation Reserve	Jammu and Kashmir	It serves as an abode to many residents and migratory bird species . It is also recognized as an Important Bird Area (IBA). It provides a plethora of ecosystem services including fish and fiber, water supply, water purification, climate regulation, flood regulation, and recreational opportunities.
Shallbugh Wetland Conservation Reserve	Jammu and Kashmir	The area has extensive reedbeds of Phragmites communis and Typha angustata , and rich growth of Nymphaea candida and <i>N. stellata</i> on open water. It serves as an abode to more than four lakh resident and migratory birds of at least 21 species.

New Elephant Reserve in Tamil Nadu

Why in News?

Recently, the Government of India has announced the notification of one more **Elephant Reserve (ER)** Agasthiyamalai in Tamil Nadu during a programme in the **Periyar Wildlife Sanctuary in Kerala**.

This will be the **32nd Elephant Reserve in the country** after Singphan ER in Nagaland was notified in 2018.

Agasthiyamalai is Tamil Nadu's 5th Elephant Reserve and also a **Biosphere Reserve**.

What do we need to know about Indian Elephant?

- **About:**
 - It is also known as "**Elephas maximus**".
- **Location:**
 - Central and Southern Western Ghats
 - North East India
 - Eastern India
 - Northern India
 - Some parts of Southern Peninsular India.
- **Protection Status:**
 - **IUCN Red List:** Endangered
 - **CITES:** Appendix I
 - **Wildlife Protection Act 1972:** Schedule I

➤ Statistics in India:

- The population of elephants in India has reached up to about 27,312 (2017 Census).
- **Karnataka had the highest number** of elephants (6,049), followed by Assam (5,719) and Kerala (3,054).

What is Project Elephant?

➤ About:

- It is a **centrally sponsored scheme** and was launched in February 1992 for the **protection of elephants, their habitats and corridors**.
- The Ministry of Environment, Forest and Climate Change provides financial and technical support to major elephant range states in the country through the project.

➤ Objectives:

- To protect elephants, their habitat & corridors
- To address issues of man-animal conflict
- Welfare of captive elephants.

Arctic Amplification

Why in News?

Recently, some studies were published on Arctic Amplification, which suggested that the **region is fast changing and that the best of climate models may not be able to capture the rate of changes** and predict it accurately.

Note:

What are the Findings of these Studies?

- The **Arctic is heating four times faster than the rest of the planet.**
- The warming is more concentrated in the **Eurasian part of the Arctic**, where the Barents Sea north of Russia and Norway is warming at an alarming rate — **seven times faster than the global average.**

What is Arctic Amplification?

- Polar amplification happens **when changes to the earth's atmosphere led to a larger difference in temperature near the north and south poles** than to the rest of the world.
- This phenomenon is measured against the **average temperature change of the planet.**
- These changes are **more pronounced at the northern latitudes** and are known as the **Arctic amplification.**
- It occurs when the **atmosphere's net radiation balance is affected by an increase in greenhouse gases.**

What causes the Arctic Amplifications?

- The ice-albedo feedback, lapse rate feedback, water vapour feedback (Change in Water Vapour amplify or weaken temperature range) and ocean heat transport are the primary causes.
- **Sea ice and snow have high albedo** (measure of reflectivity of the surface), implying that they are capable of reflecting most of the solar radiation as opposed to water and land.
 - As the sea ice melts, the Arctic Ocean **will be more capable of absorbing solar radiation, thereby driving the amplification.**
 - The lapse rate or the rate at which the **temperature drops with elevation decreases with warming.**
 - Studies show that the **ice-albedo feedback and the lapse rate feedback** are responsible for 40% and 15% of polar amplification respectively.

What are the consequences of Arctic Warming?

- **Thinning of Greenland Ice Sheet:**
 - The Greenland ice sheet is melting at an alarming rate, and the rate of accumulation of sea ice has been remarkably low since 2000, marked by young and thinner ice replacing the old and thicker ice sheets.

- The unusual summer temperatures resulted in a melt of 6 billion tonnes of ice sheet per day, amounting to a total of 18 billion tonnes in a span of three days, enough to cover West Virginia in a foot of water.

➤ **Rise in Sea Level:**

- The Greenland ice sheet **holds the second largest amount of ice**, after Antarctica, and therefore it is crucial for maintaining the sea level.
- In 2019, this was the single biggest cause for the rise in the sea level, about 1.5 metres.
- If the **sheet melts completely**, the sea level would rise by seven metres, capable of **subsuming island countries and major coastal cities.**

➤ **Impact on Biodiversity:**

- The warming of the Arctic Ocean and the seas in the region, the acidification of water, changes in the salinity levels, is impacting biodiversity, including the **marine species and the dependent species.**
- The warming is also **increasing the incidence of rainfall which is affecting the availability and accessibility of lichens** to the reindeer.
- The Arctic amplification is causing widespread **starvation and death among the Arctic fauna.**

➤ **Thawing of Permafrost:**

- The permafrost in the Arctic is thawing and in turn **releasing carbon and methane** which are among the major greenhouse gases responsible for global warming.
- Experts fear that the thaw and the melt will also release the **long-dormant bacteria and viruses that were trapped in the permafrost and can potentially give rise to diseases.**
- The best-known example of this is the permafrost thaw leading to an **anthrax outbreak in Siberia in 2016**, where nearly 2,00,000 reindeer succumbed.

Drought Tolerant Crop**Why in News?**

Recently, a study has noted that a common weed named "**Portulaca oleracea**", commonly known as **purslane**, offers important clues about creating **drought-tolerant crops** in a world beset by **climate change**.

Note:



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Yale University scientists integrated **two metabolic pathways** to produce a novel type of **photosynthesis** that enables the weed to **withstand drought while remaining highly 'productive'**.

What do we know about Purslane?

- **About:**
 - Purslane possesses evolutionary adaptations that allow it to be **both highly productive and drought tolerant**.
- **Description:**
 - It is mostly **an annual, but it may be perennial in the tropics**.
 - **Stems** are glabrous, fleshy, purplish-red to green, arising from a taproot, often prostrate, forming mats.
- **Distribution:**
 - It is most common in the **temperate and subtropical regions**, although it extends into the **tropics and higher latitudes**.
- **Habitat:**
 - It is common in fields, gardens, vineyards, lawns, driveways, dunes, beaches, salt marshes, waste areas, eroded slopes, bluffs and riverbanks.
- **Species Affected:**
 - It competes for resources with many field crops, particularly **herbaceous species** that are **germinating or growing in competition**.
 - **Affected crops include:** asparagus, red beets, celery, crucifers, cotton, maize, onions, potatoes, rice, soyabeans, sugarcane, tomatoes and wheat.
- **Ecology:**
 - It has a **wide tolerance of photoperiod, light intensity, temperature, moisture and soil type**.
 - Seeds germinate under conditions that **enhance the survival of seedlings**.
 - The species is **self-compatible**.

What are the Key Highlights of the Study?

- Plants have **independently evolved various mechanisms to improve photosynthesis**, the process by which green plants use sunlight to synthesise nutrients from carbon dioxide and water.
- **Corn and sugarcane** evolved C4 photosynthesis, which allows the plant to **remain productive under high temperatures**.

- Succulents such as **cacti and agaves possess another type called CAM photosynthesis**, which helps them **survive in deserts and other areas with little water**.
- Both C4 and CAM serve different functions but **recruit the same biochemical pathway to act as 'add-ons' to regular photosynthesis**.
- The study conducted a spatial analysis of gene expression **within the leaves of purslane and found that C4 and CAM activity is totally integrated**.
- They **operate in the same cells, with products of CAM reactions being processed by the C4 pathway**.
- This system provides unusual levels of protection for a C4 plant in times of drought.

African Rhinoceros

Why in News?

Recently, a report has stated that **Rhino poaching rates in Africa declined** to 2.3% in 2021 from 3.9% in 2018.

At least **2,707 rhinos were poached in Africa** between 2018 and 2021, including critically endangered **black rhino and near threatened white rhino**.

What do we need to know about the Report?

- **About:**
 - The report was compiled by the **International Union for Conservation of Nature (IUCN), Species Survival Commission (SSC), African and Asian Rhino Specialist Group (AfRSG)** and **TRAFFIC**.
 - **African Rhino Specialist Group (AfRSG)** gathered information from thirteen rhino range countries:
 - Botswana, Chad, Eswatini, Kenya, Malawi, Mozambique, Namibia, Rwanda, South Africa, Tanzania, Uganda, Zambia and Zimbabwe.
- **Findings of the Report:**
 - Rhinoceros **poaching rates in Africa** have declined from a peak of 5.3% of the total population in 2015 to 2.3% in 2021.
 - South Africa accounted for 90% of all reported cases, **predominantly affecting white rhinos in Kruger National Park**.
 - South Africa lost 394 rhinos to poaching in 2020, while **Kenya didn't record any poaching that year**.

Note:



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- **Rhinos in Africa:**
 - The total estimate of rhinos in Africa was 22,137 at the end of 2021.
 - **There has been an increase in poaching in private properties.**
- A total of 451 rhinos were poached in South Africa in 2021:
 - 327 within government reserves and 124 on private properties.
 - The number of **white rhinos** in the continent **declined by almost 11.8% during 2015-18**, while populations of **black rhinos increased by just over 12.2%.**
 - **Zimbabwe conserves the largest population** of African Rhinoceroses among the four range countries in Africa namely South Africa, Namibia, Kenya and Zimbabwe.

What are the Key Points related to Black Rhino & White Rhino?

- **Black Rhino:**
 - **About:**
 - Black rhinos are the **smaller of the two African Rhino species.**
 - The most notable difference between white and black rhinos is their **hooked upper lip.**
 - While **White Rhino has a square lip.**
 - Black rhinos are **browsers rather than grazers**, and their pointed lip helps them feed on leaves from bushes and trees.
 - They have **two horns, and occasionally a third, small posterior horn.**
- **Scientific Name:**
 - Diceros bicornis
- **Habitat:**
 - Semi-Desert Savannah, Woodlands, Forests, Wetlands.
- **Protection Status:**
 - **IUCN Red List:** Critically Endangered
 - **CITES:** Appendix I
 - **Wildlife Protection Act 1972:** N/A
- **White Rhino:**
 - **About:**
 - White rhinos are the **second largest land mammal** after the elephant.

- White rhinos are also known as the **square-lipped rhinoceros due to their square (not pointed) upper lip.**
- Two genetically different subspecies exist, the **northern and southern white rhino** and are found in **two different regions in Africa.**

➤ **Scientific Name:**

- Ceratotherium simum

➤ **Habitat:**

- Long and short grass savanna areas in grasslands.

➤ **Protection Status:**

- **IUCN Red List:** Near Threatened
- **CITES:** Appendix I & Appendix II
- **Wildlife Protection Act 1972:** N/A

What are Some Other Types of Rhinos?

➤ **Greater One Horned Rhino:**

○ **About:**

- Asia's largest species of rhino, also known as the Indian rhino.

➤ **Scientific Name:**

- Rhinoceros unicornis

➤ **IUCN Status:**

- Vulnerable

➤ **Habitat:**

- Tropical grassland, shrublands, savanna

➤ **Distribution:**

- India and Nepal

➤ **Sumatran Rhino:**

○ **About:**

- Closest living relative to the woolly rhinos. Only species to still be covered in hair.

➤ **Scientific Name:**

- Dicerorhinus sumatrensis

➤ **IUCN Status:**

- Critically Endangered

➤ **Habitat:**

- Tropical and subtropical forests

➤ **Distribution:**

- Sumatra, Sabah

➤ **Javan Rhino:**

○ **About:**

- All Javan rhinos in the world survive in Ujong Kulon National Park.

Note:

- **Scientific Name:**
 - Rhinoceros sondaicus
- **IUCN Status:**
 - Critically Endangered
- **Habitat:**
 - Tropical and subtropical forests
- **Distribution:**
 - Sumatra, Sabah

Battery Waste Management Rules, 2022

Why in News?

Recently, the **Ministry of Environment, Forest and Climate Change (MOEFCC)** notified the **Battery Waste Management Rules, 2022** to ensure environmentally sound management of waste batteries.

These rules will replace the **Batteries (Management and Handling) Rules, 2001**.

What are the Key Highlights of the Rules?

- **Coverage:**
 - The rules cover **all types of batteries, including Electric Vehicle batteries, portable batteries, automotive batteries, and industrial batteries.**
- **Extended Producer Responsibility (EPR):**
 - The rules function based on the concept of **Extended Producer Responsibility (EPR)** where the **producers of batteries are responsible for the collection and recycling/refurbishment of waste batteries and the use of recovered materials from waste into new batteries.**
 - EPR mandates that all waste batteries be collected and sent for recycling/refurbishment, and it prohibits disposal in landfills and incineration.
 - To meet the EPR obligations, producers may engage themselves or authorise any other entity for the collection, recycling, or refurbishment of waste batteries.
 - It will enable the **setting up of a mechanism and centralized online portal for the exchange of EPR certificates between producers and recyclers/refurbishers** to fulfill the obligations of producers.

- **Waste Management:**
 - They promote the **setting up of new industries and entrepreneurship in the collection and recycling/refurbishment of waste batteries.**
- **New Business Opportunities:**
 - Mandating the minimum percentage of recovery of materials from waste batteries under the rules will **bring new technologies and investment in the recycling and refurbishment industry and create new business opportunities.**
- **Reduce Dependency on Raw Materials:**
 - Prescribing the use of a certain number of recycled materials in the making of new batteries will reduce the dependency on new raw materials and save natural resources.
- **Online Registration:**
 - Online registration & reporting, auditing, and committee for monitoring the implementation of rules and taking measures required for removal of difficulties.
- **Principle of Polluter Pays:**
 - Environmental **compensation will be imposed for non-fulfilment of Extended Producer Responsibility targets**, responsibilities and obligations set out in the rules.
- **Environmental compensation Fund:**
 - The funds collected under environmental compensation shall be **utilized in the collection and refurbishing or recycling of uncollected and non-recycled waste batteries.**

Vishnugad Pipalkoti Hydro Electric Project

Why in News?

Recently, the World Bank has agreed to look into environmental damage from the under-construction **Vishnugad Pipalkoti Hydro Electric Project (VPHEP)** on the Alaknanda River in Uttarakhand.

The panel has considered the request for an enquiry after accepting the Complaints from 83 Local Communities.

What is the Geography of Alaknanda River?

- It is one of the **headstreams of the Ganga.**

Note:

- It rises at the confluence and feet of the **Satopanth and Bhagirath glaciers** in Uttarakhand.
- It meets the Bhagirathi River at Devprayag after which it is called the Ganga.
- Its main tributaries are the **Mandakini, Nandakini, and Pindar rivers**.
- The Alaknanda system drains parts of **Chamoli, Tehri, and Pauri districts**
- The Hindu pilgrimage center of Badrinath and the natural spring Tapt Kund lie along the banks of the Alaknanda River
- At Its origin, **Lake Satopanth** is a triangular lake located at a height of 4402 m and named after the Hindu trinity Lord Brahma, Lord Vishnu, and Lord Shiva.
- **Panch Prayag**: Five sites in Uttarakhand where **five rivers merge into River Alaknanda to ultimately form the holy River Ganga is called Panch Prayag** (in Hindi, 'panch' means five and 'prayag' means confluence).
- First, Alaknanda meets **Dhauliganga** river at **Vishnuprayag**; move on to **Nandaprayag** to meet **Nandakini** river then travels to **Karnaprayag** to join Pindar river. It unites with Nandakini river at **Rudraprayag** and joins the last and the final Bhagirathi river at **Devprayag**.

What are the Complaints?

- The project would **destroy the ancient Laxmi Narayan Temple** in Haat village.
 - The temple is a **cultural resource for the locals** and is the source of their livelihood.
- Muck-dumping from the dam **threatens the architecture of the temple walls**, which is an ancient heritage site, the villagers claimed.
 - The locals claimed to have a **sacred bond with Laxmi Narayan Temple**, which was allegedly established by **Adi Shankaracharya** in the 19th century.
 - The residents are being **forcefully relocated from their village**.
 - Some locals who refused to accept compensation and move to another place were removed from their homes while **some were locked up by the police**.
 - The project has also **not taken disasters caused by climate change and extreme weather events** into account.

- A mid-day **cloudburst** in Kedarnath in 2013 and the Chamoli disaster of 2021 were also ignored.

What is VPHEP?

- The 444-MW VPHEP is being built by the **Tehri Hydropower Development Corporation**, a partially Centre-owned enterprise.
- The project is primarily funded by the **World Bank and was sanctioned in 2011**
- The hydropower project has been targeted to be completed by 30th June, 2023 at the cost of USD 922 million.
- The project will build a 65-meter diversion dam near Helang village in Chamoli district of Uttarakhand to create a small reservoir in the **Alaknanda River**.

Electromagnetic Field (EMF) Emissions

Why in News?

Recently, in a written reply to a question in **Rajya Sabha**, the Minister of State for Communications stated that there is no impact on the Environment due to Electromagnetic Field levels in India.

What are Electromagnetic Field (EMF) Emissions?

- **About:**
 - Electromagnetic fields are a **combination of invisible electric and magnetic fields of force**.
 - Electric fields are **created by differences in voltage**: the higher the voltage, the stronger will be the resultant field.
 - Magnetic fields are **created when electric current flows**: the greater the current, the stronger the magnetic field.
- **Natural Sources of EMF:**
 - Electromagnetic fields are **present everywhere in our environment but are invisible to the human eye**.
 - Electric fields are produced by the local build-up of electric charges in the atmosphere associated with thunderstorms.
- **Human-Made Sources of EMF:**
 - Besides natural sources, the electromagnetic spectrum also includes **fields generated by**

Note:

human-made sources: X-rays are employed to diagnose a broken limb after a sport accident.

- The **electricity that comes out of every power socket** is associated with low frequency electromagnetic fields.
- Various kinds of **higher frequency radio waves** are **used to transmit information** – whether via TV antennas, radio stations or mobile phone base stations.

➤ **Issues:**

○ **Impacts on Humans:**

- Numerous worldwide studies link EMFs to serious **health problems such as leukemia, miscarriages, chronic fatigue, weakened immune system, forgetfulness, depression, nausea and loss of libido.**

○ **Impacts on the Environment:**

- Radars are used for navigation, weather forecasting **emit pulsed microwave signals, which are detrimental to health of flora and fauna present around these radars.**

Wildlife (Protection) Amendment Bill 2021

Why in News?

Recently, **Lok Sabha** passed by voice vote the **Wildlife (Protection) Amendment Bill, 2021** that seeks to provide for **implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).**

What is the Wildlife (Protection) Amendment Bill 2021?

➤ **About:**

- It was introduced in Lok Sabha by the **Minister of Environment, Forest and Climate Change** on 17th December 2021.
- It seeks to amend the **Wild Life (Protection) Act, 1972.**
- The Bill seeks to **increase the species** protected under the law and implement the CITES.

➤ **Features:**

○ **CITES:**

- CITES is an **international agreement** between governments to ensure that **international**

trade in specimens of wild animals and plants does not threaten the survival of the species.

- The Convention requires countries to **regulate the trade of all listed specimens through permits.** It also seeks to regulate the possession of live animal specimens.
- **The Bill seeks to implement these provisions of CITES.**

○ **Authority:**

- **The Bill provides for the central government to designate a:**
- **Management Authority**, which grants **export or import permits** for trade of specimens.
- Every person engaging in trade of a **scheduled specimen** must report the details of the transaction to the **Management Authority.**
- The Bill **prohibits** any person from modifying or removing the identification mark of the specimen.
- **Scientific Authority**, which gives advice on aspects related to **impact on the survival of the specimens** being traded.

➤ **Wildlife (Protection) Act, 1972:**

- Currently, the Act has **six schedules** for specially protected plants (one), specially protected animals (four), and vermin species (one).
- **The Bill reduces the total number of schedules to four by:**
- **Schedule I** for species that will enjoy the **highest level** of protection.
- **Schedule II** for species that will be subject to a **lesser degree** of protection.
- **Schedule III** that covers plants.
- It removes the schedule for **vermin species.**
- Vermin refers to **small animals that carry diseases and destroy food.**
- It **inserts a new schedule** for specimens listed in the Appendices under CITES (scheduled specimens).

➤ **Invasive Alien Species:**

- It **empowers the central government** to regulate or prohibit the import, trade, possession or proliferation of **invasive alien species.**

Note:

- Invasive alien species refers to plant or animal species **which are not native to India** and whose introduction may adversely impact wildlife or its habitat.
- The central government may authorize an officer to **seize and dispose of the invasive species**.
- **Control of Sanctuaries:**
 - The Act entrusts the **Chief Wildlife Warden** to control, manage and maintain all sanctuaries in a state.
 - The Chief Wildlife Warden is appointed by the **state government**.
 - **The Bill specifies that actions of the Chief Warden must be in accordance with the management plans for the sanctuary.**
 - These plans will be prepared as per **guidelines of the central government**, and as **approved by the Chief Warden**.
 - For sanctuaries falling under **special areas**, the management plan must be prepared after due consultation with the **Gram Sabha** concerned.
 - Special areas include a Scheduled Area or areas where the **Scheduled Tribes and Other Traditional Forest Dwellers** (Recognition of Forest Rights) Act, 2006 is applicable.
 - Scheduled Areas are economically backward areas with a predominantly tribal population, notified under the **Fifth Schedule to the Constitution**.
- **Conservation Reserve:**
 - State governments may declare areas adjacent to **national parks and sanctuaries** as a **conservation reserve**, for protecting flora and fauna, and their habitat.
 - **The Bill empowers the central government to also notify a conservation reserve.**
- **Penalties:**
 - **The WPA Act 1972** prescribes imprisonment terms and fines for violating the provisions of the Act.
 - **The Bill increases these fines.**

Type of Violation	1972 Act	2021 Bill
General violation	Up to Rs 25,000	Up to Rs 1,00,000
Specially protected animals	At least Rs 10,000	At least Rs 25,000

What is the Wildlife (Protection) Act, 1972?

- **Wild Life (Protection) Act, 1972** provides a legal framework for the **protection** of various species of wild animals and plants, the **management** of their habitats, and the **regulation** and **control** of trade in wild animals, plants and products made from them.
- The Act also lists schedules of plants and animals that are **afforded various degrees of protection and monitoring** by the government.
- The Act has been **amended several times**, with the last amendment having been made in 2006.

World Lion Day 2022

Why in News?

World Lion Day is observed on 10th August annually to spread awareness and educate people about lions and their conservation.

What is World Lion Day and its Significance?

- **About:**
 - World Lion Day aims at **spreading awareness of lions and the urgent need to strive toward their conservation** and to make everyone aware of the significance of lions in their natural habitat.
 - The initiative to protect the big cats **started in 2013 and the first World Lion Day was celebrated that year.**
- **Significance:**
 - An opportunity to understand **the place of lions in the ecological cycle and why their extinction can be an alarming sign** for humans.
 - Lions supposedly wandered through Asia, Africa, Europe, and the Middle East some three million years ago, however, their numbers have significantly decreased by about 95% over the course of five decades.

What are the Key Points Related to Lion?

- **Scientific Name:** *Panthera leo*
 - The lion is divided into **two subspecies**: the African lion (*Panthera leo leo*) and the **Asiatic lion** (*Panthera leo persica*).
 - Asiatic lions are slightly smaller than African lions.

Note:

- The most striking morphological character, which is always seen in Asiatic lions, and rarely in African lions, is a longitudinal fold of skin running along its belly.

➤ **Role in the Animal Kingdom:**

- Lions hold an **indispensable place in the ecosystem**, they are an apex predator of their habitat, responsible for checking the population of grazers, thus helping in maintaining the ecological balance.
- Lions also **contribute to keeping the population of their prey healthy and resilient as they target the weakest members** of the herd. Thus, indirectly helping in disease control in the prey population.

➤ **Threats:**

- Poaching, genetic inbreeding arising from a single population inhabiting one place, diseases such as plague, canine distemper or a natural disaster.

➤ **Protection Status:**

- **IUCN Red List:** Vulnerable
- Asiatic Lion - **Endangered**.
- **CITES:** Appendix I for populations of India, all other populations are included in Appendix II.
- **Wildlife (Protection) Act 1972:** Schedule I

➤ **Status in India:**

- India is home to the majestic Asiatic Lion, who inhabit the protected territory of **Sasan-Gir National Park (Gujarat)**.
- According to the data from 2020, there are 674 lions in India, which were 523 in 2015.

What are Conservation Efforts?

- **Project Lion**
- **Asiatic Lion Conservation Project**

Amendments to Biodiversity Bill, 2021

Why in News?

Recently, a **Joint Parliamentary Committee (JPC)** that examined the **Biological Diversity (Amendment) Bill 2021**, has submitted its suggestions on the Bill.

The JPC has **accepted several amendments** made by the Ministry of Environment & Climate Change (MoEFCC).

What is the Biodiversity Act, 2002 (BDA)?

➤ **About:**

- The **Biological Diversity Act (BDA), 2002** was enacted to provide for the **conservation of biological diversity, sustainable use of its components**, and fair and equitable sharing of the benefits arising out of the use of biological resources and traditional knowledge.

➤ **Features:**

- The Act prohibits any person or organisation from obtaining any biological resource, occurring in India for its research or commercial utilisation, without prior approval from the **National Biodiversity Authority**.
- The act envisaged a three-tier structure to regulate the access to biological resources:
- **The National Biodiversity Authority (NBA)**
- **The State Biodiversity Boards (SBBs)**
- **The Biodiversity Management Committees (BMCs)** (at local level)
- The act stipulates all offences under it as **cognizable and non-bailable**.

What are the Amendments Made in Biodiversity Bill 2021?

- **Boosting Indian Medicine System:** It seeks to give a fillip to "**Indian system of medicine**", and facilitate fast-tracking of research, patent application process, transfer of research results while utilising the biological resources available in India.
- It seeks to empower local communities to be able to utilise resources, particularly of medicinal value, such as seeds.
- The Bill looks to encourage farmers to **increase cultivation of medicinal plants**.
- These objectives to be achieved without compromising the objectives of the **United Nation Convention on Biological Diversity**.
- **Decriminalising Certain Provisions:** It seeks to decriminalise certain provisions in the chain of biological resources.
- These changes were brought in consonance with **India's ratification of Nagoya Protocol** (Access to generic resources and the fair and equitable sharing of benefits arising from their utilisation) in 2012.

Note:



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- **Allowing Foreign Investments:** It also allows for **foreign investment in research into biodiversity**. However, this investment will necessarily have to be made through Indian companies involved in biodiversity research.
 - For foreign entities approval from the **National Biodiversity Authority** is necessary.
 - **Exempting AYUSH Practitioners:** The Bill seeks to exempt registered **AYUSH medical practitioners** and people accessing codified traditional knowledge, among others, from giving prior intimation to State biodiversity boards for accessing biological resources for certain purposes.

Peninsular Rock Agama

Why in News?

Recently, a study has been carried out by researchers from **Indian Institute of Science (IISc)**, Bengaluru to understand several **environmental factors** (including urbanisation) that could affect the **presence of the Peninsular Rock Agama/ South Indian Rock Agama**.

What are Important Facts about Peninsular Rock Agama?

- **About:**
 - **The Peninsular Rock Agama (Psammophilus dorsalis)** which is a type of **garden lizard** has a strong presence in **southern India**.
 - This lizard is a **large animal**, strikingly coloured in **orange and black**.
 - They **do not generate their own body heat**, so they need to seek **warmth from external sources** like a warm rock or a sunny spot on the wall.
- **Geography:**
 - It is majorly found in India (Asia).
 - Indian states of **Tamil Nadu, Chhattisgarh, Kerala, Andhra Pradesh, Karnataka, Bihar** hosts the population of the lizard.
- **Habitat:**
 - It belongs to the **Precocial Species**.
 - Precocial species are those in which the young are relatively mature and mobile from the moment of birth or hatching.

- **Protection Status:**
 - **IUCN Red List:** Least Concern
 - **CITES:** N/A
 - **Wildlife Protection Act 1972:** N/A

What has the Study Revealed about the Lizard?

- Rock Agama can indicate **which parts of the city are warming**, and their numbers **show how the food web is changing**.
- Lizards need to **seek warmth from external sources** like a warm rock or a sunny spot on the wall as they do not generate their own body heat.
- These lizards **eat insects and are in turn eaten by raptors, snakes and dogs**, they **cannot live** in places where there are no insects.
- Insects are **critical components** of a healthy **ecosystem** as they provide many services, including **pollination**.
- Hence, the presence of rocky agamas **presents a good model system** to understand **other aspects of the ecosystem**.

Clean, Healthy Environment as a Universal Human Right

Why in News?

The United Nations declares access to a **clean, healthy environment** as a **universal human right**.

India **voted for the resolution** and pointed out that the **resolutions do not create binding obligations**.

Only through **conventions and treaties** do state parties undertake obligations for such rights.

What is the Provision for Clean Environment in Indian Constitution?

- The **right to life (Article 21)** has been used in a diversified manner in India. It includes, inter alia, the right to survive as a species, quality of life, the right to live with dignity and the right to livelihood.
 - **Article 21** of the Indian Constitution states: 'No person shall be deprived of his life or personal liberty except according to procedures established by law.'

Note:

What do we need to know about the Resolution?

- **About:**
- **Every person on the planet** has the right to live in a clean, healthy environment.
- **Climate change** and **environmental degradation** are the most critical threats awaiting humanity in the future.
- It demonstrates that the **member states can unite** in the collective fight against the triple planetary crisis of **climate change**, **biodiversity loss** and **pollution**.
- The declaration adopted by over 160 UN member nations, including India, **is not legally binding**.
 - But, it will **encourage countries** to incorporate the **right to a healthy environment** in national constitutions and regional treaties.
 - Russia and Iran **abstained from voting**.
- **Benefits:**
 - It will help to **reduce environmental injustices and protection gaps**.
 - It can **empower** people, especially those in vulnerable situations, including environmental human rights defenders, children, youth, women and indigenous people.
 - This right (Access to Clean, Healthy Environment) **was not included in the Universal Declaration of Human Rights, 1948**.
 - This is a historic resolution that will change the very nature of **international human rights law**.

International Tiger Day

Why in News?

29th July is observed as **International Tiger Day (ITD)** to promote the conservation of the striped cat as well as to **advocate a global system for protecting its natural habitats**.

ITD was established in 2010 at St Petersburg Tiger Summit in Russia in order to raise awareness about the decline of wild tiger numbers, leaving them on the brink of extinction, and to encourage the work of Tiger Conservation.

The **Manas Tiger Reserve** in Assam has **2.4 tigresses for every tiger**, the annual wildlife monitoring results of the trans-boundary wildlife preserve has revealed.

What are the Key Points Related to Tiger?

- **Scientific Name:** *Panthera tigris*
- **Indian Sub Species:** *Panthera tigris tigris*.
- **About:**
 - It stretches from Siberian temperate forests to subtropical and tropical forests on the Indian subcontinent and Sumatra.
 - It is the **largest cat species** and a member of the genus *Panthera*.
 - Traditionally **eight subspecies of tigers have been recognized, out of which three are extinct**.
 - **Bengal Tigers:** Indian Subcontinent
 - **Caspian tiger:** Turkey through central and west Asia (extinct).
 - **Amur tiger:** Amur Rivers region of Russia and China, and North Korea
 - **Javan tiger:** Java, Indonesia (extinct).
 - **South China tiger:** South central China.
 - **Bali tiger:** Bali, Indonesia (extinct).
 - **Sumatran tiger:** Sumatra, Indonesia.
 - **Indo-Chinese tiger:** Continental south-east Asia.
- **Threats:**
 - Habitat destruction, habitat fragmentation and poaching.
- **Protection Status:**
 - **Indian Wildlife (Protection) Act, 1972:** Schedule I
 - **International Union for Conservation of Nature (IUCN) Red List:** Endangered.
 - **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** Appendix I.
- **Tiger Reserves in India**
 - **Total Number:** 53
 - **Largest:** Nagarjunsagar Srisailem Tiger Reserve, Andhra Pradesh
 - **Smallest:** Bor tiger reserve in Maharashtra

What is the Status of Tiger Population in India?

- There are currently between 3,726 and 5,578 tigers in the wild worldwide, according to the latest figures by the International Union for Conservation of Nature (IUCN).

Note:



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- Tiger populations are stable or increasing in India, Nepal, Bhutan, Russia and China.
- India is home to **over 70 % of the global tiger population**.
- India has achieved the remarkable feat of doubling the tiger population in 2018 itself, 4 years ahead of the targeted year 2022 of the **St. Petersburg Declaration on tiger conservation**.
- According to the tiger census (2018) – conducted once every four years – India has a tiger population of 2,967.

What are the Related Steps Taken?

- **Project Tiger 1973:** *Project Tiger is a Centrally Sponsored Scheme of the Ministry of Environment, Forests and Climate Change (MoEFCC) launched in 1973. It provides havens for tigers in the country's national parks.*
- **National Tiger Conservation Authority (NTCA):** *It is a statutory body under the MoEFCC and was established in 2005 following the recommendations of the Tiger Task Force.*
- **Conservation Assured | Tiger Standards:** *CA/TS is a set of criteria which allows tiger sites to check if their management will lead to successful tiger conservation.*

Loktak Lake

Why in News?

Recently, Loktak Lake Authority of Manipur recently issued a notice to remove all floating houses and fishing structures on Loktak lake.

This has evoked a sharp reaction from the local Fishing Community & Homestay Operators.

What are the Issues?

- There is a **Lack of regulation**.
- There is a growing number of homestays and huts that are constructed and have put the lake at risk, and **impacted the environment**.
- There has been a sharp **reduction in fish production** and the traditional fisheries due to a **major hydropower project** that was started in 1983.
 - Also, there is a **loss of agricultural land due to inundation and increased levels of sediments and pollutants** by untreated rivers.

What do we Know About Loktak lake?

➤ About:

- It's located about 40 kilometres south of Imphal.
- It's the **largest freshwater lake in Northeast India**, the pristine Loktak Lake is one of the most popular tourist attractions in Manipur.
 - Known for its **floating circular swamps, which are called phumdis** in the local tongue,
 - The lake invites tourists from far and wide for its ethereal beauty.
 - These **swamps look almost like islands and are a mass of soil, organic matter, and vegetation**.
 - The lake houses the **only floating national park in the world, the Keibul Lamjao National Park**, which is the last refuge of the **endangered brow-antlered deer or sangai**, Manipur's state animal.
 - In addition, the lake shelters about **230 species of aquatic plants, 100 types of birds, and 400 species of fauna** like barking deer, sambar, and Indian python.
 - Loktak lake was initially designated as a **wetland of international importance under the Ramsar Convention** in 1990.
 - Later it was also listed under the **Montreux Record** in 1993.

Natural Resource Accounting (NRA)

Why in News?

- Recently, the **Comptroller and Auditor General of India** has stated that it would be coming up with **report on Natural Resource Accounting (NRA)** by November 2022.
 - It is an attempt to develop accounting systems to help monitoring their responsible utilisation, which will in turn lead to sustainability.

What is Natural Resource Accounting (NRA)?

➤ About:

- Natural Resource Accounting is a process of estimating the value of natural resource depletion and environment degradation due to economic activities.

Note:

- The concept of NRA was emerged to capture the intimate **interplay between the various components of the natural environment and the economic progress of a country.**
- It is based on the concept - 'measurement of a resource leads to its better management'.

➤ **Historical Perspective:**

- The need for NRA took its **first step at the United Nations (UN) conference on Human Environment in 1970 (Stockholm Conference)** when the relationship between economic development and environmental degradation was discussed for the first time.
- The **Brundtland Commission**, set up by the UN, articulated the idea of close association between the environment and economic activities in 1987, which was followed up by environmental accounting and the **Earth Summit at Rio de Janeiro in 1992.**

What are the Initiatives Taken to Promote NRA?

➤ **Initiative at Global Level:**

- UN General Assembly resolution titled, «**Transforming our world; the 2030 agenda for sustainable development**» (25th of September, 2016) which got the approval of more than 190 countries, **requires the preparation of Natural Resource Accounts.**
- **India is a signatory to this resolution.**
- The UN, in 2012, adopted the **System of Economic and Environmental Accounting (SEEA).** It is the **latest internationally accepted framework for NRA.**
- Around 30 nations like Australia, Canada, China, France, and Germany have attained various degrees of success in adopting environmental accounting.
- The **Natural Capital Accounting and Valuation of the Ecosystem Services (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.**
- It is an umbrella term covering efforts to make use of an **accounting framework** to provide a systematic way **to measure and report on stocks and flows of natural capital.**

➤ **India-Specific Initiatives:**

- The CAG established the **Government Accounting Standards Advisory Board (GASAB)** in 2002 with the aim to improve standards of Governmental accounting and financial reporting to enhance the quality of decision-making and public accountability.
- It consists of **representatives of all accounting services in GoI, regulatory authorities like RBI, ICAI and State Governments.**
- The CAG of India is also a **member of an international body of Supreme Audit Institutions, called WGEA (Working Group on Environmental Auditing),** which suggested (2010) that the audit institutions should aid their countries to adopt Natural Resources Accounts.

Aatmanirbhar in Diammonium Phosphate (DAP)

Why in News?

As a part of the Union Government **Aatma Nirbhar Bharat's** initiative to promote self-sufficiency in Fertilizers, it is advising and supporting the Indian fertilizer companies to strengthen their backend supply chain.

What is the Status of Fertilizer Industry in India?

➤ **Importance of Fertilizer:**

- **Agriculture**, including its allied sector, is the **largest source of income in India**, the sector contributes 19.9% to the country's GDP, with 54.6% of the population engrossed in agricultural activities.
- The agricultural sector largely depends on the **fertilizer industry**, which manufactures some of the **most important raw materials required for the production of crops.**

Note:



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- In addition, the Indian fertilizer industry is of great importance because it produces phosphorus fertilizers such as **Diammonium Phosphate (DAP)**, **monoammonium phosphate (MAP)**, **nitrogen, phosphorus, and potassium (NPKs)**, and **single superphosphate (SSP)** which aids in the development of healthy crops.
- **Issue:**
 - The country largely depends on **phosphate rock**, a **common and** key raw material sourced mainly from Rajasthan and Madhya Pradesh. However, **India imports 90% of its phosphate from other countries.**
- **Fertilizer Manufacturing in India:**
 - **Indian Farmers Fertiliser Cooperative Limited (IFFCO)**, a multi-state cooperative society headquartered in the nation's capital, is the largest fertilizer manufacturer and marketer.
 - **National Fertilizers Limited**, a state-owned corporation, is another of the largest producer of urea with a share of about 15% of total urea production in the country.
- **Initiatives:**
 - **Neem Coating of Urea**
 - **New Urea Policy (NUP) 2015**
 - **The Nutrient Based Subsidy (NBS) Scheme.**

What is Diammonium Phosphate DAP?

- DAP is the **second most commonly used fertiliser in India after urea.**
- Farmers normally apply this fertiliser just before or at the beginning of sowing, as it is **high in phosphorus (P) that stimulates root development.**
- DAP (46% P, 18% Nitrogen) is the preferred source of Phosphorus for farmers. This is **similar to urea**, which is their **preferred nitrogenous fertiliser** containing 46% N.

What are the Initiatives taken to Resolve DAP Dependency?

- **Encourage joint ventures abroad:**
 - India's leading phosphatic fertilizer player formalized the acquisition of a 45% equity share in Baobab Mining and Chemicals Corporation (BMCC); a **rock phosphate mining company based in Senegal.**
 - Further, the mining will be done in Senegal, and production of DAP will be done in India

- The government of India has been partnering with the industry to enable such investments to achieve supply security goals for meeting the country's fertilizer needs.
- **Explore potential potassic ore resources Domestically:**
 - The Department of Mining and Geological Survey planned to expedite exploration of potential potassic ore resources in Rajasthan's Satpura, Bharusari, and Lakhasar; and other states including Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat, Andhra Pradesh, and Karnataka.

India's Solar Power Dream

Why in News?

Government of India has set the target to **expand India's renewable energy installed capacity to 500 GW by 2030.**

India is also targeting to reduce India's total projected carbon emission by 1 billion tonnes by 2030, reduce the carbon intensity of the **nation's economy by less than 45% by the end of the decade, achieve net-zero carbon emissions by 2070.**

What is the Present

Status of Renewable Energy in India?

- **The total installed capacity for renewable energy in India is 151.4 GW.**
- The following is the breakup of total installed capacity for Renewables:
 - Wind power: 40.08 GW
 - **Solar Power: 50 GW**
 - Biopower: 10.61 GW
 - Small Hydro Power: 4.83 GW
 - Large Hydro: 46.51 GW
- **Present Solar Power capacity:**
 - **45 solar parks** of aggregate capacity 37 GW have been approved in India.
 - Solar Parks in Pavagada (2 GW), Kurnool (1 GW) and Bhadla-II (648 MW) are included in the top 5 operational solar parks of 7 GW capacity in the country.
 - The **world's largest renewable energy park of 30 GW capacity solar-wind hybrid project is under installation in Gujarat.**

Note:

What are the Challenges?

- **Heavily Dependent on Imports:**
 - India doesn't have enough module and PV cell manufacturing capacity.
 - The current solar module manufacturing capacity is **limited to 15 GW per year, whereas the domestic production is around 3.5 GW only.**
 - Further, out of the 15 GW of module manufacturing capacity, **only 3-4 GW of modules are technologically competitive** and worthy of deployment in grid-based projects.
- **Raw Material Supply:**
 - The **silicon wafer**, the most expensive raw material, is not manufactured in India.
 - It currently imports 100% **silicon wafers** and around 80% cells.
 - Further, other key raw materials, such as **silver and aluminum metal pastes for making electrical contacts**, are also almost 100% imported.

What are Government Initiatives?

- **PLI scheme to Support Manufacturing:**
 - The Scheme has provisions for **supporting the setting up of integrated manufacturing units of high-efficiency solar PV modules by providing Production Linked Incentive (PLI) on sales of such solar PV modules.**
- **Domestic Content Requirement (DCR):**
 - Under some of the current schemes of the **Ministry of New & Renewable Energy (MNRE)**, namely Central Public Sector Undertaking (CPSU) Scheme Phase-II, **PM-KUSUM**, and Grid-connected **Rooftop Solar Programme** Phase-II, wherein **government subsidy is given, it has been mandated to source solar PV cells and modules from domestic sources.**
 - Further, the government made it mandatory to procure modules only from an **Approved List of Manufacturers (ALMM)** for projects that are connected to state/ central government grids.
- **Imposition of Basic Customs Duty on import of solar PV cells & modules:**
 - The Government has announced the imposition of **Basic Customs Duty (BCD)** on the import of solar PV cells and modules.
 - Further, it has imposed a 40% duty on the import of modules and a 25% duty on the import of cells.

- Basic custom duty is the **duty imposed on the value of the goods at a specific rate.**
- **Modified Special Incentive Package Scheme (M-SIPS):**
 - It's a **scheme of the Ministry of Electronics & Information Technology.**
 - The scheme mainly provides a **subsidy for capital expenditure on Pv cells and modules – 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZ.**

Pre-Summit of Tiger Range Countries

Why in News?

India has hosted the Pre-Summit meeting of **Tiger Range Countries (TRCs).**

- The **Tiger Range Countries Summit is scheduled to be held at Vladivostok, Russia on 5th September 2022.**
- In January 2022, the **4th Asia Ministerial Conference on Tiger conservation** was held.
- India's **National Tiger Conservation Authority** has also decided to introduce guidelines for the reintroduction of tigers that can be used by other Tiger Range Countries.

What are the Highlights of the Meeting?

- The meeting was attended by 12 tiger range countries **except for China and Indonesia.**
 - There are **13 Tiger Range Countries (TRC):** India, Bangladesh, Bhutan, Cambodia, Lao PDR (People's Democratic Republic), Malaysia, Myanmar, Nepal, Russia, Thailand, Viet Nam, China and Indonesia.
- India is committed to bringing all potential tiger habitats within the country under the tiger reserve network.
- The meeting aims to **finalise the declaration on tiger conservation to be adopted at the Summit.**

What is the Significance of Tiger Conservation:

- **Vital in Regulating Ecological Processes:**
 - Tigers, the top predators in the ecosystem, are vital in **regulating and perpetuating ecological processes.**

Note:



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- Forests are known to provide **ecological services** like clean air, water, pollination, temperature regulation etc.

➤ **Maintaining Food Chain:**

- It is a **top predator which is at the apex of the food chain** and keeps the population of wild ungulates (primarily large mammals) in check.
- Thus, Tiger **helps in maintaining the balance between prey herbivores** and the vegetation upon which they feed.

What is the Conservation 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.**

What is the Indian Scenario in Tiger Conservation?

- India is home to **52 Tiger Reserves covering approximately 75,000 Sq Km area in 18 States.**
- India is home to approximately **75% of the wild tigers at global level.**
- India achieved the **goal of doubling the tiger numbers in 2018 itself**, four years in advance from the targeted year 2022.
- 17 Tiger Reserves in the country have got **CA|TS international accreditation** and two Tiger Reserves (Sathyamangalam and Pilibhit) have got International **Tx2 Award.**
- India is having bilateral agreements and MoU with several **Tiger Range Countries** and is **working very closely with Cambodia, for technical assistance towards bringing back wild tigers.**

Soil Mapping

Why in News?

Recently, **Food and Agriculture Organization (FAO)** started a project to digitally map soil nutrients in **sub-Saharan Africa (SSA)** and central America to increase efficiency in using fertilizers.

- Also, it will organize and improve existing soil maps.

What is Soil Mapping?

➤ **About:**

- **Soil Mapping** is the process of **delineating natural bodies of soils, classifying and grouping the delineated soils into map units**, and capturing soil property information for interpreting and depicting soil spatial distribution on a map.

➤ **Benefits:**

- It will enhance the understanding of what types of nutrients our soils and crops need.
- Further, it will reduce waste when applying fertilizers and increase their effectiveness.

What is the Project all about?

➤ **About:**

- A **United Nations** project is digitally mapping soil nutrients in sub-Saharan Africa (SSA) and central America to increase efficiency in using fertilisers. The project is being carried out by **Food and Agriculture Organization (FAO).**
- It would foster the creation of national **soil databases and soil information systems** as public goods to be used by policymakers.
- Further, the private sector, and especially farmers can generate long-term benefits from it.
- It will also improve short-term flexibility to adapt to trends in fertilizer markets and climate dynamics without compromising output.

➤ **Need:**

- There were **unsustainable agricultural practices, a lack of resources and capacity development, and nutrient underuse** in sub-Saharan Africa (SSA), which has resulted in **significant soil nutrient depletion, low crop yields, and poverty**, leaving many farm families in a scenario of vulnerability and food insecurity.
- Many African countries lack policies regulating soil as well as the capacity, knowledge and experience to plan and implement sustainable soil management programmes.
- **Africa's Total Factor Productivity growth**, especially in the sub-Sahara region, **does not match up to the growth of other developing regions.**
- Total factor productivity growth is the difference between the growth of output and the growth of a combination of all factor inputs, usually labour and capital.

Note:

Recovery of Coral Reefs in Great Barrier Reef

Why in News?

According to the **Australian Institute of Marine Science's (AIMS)** annual long-term monitoring report, Australia's northern and central **Great Barrier Reef (GBR)** has experienced high levels of coral reef cover over the past 36 years.

The researchers also warned that the gains could be quickly reversed due to rising global temperatures.

What are the Key highlights of Report?

➤ Quick Recovery:

- It states that **reef systems are resilient and capable of recovering after disturbances** such as accumulated heat stress, **cyclones**, predatory attacks.
- It shows record levels of **region-wide coral cover in the northern and central GBR since the first ever Australian Institute of Marine Science (AIMS) survey was done.**
- Coral cover is measured by determining the increase in the cover of hard corals.

➤ Growth in Central & Northern:

- The hard coral cover in northern Great Barrier Reef had reached 36% while that in the central region had reached 33%.
- Meanwhile, coral cover levels declined in the southern region from 38% in 2021 to 34% in 2022.

➤ Dominated by Acropora corals:

- The high level of recovery is fueled by the increase in the fast-growing **Acropora corals**, which are a dominant type in the Great Barrier Reef.
- Incidentally, these fast-growing corals are also the most susceptible to environmental pressures such as rising temperatures, cyclones, pollution, crown-of-thorn starfish (COTs) attacks which prey on hard corals and so on.

➤ Less Natural Calamities:

- Also, behind the recent recovery in parts of the reef, are the low levels of acute stressors in the past 12 months — no tropical cyclones, lesser heat stress in 2020 and 2022 as opposed to 2016 and 2017, and a decrease in COTs outbreaks.

What are the Issues Highlighted by the Report?

➤ Climate change:

- The biggest threat to the health of the reef is **climate change**-induced heat stress, resulting in coral bleaching.
- Despite several global initiatives sea temperatures are predicted to increase by 1.5°C to 2°C by the time the century nears its end.
- According to the United Nations assessment in 2021, the world is going to experience heating at 1.5°C in the next decade, **the temperature at which bleaching becomes more frequent and recovery less impactful.**

➤ Frequent Mass bleaching:

- In recent times mass bleaching events have become more frequent.
- **The first mass bleaching event occurred in 1998 when the El Niño weather pattern caused sea surfaces to heat, causing 8% of the world's coral to die.**
- The second event took place in 2002. But the longest and most damaging bleaching event took place from 2014 to 2017.
- The aerial surveys by AIMS included 47 reefs and coral bleaching was recorded on 45 of these reefs.
- While the levels were not high enough to cause coral death it did leave sub-lethal effects such as reduced growth and reproduction.

Loss of Mangrove Cover on Katchal Island

Why in News?

Recently, a study by the **National Aeronautics and Space Administration (NASA)**, highlighted the loss of **mangrove cover** on Katchal island, part of India's **Nicobar archipelago**.

- It showed the extent to which mangroves had been lost globally over the past two decades.

What are Mangroves?

➤ About:

- Mangroves are tropical plants that are adapted to loose, wet soils, salt water, and being periodically submerged by tides.

Note:



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➤ **Area Covered:**○ **Global Mangrove Cover:**

- The total mangrove cover in the world is one 1,50,000 sq kms.
- **Asia has the largest number of mangroves worldwide.**
- South Asia comprises 6.8% of the world's mangrove cover.

➤ **Indian Mangrove Cover:**

- **India's contribution is 45.8%** total mangrove cover in South Asia.
- According to the **Indian State Forest Report 2021**, Mangrove cover in India is 4992 sq. Km which is **0.15% of country's total geographical area.**
- **Largest Mangrove Forest: Sundarbans** in West Bengal are the largest mangrove forest regions in the world. It is listed as a **UNESCO World Heritage Site.**
- The forest is home to the **Royal Bengal tiger**, **Gangetic dolphins** and **Estuarine crocodiles.**
- **Bhitarkanika Mangroves:** The second largest mangrove forest in India is **Bhitarkanika** in Odisha created by the two river deltas of River **Brahmani and Baitarani.**
- It is one of the most significant **Ramsar wetlands** in India.
- **Godavari-Krishna Mangroves, Andhra Pradesh:** The **Godavari-Krishna mangroves** extend from Odisha to Tamil Nadu.

What are the Key Highlights of the Study?

- The study shows the real extent of tidal wetlands lost between 1992 and 2019 on Katchal Island in the Nicobar Islands in the eastern Indian Ocean.
- The mangroves had the **highest ratio of loss** to gain among the three types of tidal wetlands it studied.
- The other two were tidal flats and marshes.
- Mangroves showed an estimated net decrease of 3,700 square kilometers between 1999 and 2019.
- Despite the losses, there have been **gains of 2,100 square kilometers** indicating the considerable dynamism of these systems.
- **Reasons for loss:**
 - **Natural cause:**
 - There was an earthquake with a magnitude of 9.2 during the **Tsunami** of 2004, during which

the islands experienced up to 3 meters (10 feet) of land subsidence.

- This **submerged many mangrove ecosystems**, resulting in a loss of more than 90% of mangrove extent in some areas.

○ **Other Factors:**

- **Sea level rise**, shoreline erosion, storms, altered sediment flow, and subsidence.

○ **Human Induce:**

- Some 27% of the losses and gains were directly caused by human activity.
- They alter wetlands through development, water diversion projects, or by converting the land to **agriculture** or aquaculture.

○ **Present Status:**

- It's very difficult that the earlier mangrove cover will ever come back but there has been a rise in their numbers in other places since they propagate themselves through propagules.

Global Platform for Disaster Risk Reduction 2022

Why in News?

Recently, the **Global Platform for Disaster Risk Reduction, 2022 (GP DRR 2022)** took place in Indonesia.

The outcome was summarised in the Bali Agenda for Resilience

What do we need to know about Global Platform 2022?

➤ **Theme:**

- **From Risk to Resilience:** Towards Sustainable Development For All in a Covid-19 Transformed World.

➤ **About Global Platform:**

- It was the **first global gathering for disaster risk reduction (DRR)** actors since the Covid pandemic, and fell exactly midway **between the UNFCCC COP26 and UNFCCC COP27 negotiations.**
- It is a biennial multi-stakeholder forum, a critical component of the monitoring and implementation process of the **Sendai Framework for Disaster Risk Reduction (2015-2030).**
- **The UN General Assembly** recognizes the same.

Note:

What are the Important Outcomes of the Global Platform for DRR 2022?

- There is a **need for a whole-of-society approach** to Disaster Risk Reduction (DRR), ensuring no one is left behind
- DRR must be at the **core** of development and finance policies, legislation and plans to achieve the **2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDG)**.
- Current **greenhouse gas emission levels** far exceed **their mitigation**, resulting in an increase in frequency and intensity of catastrophic events.
- DRR and **climate change** adaptation **have the common objective of reducing vulnerability and enhancing capacity as well as resilience**.

What is GP 2022

Suggestions for Resilience Building?

- **Greater resources for grounded local action, government support and strict enforcement of law and international conventions:**
 - This calls for **greater budgetary allocation** at central and state levels, revision of national / state disaster response funds norms which were there from 2015-2020, more resources at gram panchayat level and so on.
- **Greater focus on building resilience and sustainable livelihoods focusing on community level:**
 - Need to build **rural infrastructure in the disaster-prone areas in the country but not at the cost of livelihood recovery** (climate-resilient, sustainable livelihoods) and meeting of the immediate needs.
- **Greater accountability and transparency in relief and rehabilitation efforts:**
 - Need to **standardise transparency mechanisms** to include transparency boards, clearly mentioning the cost, quality and quantity of relief items, social audits and citizens' reports.
 - This needs to be the standard practice in all relief operations, both by government and civil society actors.
- **Other Suggestions:**
 - Third World countries are fighting to revive their economy after **Covid-19**.
 - There is a need to **focus on the most vulnerable and their awareness, mobilisation as well as leadership in rebuilding**.

- There should be **sufficient groundswell at the community level** to influence the policy makers to include DRR in all its investments.
- Women, persons with disability, uncared aged, people affected by war and conflicts and **informal labour** are some of the vulnerable groups which need to be mobilised, led and heard with sensitivity.

Monarch Butterflies

Why in News?

Recently, migratory **monarch butterflies** have been declared endangered in the **International Union for Conservation of Nature (IUCN)** Red List of threatened species.

What do we know about Monarch Butterfly?

- **About:**
 - It's a sub-species of the *Danaus plexippus* butterfly that **travels around 4,000 kilometres across America**.
 - It's the most **recognizable butterfly species** that are **essential pollinators and further provides various ecosystem services** such as maintaining the global food web.
 - A smaller population of the species is also found in countries like Australia, Hawaii, and India.
- **Issues:**
 - Their population in the continent has **declined 23-72% over the last decade**.
 - The population of the eastern monarchs that migrate from the eastern United States and Canada — the bigger group — also shrunk by 84% from 1996-2014.
 - They follow a unique lifestyle as they **breed in only one particular plant The Milkweeds**, but the **removal of this plant by farmers led to their decrease in population**.
 - Further, farmers also widely use a **weedicide** for the removal of milkweeds.
 - Weedicide are known as the **weed killers or pesticides** that are used to kill unwanted plants
 - Legal and illegal logging and **deforestation** make space for **agriculture and urban development**, which causes habitat destruction.

Note:

- Frequent storms and droughts are more intense and disrupt flowering cycles, which led to the killing millions of butterflies.

Environment Impact Assessment

Why in News?

The Ministry of Environment, Forests and Climate Change (MoEF&CC) has notified **amendments to the Environmental Impact Assessment (EIA) Rules**, making several exemptions **to gaining environmental clearance**.

A new EIA Notification was promulgated by the MoEF&CC in 2006 to scrutinize all relevant information about a project or activity in order to assess (and accordingly mitigate) its potential adverse impacts on the ecology of a region. Amendments were made in 2016, 2020 and 2021.

What is EIA Notification 2006?

- **Decentralisation of Project Clearances:** It classified the developmental projects in two categories:
 - **Category A** (national level appraisal): projects are appraised by Impact Assessment Agency (IAA) and the Expert Appraisal Committee (EAC).
 - **Category B** (state level appraisal): State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) provide clearance to the Category B projects.
- **Introduction of Different Stages:** The Amendment introduced four stages into EIA Cycle; Screening, Scoping, Public hearing and Appraisal.
 - **Category A** projects require mandatory environmental clearance and thus they do not have to undergo the screening process.
 - **Category B** projects undergo a screening process and are further classified into B1 (Mandatorily requiring EIA) and B2 (Not requiring EIA).
- **Projects with Mandatory Clearance:** Projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries including very small electroplating or foundry units are mandated to get environment clearance.

What are the Exemptions?

➤ Strategic and Defence Projects:

- Exempts highway projects of strategic and defence importance, which are 100 km from the **Line of Control**, among other locations, from an environmental clearance before construction.
- Highway projects related to defence and strategic importance in border states are sensitive in nature and in many cases need to be executed on priority keeping in view strategic, defence and security considerations.
- The exemption to be accorded to highways of strategic importance **does away with the need for green clearance for construction of the controversial Char Dham project**, which includes widening of 899 km roads in ecologically sensitive areas of Uttarakhand to improve connectivity to Kedarnath, Badrinath, Yamunotri, and Gangotri shrines.
- The case is presently being heard in Supreme Court, which has set up a high-powered committee to look into the matter.

➤ Biomass Based Power Plants:

- Thermal power plants up to 15 MW **based on biomass or non-hazardous municipal solid waste** using auxiliary fuel such as **coal, lignite or petroleum products up to 15%** have also been exempted — as long as the fuel mix is eco-friendly.

➤ Ports and Harbour dealing in Fish:

- Fish handling ports and harbours with less pollution potential compared to others, and caters to small fishermen, **are exempted from environmental clearance**.

➤ Toll Plazas:

- Toll plazas that need more width for installation of toll collection booths to cater to a large number of vehicles, and expansion activities in existing airports related to terminal building expansion without increase in the airport's existing area, rather than expansion of runways, etc., are two other projects exempted.

What is the Environmental Impact Assessment?

➤ About:

- As per **UNEP (United Nations Environment Programme)** EIA is a tool **used to identify the environmental, social and economic impacts** of a project prior to decision-making.

Note:



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➤ **Aim:**

- To **predict environmental impacts at an early stage** in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers.

➤ **Process:**

- **Screening:** First stage of EIA, which determines whether the proposed project, requires an EIA and if it does, then the level of assessment required.
- **Scoping:** This stage identifies the key issues and impacts that should be further investigated. This stage also defines the boundary and time limit of the study.
- **Impact analysis:** This stage of EIA identifies and predicts the likely environmental and social impact of the proposed project and evaluates the significance.
- **Mitigation:** This step in EIA recommends the actions to reduce and avoid the potential adverse environmental consequences of development activities.
- **Reporting:** This stage presents the result of EIA in a form of a report to the decision-making body and other interested parties.
- **Public hearing:** On completion of the EIA report, public and environmental groups living close to project site may be informed and consulted.
- **Review of EIA:** It examines the adequacy and effectiveness of the EIA report and provides the information necessary for decision-making.
- **Decision-making:** It decides whether the project is rejected, approved or needs further change.
- **Post monitoring:** This stage comes into play once the project is commissioned. It checks to ensure that the impacts of the project do not exceed the legal standards and implementation of the mitigation measures are in the manner as described in the EIA report.

Tropical Ozone Hole

Why in News?

According to a recent study, a new **ozone** hole has been detected over the tropics, at latitudes of 30 degrees South to 30 degrees North.

What has the Study Revealed?

- The tropical ozone hole is about **seven times larger than Antarctica**.
- **It also appears across all seasons**, unlike that of Antarctica, which is visible only in the spring.
- The tropical ozone hole, **which makes up 50% of Earth's surface**, could cause a **global concern** due to the risks associated with it.
- It is likely to cause **skin cancer, cataracts and other negative effects** on the health and ecosystems in tropical regions.

What do we know about Ozone Layer?

➤ **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 40 km above Earth's surface. This region is called the **stratosphere** and it contains about 90% of all the ozone in the atmosphere.

Why do we know about Ozone Layer Depletion?

➤ **About:**

- **Ozone Layer Depletion** refers to chemical destruction of the stratospheric ozone layer beyond natural reactions.
- Stratospheric Ozone is constantly being created and destroyed through natural cycles.
- Various **Ozone Depleting Substances (ODS)**, however, **accelerate** the destruction process, resulting in lower than normal ozone levels.
- ODSs include **chlorofluorocarbons (CFCs)**, **bromine-containing halons and methyl bromide**, **HCFCs**, **carbon tetrachloride (CCl₄)**, and **methyl chloroform**.
- These substances were formerly used and sometimes still are used in **coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants**.
- Once released into the air these ozone-depleting substances **degrade very slowly**.
- In fact, they can **remain intact for years** as they move through the troposphere until they reach the stratosphere.

Note:



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- There they are **broken down by the intensity of the sun's UV rays** and release **chlorine and bromine molecules**, which destroy the stratospheric ozone.

➤ **Effects of Depletion:**

○ **On Human Health:**

- It increases the amount of **UV that reaches the Earth's surface**.
- **UV** causes non-melanoma skin cancer and plays a major role in malignant melanoma development.
- In addition, UV has been linked to the development of **cataracts**, a clouding of the eye's lens.

➤ **On Plants:**

- UV radiation affects the **physiological and developmental processes of plants**. Despite mechanisms to reduce or repair these effects, plant growth can be directly affected by UV radiation.
- Indirect changes caused by UV (**such as changes in plant form, how nutrients are distributed within the plant, timing of developmental phases and secondary metabolism**) may be equally or sometimes more important than damaging effects of UV.

➤ **On Marine Ecosystem:**

- **Phytoplankton** form the foundation of **aquatic food webs**. Phytoplankton productivity is limited to the **euphotic zone**, the upper layer of the water column in which there is sufficient sunlight to support net productivity.
- Exposure to solar UV radiation has been shown to affect both **orientation and motility in phytoplankton**, resulting in reduced survival rates for these organisms.

➤ **On Biogeochemical Cycles:**

- Increases in UV radiation could affect **terrestrial and aquatic biogeochemical cycles**, thus altering both sources and sinks of **greenhouse and chemically important trace gases** (e.g., carbon dioxide, carbon monoxide, carbonyl sulfide, ozone, and possibly other gases).

➤ **On Materials:**

- **Synthetic polymers**, naturally occurring biopolymers, as well as some other materials of

commercial interest are adversely affected by UV radiation.

- Increases in UV levels will accelerate their breakdown, limiting the length of time for which they are useful outdoors.

What are the Initiatives for Tackling Ozone Layer Depletion?

➤ **Vienna Convention:**

- **The 1985 Vienna Convention for the Protection of the Ozone Layer** was an international agreement in which **United Nations members recognized the fundamental importance of preventing damage to the stratospheric ozone layer**.
- India became a Party to the Vienna Convention for the Protection of the Ozone Layer on 18th March 1991.

➤ **Montreal Protocol:**

- **The 1987 Montreal Protocol** on Substances that deplete the Ozone Layer and its succeeding amendments were subsequently negotiated to control the consumption and production of **anthropogenic (ODSs) and some hydrofluorocarbons (HFCs)**.
- India became Party to the Montreal Protocol on substances that deplete the Ozone layer on 19th June 1992.

➤ **Kigali Amendment:**

- The adoption of the **2016 Kigali Amendment to the Montreal Protocol** will **phase down the production and consumption of some HFCs** and avoid much of the projected global increase and associated climate change.

➤ **EU Regulation:**

- EU legislation on ozone-depleting substances is **among the strictest and most advanced in the world**. Through a series of regulations, the EU has not only implemented the Montreal Protocol but has often phased out dangerous substances faster than required.
- **The EU Ozone Regulation** sets licensing requirements for all exports and imports of ozone-depleting substances and regulates and monitors not only substances covered by the Montreal Protocol (over 90 chemicals), but also some that are not covered (five additional chemicals called 'new substances').

Note:

- **India's regulations for safe use of hydrocarbons as non-ODS alternatives:**
 - Hydrocarbons including **isobutane and cyclopentane are available as non-ODS alternatives for use in aerosols, foam-blowing and refrigeration sectors.**
 - Safe use of hydrocarbons is regulated by petroleum laws in India.
 - **The Petroleum Act, 1934 and Petroleum Rules, 1976** relate to handling of a variety of petroleum products.
 - The latter also specifies licensing requirements for handling hydrocarbons.
 - **The Gas Cylinder Rules, 1981**, addresses filling, possession, import and transport of cylinders.

Green Pit Vipers

Why in News?

Recently, on World Snake Day (16th July, 2022), there was consensus for developing effective antivenom against the venom of the Green Pit Viper.

What are the concerns related to Green Pit Viper?

- Green pit viper is not more lethal than Russell's viper, but the **hemotoxic venom** it injects prevents the blood in the body from clotting resulting in internal bleeding.
- Moreover, the antivenom available in India cannot counter the venom of the green pit viper.
 - There are among 15 venomous snakes like the monocled cobra, the banded krait, the lesser black krait, the great black krait, the mountain pit viper and the redneck keelback out of 64 recorded so far across Northeast India.
- Most of the snakebite cases in the region involve different species of the **green pit viper, making up the other venomous snakes.**
- There is lack of standardised reporting or under-reporting of snake bites.
 - The current available data say **there are more than 1.4 million cases resulting in 1,25,000 fatalities annually.**

What do we Know about Pit Viper?

- Pit viper, **any species of viper (subfamily Crotalinae)** that has, in addition to two movable fangs, a heat-sensitive pit organ between each eye and nostril which together help it accurately aim its strike at its warm-blooded prey.
- Pit vipers are **found from deserts to rainforests.**
- They may be **terrestrial, arboreal, or aquatic.** Some species lay eggs; others produce live young.
- The **venomous pit vipers species** includes hump-nosed pit viper, Mangrove pit viper and Malabar Pit Viper.
- Russell's Viper and Saw-scaled Viper are two most venomous vipers species found in India and member of big four poisonous and deadliest snakes in India.
- These snake species are responsible for the majority of snake bites in India.

Green Protection to Aravalli

Why in News?

Recently, the **Supreme Court of India** extended **Green Protection** to forest land in **Aravalli ranges.**

The court's ruling will mean around **30,000 hectares across the Aravallis and Shivaliks** in Haryana will be considered forest land.

What is the Supreme Court Ruling?

- The Supreme Court held that all land covered by the special orders issued under **Section 4 of the Punjab Land Preservation Act (PLPA)** in Haryana will be treated as forests and be entitled to protection under the **1980 Forest Conservation Act.**
 - Such land covered under Section 4 **can see no commercial activity or non-forest use** without the consent of the central government.
- It also stated that **land covered by the special orders issued under Section 4 of PLPA** have all the trappings of forest lands within the meaning of **Section 2 of the Forest Act.**
- The court directed the **state government to clear any non-forest activity from such land in three months** and report compliance.
- The bench considered a September 2018 judgment which held all land under PLPA could be treated as forest.

Note:



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- The recent verdict clarified that the **previous judgment failed to closely examine the scheme**

of **Section 4 of PLPA and its legal effect** in relation to Section 2 of the Forest Act.

Protecting Haryana's ecology



IN CONTENTION

At the heart of the issue is the classification of land under Section 4 of the colonial era Punjab Land Preservation Act (PLPA), which remains in force since Haryana was part of undivided Punjab. The Section was used to demarcate certain areas that need to be protected from any sort of erosion

PAST ORDERS

- The issue dates back to past Supreme Court orders, in particular one in 2018 which held that areas notified under Section 4 of the PLPA should be deemed as forest land under the Forest Conservation Act
- The 2018 ruling deemed any construction on those classified lands as illegal, and should therefore be demolished

HARYANA'S RESPONSE

- The state said the 2018 order would mean 100% area of 11 of the state's 22 districts, including Gurugram and Faridabad, would need to be razed
- The state in February 2019 passed an amendment to the PLPA and excluded certain land meant for construction from the PLPA classification. This amendment was stayed by a Supreme Court bench a month later

THE LATEST RULING

- The SC upheld that Section 4 demarcations were valid and had "trappings of forest lands"
- The court also made a distinction – even if all demarcations were considered to be falling within parameters of protection of the PLPA, this did not make them fall within the Forest Act provisions
- It also rejected the state's contention that all 11 districts will need to be considered as forests, saying that in case of Gurugram, PLPA's Section 4 will apply only 5.4% of the land



What are Section 4 of PLPA & Section 2 of Forest Act?

➤ Section 4 of the Punjab Land Preservation Act (PLPA):

- Special orders under Section 4 of PLPA are the **restrictive provisions issued by the state government** to prevent deforestation of a specified area that could lead to soil erosion.
- When the state government is satisfied that deforestation of a forest area forming part of a larger area is **likely to lead to erosion of soil**, the power under Section 4 can be exercised.
- Therefore, the specific land which a special order under Section 4 of PLPA has been issued will have all the trappings of a forest governed by the Forest Act.
- While the land notified under the special orders of Section 4 of PLPA shall be forest lands, **not all land under PLPA will ipso facto become forest lands** within the meaning of the Forest Act.

➤ Section 2 of the Forest Act:

- Section 2 of the Forest Act imposes **prohibitions on the de-reservation of forests or use of forest land for non-forest purposes without prior approval of the central government**.
- Once a land is covered under Section 2 of the Forest Act, whether the special orders under Section 4 continue to be in force or not, **it shall continue to remain forest land**.

Karakoram Anomaly

Why in News?

Recently, a study investigated why glaciers in the **Karakoram Range of Central-South Asia** have not been as affected by **Climate Change** as others.

They have attributed this phenomenon called **Karakoram Anomaly** to the recent revival of **Western Disturbances (WDs)**.

Note:



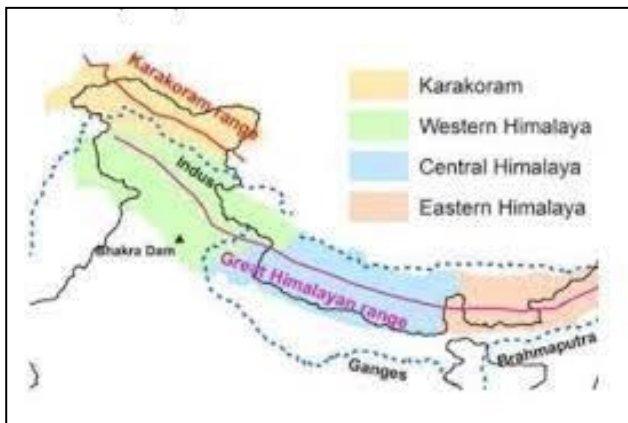
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What is Karakoram Anomaly?

The 'Karakoram Anomaly' is termed as the **stability or anomalous growth of glaciers in the central Karakoram**, in contrast to the retreat of glaciers in other nearby mountainous ranges of Himalayas and other mountainous ranges of the world.

What are the Key Findings of the study?

- It is for the **first time that a study brought forth the importance that enhanced western Disturbance (WD)-precipitation input during the accumulation period plays in modulating regional climatic anomalies.**
- Previous studies have **highlighted the role of temperature in establishing and sustaining the anomaly over the years**
 - **Western Disturbances(WDs)** are the primary feeder of snowfall for the region during winters.
 - The study suggests they **constitute about around 65% of the total seasonal snowfall volume and about 53% of the total seasonal precipitation**, easily making them the most important source of moisture.
 - Further, the **precipitation intensity of WDs impacting Karakoram has increased by around 10% in the last two decades**, which only enhances their role in sustaining the regional anomaly.



What is Karakoram Range?

- The Karakoram are part of a complex of mountain ranges at the centre of Asia, including the Hindu Kush to the west, the Pamirs to the northwest, the Kunlun Mountains to the northeast, and the Himalayas to the southeast.

- The Karakoram cover parts of Afghanistan, China, India, Pakistan, and Tajikistan.

What is the Importance of Himalayan Glaciers?

- **Himalayan glaciers** are of paramount importance in the Indian context, especially for the millions of dwellers living downstream who **rely on these perennial rivers for their day-to-day water needs.**
- They are fast receding under the impacts of **global warming**, and stifling stress on the water resources is inevitable in the coming decades.

Snow Leopard

Why in News?

Recently, a study conducted by **Zoological Survey of India (ZSI)** under **National Mission on Himalayan Studies** highlighted relation between habitat uses by **Snow Leopard**, Siberian ibex and blue sheep.

- It aimed at **examining how the predator used habitat in presence or absence of its prey species and vice-versa.**

What were Key Highlights of the Study?

- It was found that, the **likelihood of detecting a snow leopard** was increased if the place was **utilised by its prey species, ibex and blue sheep.**
- In the case of prey species, the probability of detection was low when the predator (snow leopard) was present and observed.
- Further both species were less likely to detect together than expected.
- According to the study, **habitat variables such barren area, grassland, aspect, slope, and distance to water were major drivers of habitat use** for both the snow leopard and its prey species.
- Predators such as snow leopards **regulated the populations of herbivores** such as blue sheep and Siberian ibex in the mountains, protecting the health of grasslands.
 - A long-term absence of snow leopards could cause trophic cascades as unregulated populations would likely increase, depleting vegetation cover.
- Knowledge of the **species' interactions** will be beneficial in **building better conservation and management plans for the long-term sustainability** of the snow leopard and its prey species in the Spiti Valley ecosystem.

Note:

What is Snow Leopard?

- **About:**
 - **Scientific Name:** *Panthera uncia*
 - **Top Predator:** Snow leopards 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.
- **Protection Status:**
 - **IUCN List of Threatened Species:** Vulnerable.
 - **CITES:** Appendix I.
 - **Indian Wildlife (Protection) Act, 1972:** Schedule-I.
- **Habitat:**
 - They have a vast but **fragmented distribution across the mountainous landscape of central Asia**, which covers different parts of the Himalayas such as Ladakh, Himachal Pradesh, Uttarakhand, and Sikkim.
- **Threat:**
 - Largely threatened because of the loss of natural prey species, retaliatory killing due to conflict with humans and illegal trade of its fur and bones.

Climate Finance

Why in News?

Recently, the **UNFCCC COP26** President, Alok Sharma, visited India to discuss India's implementation of its COP 26 commitments.

He also stated that a mechanism is being put in place to achieve the **target of climate financing USD 100 billion by 2023**.

What is Climate Finance?

- **About:**
- It refers to **local, national, or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change.**
- The UNFCCC, **Kyoto Protocol**, and the **Paris Agreement** call for financial assistance from Parties with **more financial resources (Developed Countries)** to those that are less endowed and **more vulnerable (Developing Countries)**.

- This is in accordance with the principle of **“Common but Differentiated Responsibility and Respective Capabilities” (CBDR)**.
- In COP26, new financial pledges to support developing countries in achieving the global goal for adapting to the effects of climate change were made.
- **New rules for the international carbon trading mechanisms agreed at COP26 will support adaptation funding.**
- **Significance:**
 - Climate finance is needed for **mitigation** because large-scale investments are required to significantly reduce emissions.
 - Climate finance is equally **important for adaptation**, as significant financial resources are needed to adapt to the adverse effects and reduce the impacts of a changing climate.
 - Climate Financing recognizes that the contribution of countries to climate change and their capacity to prevent it and **cope with its consequences vary enormously**.
 - Hence, developed countries should also continue to take the lead in **mobilizing climate finance** through a variety of actions, including supporting country-driven strategies and taking into account the needs and priorities of developing country Parties.
 - Climate finance is critical to tackle the issues posed by climate change and **achieve the goal of limiting the rise in the earth's average temperature** to below 2 degrees Celsius over pre-industrial levels, something the **2018 IPCC report** has predicted.

What is the USD 100

Billion Target and why does it matter?

- In 2009, at the UNFCCC **COP15** (held in Copenhagen);
 - The developed country parties, to achieve **meaningful mitigation actions** and transparency on implementation, jointly set a target of **USD 100 billion a year by 2020** to address the needs of developing countries.
- The climate finance goal was then **formally recognized by the UNFCCC Conference of the Parties at COP16 in Cancun**.

Note:

- At COP21 in Paris, Parties extended the \$100 billion goals through 2025.
- After COP26 there was a consensus that developed **nations will double their collective provision of adaptation finance from 2019 levels by 2025**, in order to achieve this balance between adaptation and mitigation.

What is Green Financing?

- To assist the provision of climate financing, UNFCCC established a **financial framework** to give financial resources to developing nation Parties.
 - The **finance structure** also supports the **Kyoto Protocol and the Paris Agreement**.
- It specifies that the financial mechanism's operation can be **entrusted to one or more existing international entities**, since the Convention's entrance into force in 1994, the **Global Environment Facility (GEF)** has acted as the financial mechanism's operating institution.
 - Parties established the **Green Climate Fund (GCF)** at **COP 16 in 2010** and designated it as an operating entity of the financial mechanism in 2011.
 - The financial mechanism **reports to the COP, which determines its policies, programme priorities, and financing eligibility criteria**.
- **Other Funds:**
 - In addition to providing guidance to the GEF and the GCF, Parties have established **two special funds**—
 - **Special Climate Change Fund (SCCF)**
 - **Least Developed Countries Fund (LDCF)**,
 - Both are **managed by the GEF**—and the Adaptation Fund (AF) established under the Kyoto Protocol in 2001.
 - At the Paris Climate Change Conference in 2015, the Parties agreed that the operating entities of the financial mechanisms – GCF, GEF, SCCF and the LDCF, **shall serve the Paris Agreement**.

What are India's

Initiatives regarding Climate Finance?

- **National Adaptation Fund for Climate Change (NAFCC):**
 - It was established in 2015 to **meet the cost of adaptation to climate change for the State and**

Union Territories of India that are particularly vulnerable to the adverse effects of climate change.

➤ National Clean Energy Fund:

- The Fund was created to **promote clean energy**, and funded through an initial **carbon tax** on the use of coal by industries.
- It is governed by an Inter-Ministerial Group with the Finance Secretary as the Chairman.
- Its mandate is to fund research and development of innovative **clean energy technology** in the fossil and non-fossil fuel-based sectors.

➤ National Adaptation Fund:

- The fund was established in 2014 with a corpus of Rs. 100 crores with the aim of bridging the gap between the need and the available funds.
- The fund is operated under the **Ministry of Environment, Forests, and Climate Change (MoEF&CC)**.

Light-Mantled Albatross

Why in News?

Recently Light-mantled Albatross, a species native to the **Antarctic seas**, was recorded in Tamil Nadu.

What are the Findings?

- The location where the Albatross was spotted is **part of the Palk Bay and near the Gulf of Mannar**, an 'Important Bird Area' on India's southeast coast.
- This record from the **Palk Bay** side of Rameswaram island is significant, and it throws up **new challenges to researchers once these Antarctic birds migrate to Asia**.
- This finding also **directs researchers to look for bird migration away from the well-known and established routes and sites**.
- As the nearest recorded site of the bird is around 5,000 km away from Rameswaram, **a change in atmospheric pressure may be among the reasons for the Albatross to land on an Indian shore**.

What is a Light-mantled Albatross?

Scientific Name: *Phoebastria palpebrata*

Note:



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- **About:**
 - Also, known as the **grey-mantled albatross** or the light-mantled sooty albatross.
 - Light-mantled albatrosses spend most of their lives in flight. A juvenile may **spend many years at sea before returning to breed**.
 - The Light-mantled Albatross, with broad pelagic habits, maintains a **circumpolar distribution in the Southern Ocean**.
- **Appearance:**
 - Ash coloured with darker areas around the head and lighter areas across the back and wingtips.
 - Distinctive white stripe immediately above the eye.
- **Population:**
 - A worldwide population of 21,600 breeding pairs, according to an estimate in 1998.
- **Protection:**
 - **IUCN Red List:** Near Threatened

Plastic Waste Minimisation: NITI Aayog

Why in News?

Recently, **NITI Aayog** has released a report titled '**Alternative Products and Technologies to Plastics and their Applications**' to encourage use of alternatives of plastics.

The Ministry of Environment, Forest and Climate Change has also banned **Single Used Plastics (SUP)**, violation of the ban will invite punitive action under **Section 15 of the Environment Protection Act (EPA)**.

What are the Findings of the Report?

- **Global Plastic Production and Disposal:** Between 1950–2015, the **cumulative production of polymers, synthetic fibre and additives was 8,300 Million Tonnes (MT)**, of which 55% went straight to landfills or were discarded, 8% incinerated, and only 6% were recycled.
 - By 2050 if production is continued at the same rate, it would generate 12,000 MT.
- **India's Case:** India **produced 3.47 million tonnes of plastics waste per Annum**, with the per capita waste

growing from 700 grams to 2,500 grams **over the last five years**.

- Goa, Delhi & Kerala have **reported the highest per capita plastic waste generation**, while Nagaland, Sikkim and Tripura have reported the lowest per capita plastic waste generation.
- **Concern:** Globally, 97-99% of these plastics are derived from fossil fuel feedstock while the remaining 1-3% come from bio (plant) based plastics.
 - **Only a small amount of this plastic waste gets recycled**, adding that a majority of this waste leaks into the environment through various polluting pathways.
 - India collects **only 60% of its plastic waste with the rest 40% remaining uncollected** and enters the environment directly as waste.
 - Nearly every piece of plastic begins as a fossil fuel, and greenhouse gases (GHG) are emitted at each stage of the plastic lifecycle: a) fossil fuel extraction and transport, b) plastic refining and manufacture, c) managing plastic waste, and d) ongoing effects within oceans, waterways, and various ecosystem landscapes.

What are the Recommendations?

- The most preferred option for the management of waste is **waste minimisation**. Strengthen the waste minimisation drive through **Extended Producer Responsibility (EPR)**, proper labelling and collection of compostable and biodegradable plastics, while **relaxing the deadline for adoption of biodegradable plastic**.
- Develop **emerging technologies**, e.g., **additives can make plastics biodegradable polyolefins**, such as polypropylene and polyethylene
- Use of **Bio-plastics**: as a **cost-effective** alternative to plastics.
- Encourage R&D (Research and Development) and incentivize the manufacturing sector.
- Enhance **transparency in disclosing waste generation**, collection, recycling or scientific disposal to bring accountability and avoid greenwashing.
 - Greenwashing is the **process of conveying misleading information about how a company's products are more environmentally sound**.

Note:

What can be the Alternatives to Plastics?

- **Glass:**
 - Glass has always been the **safest and the most viable option for the packaging** and use of food and liquid.
 - Glass can be recycled multiple times, so it doesn't have to end up in landfills. It is **cost-effective, considering its durability and recyclability**.
- **Bagasse:**
 - Compostable, eco-friendly **bagasse can replace plastic** needing as disposable plates, cups or takeout boxes.
 - Bagasse is made from the pulp that is leftover when the juice is extracted from sugarcane or beets. It can be **used for other purposes, such as a biofuel**.
- **Bioplastics:**
 - Plant-based plastics, known as bioplastics, have been hailed as a green alternative to fossil fuel-based plastic, especially when it comes to **food packaging**.
 - But bioplastics have their own environmental footprint, requiring the growing of crops and therefore land and water use.
 - Bioplastics have been shown to be just as harmful, and in some cases more harmful, than conventional plastic.
- **Natural Textiles:**
 - When it comes to replacing polyester and nylon clothing which shed millions of tiny plastic fibres with every single wash, the **traditional alternatives are cotton, wool, linen and hemp**.
 - But the production of cotton has been causing serious threats to the environment and also comes at a human cost.
- **Refill, reuse and buy unpackaged:**
 - By far the least damaging type of packaging is **one that can be used again and again, or none at all**.
 - Reusable fabric bags for fruit & veg etc.
 - Reusable containers and boxes for meat, fish, cheese etc.
 - Refillable bottles and jars for oil & vinegar, cleaning liquids etc.
 - Beeswax wraps instead of foil and clingfilm.

What are the Related Initiatives?

- **Plastic Waste Management rules 2016**
- **Plastic Waste Management Amendment Rules, 2021**
- **Central Pollution Control Board (CPCB)**
- **Pollution Control Committees**
- **India Plastics Pact**
- **Project REPLAN**
- **Un-Plastic Collective**
- **GoLitter Partnerships Project**

Forest (Conservation) Rules, 2022

Why in News?

Recently, the **Ministry of Environment, Forest and Climate Change (MoEFCC)** has issued the **Forest (Conservation) Rules, 2022**.

- It is conferred by **Section 4 of the Forest (Conservation) Act, 1980** and in **supersession of the Forest (Conservation) Rules, 2003**.

What are the Provisions of Forest (Conservation) Rules, 2022?

- **Formation of Committees:**
 - It constituted an **Advisory Committee**, a **regional empowered committee** at each of the integrated regional offices and a **screening committee** at State/Union Territory (UT) government-level.
- **Advisory Committee:**
 - The role of the Advisory Committee is restricted to **advise or recommend with regards to grant of approval** under relevant sections in respect of proposals referred to it and **any matter connected with the conservation of forests** referred to it by the Central government.
- **Project Screening Committee:**
 - The MoEFCC has directed the constitution of a **project screening committee in each state/UT for an initial review of proposals involving diversion of forest land**.
 - The five-member committee **will meet at least twice every month** and will advise the state governments on projects in a time bound manner.

Note:



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- All **non-mining projects between 5-40 hectares** must be reviewed within a period of 60 days and all such mining projects must be reviewed within 75 days.
- For projects involving a larger area, the committee gets some more time — 120 days for non-mining projects involving more than 100 hectares and 150 days for mining projects.
- **Regional Empowered Committees:**
 - All **linear projects (roads, highways, etc)**, projects involving forest land up to 40 hectares and those that have projected a use of forest land having a canopy density up to 0.7 — irrespective of their extent for the purpose of survey — **shall be examined in the Integrated Regional Office.**
- **Compensatory Afforestation:**
 - The applicants for diverting forest land in a hilly or mountainous state with green cover covering more than two-thirds of its geographical area, or in a state/UT with forest cover covering more than one-third of its geographical area, will be able to take up compensatory afforestation in other states/UTs where the cover is less than 20%.

Red Panda

Why in News?

Recently, the **Padmaja Naidu Himalayan Zoological Park** has started an ambitious programme to release 20 **Red Pandas** in about five years to the forests.

The **Singalila National Park**, the highest protected area in West Bengal, will soon get new denizens.

What are the Key Points related to Red Panda?

➤ About:

There are only two different panda species in the world, the **Giant Pandas** and the **Red Pandas**.

It is also the state animal of **Sikkim**.

Red Pandas are shy, solitary and arboreal animals and considered an indicator species for ecological change.

➤ India is home to both the (sub) species:

- Himalayan red panda (*Ailurus fulgens*)
- Chinese red panda (*Ailurus styani*)

- **Siang river** in Arunachal Pradesh splits the two phylogenetic species.
- It is found in the forests of **India, Nepal, Bhutan and the northern mountains of Myanmar and southern China.**
- The number of Red Pandas has been declining in the wild, even in the **Singalila and Neora Valley National Parks**, the two protected areas where the endangered mammal is found in the wild in West Bengal.
- **Protection Status:**
 - **Red Pandas:**
 - **IUCN Red List:** Endangered
 - **CITES:** Appendix I
 - **Wildlife Protection Act 1972:** Schedule I
 - **Giant Pandas:**
 - **IUCN Red List:** Vulnerable
 - **CITES:** Appendix I

What do we know about the Red Panda Release Programme?

- **Padmaja Naidu Himalayan Zoological Park** has started an ambitious programme to release 20 of these furry mammals in about five years to the forests.
- The Padmaja Naidu park, Darjeeling is one of the high-altitude zoos in the country and has been quite successful in captive breeding of the furry mammals.
- The Pandas will be released in the **Singalila National Park**, the highest protected area in West Bengal.
 - Singalila National Park is located at the **Singalila Ridge in the Darjeeling** district.
 - It is the **highest altitude park** in the state of West Bengal.
 - It was initially a **wildlife sanctuary** and made into a National Park in 1992.
 - Other national parks of West Bengal are:
 - Jaldapa National Park
 - Neora Valley National Park
 - **Sundarbans National Park**
 - Gorumara National Park
 - Buxa National Park and Tiger Reserve

Note:

UN Oceans Conference 2022

Why in News?

Recently, the **UN (United Nations) Ocean Conference 2022** was held to ensure global cooperation towards protection and sustenance of the **Ocean ecosystem** of the world.

- The conference was **co-hosted by the Governments of Kenya and Portugal**.
- **Minister of Earth Sciences** led the Indian delegation at UN Ocean Conference. India promised to provide **science and innovation-based solutions for the implementation of Goal 14** through partnerships and environmentally friendly.
- The UN Ocean conference 2022 is aligned to **SDG (Sustainable Development Goals) 14 'life below water'** and stresses on the critical need for scientific knowledge and marine technology to build ocean resilience.

What are the Key Agenda of the Conference?

- **Moratorium on Deep Sea Mining:**
 - Push for a moratorium on **deep-sea mining** of rare metals needed for a boom electric vehicle battery construction.
 - The digging and gauging of the ocean floor by machines can alter or destroy deep-sea habitats.
- **Carbon Sequestration:**
 - Focus on **carbon sequestration** to boost the ocean's capacity to soak up CO₂, by either enhancing natural sinks such as mangroves or through geoengineering schemes.
- **Blue Deal:**
 - A "Blue Deal" was promoted to enable the sustainable use of ocean resources for economic growth.
 - It includes **global trade, investment and innovation to create a sustainable and resilient ocean economy**.
 - Focus on **blue food** to ensure marine harvests from all sources are sustainable and socially responsible.
- **High Seas are Unregulated:**
 - No comprehensive legal framework covers the high seas. Oceans cover **some 70% of the earth's**

surface and provide food and livelihoods for billions of people.

- Some activists refer to them as the **largest unregulated area on the planet**.
- **Threat to Ocean:**
 - Threats to the oceans include **global warming, pollution (including plastic pollution), acidification, marine Heatwaves** etc.

Water Security in Asia

Why in News?

Recent findings by the scientists of southeast Asian countries show that the **urban water security in Asian cities including Delhi is in decline**.

- The global mega cities like Tokyo, Shanghai, and Delhi are the symbol of the rise of the new Asian century as they are the three biggest in the world, engines of economic growth, producing billions in economic activity for their residents and the world.
- But they have a serious problem i.e., there is not enough fresh water available per person for their daily needs.

What are the Issues?

- **Amount of Freshwater:**
 - In Asia, there is half as much freshwater as there is globally.
- **Low Water Efficiency:**
 - Despite the comparatively large amount of water used in agriculture production, water efficiency is also among the lowest in the world, and low water productivity results in low crop yields.
- **Urban Pollution:**
 - Water problems are common in many big cities. Degradation of the environment has been caused by population and economic growth due to industrial activities and discharge of industrial waste in water bodies.
 - Existing water resources just cannot meet the rising demand.
- **Climate change:**
 - Due to climate change, extreme weather events like droughts and floods are becoming more frequent, which exacerbates the problem.

Note:

➤ **Examples:**

- **Over-exploitation in Bangkok, Thailand**, has severely **reduced groundwater levels**, causing land to subside.
 - Water sources around the city are also polluted due to the direct discharge of domestic sewage into drains and canals.
 - Similarly, Bangkok's inadequate drainage capacity and its location in the Chao Phraya River floodplains make it susceptible to flooding.
- **Hanoi, Vietnam**, is one of the fastest-growing cities in terms of GDP growth, contributing more than 19% of the country's total GDP.
 - The repercussions of this growth are felt directly in its **polluted lakes and rivers due to wastewater from residential and industrial areas**.
- **Madaba in Jordan is a water-scarce city**.
 - Although 98% of the city's population has access to water, residents are often forced to rely on alternative sources of storage such as large tanks or private water vendors to meet their needs due to inconsistent water supplies.

India's Largest Floating Solar Power Project

Why in News?

Recently, the final 20 MW of the 100 MW Ramagundam **floating solar PV** project's commercial operation date was recently announced.

- With this, the **100 MW Ramagundam floating solar PV project in Telangana** is declared operational from 1st July 2022.
- It is the **largest project of its kind in India**.

What are Floating Solar Panels?

- These are Photovoltaic (PV) modules mounted on platforms that float on water reservoirs, lakes, and where conditions are right seas and oceans.
- These platforms are typically moored on calmer bodies of water, such as ponds, lakes or reservoirs.
- These installations are relatively quick to construct, silent to run and require no land levelling or removal of vegetation.

Environment Protection Act, 1986

Why in News?

The **Ministry of Environment, Forest and Climate Change** proposed **amendments in the Environment Protection Act, 1986**.

- Incidentally, the **Environment Protection Act provisions will be in force for penal provisions of the single use plastic ban** which has come into force recently.

What are Key Amendments

Proposed in the Environment Protection Act?

- The Ministry has proposed the **decriminalisation of the existing provisions of the EPA, 1986** in order to **weed out fear of imprisonment for simple violations**.
 - It involves **removal of imprisonment as a penalty for the "less severe" contraventions**.
 - However, **serious violations of EPA** which lead to **grievous injury or loss of life** shall be covered under the provision of **Indian Penal Code**.
 - Failure or contravention or non-compliance of the provisions of EPA such as submitting reports, furnishing information etc. will now be **dealt by imposing a monetary penalty through duly authorised Adjudicating Officer**.
 - Instead of imprisonment, the amendments propose the creation of an **Environmental Protection Fund** in which the amount of **penalty imposed** by the Adjudicating Officer after adjudicating the damage to the environment **shall be remitted**.
 - The Central Government may prescribe the manner in which the Protection Fund shall be administered.

What is the Environment (Protection) Act, 1986?

➤ About:

- The EPA, 1986 establishes the framework for **studying, planning, and implementing long-term requirements of environmental safety** and laying down a system of **speedy and adequate response to situations threatening the environment**.

Note:

➤ **Background:**

- The roots of the enactment of the EPA lies in the **United Nations Conference on the Human Environment** held at Stockholm in June, 1972 (Stockholm Conference), in which India participated, to take appropriate steps for the improvement of the human environment.
- The Act implements the decisions made at the **Stockholm Conference**.

➤ **Constitutional Provisions:**

- The EPA Act was enacted under **Article 253 of the Indian Constitution** which provides for the enactment of legislation for giving effect to international agreements.
- **Article 48A** of the Constitution specifies that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.
- **Article 51A** further provides that every citizen shall protect the environment.

➤ **Powers of the Central Government:**

- EPA empowers the **Central Government** to establish authorities charged with the **mandate of preventing environmental pollution in all its forms and to tackle specific environmental problems** that are peculiar to different parts of the country.
- EPA also empower the Government to:
 - **Plan and execute a nation-wide programme** for the prevention, control and abatement of environmental pollution.
 - **Lay down standards for the quality of the environment** in its various aspects like **emission or discharge of environmental pollutants from various sources**.
- The Central government as per the Act has the **power to direct:**
 - The **closure, prohibition or regulation of any industry, operation or process**.
 - The **stoppage or regulation of the supply of electricity or water or any other service**.

What is the Current Status of Offences and Penalties under EPA?

Non-compliance or Contravention to any of the provisions of the Act is considered as an offence.

➤ **Cognizance of Offences:**

- **No Court shall take cognizance of any offence** under this Act **except on a complaint** made by:
 - The **Central Government or any authority on behalf** of the former.
 - A person who has approached the Courts after a **60-day notice** has been furnished to the Central Government or the authority on its behalf.

➤ **Penalties:**

- In case of **any non-compliance or contravention of the current provisions of the EPA**, or of the rules under this Act, the violator can be punished with **imprisonment up to 5 years** or with a **fine up to Rs 1,00,000**, or with both.
- In case of **continuation of such violation**, an **additional fine of up to Rs 5,000 for every day during which such contravention continues** after the conviction for the first such contravention can be levied.
- If the **violation continues beyond a period of one year** after the date of conviction, the offender can be punished with **imprisonment** for a term which may extend to seven years.

What are the Drawbacks of Environment Protection Act, 1986?

➤ **Complete Centralisation of the Act:**

- A potential drawback of the Act could be its centralization.
- While such wide powers are provided to the Centre and **no powers to the state governments**, the former is liable to its arbitrariness and misuse.

➤ **No Public Participation:**

- The Act also says **nothing about public participation** as regards environmental protection.
- There is a **need to involve the citizens in environmental protection to check arbitrariness and raise awareness** and empathy towards the environment.

➤ **Incomplete Coverage of Pollutants:**

- The Act **does not address modern concepts of pollution** such as **noise, overburdened transport systems** and **radiation waves** which are also an important cause for the deteriorating environment.

Note:



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Regulating Nitrate absorption in Plants

Why in News?

Researchers from the **National Centre of Biological Sciences, Tata Institute of Fundamental Research, Bengaluru (NCBS-TIFR)** discovered a new pathway that regulates nitrate absorption in plants.

What is the New Method?

- The researchers investigated a miR444 target gene called MADS27, a transcription factor that has previously received little attention.
 - Transcription factors are proteins involved in the **process of converting, or transcribing, DNA into RNA**. Transcription factors include a **wide number of proteins, excluding RNA polymerase**, that initiate and regulate the transcription of genes.
- The micro-RNA, miR444, activates the **Gene MADS27**, which **regulates nitrate absorption, root development, and stress tolerance**, and thus provides a way to control these plant properties.
 - **The gene MADS27** appears to be an excellent candidate for modification in order to **improve nitrogen use efficiency**, which helps the plant absorb more nitrates, and to **engineer abiotic stress tolerance**.
- This mechanism was studied in both **rice (monocot) and tobacco (dicot) plants** by the researchers. The study was published in the Journal of Experimental Botany.

What is the Importance of Nitrogen?

- Nitrogen is one of the most important macronutrients needed for development of a plant.
 - However, excessive use of nitrates in fertilisers, for example, can result in nitrate dumping in the soil, resulting in nitrate accumulation in water and soil. This **accumulation contributes to soil and water pollution**, as well as increased contribution to greenhouse gas emissions.
 - It is a **part of chlorophyll, amino acids and nucleic acids**, among others.
 - It is mostly sourced from the soil where it is mainly absorbed in the form of nitrates and ammonium by the roots.

- Nitrates also **influence genome-wide gene expression**, which in turn influences the root system, the biological clock of plants, leaf growth, and so on.

Australia Killing Million of its Bees

Why in News?

Australian authorities have killed millions of honeybees over the past two weeks in an effort to stop a potentially catastrophic parasite plague named **Varroa mite**.

- The decision to kill honeybees could adversely impact the growth of several crops including almonds, macadamia nuts, and blueberries that are dependent on hives for pollination.
- Bees are some of the most important pollinators, ensuring food and food security, sustainable agriculture, and biodiversity.

What is Varroa Mite?

- Its **parasitic insect infects and feeds on honeybees**, often known as the varroa destructor. The small pests, which are reddish-brown in colour, have been **capable of eradicating entire colonies of honeybees**.
- They frequently circulate amongst bees as well as through beekeeping supplies like removed combs.
- Although Varroa mites can feed and live on adult honey bees, they primarily feed and reproduce on larvae and pupae in developing brood, causing malformation and weakening as well as virus transmission.
 - As the mite population in bee colonies grows, the symptoms become more severe. In general, heavy infestations result in crippled bees, impaired flight performance, a lower rate of return to the colony after foraging, and reduced colony productivity.

Chenkurinji

Why in News?

Chenkurinji has been affected due to **climate change**, so, there are different conservation measures are being induced.

Note:

What do we know about the Species?

- Chenkuriinji (*Gluta travancorica*), is a **species endemic to the Agasthyamala Biosphere Reserve**, and inspired the name of the Shendurney Wildlife Sanctuary.
- The **Anacardiaceae family tree was once abundant in the hills** on the southern parts of Aryankavu Pass, but its presence has been rapidly declining over the years.
- *Gluta travancorica* flowers in January on average, but the species has recently reported a tendency to extend the process due to climate change.
- It's used to treat lower blood pressure and treat arthritis.

What is Agasthyamala Biosphere Reserve?

- The Agasthyamala Biosphere Reserve, located in the **Western Ghats** in the country's south, has peaks that rise 1,868 metres above sea level.
- The site, which is mostly tropical forest, is home to **various species of higher plants, including which are endemic in nature.**
- It is also a **unique genetic reservoir for cultivated plants, particularly cardamom, jamune, nutmeg, pepper, and plantain.**
- The site contains three wildlife sanctuaries, Shendurney, Peppara, and Neyyar, as well as the Kalakad Mundanthurai Tiger reserve.

What type of conservation measures is being Implemented?

- **'Save Chenkuriinji'**, a campaign to be implemented in various areas coming under the Achencoil Forest Division.
 - It aims to plant thousands of saplings as part of the campaign in the ghat sectors of the Kollam and Pathanamthitta districts.
 - Approximately 75 schools in the area where Chenkuriinji will be grown with student help.
 - Saplings will be planted in public places in addition to schools, and the forest department has already cultivated thousands of seedlings for Save Chenkuriinji.

Direct-seeded Rice

Why in News?

Recently, the state of Punjab was unable to achieve its target in the water-saving method (direct-seeded rice).

What is Direct Seeded Rice (DSR)?

- **Direct Seeded Rice (DSR)**, also known as the **'broadcasting seed technique,'** is a **water-saving method of sowing paddy.**
- In this method, **seeds are directly drilled into the fields. In contrast to the traditional water-intensive method of transplanting rice seedlings from a nursery to waterlogged fields,** this method saves groundwater.
- There is no nursery preparation or transplantation involved in this method.
- Farmers have to only level their land and give one pre-sowing irrigation.

What are the Advantages of DSR?

- **Require Less Number of Labours:**
 - DSR can **solve labour shortage problems** because like the traditional method it does not require a paddy nursery and transplantation of 30 days old paddy nursery into the main puddled field.
- **Avenues for Groundwater:**
 - It offers **avenues for ground water recharge as it prevents the development of hard crust** just beneath the plough layer due to puddled transplanting.
 - It matures 7-10 days earlier than the puddle transplanted crop, therefore giving more time for management of paddy straw.
- **Increase in Yield:**
 - According to the results from research trials and farmers' field survey, after this technique the yield is one to two quintals per acre higher than puddled transplanted rice.

What are the Major Issues Related to DSR?

- **Extreme climate:**
 - **High temperatures and deficient rainfall** are mainly to blame.

Note:



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- The temperature was in the range of 47-48 degrees Celsius on some days, whereas the ideal temperature is 42-43°C during the period.
- **Farmers were hesitant** to choose DSR because their wheat crops had already suffered as a result of the heat wave.
- **Reluctance by Farmers:**
 - **Due to a lack of support from the government** in the form of providing a good variety of seeds, and unable to supply uninterrupted electricity during the sowing season of DSR that's why farmers found it very difficult to irrigate the field using an electric motor.
- **Governance issues:**
 - Punjab Government's **uninterrupted electricity supply for puddling season which begins in mid-June** is not beneficial for DSR as its sowing season is between **early May to mid-June** and that's why it is beneficial for the traditional method.
- **Other Challenges:**
 - It includes **closed canals, erratic electricity supply for operating tube wells for irrigation, and issues of weeds and rats.**
 - **Water availability was a challenge** due to **deficient to no rainfall** in many parts of the state of Punjab during May.

Sustainable Use of Wild Species: IPBES Report

Why in News?

A report released by the **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)** has stated that Sustainable use of wild species can meet needs of billions.

- Delegates from 140 countries came together to discuss and **reach an outcome on the sustainable use of wildlife.**
- The assessment shortlisted five categories of practices used for wild species — **Fishing, Gathering, Logging, Terrestrial animal harvesting** which includes hunting and non-extractive practices such as observing.

- The report is the first of its kind and has been **conceived after a period of four years.**

What is IPBES?

- It is an **independent intergovernmental body**, established by member States in 2012.
- It **strengthens the science-policy interface for biodiversity and ecosystem services** for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

What are the Findings?

- **Dependence on Wild Species:**
 - About **70% of the world's poor population** is directly dependent on wild species.
 - 20% source their food from wild plants, algae and fungi.
 - **Wild-Species-Important Source of Income**
 - The use of wild species is an **important source of income** for millions of people worldwide.
 - Wild tree species **account for two thirds of global industrial roundwood**; trade in wild plants, algae and fungi is a billion-dollar industry; and even non-extractive uses of wild species are big business.
- **Local Variations:**
 - About 34% of marine wild fish stocks are overfished and 66% are fished within biologically sustainable levels. But within this global picture, there are significant local and contextual variations.
- **Unsustainable Logging of Tree Species:**
 - The survival of an estimated 12% of wild tree species is **threatened by unsustainable logging.**
 - **Unsustainable gathering** is one of the main threats for several plant groups, notably cacti, cycads and orchids.
 - **Unsustainable hunting** has been identified as a threat for 1,341 wild mammal species – with declines in large-bodied species that have low natural rates of increase also linked to hunting pressure.

Note:

- **Rural People are at Risk of Unsustainable Use:**
 - Rural people in developing countries are most at risk from unsustainable use of Wild Species, with lack of complementary alternatives often forcing them to exploit wild species already at risk.
 - About 50,000 wild species are used through different practices, including more than **10,000 wild species harvested directly for human food.**
- **Cultural Significance leading to Exploitation:**
 - Certain species have cultural importance as they offer multiple benefits that define tangible and intangible features of people's cultural heritage.
 - The use of wild species is also a source of culturally meaningful employment for such communities and they have engaged in the trade of wild species and materials since millennia.
 - Wild rice (*Zizania palustris* L.) is a cultural keystone species, providing physical, spiritual and cultural sustenance for many indigenous peoples in the Great Lakes region of North America.
- **Drivers and Threats:**
 - Drivers such as land- and seascape changes; climate change; pollution and invasive alien species that impact the abundance and distribution of wild species, and can **increase stress and challenges among the human communities that use them.**
- **Illegal Trade:**
 - Global trade in wild species has expanded substantially in volume, value and trade networks over the past four decades.
 - Illegal trade in wild species represents the **third largest class of all illegal trade** – with estimated annual values of up to USD199 billion. Timber and fish make up the largest volumes and value of illegal trade in wild species.

Dragon Fruit

Why in News?

Recently, the Centre has decided to promote the growth of dragon fruit, which is recognized as a “**super fruit**” for its health advantages.

- Further, the Centre believes that due to the fruit's nutritional benefits and global demand, farming in India may be extended.

What is Dragon fruit?

- **About:**
 - **Dragon fruit** grows on the *Hylocereus* cactus, also known as the **Honolulu queen.**
 - The plant is **native to southern Mexico and Central America.** Today, it is grown all over the world.
 - At the moment, **Mizoram tops among the States** that cultivate this fruit.
 - It goes by many names, including **pitaya, pitahaya, and strawberry pear.**
 - The two most common types have **bright red skin with green scales** that **resemble a dragon.**
 - The most widely available variety has **white pulp with black seeds**, though a less common type with red pulp and black seeds exists as well.
 - The fruit is **considered good for diabetic patients**, low in calories and high in nutrients like iron, calcium, potassium and zinc.
- **Largest Producer:**
 - The **world's largest producer and exporter** of dragon fruit is Vietnam, where the plant was brought by the French in the 19th century.
 - The Vietnamese call it **thanh long**, which translates to “dragon's eyes”, believed to be the origin of its common English name.
 - Apart from Vietnam, this exotic fruit is also grown in the USA, Malaysia, Thailand, Taiwan, China, Australia, Israel, and Sri Lanka.
- **Features:**
 - Its **flowers are hermaphrodites** (male and female organs in the same flower) in nature and open at night.
 - The plant sustains yield for more than 20 years, is **high in nutraceutical properties** (having medicinal effects) and good for **value-added processing industries.**
 - It is a **rich source of vitamins and minerals.**
- **Climate Conditions:**
 - As per the **Indian Council of Agriculture Research**, **the fruit plant doesn't need much water and can be cultivated on dry land.**
 - The **cost of cultivation is initially high**, but the **plant doesn't need productive land**; it gives **maximum production from the non-productive, less fertile areas.**

Note:



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Commonwealth adopts 'Living Lands Charter'

Why in News?

Recently, the Commonwealth members have agreed to voluntarily dedicate 'living land' in their respective countries to future generations, in line with the strategy set for the **United Nations Decade on Ecosystem Restoration**.

The 'Living land' charter was announced at the conclusion of the **2022 Commonwealth Heads of Government Meeting (CHOGM)** in Kigali (Rwanda).

What is the United Nations Decade on Ecosystem Restoration?

- The United Nations Decade on Ecosystem Restoration runs from 2021 to 2030.
- Its purpose is to **promote the United Nation's environmental goals**.
- Specifically, to facilitate global cooperation for the restoration of degraded and destroyed ecosystems.
- It calls for **protection and revival of ecosystems** across the world.

What is the Living Land Charter?

- The **non-binding 'Living Lands Charter'** mandates that **member countries will safeguard global land resources** and arrest land degradation while acting against **climate change, biodiversity loss** and towards sustainable management.
- The Living Lands Charter helps to encapsulate the combined effort to **hold the global average temperature increase to 1.5 degrees Celsius**.
- The charter aims to **achieve climate goals through a mixture of policy influence**, financing, technical assistance, governance and sharing knowledge across nations.
 - Commonwealth governments have been asked to submit their emission reduction targets by 23rd September, 2022.
- It is aimed to **support member countries to effectively deliver their commitments under the three Rio conventions — UN Convention on Biological Diversity, UN Convention to Combat Desertification (UNCCD) and UN Framework Convention on Climate Change**.

What are the Highlights of the CHOGM 2022?

- The Commonwealth Heads of Government Meeting is a **biennial summit** meeting of the heads of government from all Commonwealth nations.
- CHOGM2022 was **taken place in Rwanda, with theme: 'Delivering a Common Future: Connecting, Innovating, Transforming.'**
- It has raised **more than USD 4 billion in pledges for the battle against malaria and other tropical diseases**.
- A total of 24 meetings have been held since 1971, with the most recent one taking place in the United Kingdom (UK) in 2018.

Green Hydrogen and Green Ammonia

Why in News?

- Recently, a seminar on **Production & Use of Green Hydrogen and Green Ammonia in the Process Industry** was held
 - **Process Industries** are the companies that extract, transport and process raw materials to manufacture semi-finished or high-quality end products by means of physical, mechanical and/or chemical processes.

What is Green Hydrogen?

- **About:**
 - The fuel can be a **game-changer for the energy security of India**, which imports 85% of its oil and 53% of gas requirements.
 - To promote clean fuels, India is considering making it mandatory for fertilizer plants and oil refineries to purchase green hydrogen.
- **Method of Production:**
 - It is produced by **splitting water into hydrogen and oxygen using an electrolyzer** powered by renewable energy sources such as wind and solar.
- **Uses:**
 - **Chemical industry:** Manufacturing ammonia and fertilizers.
 - **Petrochemical industry:** Production of petroleum products.

Note:

- Furthermore, it is **starting to be used in the steel industry**, a sector which is under considerable pressure in Europe because of its polluting effect.

What is Green Ammonia?

➤ About:

- Ammonia is a chemical which is **used mainly in the manufacture of nitrogenous fertilizers**, like urea and ammonium nitrate, but can be put to other uses too, such as to run engines.
- Green ammonia production is where the process of making ammonia is **100% renewable and carbon-free**.

➤ Method of Production:

- It is produced by using hydrogen from water electrolysis and nitrogen separated from the air. These are then fed into the **Haber process** (Also known as Haber-Bosch), all powered by sustainable electricity.
- Green ammonia production **makes use of renewable energy sources** such as hydro-electric, solar power or wind turbines.
- In the Haber process, **hydrogen and nitrogen are reacted together at high temperatures and pressures to produce ammonia, NH₃**.

What is Green

Hydrogen/Green Ammonia Policy?

- Under the policy, the government is offering to set up manufacturing zones for production, **connectivity to the ISTS (Inter-State Transmission System)** on priority basis, and free transmission for 25 years if the production facility is commissioned before June 2025.
- This means that a **green hydrogen producer will be able to set up a solar power plant in Rajasthan to supply renewable energy to a green hydrogen plant in Assam** and would not be required to pay any inter-state transmission charges.
- Besides, producers will be allowed to set up bunkers near ports for storage of green ammonia for export by shipping.
- **The production target has also been raised five times from 1 million tonnes (m) to 5 mt by 2030.**
 - In October, 2021 it was announced that **India is targeting initially around 1 million tonnes annual green hydrogen production by 2030.**

- Manufacturers of Green hydrogen and ammonia are allowed to purchase renewable power from the power exchange or set up **Renewable Energy (RE) capacity** themselves or through any other developer, anywhere.
- To ensure ease of doing business a **single portal for carrying out all the activities including statutory clearances in a time bound manner will be set up by MNRE** (Ministry of New and Renewable Energy).

Burmagomphus Chaukulensis

Why in News?

Recently, a rare dragonfly, *Burmagomphus chaukulensis* was spotted in Kerala.

Earlier, a new species of dragonfly '*Platygomphus benritarum*' was discovered in Assam.

What are the Findings?

- This is a dragonfly of genus *Burmagomphus*, which is represented by **three species – B. Cauvericus, B. Pyramidalis and B. Laidlawi**.
 - While *B. laidlawi* is found throughout the Western Ghats,
 - *B. cauvericus* is **more restricted in its distribution**.
 - *B. pyramidalis* is found in the Western Ghats as well as in Peninsular India.
 - All **other species of the genus are found in the Western and Eastern Himalayas**.
 - The new species **can be separated from its congeners by the markings on the lateral thorax and peculiar shape of anal appendages**.
 - This species is known to be **endemic to the Western Ghats**.

Banning Single-Use Plastic

Why in News?

Recently, the Centre has defined a list of single-use plastic items that will be banned from 1st July 2022.

The manufacture, import, stocking, distribution, sale and use of notified single-use plastic, including polystyrene and expanded polystyrene, commodities shall be prohibited with effect from the 1st July, 2022.

Note:



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Cleaning up

Plastic items completely banned from July 1, 2022

Ear buds with plastic sticks, plastic sticks for balloons, plastic flags, polystyrene (thermocool) for decoration, plates, cups, glasses, cutlery such as forks, spoons, knives, straw, trays, wrapping or packing films, cigarette packets

Plastic bags to be thicker

From September 30 this year, thickness of plastic carry bags has been increased from 50 microns to 75. From December 31, 2022, the thickness will increase to 120 microns

What is single-use plastic?

➤ About:

- It refers to plastic items that are used once and discarded.
- **Highest Shares of Plastic Manufactured and Used:**
 - **Single-use plastic** has among the **highest shares of plastic manufactured and used** — from packaging of items, to bottles (shampoo, detergents, cosmetics), polythene bags, face masks, coffee cups, cling film, trash bags, food packaging etc.

➤ Accounts for a Third of all Plastic Produced Globally:

- According to a 2021 report of the Minderoo Foundation, an Australian philanthropic organization, single-use plastics account for a **third of all plastic produced globally**, with **98% manufactured from fossil fuels**.

➤ The Majority of Plastic Discarded:

- Single-use plastic also accounts for the majority of plastic discarded — **130 million metric tonnes globally in 2019** — all of which is **burned, buried** in landfills or **discarded** directly into the environment.

➤ Contribution to Greenhouse Gas Emissions:

- On the current trajectory of production, it has been projected that single-use plastic could account for **5-10% of greenhouse gas emissions by 2050**.

➤ Data for India:

- The report found that **India features in the top 100 countries** of single-use plastic waste generation — **at rank 94** (the top three being Singapore, Australia and Oman.)

- With domestic production of 11.8 million metric tonnes annually, and import of 2.9 MMT, **India's net generation of single-use plastic waste is 5.6 MMT**, and **per capita generation is 4 kg**.

Why these items?

- The choice for the first set of single-use plastic items for the ban was based on **the difficulty of collection, and therefore recycling**.
- **When plastic remains** in the environment for **long periods of time** and **does not decay**, it turns into **microplastics** — first entering our food sources and then the human body, and this is extremely harmful.
- The largest share of single-use plastic is that of packaging — with as much as **95% of single use belonging to this category** — from toothpaste to shaving cream to frozen foods.
- The items chosen are of low value and of low turnover and are unlikely to have a big economic impact, which could be a contributing reason.

How will the ban be enforced?

➤ Monitored by:

- The ban will be **monitored** by the **CPCB from the Centre**, and by the **State Pollution Control Boards (SPCBs)** that will report to the Centre regularly.

➤ Directions Issued:

- Directions have been **issued at national, state and local levels** — for example, to all petrochemical industries — to **not supply raw materials to industries engaged in the banned items**.
- Directions have also been issued to **SPCBs and Pollution Control Committees** to modify or **revoke consent to operate issued under the Air/Water Act** to industries engaged in single-use plastic items.
- **Local authorities** have been directed to issue **fresh commercial licenses** with the condition that **SUP items will not be sold on their premises, and existing commercial licences will be cancelled** if they are found to be selling these items.

➤ Promoting Compostable and Biodegradable Plastics:

- The **CPCB issued one-time certificates to 200 manufacturers of compostable plastic** and the **BIS passed standards for biodegradable plastic**.

Note:



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➤ **Penalty:**

- Those found violating the ban can be penalised under the **Environment Protection Act 1986** – which allows for **imprisonment up to 5 years, or a penalty up to Rs 1 lakh, or both.**
- Violators can also be asked to pay Environmental Damage Compensation by the SPCB.
- There are municipal laws on plastic waste, with their own penal codes.

How are other countries dealing with single-use plastic?

➤ **Sign Resolution:**

- In 2022, **124 countries**, parties to the **United Nations Environment Assembly**, including India, **signed a resolution** to draw up an agreement which will in the future make it **legally binding for the signatories to address the full life of plastics** from production to disposal, to end plastic pollution.
- As of July 2019, 68 countries have plastic bag bans with varying degrees of enforcement.

Renewables 2022 Global Status Report (GSR 2022)

Why in News?

Recently the Renewables 2022 Global Status Report (GSR 2022) was released by **REN21 (Renewable Energy Policy Network for the 21st Century)**.

- REN21 is a **global collective of renewable energy actors.**
- It includes **scientists, governments such as India's, non-governmental organisations** and members of the industry who collated data on renewable energy installations, markets, investments and policies in countries across the world.

What is Renewables 2022 Global Status Report (GSR 2022)?

- The Renewables 2022 Global Status Report **documents the progress made in the renewable energy sector.**
- It highlights the **opportunities afforded by a renewable-based economy and society**, including

the ability to achieve more diversified and inclusive energy governance through localised energy generation and value chains.

- Countries with higher shares of renewables in their total energy consumption enjoy a greater level of energy independence and security.

What are the key Highlights of the Report?

➤ **Global Overview:**

- This Report sends a **clear warning** that the **global clean energy transition is not happening**, making it unlikely that the world will be able to meet critical climate goals this decade.
- Although many more governments committed to **net zero greenhouse gas** emissions in 2021, the reality is that, in response to the energy crisis, **most countries have gone back to seeking out new sources of fossil fuels and to burning even more coal, oil and natural gas.**
- **For the first time, GSR 2022 provides a world map of renewable energy shares by country** and highlights progress in some of the leading countries.
- In the lead-up to the **United Nations Climate Change Conference (COP26)** in November 2021, a **record 135 countries pledged to achieve net zero greenhouse gas emissions by 2050.**
- However, **only 84 of these countries had economy-wide targets** for renewable energy, and only 36 had targets for 100 % renewables.

➤ **India's Performance:**

- **Renewable Energy:** India ranked **third** in renewable energy installations in 2021, **after China and Russia.**
- **Hydropower Capacity:** India added **843 MW of hydropower capacity in 2021**, raising the total capacity to 45.3 GW.
- **New Solar PV Capacity:** India was the **second largest market in Asia** for new solar PV capacity and **third globally** (13 GW of additions in 2021).
- **Total Installations:** It ranked **fourth** for total installations (60.4 GW), **overtaking Germany** (59.2 GW) for the first time.
- **Wind Power:** India ranked **third globally** for the total installed capacity of wind power (40.1 GW), behind China, the US and Germany.

Note:



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What are the Initiatives taken by India to Promote Renewable Energy?

- **National Solar Mission (NSM):** The 100 GW solar ambition at the heart of the world's largest renewable energy expansion programme.
- **The Wind Energy Revolution:** Leveraging India's robust wind energy sector to boost clean energy manufacturing and the rural economy
- **National Biofuels Policy and SATAT:** Building value chains to reduce fuel imports, increase clean energy, manage waste, and create jobs
- **International Solar Alliance (ISA):** Harnessing the infinite power for the Sun for sustainable human development.
- **Small Hydro Power (SHP):** Harnessing the power of water to integrate remote communities into the economic mainstream.
- **National Hydrogen Energy Mission (NHEM):** Exploring the commercial viability of a versatile clean fuel.
- **Production-Linked Incentive (PLI) Scheme:** Integrating India into the global clean energy value chains

Water Hyacinth

Why in News?

Recently, West Bengal has made an outstanding example by utilising Water Hyacinth, an obnoxious aquatic weed plant to develop small-scale cottage industry that is both financially rewarding as well as environmentally friendly in approach.

What are the Key Facts about Water Hyacinth?

- **About:**
 - **Water hyacinth**, scientifically known as *Eichhornia crassipes* Mart. (Pontederiaceae), is an aquatic weed common in waterbodies across South Asia, including India.
 - This is not an indigenous species but was introduced to India during the British colonial rule as an ornamental aquatic plant from South America.
 - The plant produces beautiful purple flowers that have high aesthetic value.

Issues:

- This simple, floating aquatic plant, unfortunately, is also an **obnoxious weed** that has been **suffocating surface freshwater sources** like rivers, rivulets, streams, ponds, dams, lakes and bogs, **making the waterbodies unsuitable for commercial fishery, transportation and recreation.**
- The plant is a **prolific vegetable matter-producer** and has the ability to choke out any closed waterbody at an astonishing rate.
 - A plant that is **prolific produces a large number of young plants, or fruit.**
 - This **cuts off sunlight** as well as **reduces oxygen level in the water**, making it unfit for commercial use.
 - It is an **expensive and labour-intensive process to remove this weed from time to time.**
 - This water hyacinth has **become a serious problem plant for the ecosystem.**

Significance:

- The plant has been used as a **bio-fertiliser** in some organic agriculture practises.
- This plant is a **good phytoremediation species**, suggesting it has the **ability to trap and remove toxic metabolites and harmful heavy metals from water.**

Need for Climate Finance for MSME

Why in News?

According to a report by the **Centre for Study of Science, Technology & Policy (CSTEP)** published in 2018, **Micro, Small and Medium Scale (MSME)** generates around **110 million tonnes of CO₂ equivalent**. India's MSMEs must pare emissions and **climate finance** maybe the nudge they need.

The **MSME sector** contributes around **30% to India's gross domestic product** and employs around **120 million people.**

Why are MSMEs needed to curb emissions?

- **India's Commitment to CoP 26:**
 - India committed to attain **net zero carbon emissions by 2070** during the **26th Conference of**

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Parties (CoP26) to the **United Nations Framework Convention on Climate Change** at Glasgow, Scotland in 2021.

- India would supply **50% of its energy needs through renewable sources by 2030**.
- **Solution:** The only way to do this is to **gradually phase out the use of coal, increase investment in renewable energy sources, stop deforestation and speed up the transition to electric vehicles**.
- **To Minimise its Carbon Footprints:**
 - The CSTEP report highlighted that **the MSME sector used 13% of the total coal / lignite, 7% of petroleum products and 8% of the natural gas** supplied in India in 2015-16.
 - The MSME sector needs a push to **adopt new technologies** that quickly minimise its carbon footprints and **make it less vulnerable to climate change and risk**.
 - The sector can achieve this transformation with **the aid of climate finance**.
 - **Traditional funds alone cannot help** the sector to become **decarbonised**.

What is Climate Finance?

- **Climate finance** is **money paid by developed countries** (which are responsible for most of the historic emissions) **to developing countries to help them pay for emissions reduction measures and adaptation**.
- Climate finance will open doors and enable **the transfer of technology and expertise from developed to developing nations**, which require these resources and capacity to combat climate change at the rate that the world currently demands.

Why do MSMEs need Climate Finance?

- **Huge Credit Gap:**
 - The **MSME sector in India** faces a **huge credit gap**, which means the **difference between the total supply of credit** from formal channels in the country and **the addressable demand**.
 - According to the **International Finance Corporation**, the credit gap was around \$37 billion in 2010 and reached \$330 billion in 2017.
 - In 10 years, **the gap** compounded annually at a **rate of 37%**.

➤ Status of Flow of Finance:

- The overall debt demand of the MSME sector is USD 882.42 billion.
- But the irony is only **16%** is catered to **by the formal sector** and the **remaining are catered to by the informal sector**.

Keibul Lamjao National Park

Why in News?

Manipur's Keibul Lamjao National Park (KLNPN) residents oppose the site's relocation.

People argue that the proposed site has **no connection with efforts to save the endangered deer**. On the other hand, the people in surrounding villages have been doing everything possible to protect the deer.

What are the Important Facts about Keibul Lamjao National Park?

- It is the only **floating National Park in the world**, the Keibul Lamjao National Park located on the **Loktak Lake** is the last natural habitat of the 'Sangai' (*Rucervus eldii eldii*), the dancing deer of Manipur.
- This is the **last natural habitat of the brow-antlered deer (Sangai)** the dancing deer of Manipur.
 - In the 1950s, it was believed that the brow-antlered deer (*Rucervus eldii eldii*) had become extinct in the country. However, it was subsequently re-discovered in Manipur.
 - Hog Deer, Otter, a host of water fowls and **migratory birds** are found here.

What are the Key Points of Loktak Lake?

- Loktak Lake is the **largest freshwater lake in Northeast India** and is famous for the phumdis floating over it.
 - Phumdis are the **heterogeneous mass of vegetation**, soil and organic matter at various stages of decomposition.
- This ancient lake plays an important role in the economy of Manipur. It serves as a **source of water for irrigation, drinking water supply** and hydropower generation.

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- Considering the ecological status and its biodiversity values, **Loktak lake was initially designated as a wetland of international importance under the Ramsar Convention in 1990.**
 - Later it was also listed under the **Montreux Record** in 1993.
 - Human activity has led to severe pressure on the lake ecosystem.

Bamboo-Dwelling Bat

Why in News?

Recently, Scientists have discovered a **new species of bamboo-dwelling bat** near the **Nongkhylllem Wildlife Sanctuary**.

What do we Need to Know about Newly Discovered Species?

The new species of **bamboo-dwelling bat** has been named ***Glischropus meghalayanus***.

Bamboo-dwelling bats are a particular kind of bat living in the internodes of bamboo with specialised morphological characters that help them to adapt to the life inside a bamboo plant.

It is **small in size and has a dark brown colour** with sulphur yellow belly.

The present discovery is the **first report of a thick-thumbed bat** not only from India but also from South Asia.

What are Thick-Thumbed Bats?

- This bat has typical **fleshy pads on the thumb and soles of feet** which aid them to crawl over smooth surfaces of bamboo internodes.
- Thick-thumb bats of the **genus *Glischropus*** are currently composed of four recognized species from Southeast Asia.
 - ***G. aquilus*** is endemic to Sumatra, ***G. javanus*** is restricted to western Java, whereas ***G. bucephalus*** is widely distributed north to the Isthmus of Kra and ***G. tylopus*** is widespread south to this zoogeographic boundary.
- Earlier, a new species of thick-thumb bat (Chiroptera: Vespertilionidae: *Glischropus*) from Meghalaya, north-eastern India was discovered.

What are the Recent Discoveries of Bats from Meghalaya?

- From the same forested patches outside **Nongkhylllem Wildlife Sanctuary**, another species of **disk-footed bat *Eudiscopus denticulus*** was found which was a new record in India.
- In the past few years, **three bamboo-dwelling bats** have been reported from the area which highlights the ecological significance of the region.
 - Since the bamboo forest around the wildlife sanctuary has a rich bio-diversity there should be attempts to conserve it.

Heavy Metal Pollution

Why in News?

Recently, the **Center for Science and Environment** has reported that rivers of India are facing severe metal pollution.

Three out of every four river monitoring stations in India have observed alarming levels of **heavy toxic metals** such as **lead, iron, nickel, cadmium, arsenic, chromium and copper**.

What is Heavy Metal Pollution?

- **Heavy Metals:**
 - **Heavy metals** may be defined as elements with an **atomic number** larger than **20** and an **atomic density greater than 5 g cm⁻³** that must possess metal-like characteristics. **Example: arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, uranium** etc.
- **Heavy Metal Pollution:**
 - Heavy metal pollution has been caused in our **rivers, soils, and environment** as a result of rapidly growing **agriculture** and **metal industries, improper waste management, heavy use of fertilizers, and pesticides**.
 - **Agricultural and industrial operations, landfilling, mining, and transportation** are the primary sources of heavy metals in **groundwater**.
 - Through the **agricultural water runoff heavy metals** reach upto river.
 - **Discharge of wastewater** from industries (like the tannery industry which is a big source of chromium

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heavy metals) directly into **river bodies** intensified the severity of the **heavy metal pollution**.

- Heavy metals have the property of long persistent in plants, animals and environment.

What are the Sources of Heavy Metals?

- There are two kinds of sources through which the heavy metals enter into the environment.

- **Natural Source:**

- Heavy Metals are naturally present in the **earth's crust**. Rocks are the natural source of heavy metals. Heavy Metals are present in the **rocks** in the form **minerals**. Examples: arsenic, copper, lead etc

- **Anthropogenic Source:**

- **Mining, industrial, and agricultural operations** are all anthropogenic sources of **heavy metals** in the environment.
- These heavy metals are produced during the **mining** and **extraction** of various elements from their respective **ores**.
 - **Heavy metals emitted** into the atmosphere during **mining, smelting, and other industrial activities** are deposited on land by **dry** and **wet deposition**.
 - Discharge of **wastewaters** such as **industrial effluents** and **domestic sewage** add heavy metals to the environment.
 - Application of **chemical fertilizers** and **combustion of fossil fuels** also contribute to the **anthropogenic input of heavy metals** in the environment.

What has been Observed in Monitoring of Heavy Metal Pollution?

- There are **764 river quality monitoring stations** in India, spread over **28 states**.
- Out of the **33 monitoring stations in Ganga**, **10** had **high levels of heavy metals contaminants**.
- The **Central Water Commission** examined water samples from 688 sites for heavy metals between August 2018 and December 2020.
- **Total coliform** and **biochemical oxygen demand** were high in **239 and 88** of the **588 water quality stations** examined for pollution throughout **21 states**,

- It indicates that **wastewater treatment** from **industry, agricultural, and domestic households** is inadequate.
- According to the **Center for Science and Environment's State of the Environment Report 2022**, the river, which is the focus of the **Namami Gange mission**, contains high levels of lead, iron, nickel, cadmium, and arsenic (CSE).
- The report is a yearly compilation of data on environmental development obtained from public sources.
- According to the **Central Pollution Control Board**, **ten states** do not treat their sewage at all.
- In India, 72% of sewage waste is dumped untreated.

What are the Consequences of the Heavy Metal Pollution?

- These toxic heavy metals entering the environment may lead to **bioaccumulation** and **biomagnifications**.
 - **Bioaccumulation:**
 - The net **accumulation of a pollutant in an organism** from all sources, including water, air, and food, is known as bioaccumulation.'
 - **Biomagnifications:**
 - Biomagnification is the **accumulation of a chemical by an organism** as a result of water and food exposure, **resulting in an increase in concentration** that is higher than would have been expected from equilibrium.
 - Some heavy metals have an effect on **biological activities** and **growth**, while others accumulate in one or more organs, resulting in a variety of **severe diseases** such as **cancers, skin diseases, nervous system disorders** etc.
 - **Metal toxicity** results in the production of **free radicals**, which **damages DNA**.
 - These heavy metals are not readily degradable in nature and accumulate in the animal as well as human bodies to a **very high toxic** amount.
 - Heavy metal intake has been related to **developmental retardation, renal damage, a variety of cancers**, and **even death** in extreme cases.

What is the Central Water Commission?

- The Central Water Commission is the apex technical organization in the country for development of water

Note:

resources and is an attached organization of the **Ministry of Jal Shakti**.

- The Commission is responsible for **initiating, coordinating and furthering**, in consultation with the **State Governments**, the schemes for **control, conservation, development and utilization of water resources** throughout the country for the purpose of **irrigation, flood management, power generation, navigation** etc.

UN Funds Insufficient for Climate Disasters: Oxfam

For Prelims: Oxfam International, Climate Finance, Conference of Parties.

For Mains: Oxfam International's Report on Climate Finance.

Why in News?

Recently, **Oxfam International** released a report, which says the **UN (United Nations)** requires **eight times more Climate Finance** than 20 years ago to be able to provide humanitarian aid to **Low-Income Countries** during Climate-Related Disasters (Droughts, Floods or Wildfires).

The latest **Intergovernmental Panel on Climate Change (IPCC)'s sixth assessment reports** made it evident that more climate-related disasters are in the offing and therefore climate change will escalate the loss and damage suffered by these marginalized communities.

What is Oxfam International?

- Oxfam International is a group of independent non-governmental organisations formed in 1995.
- The name "Oxfam" comes from the Oxford Committee for Famine Relief, founded in Britain in 1942.
 - The group campaigned for food supplies to starving women and children in enemy-occupied Greece during the Second World War.
- It aims to maximize efficiency and achieve greater impact to reduce global poverty and injustice.
- The Oxfam International Secretariat is based in Nairobi, Kenya.

What are the Findings?

- In 2000-02, UN appealed for USD 1.6 billion as humanitarian aid. The appealed amount rose to an

average of USD 15.5 billion in 2019-2021 — an unprecedented 819% increase.

- Rich countries have been able to **deliver 54% of the UN's appeals in the last five years**, leaving a massive deficit of USD 28-USD 33 billion.
- People in **low-income countries are most vulnerable** to the impacts of climate-related disasters, be it droughts, floods or wildfires, as these disasters further exacerbate poverty and death affecting them disproportionately.
- Besides the huge financial burden, **loss and damage due to climate crisis encompass health, biodiversity and loss of indigenous knowledge**, among gender issues and other related factors.
- For every USD 2 needed for the UN's humanitarian aid, rich donor countries provide USD 1.
- This is despite the fact that the **richest 1% people on Earth are emitting twice as much carbon pollution** as the poorest half of humanity.
- Afghanistan, Burkina Faso, Burundi, Chad, Democratic Republic of Congo, Haiti, Kenya, Niger, Somalia, South Sudan, and Zimbabwe are among the ten countries most in need of **Climate Finance**.
- Richer people are less exposed to climate risks and better able to weather disasters. They live in more secure places and have more assets to draw on. Poorer people have less protection and therefore experience greater loss and damage, which accumulates over time.
- The economic cost of loss and damage by 2030 will rise to the range of USD 290-USD 580 billion.

What are the Recommendations?

- Paying the cost of climate-driven loss and damages should be on the basis of responsibility — not charity.
- Rich countries, rich people, and big corporations most responsible for causing climate change must pay for the harm they are causing.
- Need establishment of a facility to draw innovative sources of finance from rich countries, which was rejected by developed nations at the **26th Conference of Parties (CoP26)** to the United Nations Framework Convention on Climate Change in 2021.
- At CoP27, governments should agree to make loss and damage finance a core element of the United Nations Framework Convention on Climate Change (UNFCCC)'s Global Stock take.

Note:



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Biodiversity Park in Sirumalai Hills: Tamil Nadu

Why in News?

The Government of Tamil Nadu is developing a biodiversity park in the **Sirumalai Hill Range** in Dindigul district.

- The main aim is **to create awareness for the sustainable management of the ecologically sensitive area.**

What are the Key Points of this Park?

- This park is **a nature reserve that harbours the natural heritage of the area and has conservation, education and cultural values** and will enhance the quality of the environment.
- Various biodiversity components such as mammals, birds, reptiles, amphibians, etc, have been showcased here.
- Different types of **flowering plants have been planted all around the park and necessary irrigation facilities have been provided.**
- Assemblage of nectar plants to attract butterflies and host plants has also been planned.

What is a Biodiversity Park?

- **About:**
 - The biodiversity park is **a unique landscape of wilderness** where ecological assemblages of native plant and animal species in the form of biological communities are recreated in a region.
 - The underlying principle of the park is **to recreate self-sustaining ecosystems with native flora and fauna** which are characteristics of the area.
- **Objectives:**
 - Creating awareness among the forest stakeholders, the public and the student community **about biological diversity and its significance.**
 - Creating plant diversity that is **endangered, threatened and highly valuable for human existence.**
 - Creating a **gene bank with important plant species** including rare and endemic ones.

- Creating a **carbon sink** for future generations with indigenous species to **mitigate problems of global warming and climate change.**
- Promoting the **culture of conservation and appreciation towards natural resources** and its management.
- Creating **livelihood opportunities for local communities**, especially the tribal community who are part and parcel of the forest ecosystem from time immemorial.

What are the Key

Points Related to Sirumalai Hill Range?

➤ About:

- The Sirumalai Hills are **spread over 60,000 acres** in Dindigul District of Tamil Nadu.
- They are considered to be the **spur of the Eastern Ghats.** They are located about 25 kilometres from Dindigul town, at an altitude of 400 to 1,650 metres from mean sea level.
- The hills act as a repository of several rare and endemic plants.

➤ Flora:

- The lower hill range consists of highly disturbed **scrub forest** while the major portion of the middle hill ranges are occupied by tropical mixed dry deciduous forest.
- The higher elevations are occupied by semi evergreen forest. The woodland **savannahs** are found along the slopes in the higher altitudes.

➤ Fauna:

- Animals like **Gaur, Leopard**, spotted deer, mouse deer, barking deer, **Jackal, Sloth Bear**, wild boar, **Indian pangolin, slender loris** and several species of **reptiles** and avifauna (Birds) are found in the region.

Ban on use of Coal in Delhi-NCR

Why in News?

Recently, the **Commission for Air Quality Management (CAQM)** has issued directions to ban the use of coal in industrial, domestic and other miscellaneous applications in the entire Delhi-NCR region from 1st January 2023.

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- This step is taken to **bring down greenhouse gas emissions** in Delhi NCR.
- Delhi is among the world's most polluted capital cities.
 - According to the **pollution index**, on average, the AQI in the capital, its neighboring cities - Gurgaon, Noida, and Ghaziabad - is in the 300-400 level mark.

What is the Significance of this Step?

- **Save Tonnes of Coal Annually:**
 - The Step to drive the switching over to cleaner fuel such as natural gas and biomass **will not only help save 1.7 million tonnes of coal annually**, but also reduce pollutants including **Particulate Matter (PM), Nitrogen Oxide (NOx), CO₂ and Carbon monoxide (CO)**.
 - However, **thermal power plants** in NCR are allowed to use **low-sulphur coal**.
- **Help in Tackling Air pollution:**
 - **Heavy pollution from coal is a significant contributor to the degrading quality** of air in the NCR and surrounding areas, and thus a need to switch to a cleaner fuel has been felt over time.
 - Every year, **air pollution from fossil fuels takes millions of lives, increases our risk of stroke, lung cancer and asthma**, and costs us a huge amount of money.
- **Natural Gas gets a Boost:**
 - The decision to ban use of coal as a fuel **will boost the prospects of natural gas in the NCR**.
 - As per the **Petroleum Planning & Analysis Cell**, the global per capita natural gas consumption is 496 cubic meters) compared to 43 cu m for India.

Etalin Hydro Power Project

Why in News?

Wildlife scientists and conservationists in **Arunachal Pradesh** flagged threats to local biodiversity from the proposed Etalin hydroelectric (3,097 MW) project in **Dibang Valley** to raise the issue, they approached the **Forest Advisory Committee (FAC)** under the Union Ministry of Environment, Forest and Climate Change (MoEF&CC).

- **WildLife Institute of India (WII)** and the **National Tiger Conservation Authority (NTCA)** have suggested taking cognizance of certain safeguards and mitigation measures while considering project approval.
- FAC ordered the formation of a **four-member committee** to address apprehensions concerning wildlife as well as endemic flora and fauna of the area in a holistic manner.

What is the Significance of Dibang River?

- The Project is based on the **river Dibang** and is proposed to be completed in 7 years.
 - **Dibang is a tributary of the Brahmaputra River** which flows through the states of Arunachal Pradesh and Assam.
- It envisages construction of two dams over the tributaries of Dibang: **Dir and Tangon**.
- The Project falls under the richest **bio-geographical province of the Himalayan zone** and would be located at the junction of major biogeographic zones like Palearctic Zone and Indo-Malayan Zone.
- It is expected to be **one of the biggest hydropower projects** in India in terms of installed capacity.

What are the Concerns Raised by the Environmentalists?

- Conservationists highlighted that the FAC sub-committee **ignored established tenets of forest conservation and related legal issues** while recommending the proposal.
- FAC **ignored the threat of forest fragmentation**.
 - **Forest fragmentation** results from ill-planned intrusion of developmental projects into contiguous landscapes with natural forests and threatens rare floral and faunal species in a biodiversity hotspot.
- FAC's **site inspection report was also questioned for leaving out key details** like number of grids across an altitudinal range inspected and the status of vegetation there, direct and indirect signs of wild animals listed in the various **schedules of the Wildlife Protection Act, 1972** and overall appreciation of the ecological value of the area.
- The **inadequacy of the Environment Impact Assessment report** on Etalin was also highlighted.

Note:

- Wildlife officials ignored observations which include the threat to 25 globally endangered mammal and bird species in the area to be affected.
- The proposed **mitigation measures** like setting up butterfly and reptile parks are **inadequate and insufficient**.

What is the Forest Advisory Committee?

- It is a statutory body which was constituted by the **Forest (Conservation) Act 1980**.
- It comes under the Ministry of Environment, Forests & Climate Change (MoEF&CC).
- It considers questions on the diversion of forest land for non-forest uses such as mining, industrial projects, townships and advises the government on the issue of granting forest clearances. However, its role is advisory.

World Environment Day

Why in News?

World Environment Day is celebrated on **5th June every year** to encourage awareness and environmental protection.

On the Occasion, India launched '**Lifestyle for the Environment (LiFE) Movement**'.

What are the Key

Highlights about World Environment Day?

- **About:**
 - The **United Nations Assembly** established World Environment Day in 1972, which was the **first day of the Stockholm Conference on the human environment**.
 - The celebration of world environment day every year **is done according to a specific theme** and slogan which addresses the major environmental concern of the time.
 - It is **hosted by a different country each year**.
 - For example, **India hosted the 45th celebration of World Environment Day** under the theme '**Beat Plastic Pollution**'.
 - World Environment Day celebration last year also kicked off the **UN Decade on Ecosystem**

Restoration (2021-2030) which is a global mission to revive billions of hectares, from forests to farmlands, from the top of mountains to the depth of the seas.

➤ Theme for 2022:

○ OnlyOneEarth:

- It mirrors the theme of the **first World Environment Day in 1973**.

➤ Significance:

- 2022 is a historic milestone as it marks 50 years since the 1972 **Stockholm Conference**.

What is LiFE Movement?

➤ About:

- The idea of LiFE was introduced by India during the **26th United Nations Climate Change Conference of the Parties (COP26)** in Glasgow in 2021.
- The **idea promotes an environmentally conscious lifestyle** that focuses on 'mindful and deliberate utilisation' instead of 'mindless and wasteful consumption'.
- With the launch of the Mission, the prevalent **"use-and-dispose" economy-governed by mindless** and destructive consumption-will be replaced by a **circular economy**, defined by conscious and deliberate consumption.

➤ Objective:

- The Movement **aims to utilise the power of collective action** and nudge individuals across the world to undertake simple climate-friendly actions in their daily lives.
- It also **seeks to leverage the strength of social networks to influence social norms** surrounding climate.
- The Mission plans to create and nurture a global network of individuals, namely '**Pro-Planet People**' (P3).
 - P3 will have a **shared commitment to adopt and promote environmentally friendly lifestyles**.
 - Through the P3 community, the **Mission seeks to create an ecosystem that will reinforce and enable environmentally friendly** behaviours to be self-sustainable.

Note:



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What has India Achieved in Conserving the Environment?

- **Increase in Forest Cover:**
 - India's forest cover is increasing and so is the population of lions, tigers, leopards, elephants and rhinos.
 - The total forest cover is **21.71% of the total geographical area** in 2021, compared with 21.67% in 2019 and 21.54% in 2017.
- **Installed Electric Capacity:**
 - India's commitment to **reach 40% of installed electric capacity** from non-fossil fuel-based sources has been achieved, 9 years ahead of schedule.
- **Ethanol Blending Target:**
 - The **target of 10% ethanol blending** in petrol has been achieved 5 months ahead of the November 2022 target.
 - This is a major accomplishment given that blending was hardly 1.5% in 2013-14 and 5% in 2019-20.
- **Renewable Energy Target:**
 - **Renewable energy** has a very high focus in the government.
 - The **country's installed Renewable Energy (RE) capacity** stands at 150.54 GW (solar: 48.55 GW, wind: 40.03 GW, Small hydro Power: 4.83, Bio-power: 10.62, Large Hydro: 46.51 GW) as on 30th Nov. 2021 while its nuclear energy based installed electricity capacity stands at 6.78 GW.
 - **India has the 4th largest wind power capacity** in the world.

Stockholm+50

Why in News?

Stockholm+50 is being held in **Stockholm, Sweden**. It will **commemorate the 50 years since the 1972 United Nations (UN) Conference on the Human Environment** (also known as the Stockholm Conference).

- The **UN General Assembly** will be convening this international meeting.
- This is being held at a time **when the world is facing a triple planetary crisis of climate change, pollution**

and waste, nature and biodiversity loss, as well as other planetary issues even after 50 years of the Stockholm Declaration. This is threatening the **achievement of the Sustainable Development Goals**.

- A **sustainable recovery from the Covid-19 pandemic** will also remain as one of agenda points.

What is Stockholm Conference, 1972?

- **Background:**
 - Climate change was **first discussed** using emerging scientific evidence in the **UN General Assembly in 1968**.
 - In **1967**, a research study provided the **actual estimates of global temperature based on CO₂ levels**. Also, it was predicted that the **doubling of CO₂ from the current level would result in nearly 2°C rise in global temperature**.
 - The **idea of the Stockholm Conference was first proposed by Sweden**. That's why it's also termed the "**Swedish Initiative**".
- **About:**
 - The **United Nations Conference on the Human Environment in Stockholm** was held from **5th–16th June, 1972**.
 - This was the **first global convergence on the planetary environment**.
 - The theme was '**Only One Earth**'.
 - **122 countries participated** in the conference.
- **Aim:**
 - Creating a common governance framework for the planetary environment and natural resources.
 - **Stockholm Declaration and Action Plan for the Human Environment**
- **Stockholm Declaration:**
 - **70 out of 122 participant countries** which were developing and poor countries adopted the Stockholm Declaration.
 - The Stockholm Declaration **contained 26 principles** that marked the beginning of a dialogue between developed and developing countries.
 - This built the "**interconnections between development, poverty and the environment**".
- **Action Plan:**
 - The Action Plan contained **three main categories** that were further broken down into **109 recommendations**:

Note:



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- Global Environmental Assessment Programme (watch plan)
- Environmental management activities
- International measures to support assessment and management activities carried out at the national and international levels.

➤ **Three Dimension of the Conference:**

- Countries agreed to **not “harm each other’s environment or the areas beyond national jurisdiction”**.
- An **action plan to study the threat to Earth’s environment**.
- **Establishment** of an international body called the **UN Environment programme (UNEP)** to bring in cooperation among countries.

What were the key agreements of the Stockholm Declaration?

- **Natural resources such as air, water, land, flora and fauna must be safeguarded** through careful planning for the benefit of the present and future generations.
- The release of **toxic substances and heat emissions should not be allowed to exceed** the capacity of the environment.
- The **poor and developing nations must be supported** in their struggle against pollution.
- The environmental policies of the states **should support the present or future development potential of developing countries**.
- Appropriate steps should be taken by States and international organisations to **reach an agreement on meeting the possible national and international economic consequences resulting from the application of environmental measures**.
- According to the UN charter and principles of international law, **the States have the sovereign right to exploit their own resources as per their own environmental policies**.
 - However, the states have this **responsibility of making sure that activities within their jurisdiction or control do not cause any harm to the environment of other States or of areas beyond the limits of national jurisdiction**.

Cheetah Relocation in India

Why in News?

India will be soon releasing cheetahs from South Africa and Namibia into the wild at **Kuno Palpur** in Sheopur district of Madhya Pradesh.

- It will initiate **India’s ambitious plan of transcontinental relocation of cheetahs**.
- The country’s last spotted cheetah died in Chhattisgarh in 1947 and it was declared extinct in the country in 1952.
- The **Wildlife Institute of India (WII)** some years back prepared a cheetah reintroduction project.

What are the Key Points Related to Cheetahs?

➤ **About:**

- The cheetah is one of the oldest of the big cat species, with ancestors that can be traced back more than five million years to the Miocene era.
- The cheetah is also the world’s fastest land mammal that lives in Africa and Asia.

➤ **African Cheetah:**

- **Scientific Name:** *Acinonyx Jubatus*
- **Characteristics:** They have slightly brownish and golden skin which is thicker than the Asiatic Cheetahs.
- They have much more prominent spots and lines on their face as compared to their Asian cousins.
- **Distribution:** Found all over the African continent in thousands of numbers.

➤ **Protection:**

- **IUCN Red List:** Vulnerable.
- **CITES:** Appendix 1.
- **WPA:** Schedule-2.

➤ **Asiatic Cheetah:**

- **Scientific Name:** *Acinonyx Jubatus Venaticus*
- **Characteristic:** Slightly smaller than the African Cheetahs.
- They have pale yellowish fawn coloured skin with more fur under their body, specifically on the belly.
- **Distribution:** Found only in Iran with less than 100 individuals left.

Note:



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- **Protection:**
 - **IUCN Red List:** critically endangered.
 - **CITES:** Appendix 1.
 - **WPA:** Schedule-2.

What are the Threats?

- Human-wildlife conflict, loss of habitat and loss of prey, and illegal trafficking.
- Deforestation and **agriculture eventually led to less forest land and Cheetah habitat.**
- The advent of climate change and growing human populations have only made these problems worse.

What are the Indian Conservation Efforts?

- The Wildlife Institute of India had prepared a Rs 260-crore cheetah **Re-introduction project** seven years ago.
- This could be the world's first inter-continental cheetah translocation project.
- The Ministry of Environment had in the 19th meeting of the **National Tiger Conservation Authority (NTCA)** released an **"Action Plan for Introduction of Cheetah in India"**.
- The National Tiger Conservation Authority (NTCA) has decided to bring 50 African Cheetah from Namibia within the next 5 years.

What are the Key Points of Kuno National Park?

- Kuno National Park of Madhya Pradesh is **one the most unique destinations** for all wildlife lovers and enthusiasts.
- It has a **healthy population of chital, sambar, nilgai, wild pig, chinkara and cattle.**
- Currently, the leopard and striped hyena are the only larger carnivores within the National Park, with the lone tiger having returned to Ranthambore earlier this year.

Biomass Electricity

Why in News?

Recently, a **new biomass-based boiler technology was launched in India** (Kurukshetra, Haryana) that claims to accommodate all kinds of agricultural residue as fuel and can be greener and may also help reduce the burden of **stubble burning**.

Biomass-based electricity is gaining the attention of regulators and policy makers, as the country moves towards power generation that is not carbon-intensive.

Around 2.6% of the country's electricity demand is met by biomass.

What are the Key Highlights?

- **Features of the Biomass-based Boiler:**
- The new boiler had a **capacity of 75 tonnes per hour** and generated **15 megawatts of electricity.**
- This new **Denmark-based technology** allows the plant to fire a wide range of fuels with less fuel preparation and handling.
- This combustion technology is advantageous because of the **vibrating grate.**
- The grate of a steam boiler supports the solid fuel in the furnace.
- Vibrating grate accommodates **biomass of every density.**
 - The moisture content of the fuel, however, has to be 15-20%
 - Since the vibrating grate supports firing agro residue of any size, it **saves energy consumed for processing biomass for energy generation.**
- **Advantages over Conventional Boilers:**
 - The existing conventional boilers are designed **only for specific types of agro residue** such as paddy husk, paddy straw, mustard, etc and thus restrict the biomass contribution in energy generation.
 - While vibrating grate boiler technology can be a solution for firing any kind of biomass.

Painted Leopard Gecko

Why in News?

Recently, researchers have identified a new colorful species of leopard geckos named *Eublepharis pictus*, also known as the Painted Leopard Gecko, earlier it was thought to belong to a known species.

What are the Findings?

- The new species **differs from all members of the genus Eublepharis except for E hardwickii.**
 - Eublepharis is a genus of terrestrial geckos native to eastern and southwestern Asia.

Note:

- The new species lives in dry evergreen forests mixed with scrub and meadows. It is strictly **nocturnal**, **actively foraging along trails in the forest after dusk**.
- Researchers had **initially identified the specimen as an East Indian Leopard Gecko** (*Eublepharis hardwickii*). This new species appears to be common in the forests of Andhra Pradesh and Odisha.
 - Geographically the two species **appear to be separated by the Brahmani River**.
- The gecko genus *Eublepharis* **now has 7 species**.
- Based on IUCN (International Union for the Conservation of Nature) conservation prioritization criteria, the researchers suggested it to list as Near Threatened (NT).
- More research may also encourage better protection of biodiversity in the area. The Eastern Ghats are severely under-surveyed, and dedicated efforts will help recognise it as a biodiversity hotspot.



What are Geckos?

- **About:**
 - Geckos are reptiles and are found on all continents except Antarctica. These colorful lizards have adapted to habitats from rainforests, to deserts, to cold mountain slopes.
 - Most geckos are nocturnal, which means they are active at night, but day geckos are active during the day and depend on insects, fruits, and flower nectar.
 - Geckos are spread across six families: Carphodactylidae, Diplodactylidae, Eublepharidae, Gekkonidae, Phyllodactylidae, and Sphaerodactylidae.
- **Other Species of Gecko in India:**
 - Indian Golden Gecko (family Gekkonidae) is native to India (Tamil Nadu, Orissa, Andhra Pradesh). It

is listed in **Schedule 1 of WPA (Wildlife Protection Act)**.

- **IUCN Red List:** Least Concern (LC)
- Tokay Gecko (family Gekkonidae) is widespread in the Indo-Malayan region **Protection Status:**
 - Schedule 4 of WPA.
 - IUCN Red List: Least Concern (LC).

Global Sustainable Development Report, 2022

Why in News?

Recently, the global Sustainable Development Report, 2022 was released.

- India was **ranked 121 out of the 163 countries**. It was ranked 117 in 2020 and 120 in 2021.
- Earlier, in February 2022, the Prime Minister addressed the **The Energy and Resources Institute's (TERI) World Sustainable Development Summit**.

What is a Sustainable Development Report?

- **About:**
 - It is a **global assessment of countries' progress** towards achieving the **Sustainable Development Goals**.
 - It is published by a group of independent experts at the **Sustainable Development Solutions Network (SDSN)**.
 - SDSN was launched in 2012 to **mobilize global scientific and technological expertise** to promote practical problem solving for sustainable development and implement the Sustainable Development Goals (SDGs).
 - Following their adoption, **SDSN is now committed to supporting the implementation of the SDGs** at national and international levels.
- **Ranking:**
 - Countries are ranked by **their overall score**.
 - The overall score measures the total progress towards achieving all 17 **Sustainable Development Goals (SDG)**.
 - The score can be interpreted as a **percentage of SDG achievement**.
 - A score of 100 indicates that all SDGs have been achieved.

Note:

➤ **Performance of the Countries:**

- The 2022 SDG Index is **topped by Finland, followed by three Nordic countries –Denmark, Sweden and Norway.**
- East and South Asia is the region that progressed most on the SDGs since their adoption in 2015.
- Bangladesh and Cambodia are the two countries that progressed most on the SDGs since 2015.
- By contrast Venezuela has declined the most on the SDG Index since their adoption in 2015.

What are the key Highlights of the Report?

➤ **About World:**

- Multiple and simultaneous health, climate, biodiversity, geopolitical and military crises are major setbacks for sustainable development globally.
- The SDG Index world average has **slightly decreased in 2021 for the second year in a row**, largely due to the impact of the pandemic on SDG1 (No Poverty) and SDG8 (Decent Work and Economic Growth) and poor performance on SDG11-15 (climate, biodiversity, and sustainable urban development goals).
- Besides their **massive humanitarian costs, military conflicts – including the war in Ukraine** – have major international spill overs on food security and energy prices, which are amplified by the climate and biodiversity crises.

➤ **About India:**

- **India's Preparedness Worsened:**
 - India is **not placed well to achieve the United Nations-mandated Sustainable Development Goals (SDG)** and its preparedness has worsened over the years in comparison with other countries.

➤ **Major Challenges:**

- The country **continues to face major challenges in achieving 11 of the 17 SDGs**, which has pushed down its global ranking on SDG preparedness.
- **Ensuring decent work (SDG 8)** has become more challenging.
- According to the report, India is on track to achieving SDG 13 on climate action.
- However, **The State of India's Environment, 2022** flagged that the country was facing major challenges in this area.

- India's performance on climate action — (SDG) 13 — **has slipped from 2019-2020.**
- This decline in India's overall performance is primarily due to eight states — Bihar, Telangana, Rajasthan, Uttar Pradesh, Karnataka, Andhra Pradesh, Punjab and Jharkhand — whose scores have dipped under SDG 13 in the two years.

➤ **Progress Made:**

- The progress in around 10 of these goals is similar to those in 2021.
- These include SDG 2 on ending hunger, SDG 3 on good health and well being and SDG 6 on clean water and sanitation.

Kosi River Avulsions

Why in News?

Recently a research study reported that **instability in Kosi River has been observed after the construction of embankments on either side of it.**

What are Avulsions?

➤ **About:**

- Avulsion refers to the **phenomenon of change in the course of river flow** causing the **abandonment of the old established river channel and formation of a new channel.**

➤ **Occurrence:**

- Rivers lining **tropical and desert regions are more prone** to avulsions.
- Avulsions **occur less frequently**, only once a decade or century, or even less.
- The rare occurrence of avulsions makes them **less discussed despite their catastrophic effects as compared to more frequent extreme weather events** and the continuous effect of sea-level rise.

What are the Key Findings of the Research Study?

➤ **Global Scenario:**

- **113 avulsions** have been documented worldwide as per the satellite imagery from **1973-2020** and historical maps.
- Rivers **altered routes in the mountain bases while descending onto unconfined valleys or open oceans in 33 instances.**

Note:

- **Kosi river falls** under this category.
- The change **can also occur in the delta regions**. One is along backwater zones, part of the river that flows differently because of the effects of the downstream sea.
- Along some of the world's largest waterways, such as the Orinoco, Yellow, Nile and Mississippi Rivers, **50 instances occurred on low sloping deltas**.
- In 30 instances, **avulsions occurred in rivers with extreme sediment load**. River beds are filled-up with the sediments causing the rivers to seek new channels during floods.
- **Case-study of Kosi River:**
 - **Kosi-like systems** bring a lot of sediments from the Himalayas. After embankments were made on either side of the river in the 1950s, it became much more unstable.
 - In 2008, a large flood forced the Kosi River to leave its established channel for an older one. As a result, **3 million people were displaced and more than 250 human lives were claimed**.
 - Kosi river avulsions are **not at all natural**. The **200 km stretch** where the river used to distribute sediments before the embankment-construction has now been **reduced to 10 km**.
 - Though the course of sediment-flow has not altered, **the area available for its movement has contracted**.
 - Only a **false perception of protection** is created due to temporary solutions like **embankments**. Instead, these **aggravate system-scale degradation by limiting natural sediment dispersal**.

What is the Kosi River System?

- The **Kosi** is a **trans-boundary river** which flows through **Tibet, Nepal and India**.
- It has its **source in Tibet** that includes the **world's highest upland**; it then **drains a large part of Nepal before emerging onto the Gangetic plains**.
- Its **three major tributaries**, the **Sun Kosi, Arun and Tamur** meet at one point just upstream of a 10 km gorge cut through the **Himalayan foothills**.
- The river crosses into **northern Bihar, India** where it branches into distributaries before joining the **Ganges near Kursela in Katihar district**.
- The Kosi carries **the maximum amount of silt and sand after the Brahmaputra** in India.

- It is also known as the **"Sorrow of Bihar"** as the annual floods affect about 21,000 sq. km. of fertile agricultural lands thereby disturbing the rural economy.

Tracking SDG 7

Why in News?

Recently, the **Tracking SDG 7 – The Energy Progress Report 2022** was released which showed that the **Russia-Ukraine war** and **Covid-19 crisis** have **considerably slowed down efforts towards attaining the Seventh Sustainable Development Goal (SDG 7) target**.

- The **Energy Progress Report** is a product of close collaboration among the five SDG 7 custodian agencies in the form of a specially constituted Steering Group:
- **International Energy Agency (IEA), International Renewable Energy Agency (IRENA), United Nations Statistics Division (UNSD), World Bank, World Health Organization (WHO)**.
- SDG 7 has a target of universal access to clean and affordable energy by 2030.

Note

- The annual SDG 7 tracking report includes the official dashboard of global, regional and national progress on **four key energy targets**:
 - **7.1:** Ensuring universal access to electricity and clean cooking solutions;
 - **7.2:** Substantially increasing the share of renewable energy;
 - **7.3:** Doubling progress on energy efficiency;
 - **7.A:** Increasing international collaboration in support of clean and renewable energy.

What are the Findings?

- **Access to electricity (7.1):**
 - The share of the world's population with access to electricity **rose from 83% in 2010 to 91% in 2020**, increasing the number of people with access by 1.3 billion globally.
 - The number **without access declined from 1.2 billion people in 2010 to 733 million in 2020**.
 - However, the **pace of progress in electrification has slowed in recent years** which may be

Note:

explained by the increasing complexity of reaching more remote and poorer unserved populations and the **unprecedented impact of the Covid-19 pandemic**.

- At current rates of progress, the **world will reach only 92% electrification by 2030**.

➤ **Clean cooking (7.1):**

- The share of the global population with **access to clean cooking fuels and technologies rose to 69% in 2020**, an increase of 3% points over last year 2021.
- However, **population growth outpaced much of the gains in access, particularly in Sub-Saharan Africa**.
- As a result, the total number of people lacking access to clean cooking has remained relatively stagnant for decades. The increase was primarily driven by advancements in access to large, populous countries in Asia.

➤ **Renewables (7.2):**

- While the share of renewable capacity expansion rose by a record amount in 2021, the positive global and regional trajectories mask the fact that **countries where new capacity additions lagged were those most in need of increased access**.
- Moreover, rising commodity, energy and shipping prices, as well as restrictive trade measures, have **increased the cost of producing and transporting solar photovoltaic (PV) modules, wind turbines, and biofuels**, adding uncertainty for future renewable energy projects.

➤ **Energy efficiency (7.3):**

- SDG 7.3 aims to double the global rate of annual improvement in primary energy intensity—the amount of energy used per unit of wealth created—to 2.6% in 2010–30 versus 1990–2010.
- From 2010 to 2019, global annual improvements in energy intensity averaged around 1.9%, well below the target.

➤ **International Financial Flows (7.A):**

- International public financial flows to developing countries in support of clean energy **decreased for the second year in a row**, falling to USD 10.9 billion in 2019, **despite the immense needs for sustainable development in most countries and growing urgency of climate change**.

- Overall, the level of **financing remains below what is needed to reach SDG 7**, particularly in the most vulnerable and least developed countries.

Seoul Forest Declaration

For Prelims: Seoul Forest Declaration, World Forestry Congress, SOFO 2022, FAO

For Mains: State of Forest Resources in India and related concerns

Why in News?

Recently, the **Seoul Declaration** was adopted at the **XV World Forestry Congress**, held in Seoul, South Korea.

- The Declaration, **signed by 141 participant countries**.
- Earlier, the **State of the World's Forests 2022 (SOFO 2022)** was released by the **United Nations Food and Agriculture Organization (FAO)**.

What is the World Forestry Congress?

➤ **About:**

- It is held **every six years**.
- This year's event, hosted by the Republic of Korea and co-organized with FAO, was the second congress held in Asia.
 - Indonesia hosted the **first Congress in Asia in 1978**.
 - The Congress has been **providing a forum for inclusive discussion** on the key challenges and way forward for the forestry sector.
- **Theme for 2022:** Building a Green, Healthy and Resilient.

➤ **Aim:**

- To build a new vision – a new way of thinking and acting – for the future of forests and forestry in sustainable development at all levels.
- Investing in forests and forestry is **investment in people and their livelihoods**, especially the rural poor, youth and women.
- In turn, **this is investment in sustainable development** and in achieving the **Sustainable Development Goals** by 2030.

What are the Highlights of the Declaration?

➤ **Urges for Shared Responsibility:**

- The declaration urges that **responsibility for forests should be shared and integrated across institutions, sectors and stakeholders**.

Note:

- It was Underlined that **forests transcend political, social and environmental boundaries** and are vital for biodiversity and the carbon, water and energy cycles at a planetary scale.
- **Investment in Forest:**
 - **Investment in forest and landscape restoration globally needs to triple by 2030** to meet internationally agreed commitments and targets on restoring degraded land.
- **Circular Bioeconomy and Climate Neutrality:**
 - One of the key takeaways from Congress was the **importance of moving towards a circular bioeconomy** and climate neutrality.
 - The **Declaration called for innovative green financing mechanisms** to upscale investment in forest conservation, restoration and sustainable use, and highlighted the potential of sustainably produced wood as a renewable, recyclable and versatile material.
- **Steps to Prevent Future Pandemics:**
 - **Healthy, productive forests must also be maintained** to reduce the risk of future **pandemics** and to provide other essential benefits for human physical and mental health.
- **Need for Innovative Technologies and Mechanisms:**
 - The Declaration urged the **continued development and use of emerging innovative technologies** and mechanisms to enable evidence-based forest and landscape decision-making.

What are the other Highlights of the XV World Forestry Congress?

Other Initiatives undertaken at the Congress to boost international participation and cooperation.

- **Assuring the Future of Forests with Integrated Risk Management (AFFIRM) Mechanism:**
 - AFFIRM aims to **develop integrated risk management plans** to use as examples for other countries to follow, creating a methodology that will enable countries to better conduct disturbance risk assessments and provide an improved understanding of forest hazards and forest-related risks.
 - **Sustaining an Abundance of Forest Ecosystems (SAFE) Initiative**

- **The Platform for REDD+ Capacity Building:**
 - REDD+ is a framework created by the **United Nations Framework Convention on Climate Change (UNFCCC)** Conference of the Parties (COP) to guide activities in the forest sector that reduces emissions from deforestation and forest degradation, as well as the sustainable management of forests and the conservation and enhancement of forest carbon stocks in developing countries.

Urban Heat Islands

Why in News?

Recently, several parts of India are experiencing severe heat waves. Urban areas and cities are the places which have higher temperatures than rural places. This phenomenon is referred to as **"Urban Heat Island"**.

According to experts, these temperature discrepancies are caused by variations in heating over highly urbanized and semi-urbanized areas, as well as the relative availability of open and green spaces in the surrounding areas.

What is an Urban Heat Island?

- Urban heat island may be defined as the local and temporary phenomenon in which certain pockets within a city are experiencing higher heat load than its surrounding area.
- This rise of heat basically happens due to buildings and houses of cities made up of concrete where the heat is trapped and not able to dissipate easily.
- Urban heat island is basically induced due to trapped heat between establishments made up of concrete.
- The temperature variation can range between 3 to 5 degrees Celsius.

What are the Causes of Urban Heat Island?

- **Manifold increase in construction activities:** For building simple urban dwellings to complex infrastructures, carbon absorbing material like asphalt and concrete is needed for the expansion of cities. They trap huge amounts of heat which increases the mean surface temperatures of urban areas.

Note:

- **Dark surfaces:** Many buildings found in urban areas have dark surfaces, thereby decreasing albedo and increased absorption of heat.
- **Air conditioning:** Buildings with dark surfaces heat up more rapidly and require more cooling from air conditioning, which requires more energy from power plants, which causes more pollution. Also, air conditioners exchange heat with atmospheric air, causing further local heating. Thus, there is a cascade effect that contributes to the expansion of urban heat islands.
- **Urban Architecture:** Tall buildings, and often accompanying narrow streets, hinder the circulation of air, reduce the wind speed, and thus reduce any natural cooling effects. This is called the Urban Canyon Effect.
- **Need for mass transportation system:** Transportation systems and the unimpeded use of fossil fuels also add warmth to urban areas.
- **Lack of Trees and green areas:** which impedes evapotranspiration, shade and removal of carbon dioxide, all the processes that help to cool the surrounding air.

How can Urban Heat Islands be Reduced?

- **Increase Area Under Green Cover:** Plantation and effort to increase the area under green cover are the primary requirement to cut heat load within urban areas.
- **Passive Cooling to Reduce Urban Heat Islands:** Passive cooling technology, a widely-used strategy to create naturally ventilated buildings, can be a vital alternative to address the urban heat island for residential and commercial buildings.
- **The IPCC report** cites ancient Indian building designs that have used this technology, which could be adapted to modern facilities in the context of global warming.
- **Other methods** of heat mitigation include using appropriate construction materials.
- Roof and terraces should be painted in white or light colors to reflect heat and reduce the absorption.
- Terrace plantation and kitchen gardening should be promoted.

National Policy on Biofuels

For Prelims: Ethanol Blending, Biofuels, Crude oil, 2018 National Policy on Biofuels

For Mains: Ethanol Blending and its significance

Why in News?

Recently, the Union Cabinet approved amendments to the **National Policy on Biofuels, 2018**.

What are the Key Amendments approved?

- **More Feedstocks:**
 - One of the amendments is that the **government will allow more feedstocks** for the production of biofuels.
- **Ethanol Blending Target:**
 - Instead of 2030, the Centre plans to move ahead with its **ethanol blending target of 20% of petrol containing ethanol by 2025-26**.
 - It will **promote the production of biofuels in the country**, under the **Make in India program**, by units located in **Special Economic Zones (SEZ)/ Export Oriented Units (EoUs)**.
- **New members to the NBCC:**
 - The government has allowed the addition of new members to the **National Biofuel Coordination Committee (NBCC)**.
 - NBCC was constituted **under the Chairmanship of Minister, Petroleum & Natural Gas (P&NG)** to provide overall coordination, effective end-to-end implementation and monitoring of biofuel programme.
 - NBCC has members from 14 other ministries.
- **Export of Biofuels:**
 - Permission will be granted for the **export of biofuels in specific cases**.

What is the Significance of the Amendments?

- **Boost Make in India Drive:**
 - The proposed amendments are expected to pave the way for the **Make in India drive thereby leading to a reduction in the import of petroleum products** by the generation of more and more biofuels.

Note:



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- **Promote the Atmanirbhar Bharat Initiative:**
 - Since many more feedstocks are being allowed for the production of biofuels, this will promote the **Atmanirbhar Bharat** and give an impetus to the Prime Minister's vision of **India becoming 'energy independent' by 2047.**
- **Generate More Employment:**
 - Also, the proposed amendments are **expected to attract and foster developments of indigenous technologies** which will pave the way for the Make in India drive and thereby generate more employment.

What is the National Policy on Biofuels, 2018?

- **About:**
 - The "National Policy on Biofuels was notified by the **Ministry of Petroleum and Natural Gas in 2018.**
 - The policy was **notified in supersession of the National Policy on Biofuels**, promulgated through the Ministry of New & Renewable Energy, in 2009.
- **Categorisation:**
 - The Policy **categorises biofuels as**
 - **"Basic Biofuels"** viz. First Generation (1G) bioethanol & biodiesel and "Advanced Biofuels".
 - **"Advance Biofuels"** viz. Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels.
 - Third Generation (3G) biofuels, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
- **Features:**
 - It expands the **scope of raw material for ethanol production** by allowing use of sugarcane juice, sugar containing materials like sugar beet, sweet sorghum, starch containing materials like corn, cassava, damaged food grains like wheat, broken rice, rotten potatoes, unfit for human consumption for ethanol production.
 - The Policy **allows use of surplus food grains for production of ethanol** for blending with petrol with the approval of National Biofuel Coordination Committee.
 - With a thrust on Advanced Biofuels, the **Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries** of Rs. 5000 crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.

NTPC's Biodiversity Policy

Why in News?

Recently, **National Thermal Power Corporation Limited (NTPC Ltd.)** has issued a renewed **Biodiversity Policy 2022** to establish a comprehensive vision and guiding principle for conservation, restoration, and enhancement of biodiversity.

It is an **integral part of NTPC's Environmental Policy** and its objectives are **aligned with environmental and sustainability policies.**

What are the Objectives of the Policy?

- **Support Professionals to achieve Biodiversity Target:**
 - The policy is **designed to support all the professionals of the NTPC Group** to help them contribute toward the achievement of the targets set in this field.
 - NTPC has always been **mindful about avoiding operations in areas** with the highest biodiversity value and judiciously selecting project sites.
 - Company's efforts will be **further strengthened to ensure that biodiversity is not lost** at any of its currently operating sites and that there is a net positive balance wherever possible.
- **Mainstreaming the Concept of Biodiversity:**
 - The major aim is **to mainstream the concept of biodiversity** across NTPC's value chain.
 - It also **aims to adopt a precautionary approach** for sustainable management of biodiversity in all the decision-making processes to ensure the Earth's variety of life in and around the business units of NTPC.
- **Addressing Local Threats:**
 - The policy also **aims to adopt systematic consideration of local threats** to biodiversity beyond the company's business activities.

What are the other Related Steps taken by NTPC?

- **Raising Awareness:**
 - NTPC is **raising awareness among local communities**, employees, and its associates across the supply chain about biodiversity through project-specific and national level training in collaboration with experts.

Note:

- **Through Collaboration:**
 - NTPC is also **collaborating with local communities, organizations, regulatory agencies** and research institutes of national/international repute in the field of biodiversity.
- **Adhering to Legal Compliances:**
 - NTPC will be **adhering to legal compliances** with respect to biodiversity by complying with rules and regulations related to the environment, forest, wildlife, coastal zone, and green cover during planning and execution of its projects.
- **Related Agreement Signed:**
 - NTPC has signed a five-year agreement with Andhra Pradesh Forest Department for conservation of **Olive Ridley Turtles** in the coastline of Andhra Pradesh.

Community Forest Resource

Why in News?

Chhattisgarh has become only the second state in the country to **recognise Community Forest Resource (CFR) rights** of a village inside a **Kanger Ghati National Park**.

- While CFR rights are an important empowerment tool, getting a consensus amongst various villages about their traditional boundaries often proves a challenge.
- In 2016, the **Odisha government was the first to recognise Community Forest Resources (CFRs)** inside the **Simlipal National Park**.

What are the Highlights about the Kanger Ghati National Park?

- Kanger Valley National Park is located in the Bastar district (Near Jagdalpur) of the state of Chhattisgarh.
- The Kanger Valley National park is also known as **Kanger Ghati National Park**.
- It was declared as a **National park in the year of 1982**. Total area of the park is about 200 Km².
- The national Park is situated on the valley of river Kanger. The park derives its name from the Kanger River, which flows throughout its length.
- The Park is a typical mixed **humid deciduous type of forest**, in which the Sal, Saugaun, teak and bamboo trees are available in abundance.

- The **most popular species** in this area is **Bastar Maina** which enchant everyone with their human voice.

What is Community Forest Resource (CFR)?

- **About:**
 - It is the **common forest land** that has been traditionally protected and conserved for sustainable use by a particular community.
 - The community **uses it to access resources available within the traditional and customary boundary** of the village; and for seasonal use of landscape in case of pastoralist communities.
 - Each CFR area has a **customary boundary with identifiable landmarks** recognised by the community and its neighboring villages.

Categories:

- It may **include forest of any category** – revenue forest, classified & unclassified forest, deemed forest, District Level Committee (DLC) land, reserve forest, **protected forest**, **sanctuary** and **national parks** etc.

What are Community Forest Resource Rights?

- Under Section 3(1)(i) of the **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (commonly referred to as the Forest Rights Act or the FRA)**, 2006 the Community Forest Resource rights **provide for recognition of the right to “protect, regenerate or conserve or manage”** the community forest resource.
- These **rights allow the community to formulate rules for forest use** by itself and others and thereby discharge its responsibilities under Section 5 of the FRA.
- CFR rights, along with Community Rights (CRs) under Sections 3(1)(b) and 3(1)(c), which **include nistar rights** (used erstwhile in princely states or zamindari, etc.) **and rights over non-timber forest products**, ensure sustainable livelihoods of the community.
- These rights give the **authority to the Gram Sabha to adopt local traditional practices** of forest conservation and management within the community forest resource boundary.

Note:

SC Judgement on Eco Sensitive Zone

Why in News?

Recently, the **Supreme Court** directed that every protected forest, national park and wildlife sanctuary across the country should have a **mandatory eco-sensitive zone (ESZ) of a minimum one km** starting from their demarcated boundaries.

The judgment came on a petition instituted for the protection of forest lands in the Nilgiris district of Tamil Nadu.

What are the Key Highlights of Judgement?

- The **Centre** had while coming out with **February 2011 guidelines on ESZ** had prescribed a **10-kilometre boundary** based on responses received from states and UTs.
 - The Court was conscious of the fact that a **uniform ESZ for all national parks and sanctuaries would not be feasible** as it noted special cases such as Sanjay Gandhi National Park in Mumbai and Guindy National Park in Chennai which are situated very close to the metropolis.
 - If the existing ESZ goes **beyond the 1 km buffer zone** or if any statutory instrument prescribes a higher limit, then **such extended boundary shall prevail**.
 - **Mining** within the national parks and wildlife sanctuaries **shall not be permitted**.
 - The judgement would **apply in all such states/UTs** where the minimum ESZ is not prescribed.
 - The **minimum width of ESZ may be diluted in the overwhelming public interest**.
 - The state or UT concerned shall approach the Court-appointed **Central Empowered Committee (CEC) and MoEFCC** (Ministry of Environment Forest and Climate Change) and both these bodies shall give the respective opinions or recommendations before this Court based on which this Court shall pass appropriate order.
 - The Court directed the **Principal Chief Conservator of Forests (PCCF)** of each state

and UT to submit a **report in three months** to the Court providing a list of activities continuing in the ESZ of every national park or wildlife sanctuary.

- The Court entrusted the PCCF to ensure that **no new permanent structure comes up within ESZ** and those already carrying out any activity will have to apply for permission afresh from the PCCF within six months.

What are Eco Sensitive Zones?

➤ About:

- The **National Wildlife Action Plan (2002-2016)** of the **Ministry of Environment, Forest and Climate Change (MoEFCC)** stipulated that state governments should declare land falling within **10 km of the boundaries of national parks and wildlife sanctuaries** as eco fragile zones or **Eco Sensitive Zones (ESZs)** under the **Environmental (Protection) Act, 1986**.

➤ Purpose:

- The purpose of declaring ESZs around national parks, forests and sanctuaries is to create some kind of a **“shock absorber”** for the protected areas.
- These zones would act as a **transition zone** from **areas of high protection** to those involving **lesser protection**.

➤ Prohibited activities:

- Commercial mining, saw mills, industries causing pollution, establishment of major hydroelectric projects (HEP), commercial use of wood.
- Tourism activities like hot-air balloons over the National Park, discharge of effluents or any solid waste or production of hazardous substances.

➤ Regulated activities:

- Felling of trees, establishment of hotels and resorts, commercial use of natural water, erection of electrical cables, drastic change of agriculture system, e.g. adoption of heavy technology, pesticides etc, widening of roads.

➤ Permitted activities:

- Ongoing agricultural or horticultural practices, rainwater harvesting, organic farming, use of renewable energy sources, adoption of green technology for all activities.

Note:

- **Significance:**
 - **Minimize the impact of development activities**
 - To minimize the impact of urbanization and other developmental activities, the areas adjacent to protected areas have been declared as Eco-Sensitive Zones.
- **In-situ conservation:**
 - ESZs help in in-situ conservation, which deals with conservation of an endangered species in its natural habitat, for example the conservation of the One-horned Rhino of Kaziranga National Park, Assam.
- **Minimize Forest Depletion and Man-Animal Conflict**
 - Eco-Sensitive Zones minimize forest depletion and man-animal conflict.
 - The protected areas are based on the core and buffer model of management, through which local area communities are also protected and benefitted.

Fishing Cats

Why in News?

According to a census conducted by Chilika Development Authority, the Chilika Lake has 176 Fishing Cats.

- The Census was conducted in Collaboration with The Fishing Cat Project (TFCP). This is the **world's first population estimation of the fishing cat**, which has been conducted outside the protected area network.
- **Spatially Explicit Capture Recapture (SECR) method** was used to analyze the data. SECR is used to estimate the density of an animal population from capture–recapture data collected using an array of ‘detectors’.

What are Fishing Cats?

- **Scientific Name:** *Prionailurus viverrinus*.
- **Description:**
 - It is twice the size of a house cat.
 - 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:**
 - **Habitat Destruction:** A major threat for fishing cats is the destruction of wetlands, their preferred habitat.
 - **Shrimp Farming:** Shrimp farming is another growing threat to **mangrove habitats** of the Fishing Cat.
 - **Hunting:** This unique cat also faces threats from hunting for meat and skin.
 - **Ritual Practices:** Tribal hunters indulge in ritual hunting practices throughout the year.
 - **Poaching:** It is also occasionally poached for its skin.
 - **Poisoning:** Indiscriminate trapping, snaring and poisoning.
- **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:**
 - Earlier, Chilika Development Authority had declared its intent to adopt a **five year action plan for fishing cat conservation** in Chilika.
 - In 2021, the **Fishing Cat Conservation Alliance** 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.

Note:

- The Fishing Cat Project, launched in 2010 started raising awareness about the Cat in West Bengal.
- 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.

What are the Key Points of Chilika Lake?

- Chilika is Asia's largest and **world's second largest lagoon**.
- In 1981, Chilika Lake was designated the first Indian wetland of international importance under the **Ramsar Convention**.
- Major attraction at Chilika is **the Irrawaddy dolphins** which are often spotted off Satapada Island.
- The large Nalabana Island (Forest of Reeds) covering about 16 sq km in the lagoon area was declared a bird sanctuary in 1987.
- Kalijai Temple - Located on an island in the Chilika Lake.
- Chilika lake hosts birds migrating from thousands of miles away from the Caspian Sea, Lake Baikal, Aral Sea, remote parts of Russia, Kirghiz steppes of Mongolia, Central and South East Asia, Ladakh and the Himalayas.
- The birds find the vast mud-field and abundant fish stock here suitable to congregate.

Compliance Deadline for Category-C Coal Plants

Why in News?

The Ministry of Power (MoP) has sought a **blanket extension of 20 years again for 398 thermal Category C coal power plants to comply with the emission norms**.

- The **Union Ministry of Environment, Forest and Climate Change (MoEF&CC)** set-up the **original deadline of 2017** for the units accounting for 78% coal-fired thermal power capacity of the nation. In 2021, this **deadline was revised to 2024**.

What are the Reasons for the Extension?

➤ Background:

- India had **initially set a 2017 deadline for thermal powerplants to install Flue Gas Desulphurization (FGD) units** that cut emissions of sulphur dioxides.
- In 2021, the **Mop requested the Environment Ministry** to extend the deadline for meeting emission norms for all thermal plants from 2022 to 2024, citing delay due to various reasons, including the coronavirus pandemic and import restrictions.
- In April 2021, the Environment Ministry **extended timelines for coal-based power plants to comply with emission norms by three to five years**.
- The amended norms stagger the timeline for compliance based on location of a power plant.
- All the thermal power plants were categorised into three groups- Category A, B and C.

➤ Emissions from Coal-fired Power Plants:

- Thermal power companies, which produce three-fourths of the country's electricity, account for some **80% of its industrial emissions of particulate matter, sulphur- and nitrous-oxides, which cause lung diseases, acid rain and smog**.
- These are also responsible for **70% of the total freshwater withdrawal** by all industries.

➤ Reasons for Extension:

- Phased manufacturing programme for **Flue Gas Desulfurisation (FGD)** to encourage '**Atmanirbhar Bharat**'.
- **FGD** is the process of **elimination of sulphur-dioxide viz. SO₂** from exhaust flue gases produced due to thermal processing, treatment, and combustion furnaces, boilers, and other industrial processes.
- **High cost of FGD due to demand-supply gap** and escalated prices of FGD to Rs 1.14 crore from 0.39 crore per unit of generation.
- The planning, tendering and implementation of FGD was **disrupted on account of the Covid-19 pandemic**.
- Further, there exist **import constraints for the components of FGD like absorber lining and borosilicates** owing to the geopolitical conditions.

Note:



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What are the Different Categories of Coal Plants?

➤ Based on their aerial distance from the million-plus population cities, critically polluted areas, non-attainment cities, and Delhi-National Capital Region region, coal plants are categorized into **Category-A**, **Category-B** and **Category-C** plants.

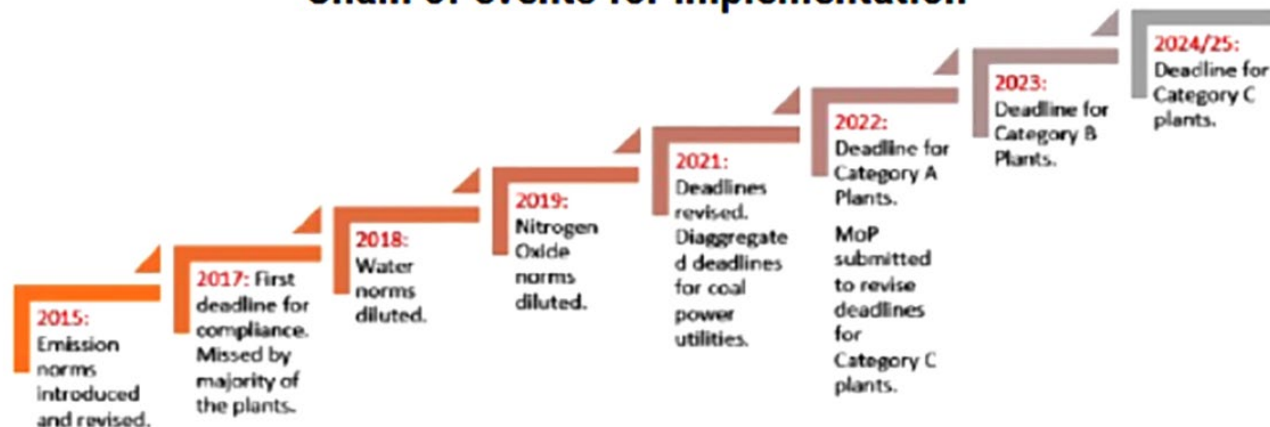
○ Category-A:

- The power plants **within the radius of 10 km of the National Capital Region (NCR) or cities having million-plus population** have to meet the **December 2022 deadline**.
- As per the list prepared by the **Central Pollution Control Board (CPCB)**, there are **79** such coal-based power plants.

○ Category-B and -C:

- The power plants **within the radius of 10 km of critically polluted areas or non-attainment cities** have to meet the **December 2023 deadline**. There are **68 Category-B** plants.
 - The **remaining plants comprising 75% of total** fall under **Category-C** those were expected to meet the December 2024 deadline. There are **449 Category-C** plants.
- The **2021 amendment** for the first time introduced a **penalty mechanism**. The **maximum fine** upon deadline breach for **non-retiring plants in Category-A** is **20 paise per unit**; **15 paise per unit** for plants in **Category-B**; and **10 paise per unit** for those in **Category-C**. The penalty for **retiring plants** is set at **20 paise per unit**.

Chain of events for implementation



What is the compliance status of Category-A and Category-B plants?

- Around half of the **Category-A** plants (54%) may not comply with the **December 2022 deadline**. Till date, just **13%** of plants have met the emission norms.
- Only **8%** **Category-B** plants claim to be compliant and **30%** are likely to meet the deadline. **61%** are expected to miss the deadline.

Coal Gasification

Why in News?

The Ministry of Coal has prepared a **National Mission document to achieve 100 MT (Million Tonnes) Coal Gasification by 2030**.

What is Coal Gasification?

- **Process:** Coal gasification is a process in which **coal is partially oxidised with air, oxygen, steam or carbon dioxide to form a fuel gas**.
- This gas is then used instead of piped natural gas, methane and others for deriving energy.
- **In-situ gasification of coal – or Underground Coal Gasification (UCG) – is the technique of converting coal into gas while it is still in the seam and then extracting it through wells.**
- **Production of Syngas:** It produces Syngas which is a **mixture consisting primarily of methane (CH₄), carbon monoxide (CO), hydrogen (H₂), carbon dioxide (CO₂) and water vapour (H₂O)**.
 - Syngas can be used to **produce a wide range of fertilizers, fuels, solvent and synthetic materials**.

Note:

What is the Significance of Coal Gasification?

- Steel companies typically use coking coal in their manufacturing process. Most of the coking coal is imported and is expensive. To **cut costs, plants can use syngas**, which comes from coal gasification plants in the place of coking coal.
- It is primarily **used for electricity generation**, to produce chemical feedstocks.
- The **hydrogen obtained from coal gasification can be used for various purposes** such as making ammonia, powering a **Hydrogen Economy**.
- India's hydrogen demand is likely to increase to **11.7 million tonnes by 2030 from 6.7 million tonnes per year as of now**. Refineries and fertiliser plants are the largest consumers of hydrogen now, which is being produced from natural gas. It can be produced through coal in the processes during coal gasification.

What are the Concerns associated with Coal Gasification Plants?

- **Environmental Perspective:** Coal gasification produces more carbon dioxide than a conventional coal-powered thermal power plant.
 - According to CSE estimates, one unit of electricity generated by burning gasified coal generates 2.5 times more carbon dioxide than what would result when burning the coal directly.
 - **Efficiency Perspective:** The syngas process converts a relatively high-quality energy source (coal) to a lower quality state (gas) and consumes a lot of energy in doing so.
 - Thus, the efficiency of conversion is also low.

Non CO₂ Pollutants

Why in News?

According to a new study, world needs to target both non-CO₂ pollutants and CO₂ pollutants to achieve climate targets.

- Global temperatures are likely to exceed 1.5 degrees Celsius over pre-industrial levels by 2035 and 2°C by 2050 if the focus is merely on decarbonisation efforts.

What are Non-CO₂ Pollutants?

- **About:** The Non-CO₂ Pollutants include **methane, black carbon, hydrofluorocarbons (HFC), tropospheric ozone and nitrous oxide**.

- **Methane:** Methane is a potent greenhouse gas. It contributes to the formation of ozone.
- **Black Carbon:** Black carbon is a **major component of PM2.5** and a potent warming agent in the atmosphere, and contributes to regional environmental disruption and accelerates glacier melting.
- **Hydrofluorocarbons (HFC):** Hydrofluorocarbons (HFCs) are greenhouse gases (GHGs) commonly used in refrigeration, air-conditioning (AC), building insulation, fire extinguishing systems, and aerosols.
- **Tropospheric ozone** is formed by the interaction of sunlight, particularly ultraviolet light, **with hydrocarbons and nitrogen oxides**, which are emitted by automobile tailpipes and smokestacks.
- **Nitrous oxide:** Nitrous oxide is a greenhouse gas which is 300 times more potent than carbon dioxide (CO₂). A major proportion of the N₂O emissions came from the agricultural sector.
- **Sources:** These gases are emitted from a broad range of sectors and sources, namely:
 - Methane is mostly emitted from extraction, distribution and combustion of fossil fuel, industrial processes, enteric fermentation, rice cultivation, manure management, other agricultural sources, and the waste sector.
 - N₂O is mostly emitted from industrial processes, agricultural soils, manure management and wastewater.
 - F-gases are mostly emitted from industrial processes.
- **Contribution in Global Warming:** The share of non-CO₂ pollutants contributing to global warming is almost as much as carbon dioxide.
 - IPCC WGI reports have shown that the contribution of **CO₂ and non-CO₂ greenhouse** gases to global heating was 52-57% and 43-48 %, respectively.

What is the Issue?

- The **Working Group III report of the Intergovernmental Panel for Climate Change (IPCC)** deals with mitigating climate change, focuses on CO₂ and a few greenhouse gasses, but **excludes other non- CO₂ pollutants**.
- Warming from non- CO₂ greenhouse gasses and black carbon soot was close to 80%.

Note:

- Without tackling non- CO₂ pollutants, these gasses will continue to trap heat and keep the warming above 1.5°C, as there are not many cooling aerosols to mask the warming.

What are the Recent Initiatives to Tackle Non-CO₂ pollutants?

- The **Glasgow Climate Pact**, an agreement signed during the 2021 United Nations Climate Change Conference (CoP26), recognised the need to consider further actions to reduce non-carbon dioxide greenhouse gas emissions, including methane, by 2030.
 - **Global Methane Pledge**: The US and the European Union launched the Global Methane Pledge at the COP26 in Glasgow. More than 100 countries have committed to cut methane emissions by 30% by 2030.
 - India has not signed up for the Global Methane Pledge
 - **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%.

UNCCD Conference of Parties (COP15)

Why in News?

Recently, the Union Minister for Environment, Forest and Climate Change addressed the **fifteenth session of the Conference of the Parties (COP15)** of the **United Nations Convention to Combat Desertification (UNCCD)** in Cote d'Ivoire (Western Africa).

What are the Highlights of the COP15?

- **About:**
 - COP 15 is a **key moment in the fight against desertification, land degradation and drought**.
 - It will **build on the findings of the second edition of the Global Land Outlook** and offer a concrete response to the interconnected challenges of **land degradation, climate change** and biodiversity loss.
 - The Global Land Outlook (GLO), the **UNCCD flagship publication, underscores land system challenges**, showcases transformative policies

and practices, and points to cost-effective pathways to scale up sustainable land and water management.

➤ Top Agenda:

- **Drought, land restoration, and related enablers** such as land rights, gender equality and youth empowerment are among the top items on the Conference agenda.
- **Theme:** 'Land. Life. Legacy: From scarcity to prosperity'

What is Desertification?

- Land degradation is defined as the **reduction or loss of the biological or economic productivity of drylands**.
- Land degradation in arid, semiarid and dry subhumid areas resulting from various factors, including climatic variations and human activities.
 - The **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)**,
 - Soil Conservation in the Catchment of River Valley Project
 - National Watershed Development Project for Rainfed Areas (NWDPA)
 - Fodder and Feed Development Scheme-component of Grassland Development including Grass Reserves.
 - Command Area Development and Water Management (CADWM) programme,
 - **Soil Health Card Scheme**, etc.

International Conference on Disaster Resilient Infrastructure

Why in News?

Recently, the Prime Minister addressed the inaugural session of the **fourth edition of the International Conference on Disaster Resilient Infrastructure** via video message.

- ICDRI is the annual international conference of the **Coalition for Disaster Resilient Infrastructure (CDRI)** in partnership with member countries, organizations and institutions to strengthen the global discourse on disaster and climate resilient infrastructure.

Note:

What is CDRI?

- The **Coalition for Disaster Resilient Infrastructure (CDRI)** is a **multi-stakeholder global partnership** of national governments, **UN (United Nations)** agencies and programmes, multilateral development banks and financing mechanisms, the private sector, and knowledge institutions.
 - The **Prime Minister of India** launched CDRI during his speech at the **UN Climate Action Summit** on 23rd September 2019.
 - It aims **to promote the resilience of new and existing infrastructure systems** to climate and disaster risks in support of sustainable development.
 - **Members:** 30 countries and 8 organizations.
 - **Thematic Areas:** Governance and Policy, Risk Identification and Estimation, Standards and Certification, Capacity building, Innovation & Emerging Technology, Recovery and Reconstruction, Finance and Community based approaches.
 - The CDRI Secretariat is based in **New Delhi, India.**

How is Disaster Resilient Infrastructure (DRI) different from Climate Resilient Infrastructure (CRI)?

- DRI also includes addressing disaster risk due to geophysical and geomorphological hazards **such as earthquakes, landslides, tsunami and volcanic activity**. Since infrastructure systems are built for long life cycles, **it is imperative that DRI addresses risks emanating from such low-frequency high impact events.**
- DRI must **deal with technological hazards** like nuclear radiation, dam failures, chemical spills, explosions which are **not directly linked to climate.**
- More than 90% of disasters are a **manifestation of weather and climate-related extreme events**. So, making infrastructure climate-resilient also **contributes to making it disaster resilient.**
- Some **CRI efforts may focus on reducing carbon footprint of Infrastructure**. While this may be a byproduct of DRI, DRI does not explicitly address these aspects.

Grey Slender Loris

Why in News?

Recently, scientists from the **Salim Ali Centre for Ornithology and Natural History (SACON)** in Coimbatore carried out a survey of Grey slender loris populations in **Tamil Nadu's Dindigul forest division.**

What is Grey Slender Loris?

- **About:**
 - The Grey slender loris belongs to the **family Loridae.**
 - It is a **species of primate.**
 - It has got a **lean and lanky appearance**, with **longer and slender limbs, larger ears, pointed snout** and eyes circled with black or dark brown.
 - The fur is **soft and woolly**. The colour varies from **dark grey to earthy brown.**
 - The Grey slender loris is a **nocturnal animal**. It is also a slow-moving animal. It comes down into the **bushes to feed and crosses open stretches of ground** to enter isolated groves or to cross from one tree to another.
 - Though it is **insectivorous**, it is fond of berries also.
- **Habitat:**
 - They are found in **tropical rainforests, scrub forests, semi-deciduous forests, and swamps.**
 - Grey Slender Loris generally inhabits **dry and drought-prone areas of Dindigul district of Tamil Nadu.**
 - It is found in acacia and tamarind-dominated thorn and scrub forests near cultivated fields.
 - The species occurs in southern and eastern India (Andhra Pradesh, Karnataka, Kerala and Tamil Nadu) and Sri Lanka.
- **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:**
 - The loris has become **threatened mainly because of habitat loss.**
 - The disappearance of the **acacia tree, a preferred**

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tree species of the loris, hunting for the pet trade and for their meat, road kills, superstitious kills, traditional medicine and habitat fragmentation pose serious threats to this primate.

➤ **Protection Status:**

- **IUCN:** Near Threatened
- **CITES:** Appendix II
- **Wildlife (Protection) Act of India, 1972:** Schedule I

What is Salim Ali Centre for Ornithology and Natural History (SACON)?

- SACON, established in 1990 at Anaikatti, Coimbatore (Tamil Nadu) is a national centre for information, education and research in ornithology and natural history in India.
- It was named after Dr. Salim Ali in appreciation of his lifelong services to India's bird life and conservation of natural resources.
- It designs and conducts research in ornithology covering all aspects of biodiversity and natural history.

Heatwaves and Wet Bulb Temperature

Why in News?

The recently published **Intergovernmental Panel on Climate Change (IPCC) Report AR6** (Sixth Assessment Report) has emphasised that **humidity is very important factor** while estimating the physiological stress that extreme heat puts on the human body.

- Instead of the “**dry bulb**” temperature which is usually measured using a regular thermometer, an alternative metric known as the “**wet bulb temperature**” has been used to measure exposure to extreme heat.
- Since March 2022, the consecutive **heatwaves** over South Asia **have continued the disturbing tradition of breaking historical temperature records**.

What are Heatwaves?

- A heatwave is a period of **abnormally high temperatures**, more than the normal maximum

temperature that occurs during the summer season in the North-Western and South Central parts of India.

- Heatwaves typically occur between March and June, and in some rare cases even **extend till July**.
- **India Meteorological Department (IMD)** classifies heatwaves according to regions and their temperature ranges.

What is the Criteria for Heatwaves?

- The heatwave is considered when the maximum temperature of a station reaches **at least 40°C for Plains and at least 30°C for Hilly regions**.
- If the normal maximum temperature of a station is less than or equal to 40°C, then an increase of 5°C to 6°C from the **normal temperature is considered to be heat wave condition**.
 - Further, an increase of 7°C or more from the normal temperature is considered a **severe heat wave condition**.
- If the normal maximum temperature of a station is more than 40°C, then an increase of **4°C to 5°C from the normal temperature** is considered to be heat wave condition. Further, an increase of 6°C or more is considered a severe heat wave condition.
- Additionally, if the **actual maximum temperature remains 45°C or more** irrespective of normal maximum temperature, a heat wave is declared.

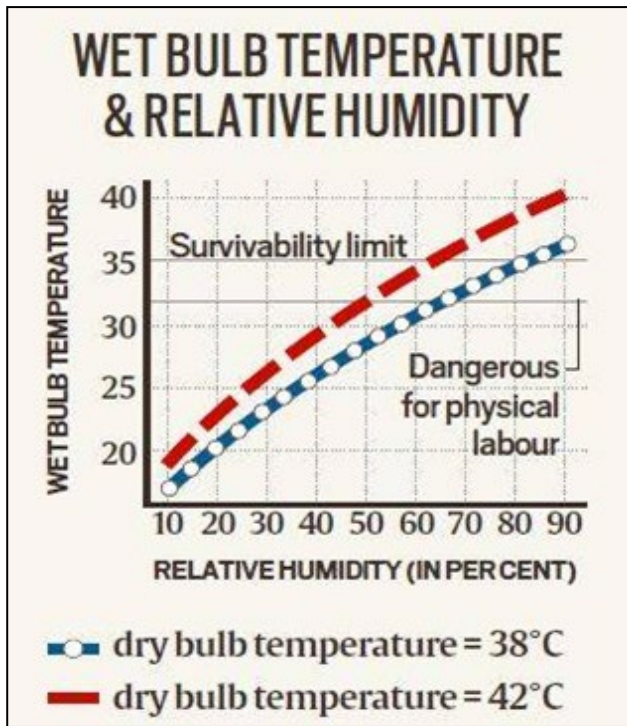
Why is Humidity such a Critical factor while Measuring Heat Exposure?

- Humans lose heat generated within their bodies by **producing sweat that evaporates on the skin**.
 - The cooling effect of this evaporation is essential in maintaining a **stable body temperature**.
- As humidity rises, sweat does not evaporate and makes it difficult to regulate body temperature. This is why humans **feel more discomfort in humid places**.
- The wet bulb temperature is usually **lower than the dry bulb temperature**, and the difference **between the two increases** dramatically as the air becomes dry.
- The report mentions that sustained exposures to wet bulb temperatures **above 35°C are fatal**, while sustained exposures to wet bulb temperatures **above 32°C are dangerous for intense physical activity**.

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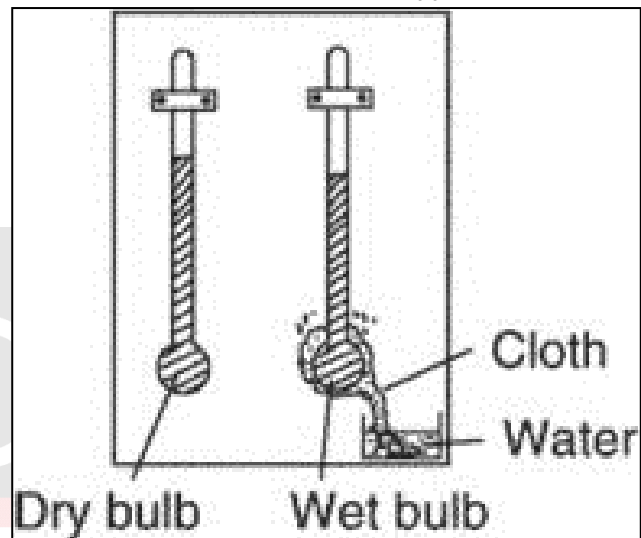


- The humidity required to reach wet bulb temperatures in excess of 35°C over land is exceedingly **difficult to achieve**.
 - According to the report, such conditions are **rarely observed** nowadays.
- The findings also suggest that it is unlikely to experience sustained exposure to wet bulb temperatures **beyond the threshold of survivability**.
- The hype around survivability thresholds and wet bulb temperatures hides deeper issues, **both physiological and political**.
 - Firstly, the **inability of the body to stabilise its core temperature** can have multiple reasons.
 - Increased strain on the heart during periods of elevated temperature could be fatal for those with **pre-existing cardiac conditions** which is the **leading cause of deaths** during heatwaves.
 - **Pre-existing respiratory problems and diabetes** too are potential causes of death.
 - Such conditions **impair the body's ability to efficiently transfer heat to the environment**.

What is the Wet Bulb Temperature?

- Wet bulb temperature is the **lowest temperature to which air can be cooled** by the evaporation of water into the air at a constant pressure.

- WBT is a limit that **considers heat and humidity beyond which humans can not tolerate** high temperatures.
- The Wet Bulb temperature is the **temperature of adiabatic saturation**. This is the temperature indicated by a moistened thermometer bulb exposed to the air flow.
 - An adiabatic process is one in which **no heat is gained or lost by the system**.
- Wet Bulb temperature can be **measured by using a thermometer with the bulb wrapped in wet muslin**.



- The adiabatic evaporation of water from the thermometer and the cooling effect is indicated by a **"wet bulb temperature" lower than the "dry bulb temperature"** in the air.
- The rate of evaporation from the wet bandage on the bulb, and the temperature difference between the dry bulb and wet bulb, **depending on the humidity of the air**.
- The evaporation is reduced when the air contains more **water vapour**.
- The wet bulb temperature is always lower than the dry bulb temperature but will be **identical with 100% relative humidity** (the air is at the saturation line).

What is Dry Bulb Temperature?

- The Dry Bulb temperature usually referred to as **"air temperature"**, is the air property that is most commonly used. When people refer to the temperature of the air they are normally referring to the dry bulb temperature.

Note:

- The Dry Bulb Temperature refers basically to the **ambient air temperature**. It is called “Dry Bulb” because the air temperature is **indicated by a thermometer not affected by the moisture of the air**.
- Dry-bulb temperature **can be measured using a normal thermometer** freely exposed to the air but shielded from radiation and moisture.
- The dry-bulb temperature is an **indicator of heat content**

State of the World's Birds

Why in News?

According to the **new review ‘State of the World’s Birds’**, **approximately 48% of existing bird species worldwide** are known or suspected to be undergoing population declines.

- State of the World’s Birds is an **annual review of environmental resources**.
- Since birds are highly visible and are sensitive indicators of environmental health, **their loss signals a much wider loss of biodiversity** and threat to human health and well-being.

What are the Key Highlights of the Review?

- **About:**
 - **Overall:**
 - The threat has been **attributed to almost half of the 10,994 recognised extant species of birds to the expanding human footprint** on the natural world and **climate change**.
 - **While 4,295 or 39% of the species** had stable trends, about 7% or 778 species had increasing population trends. The trend of 37 species was unknown.
 - The study **reviewed changes in avian biodiversity** using data from the **International Union for Conservation of Nature’s Red List** to reveal the changes in fortunes of all the global bird species.
 - **India:**
 - The trend towards **declining bird diversity is just as alarming in India**, where recent annual trends have been calculated for 146 species.

- Of these, **nearly 80% are declining in numbers**, and **almost 50% plummeting strongly**.
- Just over **6% of the species studied show stable populations** and 14% show increasing population trends.
- **Among the most threatened species** were endemic species, birds of prey, and those living in forests and grasslands.
- **Reasons for the Decline:**
 - **Degradation and loss of natural habitats as well as direct overexploitation** of many species are the key threats to avian biodiversity.
 - The **use of 37% of the surviving bird species as common or exotic pets** and **14% as food** are examples of direct overexploitation.
 - Also, humans eat 14% of the world’s surviving species of birds.
 - Apart from **tropical forests**, the threat of natural grasslands has been particularly worrying for North America, Europe and India.

What are the Recommendations?

- Conducting reliable estimates of population abundance and change.
- Novel and more effective solutions applied at scale for demand reduction for over harvested wild birds.
- Monitoring green energy transitions that can impact birds if inappropriately implemented
- Eradication of populations of invasive alien species.
- Shifting human societies to economically sustainable development pathways.

National Mission for Clean Ganga

Why in News?

The **National Mission for Clean Ganga (NMCG)** has organised the 6th Edition of the monthly ‘Webinar with Universities’ series on ‘Igniting Young Minds, Rejuvenating Rivers’.

The theme for the webinar was **‘Wastewater Management.’**

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What is NMCG?

- **About:**
 - The National Mission for Clean Ganga (NMCG) is implemented by the **National Council for Rejuvenation, Protection and Management of River Ganga** also known as the **National Ganga Council**.
 - This mission was established on 12th August 2011 under the **Societies Registration Act, 1860** as a registered society.
- **Objectives:**
 - The mission incorporates **rehabilitating and boosting the existing STPs (Sewage Treatment Plants) and instant short-term steps** to curb pollution at exit points on the riverfront in order to check the inflow of sewage.
 - To maintain the continuity of the water flow without changing the natural season variations.
 - To restore and maintain the surface flow and groundwater.
 - To regenerate and maintain the natural vegetation of the area.
 - To conserve and regenerate the aquatic biodiversity as well as the riparian biodiversity of the river Ganga basin.
 - To allow participation of the public in the process of protection, rejuvenation and management of the river.

What are the Initiatives Related to Ganga?

- **Namami Gange Programme:** It is an Integrated Conservation Mission, approved as a 'Flagship Programme' by the Union Government in June 2014 to accomplish the twin objectives of effective abatement of pollution and conservation and rejuvenation of National River Ganga.
- **Ganga Action Plan:** It was the first River Action Plan that was taken up by the Ministry of Environment, Forest and Climate Change in 1985, to improve the water quality by the interception, diversion, and treatment of domestic sewage.
 - The National River Conservation Plan is an extension to the Ganga Action Plan. It aims at cleaning the Ganga river under Ganga Action Plan phase-2.

- **National River Ganga Basin Authority (NRGBA):** It was formed by the Government of India in the year 2009 under Section-3 of the Environment Protection Act, 1986.
 - Ganga was declared as the 'National River' of India in 2008.
- **Clean Ganga Fund:** In 2014, it was formed for cleaning up of the Ganga, setting up of waste treatment plants, and conservation of biotic diversity of the river.
- **Bhuvan-Ganga Web App:** It ensures involvement of the public in monitoring of pollution entering into the river Ganga.
- **Ban on Waste Disposal:** In 2017, the **National Green Tribunal** banned the disposal of any waste in the Ganga.

What is the Ganga River System?

- The headwaters of the Ganga called the 'Bhagirathi' are fed by the Gangotri Glacier and joined by the Alaknanda at Devprayag in Uttarakhand.
- At Haridwar, Ganga emerges from the mountains to the plains.
- The Ganga is joined by many tributaries from the Himalayas, a few of them being major rivers such as the Yamuna, the Ghaghara, the Gandak and the Kosi.

Global Annual to Decadal Climate Update Report

Why in News?

- According to the global annual to decadal climate update report issued by the **World Meteorological Organisation (WMO)**, India could be among the few regions globally where **below normal temperatures have been predicted for the year 2022** and the next four years.
- The year 2022 will be cooler (compared to the 1991 – 2020 average) over India, along with Alaska and Canada.
 - The annual update harnesses the expertise of internationally acclaimed climate scientists and the best prediction systems from leading climate centres around the world to produce actionable information for decision-makers.

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What is World**Meteorological Organization (WMO)?**

- It is an **intergovernmental organization** with a membership of 193 Member States and Territories.
 - India is a member of WMO.
- It originated from the **International Meteorological Organization (IMO)**, which was established after the **1873 Vienna International Meteorological Congress**.
- Established by the ratification of the WMO Convention on 23rd March 1950, WMO became the **specialized agency** of the United Nations for meteorology (weather and climate), operational hydrology and related geophysical sciences.'
- WMO is **headquartered in Geneva**, Switzerland.

What are the Major Findings?

- **Temperature above 1.5°C:** There is a **50:50 chance of the annual average global temperature temporarily reaching 1.5°C above the pre-industrial level** for at least one of the next five years.
- **Warmest Year:** There is a 93% likelihood of at least one year between 2022-2026 becoming **the warmest on record** and dislodging 2016 from the top ranking.
 - The chance of the five-year average for 2022-2026 being higher than the last five years (2017-2021) is also 93%.
- **La Nina and El Nino Events:** Back-to-back **La Niña events** at the start and end of 2021 had a cooling effect on global temperatures, but this is only **temporary and does not reverse the long-term global warming trend**.
 - Any development of an **El Niño event** would immediately fuel temperatures, as it did in 2016, which is until now the warmest year on record.
- **Precipitation Patterns:** Predicted precipitation patterns for the November to March 2022/23-2026/27 average, compared to the 1991-2020 average, suggest increased precipitation in the tropics and reduced precipitation in the subtropics, consistent with the patterns expected from climate warming.

What are the India Specific Findings?

- One of the primary reasons for the lowering of temperatures over India from next year is the **possible increase in rainfall activity** in this decade.

- As per the **India Meteorological Department (IMD)**, the Indian monsoon will soon enter a positive period after remaining in a negative period since 1971.
 - Many parts of India will **receive above-normal rainfall**. This will keep temperatures low.
 - The future trend suggests that the decadal mean value will be **close to near normal from 2021 to 2030**.
 - It will then turn positive, the decade 2031-2040 will be the **beginning of a wet period**.

What are the Concerns?

- According to the study, the world is getting measurably closer to temporarily reaching the lower target of the **Paris Agreement on Climate Change**.
- The 1.5°C is probably an indicator of the point at which climate impacts will become **increasingly harmful for people and indeed the entire planet**.
- The Paris Agreement sets **long-term goals** to guide all nations to substantially reduce global greenhouse gas emissions **to limit the global temperature increase** in this century to 2 °C while pursuing efforts to limit the increase even further to 1.5 °C.
- For as long as people continue to emit greenhouse gases, **temperatures will continue to rise**. And alongside that, oceans will continue to become warmer and more acidic, sea ice and glaciers will continue to melt, sea level will continue to rise and our weather will become more extreme.
- **Arctic warming** is disproportionately high and what happens in the Arctic will affect everyone.

Earth Day**Why in News?**

On 22nd April 2022, the **52nd anniversary of Earth Day** was celebrated. Earth Day is an international event celebrated around the **world to pledge support for environmental protection**.

The **theme for Earth Day 2022** is "Invest In our Planet".

What is Earth Day?

- **Background:** Earth Day was first observed in 1970 when 20 million took to the streets to protest environmental degradation on the call of US Senator Gaylord Nelson.

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- The event was triggered by the **1969 Santa Barbara oil spill**, as well as other issues such as smog and polluted rivers.
- In 2009, the United Nations designated 22nd April as '**International Mother Earth Day**'.
- **About:** Earth Day is now globally coordinated by **EARTHDAY.ORG**, which is a non-profit organization. It was formerly known as **Earth Day Network**.
- It aims to "**build the world's largest environmental movement to drive transformative change for people and the planet**".
- It recognizes a collective responsibility, as called for in the **1992 Rio Declaration (Earth Summit)**, to promote harmony with nature and the Earth to achieve a just balance among the economic, social and environmental needs of present and future generations of humanity.
- The landmark **Paris Agreement**, which brings almost 200 countries together in setting a common target to reduce global greenhouse emissions, was also signed on Earth Day 2016.

Blue Blob

Why in News?

According to a recent Research, a region of cooling water in the North **Atlantic Ocean** near Iceland, nicknamed the "**Blue blob**" may have helped temporarily stall the melting of **Arctic sea ice**.

However, the study has also stated that the effects of **climate change** will catch up to the massive ice chunks if temperatures are not kept in check.

What is Blue Blob and its role in Slowing Down of Glacier Melting?

- It is a **cold patch located south of Iceland and Greenland** and little is known about it.
- The cold patch was **most prominent during the winter of 2014-2015** when the sea surface temperature was about **1.4 degrees Celsius** colder than normal.
- The Arctic region is **reportedly warming four times faster** than the global average and Iceland's glaciers steadily shrank from 1995 to 2010, losing an average of 11 billion tons of ice per year.

- Starting in 2011, **however, the speed of Iceland's melting slowed**, resulting in about half as much ice loss annually and the **Blue Blob has been linked to cooler air** temperatures over Iceland's glaciers and cooler waters.
- This **trend was not seen in nearby**, larger glaciers across **Greenland** and **Svalbard**.
- Before the Blue Blob, a long-term cooling trend in the same region, called the **Atlantic Warming Hole**, reduced sea surface temperatures by about **0.4 to 0.8 degrees Celsius** during the last century and may continue to cool the region in the future.
 - A possible cause of the Warming Hole is a slowdown of the **Atlantic Meridional Overturning Circulation (AMOC)**.
 - AMOC is an **ocean current that brings warm water up** from the tropics to the Arctic, thus reducing the amount of heat delivered to the region.

Forest Fires Reducing Solar Power Production

Why in News?

A new study by Aryabhata Research Institute of Observational Sciences (ARIES) and National Observatory of Athens (NOA), Greece has found that **Forest Fires can reduce solar power production in India**.

- The scientists used remote sensing data for the research and studied the impact of aerosols and clouds on the solar energy potential over the Indian region with extensive analysis and model simulations.
- Large-scale development of a solar energy system requires proper planning, and there is a need to estimate the solar potential.
- ARIES is an autonomous institute under the Department of Science & Technology and is located in Nainital (Uttarakhand).

What are the Forest Fires?

- Also called **bush or vegetation fire or wildfire**, it can be described as any uncontrolled and non-prescribed combustion or burning of plants in a natural setting such as a forest, grassland, brush land or tundra,

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which consumes the natural fuels and spreads based on environmental conditions (e.g., wind, topography).

- Forest Fires can be incited by human actions, such as land clearing, extreme drought or in rare cases by **lightning**.
- There are three conditions that need to be present in order for a wildfire to burn: fuel, oxygen, and a heat source.

What are the Findings?

- Several factors like clouds, aerosols, and pollution generated from various sources **limit the solar irradiance causing performance issues in the photovoltaic and concentrated solar power plant installations**.
- Apart from clouds and aerosols, forest fires play a very crucial role in reducing solar energy production.
- The findings of the present study will drastically increase the awareness among decision-makers about the effect of forest fires on energy management and planning at a country level.
- In addition, this research **can support the mitigation processes and policies for climate change and its direct and indirect impacts on sustainable development**.
- Such analysis of the energy and financial losses due to the direct and indirect effects of forest fires on the production of solar plants can help grid operators to plan and schedule power generation, as also the distribution, supply, security, and overall stability of power production.

Imbalance in Nitrogen Availability

Why in News?

According to a new report, an **imbalance in nitrogen availability has been reported** across the globe, with some places having an excess and others a shortage of the element.

What are the Reasons Causing the Decline?

- **Rising carbon dioxide levels** and other global changes **have increased demand for nitrogen** by plants and microbes.

- Plants grow quickly when **exposed to high carbon dioxide (CO₂)** concentrations.
- The presence of high CO₂ levels dilutes the availability of nitrogen in Plants, thus, their demand for nitrogen goes up.
- Other factors contributing to nitrogen decline include **warming and disturbances, including wildfire**.
 - Many areas of the world, where people do not contribute excessive amounts of nitrogen to the soil, long-term records demonstrate that nitrogen availability is declining, with important consequences for plant and animal growth.
 - **Burning fossil fuels, application of nitrogen-based fertilizers**, and other activities can dramatically increase the amount of biologically available nitrogen in an ecosystem.

What are the Consequences of Nitrogen Imbalance?

- **Low Nitrogen:**
 - Declining nitrogen availability can be **linked to insect apocalypse**.
 - **Climate change**, insecticides, herbicides, **light pollution**, **invasive species** and changes in agriculture and land use are **causing Earth to lose about 1-2% of its insects each year**. This is being termed as “**Insect Apocalypse**”.
 - It **can encourage swarming in some species of locusts**.
 - Further, low nitrogen availability **could limit plants’ ability to capture CO₂** from the atmosphere.
- **High Nitrogen:**
 - When excessive nitrogen accumulates in the streams, inland lakes and coastal bodies of water, it could sometimes result in **eutrophication**, leading to harmful algal blooms, dead zones and fish kills.
 - **Eutrophication:** When a water body becomes overly enriched with minerals and nutrients which induce excessive growth of algae or algal bloom. This process also results in oxygen depletion of the water body.
 - In humans, high levels of nitrogen in the groundwater are **linked to intestinal cancers and miscarriages** and can be fatal for infants.

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Palmking

Why in News?

Recently, the rare butterfly **Palmking (*Amathusia phidippus*)** was sighted for the first time in Tamil Nadu.

It is the **321st species of butterfly found in Tamil Nadu** among the 1,500 species in India.

What is Palmking?

➤ About:

- Palmking was **first recorded in South India** by British scientist **H.S.Ferguson in 1891**. More than a Century later, it was **rediscovered in 2007**.
- Palmking belongs to the **Nymphalidae subfamily and feeds on palm, coconut and calamus varieties** of plants.
- The butterfly is characterised by **its brown colour and dark bands and is described as reclusive, mostly resting in the shade**.
- It is not easy to spot a Palmking because **its wood colour makes for easy camouflage and it rarely spreads its wings**.

➤ Distribution:

- This butterfly is widely distributed across parts of **India, Myanmar, Indo China, Peninsular Malaysia and Thailand**.
- It occurs in the **Indonesian archipelago and the Philippines**.
- In India, Palmking sightings were recorded in the forests of **Arippa, Shendurney, Periyar Tiger Reserve** in the south of **Western Ghats**.

State Energy and Climate Index

Why in News?

Recently, the **NITI Aayog** launched the **State Energy and Climate Index (SECI)**. It is the **first index that aims to track the efforts made by states and UTs in the climate and energy sector**.

The parameters of the index have been devised keeping in mind **India's goals for climate change and clean energy transition**.

What are the Key Points of SECI?

➤ Objectives: The objectives of the index are:

- **Ranking the States** based on their efforts towards improving energy access, energy consumption, energy efficiency, and safeguarding the environment.
- **Helping drive the agenda** of the affordable, accessible, efficient and clean energy transition at the State level,
- **Encouraging healthy competition** among the states on different dimensions of energy and climate.

➤ Parameters: The State Energy and Climate Index (SECI) ranks states and UTs on **six parameters**:

- **Discoms** (Power distribution companies) Performance,
- **Access Affordability And Reliability Of Energy,**
- **Clean Energy Initiatives,**
- **Energy Efficiency,**
- **Environmental Sustainability,**
- **New Initiatives.**

➤ Categorization: Based on the outcome of SECI scores, states and union territories have been categorised into **three groups -- front runners, achievers, and aspirants**.

- **Top Performers:** Gujarat, Kerala and Punjab have been adjudged as top three performer states in the NITI Aayog's SECI.
- The top three performers among smaller states are **Goa, Tripura and Manipur**.
- **Unsatisfactory Performance:** States like Chhattisgarh, Madhya Pradesh and Jharkhand were placed at the bottom.

➤ Need: India is a **resource-rich and diverse country**. Many of its states are comparable to countries in the **European Union** in terms of area, population, and diversity of resources.

- Thus, a **one-size-fits-all approach** will not be appropriate as each state and Union Territory (UT) differ in terms of culture, geography, and use of energy resources.
- It is imperative for each state and UT to have its **own policy to harness its potential and capability**.

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UNEP Report on Noise Pollution

Why in News?

Recently released **United Nations Environment Programme** report titled **Annual Frontiers Report 2022** became **controversial on account of the mention of a single city, Moradabad of Uttar Pradesh.**

- The **Frontiers report identifies and offers solutions to three environmental issues:** urban noise pollution, **wildfires** and phenological shifts that merit attention and action from governments and the public at large to address the triple planetary crisis of **climate change, pollution and biodiversity loss.**

What was the Controversy?

- The report **compiles studies about noise levels** in several cities around the world and illustrates a subset of 61 cities and the range of dB (decibel) levels that have been measured.
- **Delhi, Jaipur, Kolkata, Asansol and Moradabad** are the five Indian cities mentioned in this list.
- **Moradabad in Uttar Pradesh** was shown as having a dB range from 29 to 114.
 - At a maximum value of 114, it was the **second-noisiest city in the list.**
 - While **road traffic, industry and high population density** are well-known factors associated with high dB levels, the inclusion of Moradabad appeared strange because similar studies in the past had never suggested it to be an unusually noisy city.
 - The **first was Dhaka, Bangladesh** at a maximum value of 119 dB.

Why are Measurements of Noise Important?

- **Fulfil the WHO Guidelines:**
 - The latest 2018 **World Health Organization (WHO)** guidelines established a health-protective recommendation for road traffic noise levels of 53 dB.
- **Adverse Effects on Public Health:**
 - The **Frontiers report compiled a host of evidence**, including the adverse effects of noise on public health, which range from mild and temporary distress to severe and chronic physical impairment.

- Estimates suggest that in **Europe 22 million and 6.5 million people suffer from chronic noise annoyance** and sleep disturbance, respectively.
- The **elderly, pregnant women and shift workers** are among those at risk of noise-induced sleep disturbance.
- **Noise-induced awakenings** can trigger a **range of physiological and psychological stress** responses because sleep is necessary for hormonal regulation and cardiovascular functioning.
- **Traffic noise exposure** is a **risk factor for the development of cardiovascular and metabolic disorders** such as elevated blood pressure, arterial hypertension, coronary heart disease and diabetes.
- **Long-term exposure to environmental noise contributes** to 48,000 new cases of ischemic heart disease and causes 12,000 premature deaths annually in Europe.

What is India Doing about Noise Pollution?

- The **Central Pollution Control Board (CPCB)** is mandated to track noise levels, set standards as well as ensure, via their State units, that sources of excessive noise are controlled.
- The **agency has a manual monitoring system** where sensors are installed in major cities and few cities have the facility to track noise levels in real time.

What are the Laws related to Noise Pollution in India?

- Noise pollution is regulated separately under the **Noise Pollution (Regulation and Control) Rules, 2000.**
 - Earlier, **noise pollution and its sources** were addressed under the **Air (Prevention and Control of Pollution) Act, 1981.**
- Additionally, **noise standards for motor vehicles, air-conditioners, refrigerators**, diesel generators and certain types of construction equipment are prescribed under the **Environment (Protection) Rules, 1986.**
- **Noise emanating from industry** is regulated by **State Pollution Control Boards / Pollution Control Committees (SPCBs / PCCs)** for states / Union territories under the **Air (Prevention and Control of Pollution) Act, 1981.**

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Draft Indian Antarctic Bill 2022

Why in News?

Recently, the government has introduced the 'Antarctic Bill' in the **Lok Sabha**, which envisages regulating visits and activities to Antarctica as well potential disputes that may arise among those present on the continent.

- The Bill is **applicable to Indian citizens as well as foreign citizens**.
- In October 2021, **India extended its support for protecting the Antarctic environment** and for co-sponsoring the proposal of the **European Union** for designating East Antarctica and the Weddell Sea as **Marine Protected Areas (MPAs)**.
- Earlier, a 100-km long body of ice in Antarctica, which has been experiencing rapid melting, was formally **named Glasgow** after the Glasgow climate summit.

What are the Provisions under the Bill?

- **Regulate Visiting:**
 - The bill has listed **strict guidelines and a system of permits**, which will be issued by a government-appointed committee, without which any expedition or individual will not be allowed to enter Antarctica.
 - The bill has **provision to establish a committee on Antarctic governance and environmental protection** to monitor, implement and ensure compliance with the relevant international laws, emissions standards and rules of protection.
- **Protecting Mineral Resources:**
 - The Bill further **prohibits drilling, dredging, excavation or collection of mineral resources** or even doing anything to identify where such mineral deposits occur.
 - The only exception is for **scientific research with a permit**.
- **Protecting Native Plants:**
 - There will be strict **prohibition on damaging native plants, flying or landing helicopters or operating vessels** that could disturb birds and seals, using firearms that could disturb the birds

and animals, remove soil or any biological material native to Antarctica, engage in any activity that could adversely change the habitat of birds and animals, or harm them.

- **Prohibition on introducing Birds not Native to Antarctica:**
 - Introduction of animals, birds, plants or **microscopic organisms** that are not native to Antarctica are also prohibited.
 - **Violators can face imprisonment** as well as penalties.
- **Provisions for Indian Tour Operators:**
 - The Bill **also provides for Indian tour operators** to be able to operate in Antarctica after acquiring a permit.
 - There are **40 permanent research stations in Antarctica** of which two – **Maitri and Bharati** – are Indian.

What is the Objective of the Bill?

- To **provide a harmonious policy framework for India's Antarctic activities** through a well-established legal mechanism, facilitate activities of the Indian Antarctic programme, including management of Antarctic tourism and sustainable development of fisheries.

What is the Need of Such Law?

- **To Fulfill Provisions under the Antarctica Treaty:**
 - **India had been a signatory to the Antarctica Treaty since 1983** and that **encumbered India to specify a set of laws governing portions** of the continent where it had its research bases.
 - The **Treaty made it mandatory for the 54 signatory countries to specify laws** governing territories on which their stations are located.
- **Preserve the Pristine Nature of the Continent:**
 - India is **also signatory to treaties such as the Convention on the Conservation of Antarctic Marine Living Resources** and the **Commission for Conservation of Antarctic Marine Living Resources**.
 - Both the conventions **enjoin India to help preserve the pristine nature of the continent**.

Note:

Two New Geological Heritage Sites

Why in News?

Recently, **Geological Survey of India (GSI)** has identified **two geological heritage sites in the Indian Himalayan Region of India.**

- The sites identified are **Siwalik Fossil Park, Himachal Pradesh** and **Stromatolite bearing Dolomite / Limestone of Buxa Formation of Buxa Formation, Sikkim.**
- With inclusion of these two sites, there are **34 Geological Heritage Sites in India.**
- Earlier, the GSI **identified certain geological sites across the Northeast** for promotion of geo-tourism.

What are the Key Points?

- **Siwalik Fossil Park (Himachal Pradesh):** The Siwalik Fossil park displays a rich collection of vertebrate fossils recovered from the Siwalik rocks of the area of Plio-Pleistocene age (**2.6 million to 11,700 years ago**).
- The deposition of Siwalik sediments took place in the narrow linear depression, called the 'fore deep', which started developing in front of the Himalayas since the inception of its uplift in the middle **Miocene (23 million years to 2.6 million years ago).**
- **Stromatolite bearing Dolomite / Limestone of Buxa Formation of Buxa Formation (Sikkim):** This Geoheritage site at Mamley exposes lithounits of Buxa Formation, Daling Group of Proterozoic age (**2.5 billion years to 541 million years ago**).
- The dolostones (sedimentary rock) are profusely stromatolitic (Precambrian algal structures). This site provides one of the rare examples of early life in Sikkim Himalaya.
- The Precambrian is the **earliest of the geologic ages**, which are marked by different layers of sedimentary rock.

What are Geo-heritage Sites?

- Geo-heritage refers to the geological features which are inherently or culturally **significant offering insight to earth's evolution or history to earth science** or that can be utilized for education.

- **Geological Survey of India (GSI)** is the parent body which is making efforts towards identification and protection of geo-heritage sites/national geological monuments in the country.

Global Wind Report 2022

Why in News?

Recently, the **Global Wind Report for 2022** was published by the **Global Wind Energy Council (GWEC).**

GWEC was established in 2005 to **provide a credible and representative forum** for the entire wind energy sector at an international level.

What are the Key Highlights of the Report?

- **Wind Energy Installations Must Quadruple Every Year:**
 - Wind energy installations **every year across the world must quadruple from the 94 GW (Gigawatt) installed in 2021** within this decade to meet the global climate targets.
 - Without the necessary amplification, restricting global warming over pre-industrial levels to 1.5 degrees Celsius — a target set by the **Paris Agreement** — and achieving **Net Zero emissions** by 2050 may become difficult.
- **Capacity Installed in 2021:**
 - New installations of 93.6 GW in 2021 brought global cumulative wind energy capacity to 837 GW, a Year-on-Year (YoY) growth of 12%.
 - The **onshore wind market** added 72.5 GW worldwide. That is 18% lower than the previous year **due to a slowdown in China and the US, the world's two largest wind markets.**
 - The **offshore wind market** enjoyed its best ever year in 2021, with 21.1GW commissioned.
- **New offshore installations likely to Decline:**
 - New offshore installations in 2022 are likely to decline to the 2019 / 2020 levels.
 - Decline will be primarily **due to the reduction of installations in China.**
 - However, **market growth is expected to regain momentum from 2023**, eventually passing the 30GW-mark in 2026.

Note:

- **Offshore Wind Energy Generation Increases Return:**
 - Offshore wind energy generation **increases return on investment**, along with reducing **greenhouse gas emissions**.
 - Carbon dioxide emissions can reduce by 0.3-1.61 gigatonnes every year by 2050 if offshore wind energy generation is scaled up.

What are the Challenges to Growth of the Wind Energy Sector?

- **Inconsistent policy environments** focused on short-term political aims.
- **Badly designed markets** which do not enable bankable renewable energy projects.
- Infrastructure and transmission bottlenecks.
- **A lack of adequate industrial and trade policies** related to renewable technologies
- Hostile political or misinformation campaigns.

What is the Scope of the Wind Energy Sector in India?

- In India, more than **1.4 GW of wind was installed in 2021**, exceeding the 1.1 GW of installations during the previous year.
- The Government has **set a target of installing 5 GW of offshore capacity by 2022 and 30 GW by 2030**.
- India is yet to develop its offshore wind energy facility.
- India can **generate 127 GW of offshore wind energy** with its 7,600 km of coastline.
 - **Onshore wind energy** refers to turbines that are located on land and use wind to generate electricity.
 - **Offshore wind energy** is the energy generated from the wind at sea.
- The Indian wind market outlook for 2022 and 2023 is projected at 3.2 GW and 4.1 GW of onshore wind installations, respectively.

IPCC: Part Three of Sixth Assessment Report

Why in News?

Recently, the **United Nations'** climate science body, the **Intergovernmental Panel on Climate Change (IPCC)** published the third part of its **Sixth Assessment Report (AR6)**.

- This **second part** of the report was **published in March 2022** which was about **climate change impacts, risks and vulnerabilities, and adaptation options**.
- The first part of this report, on the physical science of climate change was published in 2021. It had **warned that 1.5 degree Celsius warming was likely to be achieved** before 2040 itself.

What are the Key Findings of the Report?

- **GreenHouse Gas Emissions:**
 - In 2019, global net anthropogenic **Greenhouse gas (GHG)** emissions were at **59 Gigatonnes of carbon dioxide equivalent (GtCO₂e)**, 54% higher than in 1990.
 - **Net emissions** refer to emissions accounted for after deducting emissions soaked up by the world's forests and oceans.
 - **Anthropogenic emissions** refer to emissions that originate from human-driven activities like the burning of coal for energy or cutting of forests.
 - This emissions growth has been driven mainly by CO₂ emissions from the burning of fossil fuels and the industrial sector, as well as methane emissions.
 - But the average annual rate of **growth slowed to 1.3% per year in the period 2010-19, compared to 2.1% per year in the period 2000-09**.
 - At least 18 countries have reduced GHG emissions for longer than 10 years on a continuous basis due to decarbonisation of their energy system, energy efficiency measures and reduced energy demand.
- **Emission by the Least Developed Countries:**
 - Carbon inequality remains pervasive as ever with **Least Developed Countries (LDCs)** emitting only **3.3% of global emissions in 2019**.
- **Pledges to the Paris Agreement:**
 - In its **best-case scenario**, known as the **C1 pathway**, the IPCC outlines what the world needs to do to limit temperatures to 1.5°C, with limited or no 'overshoot'.
 - **Overshoot** refers to global temperatures crossing the 1.5°C threshold temporarily, but then being brought back down using technologies that suck CO₂ out of the atmosphere.
 - To achieve the C1 pathway, global **GHG emissions must fall by 43% by 2030**.

Note:



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- **Low Emissions Technologies:**
 - The **costs of low emissions technologies have fallen continuously since 2010**. On a unit costs basis, **solar energy** has dropped 85%, **wind** by 55 %, and **lithium-ion batteries** by 85%.
 - Their **deployment, or usage, has increased multiple fold since 2010** — 10 times for solar and 100 times for electric vehicles.
- **Demand-side Mitigation:**
 - It also adds that **demand-side mitigation**, ie, behavioural changes such as adopting plant-based diets, or shifting to walking and cycling “**can reduce global GHG emissions in end use sectors by 40-70% by 2050** compared to baseline scenarios” and improve wellbeing.
 - Most of the potential for demand-side mitigation currently lies in developed countries.
- **Impact on GDP:**
 - The IPCC states that **low-cost climate mitigation options could halve global GHG emissions by 2030**. In fact, the **long-term benefits of limiting warming far outweigh the costs**.
 - Investing in decarbonisation would have a minimal impact on **global Gross Domestic Product (GDP)**.

World Energy Transitions Outlook 2022

Why in News?

Recently, the **International Renewable Energy Agency (IRENA)** launched the **World Energy Transitions Outlook 2022** at the **Berlin Energy Transition Dialogue**.

The Berlin Energy Transition Dialogue (BETD) has become a leading international forum for key stakeholders of the energy sector.

What is Energy Transition?

Energy transition refers to the **global energy sector's shift from fossil-based systems of energy production and consumption** — including oil, natural gas and coal — **to renewable energy sources** like wind and solar, as well as lithium-ion batteries.

What is the Purpose of the Outlook?

- The Outlook **sets out priority areas and actions based on available technologies** that must be

realised by 2030 to achieve **net zero emissions** by mid-century.

- It also **takes stock of progress across all energy uses** to date, which shows that the current pace and scale of the renewables-based transition is inadequate.
- It **provides in-depth analysis of two areas** particularly relevant for the **decarbonisation** of end-use sectors: **electrification and bioenergy**.
- It also **explores the socio-economic impacts of the 1.5°C pathway (under Paris Agreement)** and suggests ways to speed progress towards **universal access to clean energy (renewable energy)**.

What are the Findings of the Outlook?

- **Global annual additions of renewable power will triple by 2030** as recommended by the **Intergovernmental Panel on Climate Change**.
 - At the same time, **coal power will have to resolutely be replaced**, fossil fuel assets phased out and infrastructure upgraded.
 - The **Outlook sees electrification and efficiency as key drivers of the energy transition**, enabled by **renewables, hydrogen**, and sustainable biomass.
 - **End-use decarbonisation will take centre-stage** with many solutions available through **electrification, green hydrogen**, and the direct use of renewables.
 - **High fossil fuel prices, energy security concerns** and the urgency of **climate change** underscore the pressing need to move faster to a clean energy system.

What is the State of India's Energy Transition?

About:

- The country's installed **Renewable Energy (RE)** capacity stands at 150.54 GW (solar: 48.55 GW, wind: 40.03 GW, Small hydro Power: 4.83, Bio-power: 10.62, Large Hydro: 46.51 GW) as on 30th Nov. 2021 while its nuclear energy based installed electricity capacity stands at 6.78 GW.
- **India has the 4th largest wind power capacity** in the world.
- This brings the total **non-fossil based installed energy capacity to 157.32 GW** which is 40.1% of the total installed electricity capacity of 392.01 GW.

Note:

- At **COP26**, 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.
- **Rank of India in the Energy Transition Index:**
 - India ranked 87 out of 110 countries in the **Global Energy Transition Index (ETI) 2021**, a benchmark by the **World Economic Forum**.

Microplastics in Human Blood

Why in News?

Tiny particles of plastics, called **Microplastics**, were detected in human blood for the first time, according to a study by a group of researchers in the Netherlands.

- The researchers adapted existing techniques to detect and analyze particles that were as small as **700 nanometers** in size.
- They **targeted five common plastics**, including **Polyethylene Terephthalate (PET)**, and polyethylene.

What are Microplastics?

- They are **defined as plastics less than five millimeters in diameter**—smaller in diameter than the standard pearl used in jewelry. It can be harmful to our ocean and aquatic life.
- There are **two categories of microplastics**: primary and secondary.

What does the Study Say?

- The scientists **analysed blood samples from 22 anonymous donors, all healthy adults and found plastic particles in 17.**
 - Half the samples contained PET plastic, which is commonly used in drinks bottles.
 - A third contained polystyrene, used for packaging food and other products.
 - A quarter of the blood samples contained polyethylene, from which plastic carrier bags are made.
- This is the **first indication that we have polymer particles in blood**. The impact on health is as yet unknown.

What are the Concerns related to Microplastics?

- Microplastics can latch on to the outer membranes of red blood cells and **may limit their ability to transport oxygen**.
- The particles have also been found in the **placentas of pregnant women, and in pregnant rats they pass rapidly through the lungs** into the hearts, brains and other organs of the fetuses.
- Microplastics **cause damage to human cells in the laboratory** and air pollution particles are already known to enter the body and cause millions of early deaths a year.

'Sujalam 2.0' Grey Water Recycling Project

Why in News?

On the **World Water Day (22nd March)**, the Ministry of Jal Shakti launched a **countrywide project to reuse grey water, or run-offs from kitchens, bathing and laundry**.

What is Grey water?

Grey water is defined as **wastewater that is produced from household processes** (e.g. washing dishes, laundry and bathing).

What is 'Sujalam 2.0' Grey Water Recycling Project?

- **About:**
 - The campaign would focus on the **creation of institutional level greywater management assets in Panchayat Ghar, healthcare facilities, schools, Anganwadi Centres (AWCs), community centres** and other government institutions.
 - Creation of individual and community greywater management assets **will be encouraged**.
 - With active participation from all States and local communities' great success was achieved under the **Sujlam 1.0 campaign** which was started in August 2021.
 - **More than 1 million soak pits were built** at household and community level across the country.

Note:

➤ Funding for the Project:

- The funds to execute the activities for greywater management will be sourced from **Swachh Bharat Mission Grameen Phase-II** or through **15th Finance Commission** tied-grants or **MGNREGS** or through convergence of all.

Lead Poisoning

Why in News?

Recently, **high levels of lead were found in the blood of thousands of children** living around the Kabwe mine in Zambia.

What is Lead Poisoning?

➤ About:

- Lead poisoning or chronic intoxication is caused by the **absorption of Lead in the system and is characterised especially by fatigue, abdominal pain, nausea, diarrhoea, loss of appetite, anaemia, a dark line along the gums, and muscle paralysis or weakness of limbs.**
- Lead exposure also causes **anaemia, hypertension, renal impairment, immunotoxicity and toxicity** to the reproductive organs.

➤ Sources of Lead Poisoning:

- People can become exposed to lead through **occupational and environmental sources.** This mainly results from:
 - **Inhalation of lead particles generated** by burning materials containing lead, for example during smelting, recycling, stripping leaded paint and using leaded aviation fuel, and
 - **Ingestion of lead-contaminated dust, water** (from leaded pipes) and food (from lead-glazed or lead-soldered containers).

What is Lead?

- Lead is a **naturally occurring toxic metal found in the Earth's crust.**
- Lead in the body is **distributed to the brain, liver, kidney and bones.** It is stored in the teeth and bones, where it accumulates over time.
 - Human exposure is usually assessed through the **measurement of lead in blood.**

- **Lead in bone is released into blood during pregnancy** and becomes a source of exposure to the developing foetus.
- There is **no level of exposure to lead** that is known to be without harmful effects.
- Lead exposure is preventable.

What about the Disease Burden of Lead?

- According to the **Institute for Health Metrics and Evaluation (IHME)**, in 2019, lead exposure **accounted for 900 000 deaths and 21.7 million years of healthy life lost (Disability-Adjusted Life Years, or DALYs)** worldwide due to long-term effects on health.
- The highest burden was in **low- and middle-income countries.**

Mercury Pollution

Why in News?

Recently, Indonesia has **introduced a global declaration** that calls on parties to the **Minamata Convention on Mercury** to tackle illegal trade of mercury.

The declaration was read in Nusa Dua, Bali, where **Indonesia is hosting the fourth Conference of Parties (COP4)** to the Minamata Convention on Mercury.

The conference is being held from 21st to 25th March 2022.

What are the Objectives of the Declaration?

- The non-binding declaration calls upon parties to:
 - **Develop practical tools and notification** and information-sharing systems for monitoring and managing trade in mercury.
 - **Exchange experiences and practices relating to combating illegal trade** in mercury, including reducing the use of mercury in artisanal and small-scale gold mining.
 - **Share examples of national legislation and data** and information related to such trade.

What is the Minamata Convention on Mercury?

- The Minamata Convention on Mercury is a **global treaty to protect human health and the environment** from the adverse effects of mercury and its compounds.

Note:

- It was **agreed at the fifth session of the Intergovernmental Negotiating Committee in Geneva, Switzerland 2013**.
- Controlling the **anthropogenic releases of mercury throughout its lifecycle** is one of the key obligations under the Convention.
- The **Convention also addresses interim storage of mercury** and its disposal once it becomes waste, sites contaminated by mercury as well as health issues.
- The Convention **covers all aspects of the life cycle of mercury, controlling and reducing mercury** across a range of products, processes and industries. This includes controls on:
 - mercury mining
 - the manufacture and trade of mercury and products containing mercury
 - disposal of mercury waste
 - emissions of mercury from industrial facilities.
- Countries that have **ratified the Convention are bound by international law** to put these controls in place.
- **India has ratified the Convention.**

What do we know about Mercury?

- Mercury is a **naturally occurring element** that is found in air, water and soil.
- Exposure to mercury – **even small amounts** – may **cause serious health problems**, and is a threat to the development of the child in utero and early in life.
- Mercury may have **toxic effects on the nervous, digestive and immune systems**, and on lungs, kidneys, skin and eyes.
- Mercury is considered by the **World Health Organisation (WHO)** as one of the **top ten chemicals or groups of chemicals** of major public health concern.
- People are mainly exposed to **methylmercury, (an organic compound)** when they eat fish and shellfish and are more vulnerable to Minamata disease.

India's Arctic Policy

Why in News?

Recently, the Ministry of Earth Science has unveiled **India's Arctic Policy**, titled **«India and the Arctic: building a partnership for sustainable development»**.

- India holds one of the 13 positions as the Observer in the **Arctic Council**.
- The **Arctic Council** is an **intergovernmental body** that promotes research and facilitates cooperation among Arctic countries on issues related to the environmental **protection and sustainable development of the Arctic region**.

What is the Background?

- India's engagement with the Arctic began when it signed the **Svalbard Treaty in 1920** in Paris between **Norway, the US, Denmark, France, Italy, Japan, the Netherlands, Great Britain, and Ireland, and the British overseas Dominions and Sweden** concerning Spitsbergen.
 - **Spitsbergen** is the largest island of the **Svalbard archipelago**, part of Norway, in the Arctic Ocean.
 - Spitsbergen is the **only permanently inhabited part of Svalbard**. More than 50% of the land is covered in ice year-round. Together with the glaciers, it is mountains and fjords that define the landscape.
 - Ever since then, India has been closely monitoring all the developments in the Arctic region.
 - India initiated its **Arctic research program in 2007 with a focus on climate change** in the region.
 - The **objectives included studying teleconnections** between Arctic climate and **Indian monsoon**, to characterise sea ice in the Arctic using satellite data, to estimate the effect on global warming.
 - India also **focuses on conducting research on the dynamics and mass budget of Arctic glaciers and sea-level changes**, carrying out an assessment of the flora and fauna of the Arctic.

What are the Major Provisions of India's Arctic Policy?

- **Six Central Pillars:**
 - Science and research.
 - Environmental protection.
 - Economic and human development.
 - Transportation and connectivity.
 - Governance and international cooperation.
 - National capacity building.

Note:

Project Dolphin

Why in News

Recently, the Ministry of Jal Shakti expressed his displeasure **over the slow pace of the approval process for Project Dolphin**.

What is Project Dolphin?

- The initiative got in-principle approval in 2019 at the first meeting of the **National Ganga Council (NGC)**, headed by the Prime Minister.
 - Project Dolphin is one of the activities planned under **Arth Ganga**, an ambitious inter-ministerial initiative of the government approved in 2019.
- Project Dolphin will be on the lines of **Project Tiger**, which has helped increase the tiger population.
- It is expected to be **implemented by the Ministry of Environment, Forest and Climate Change**.
 - A Special Conservation program **needs to be taken up for Gangetic Dolphin which is a national aquatic animal** and also **indicator species** for the river **Ganga** spread over several states.
 - Indicator species, organisms—often a microorganism or a plant—that serves as a measure of the environmental conditions that exist in a given locale.
 - As the Gangetic dolphin is at the top of the food chain, protecting the species and its habitat will ensure conservation of aquatic lives of the river.
 - So far, the **National Mission for Clean Ganga (NMCG)**, which implements the government's flagship scheme **Namami Gange**, has been taking some initiatives for saving dolphins.
- **Global Experience:** The **Rhine Action Plan (1987)** of the International Commission for the Protection of the Rhine (ICPR) — representing Switzerland, France, Germany, Luxemburg and the Netherlands — helped in conservation of the **salmon fish** (also an indicator species).

What are the Key Points

Related to Gangetic Dolphin?

Scientific Name: *Platanista gangetica gangetica*.

Discovery: It was officially discovered in **1801**.

- **Habitat:** They 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:** The global population of the species is estimated at 4,000, and nearly **80% found in the Indian subcontinent**.
- **Significance:**
 - It is a reliable **indicator of the health of the entire river ecosystem**.
- **Threats:**
 - **Bycatch:** These dolphins and people both favour areas of the river where fish are plentiful and the water current is slower.
 - This has led to **fewer fish for people and more dolphins dying as a result of accidentally being caught** in fishing nets, also known as bycatch.
 - **Pollution:** Industrial, agricultural, and human pollution is another serious cause of habitat degradation.
- Dams:** Construction of dams and other irrigation-related projects make them susceptible to inbreeding and more **vulnerable to other threats because they cannot move to new areas**.
- Dolphins below a dam are **threatened by heavy pollution**, increased fishing activities and vessel traffic. They also have less food because dams disturb the migration, breeding cycles and habitat of fish and other prey.
- **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).

Note:

Himalayan Griffons

Why in News?

Recently, at least **Himalayan Griffons** died of suspected poisoning in Assam.

What do we Know about Himalayan Griffons?

- **About:**
 - The Himalayan Griffon **Vulture**, *Gyps himalayensis*, is an Old World vulture in the **family Accipitridae**, which also includes eagles, kites, buzzards and hawks.
 - It is closely related to the **European Griffon Vulture**, *G. fulvus*.
 - This vulture is a **typical vulture**, with a **bald white head**, **very broad wings**, and short tail feathers.
 - It has a **white neck ruff and yellow bill** and the whitish body and wing coverts contrast with the dark flight feathers.
- **Protection Status:**
 - **IUCN Red List:** Near Threatened (NT)
- **Distribution Range:**
 - The Himalayan vulture mostly lives in the **Himalayas on the Tibetan plateau** (India, Nepal and Bhutan, central China and Mongolia).
 - It is also **found in the Central Asian mountains** (from Kazakhstan and Afghanistan in the west to western China and Mongolia in the east).
 - Occasionally it **migrates to northern India** but migration usually only occurs altitudinally.

What are the Characteristics of Vultures?

- **About:**
 - It is one of the **22 species of large carrion-eating birds** that live predominantly in the tropics and subtropics.
 - They act an **important function as nature's garbage collectors** and help to keep the environment clean of waste.
 - Vultures also play a valuable role in keeping wildlife diseases in check.
- **Species in India:**
 - India is home to **9 species of Vulture** namely the Oriental white-backed, Long-billed, Slender-

billed, Himalayan, Red-headed, Egyptian, Bearded, Cinereous and the Eurasian Griffon.

- Most of these 9 species face danger of extinction.
- Bearded, Long-billed, Slender-billed, Oriental white-backed are protected in the **Schedule-1** of the **Wildlife Protection Act 1972**. Rest are protected under **'Schedule IV'**.
- **Threats:**
 - Poisoning from diclofenac that is used as a medicine for livestock.
 - Loss of Natural Habitats due to anthropogenic activities.
 - Food Dearth and Contaminated Food.
 - Electrocutation by Power lines.

Nuclear Waste Facility at the Kudankulam

Why in News?

- Recently, the **Kudankulam Village Panchayat** has passed a resolution against the construction of the **'Away From Reactor (AFR) facility** at the **Kudankulam Nuclear Power Project (KKNPP)** site for storing nuclear waste.
- Earlier, the state government (Tamil Nadu) had **also opposed such construction**.
- The village panchayat is of the view that the AFR site would lead to **radioactive pollution (spread of radioactivity)** and **spoil the groundwater**, which is used for drinking water and irrigation.

What is an AFR site?

- The scheme for the storage of spent fuel in a nuclear power plant is **two-fold**:
 - One facility is located within the **reactor building/ service building**, generally known as the **spent fuel storage pool/bay**.
 - Another is located away from the reactor, called the **Away From Reactor (AFR) Spent Fuel Storage Facility**, **but within the plant's premises**.
 - The spent fuel storage pool inside the reactor building has a **limited capacity** and is **used for immediate storage of the spent fuel** removed from the **reactor during refueling**.

Note:



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- The fuel remains in the pool initially for a few years for it to be **cooled sufficiently before it is shifted to the facility**.
- The AFR Spent Fuel Storage Facility is functionally similar to the 'Spent Fuel Pool' inside the reactor building, **except in terms of capacity**.

What is Radioactivity?

- Radioactivity is the phenomenon of **spontaneous emission of particles** or waves from the **unstable nuclei of some elements**.
- There are three types of radioactive emissions: **Alpha, Beta and Gamma**.
Alpha particles are positively charged He (Helium) atoms, beta particles are negatively charged electrons and gamma rays are neutral electromagnetic radiations.
- Radioactive elements are naturally found in the earth's crust.
 - **Uranium, thorium and actinium are three NORM (Naturally Occurring Radioactive Materials) series that contaminate water resources.**
- A small amount of radiation is found in nature **but the extended amount of radiation is harmful to human health**.
- Radioactivity is measured in **Becquerel (SI unit) or in Curie**.
- The unit **Sievert measures the quantity of radiation absorbed by human tissues**.

What are the effects of radioactive pollution on Health?

- **Radiation Syndrome:**
 - Human tissues absorb radiation through polluted water and foodstuff, which can cause serious health risks.
 - High doses of radiation can cause acute radiation syndrome or dermal radiation injury.
- **Disorders in Human Physiology:**
 - Exposure to radiation causes various disorders in human physiology, including cancer, leukemia, genetic mutations, cataracts, etc.
- **Mutation and Structural Alteration:**
 - Genetic effects ionizing radiation induces mutations in germ cells (male sperm cells and female egg cells), resulting in structural alteration in germ cell DNA that is passed onto offspring.

- **Hereditary disorders** can lead to premature death and severe mental illness.

State of India's Environment Report 2022: CSE

Why in News?

Recently, the **Centre for Science and Environment (CSE)**, released the **State of India's Environment Report 2022**.

- The report is the **annual publication of the Centre for Science and Environment, and Down To Earth (magazine)**.
- The report **focuses on climate change**, migration, health and food systems. It also covers biodiversity, forest and wildlife, energy, industry, habitat, pollution, waste, agriculture and rural development.
- **CSE is a public interest research and advocacy organisation based in New Delhi.**

Where does India Stand on Achieving its National Targets?

- **Economy:** The target for the economy is to raise the **Gross Domestic Product (GDP)** to nearly USD 4 trillion by 2022-23. **But by 2020, the economy has grown only to USD 2.48 trillion.**
 - The economy has largely shrunk during the **Covid-19 pandemic**, making it even more difficult to meet the deadline.
- **Employment:** The target is to increase the **female labour force participation** rate to at least 30% by 2022-23.
 - **It stood at 17.3% in January-March 2020.**
- **Housing:** The targets are to construct 29.5 million housing units under **Pradhan Mantri Awas Yojana (PMAY)-Rural** and 12 million units under PMAY-Urban.
 - **Only about 46.8% and 38% respectively of the targets under 'Housing for All' have been achieved.**
- **Drinking Water:** The target is to provide safe piped drinking water to all by 2022-23.
 - **Only 45% of the target has been achieved.**
- **Agriculture:** The target is to **double farmers' income by 2022**. While the average monthly income of an

Note:



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agricultural household has increased to Rs 10,218 from Rs 6,426, this increase is largely due to increase in wages and income from farming animals.

- The share of income from crop production in the average monthly income of an agricultural household has, in fact, dropped — to **37.2% in 2018-19, from 48% in 2012-13.**
- **Digitisation of Land Records:** Another target is to **digitise all land records by 2022.** While states like Madhya Pradesh, West Bengal and Odisha have made good progress, states like **Jammu and Kashmir, Ladakh and Sikkim languish at 5%, 2% and 8.8%** digitisation of land records, respectively.
 - Overall, **the target is unlikely to be met, particularly because 14 states have witnessed deterioration in the quality of land records** since 2019-20.
- **Air Pollution:** The target is to bring down **Particulate Matter (PM) 2.5** levels in Indian cities to less than 50 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$). In 2020, when vehicular movement was restricted due to the pandemic, **23 of the 121 cities monitored for PM2.5 exceeded 50 $\mu\text{g}/\text{m}^3$.**
 - **Solid Waste Management:** The target is to achieve 100% source segregation in all households.
 - The overall progress is 78%, and while states like Kerala and Union territories like Puducherry have achieved the target, others like West Bengal and Delhi are woefully behind.
 - **Manual scavenging** is targeted for eradication, but **India still has 66,692 manual scavengers.**
- **Forest Cover:** The target is to increase it to 33.3% of the geographical area, as envisaged in the **National Forest Policy, 1988.**
 - **By 2019, 21.6% of India was under forest cover.**
 - **Energy:** The target is to achieve **175 GW of renewable energy** generation capacity by 2022.
 - **Only 56% of this target has been achieved thus far.**

What was India's Performance on Sustainable Development Goals?

- India has **slipped three spots to rank 120** on the 17 **Sustainable Development Goals** (SDG) adopted as a part of the 2030 agenda by 192 **United Nations** member states in 2015.

- **In 2021 India ranked 117 among 192 nations.**
- India's overall **SDG score was 66 out of 100.**
- India's **rank dropped primarily because of major challenges in 11 SDGs** including zero hunger, good health and wellbeing, gender equality and sustainable cities and communities.
- India also **performed poorly in dealing with quality education and life on land aspects.**
 - In 2021, India had suffered on the fronts of ending hunger and achieving food security, achieving gender equality and building resilient infrastructure, promoting inclusive and sustainable industrialisation and fostering innovation.

How did the Indian States Perform?

- **Jharkhand and Bihar are the least prepared to meet the SDGs by the target year 2030.**
- **Kerala ranked first**, followed by Tamil Nadu and Himachal Pradesh in the second position.
- The **third position was shared by Goa, Karnataka, Andhra Pradesh and Uttarakhand.**
- Among the Union Territories, **Chandigarh was ranked first**, followed by Delhi, Lakshadweep and Puducherry in the second place and the Andaman and Nicobar Islands on the third.

World Wildlife Day

Why in News?

World Wildlife Day has been **celebrated every year on the 3rd of March since 2013.**

The date chosen coincides with the day of the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** which was signed in 1973.

The **UNGA (General Assembly)** resolution also **designated the CITES Secretariat** as the facilitator for the global observance of this special day for wildlife on the **UN (United Nations)** calendar.

What is the theme of 2022?

- Theme: **Recovering key species for ecosystem restoration.**
- This theme is chosen as a way to draw attention to the conservation status of some of the most critically endangered species of wild fauna and flora.

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What is the Significance of the Day?

- This aligns with UN **Sustainable Development Goals 1, 12, 14 and 15**, and their wide-ranging commitments on alleviating **poverty**, ensuring sustainable use of resources, and on conserving life both on land and below water to halt biodiversity loss.
- Our planet is currently facing the urgent challenge that is the loss of biodiversity and up to a million species could disappear in the coming decades if unsustainable human activity, **climate change** and habitat degradation are left unchecked.

What about India's Domestic Legal Framework for Wildlife Conservation?

- **Constitutional Provisions for Wildlife:**
 - By the **42nd Amendment Act 1976** of the Constitution «Forests» was added as Entry 17A in the Concurrent List and the «protection of wild animals and birds» was added as Entry 17B.
 - **Article 51 A (g)** of the Constitution states that it shall be the **fundamental duty** of every citizen to protect and improve the natural environment including forests and Wildlife.
 - **Article 48 A** in the **Directive Principles of State policy**, mandates that the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.
- **Legal Framework:**
 - **Wildlife (Protection) Act, 1972**
 - **Environment Protection Act, 1986**
 - **The Biological Diversity Act, 2002**

IPCC: Part Two of Sixth Assessment Report

Why in News?

Recently, the **Intergovernmental Panel on Climate Change (IPCC)**, released the second part of its **sixth assessment report**. This second part of the report is about **climate change impacts, risks and vulnerabilities, and adaptation options**.

- The **first part of this report**, on the **physical science of climate change in 2021**. It had warned that **1.5 degree Celsius warming** was likely to be achieved before 2040 itself.

- The **third and final part of the report**, which will look into the **possibilities of reducing emissions**, is expected to come out in April 2022.

What are Important Observations of the Report?

- **Population at Risk:** Noting that over **3.5 billion people**, over **45% of the global population**, were living in areas highly vulnerable to climate change.
- **Indian Scenario:** The report identifies India as one of the **vulnerable hotspots**, with several regions and important cities facing very high risk of climate disasters such as **flooding, sea-level rise and heat-waves**.
 - For example, **Mumbai** is at high risk of sea-level rise and flooding, while Ahmedabad faces serious danger of heat-waves.
- **Complex, Compound and Cascading Risks:** The latest report warns that **multiple disasters induced by climate change** are likely to emerge in different parts of the world in the next two decades.
 - Multiple climate hazards will occur simultaneously, and **multiple climatic and non-climatic risks** will interact, resulting in compounding overall risk and risks cascading across sectors and regions.
 - **Near to Long-term Risks:** Even if adequate efforts are made to keep the global rise in temperatures within **1.5 degree Celsius from pre-industrial times**.
 - Even temporarily exceeding this warming level will result in **additional severe impacts, some of which will be irreversible**.
 - The magnitude and rate of climate change and associated risks depend strongly on **near-term mitigation and adaptation actions**.
 - Projected adverse impacts and related losses and damages escalate **with every increment of global warming**.
- **Coupled System:** There is a strong focus on the interactions among the coupled systems climate, ecosystems (including their biodiversity) and human society.
- **Regional Variation:** Vulnerability of ecosystems and people to climate change differs **substantially among and within regions**.
 - These are driven by patterns of intersecting **socio-economic development, unsustainable ocean**

Note:



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and land use, inequity, marginalization, historical and ongoing patterns of **inequity such as colonialism, and governance.**

- **Health Impacts of Climate Change:** It has found that climate change is increasing **vector-borne and water-borne diseases** such as **malaria** or **dengue**, particularly in sub-tropical regions of Asia.
 - It has also said deaths related to **circulatory, respiratory, diabetic and infectious diseases**, as well as infant mortality, are likely to increase with a rise in temperature.
 - Increasing frequency of extreme weather events like heatwaves, flooding and drought, and even air pollution was contributing to **under-nutrition, allergic diseases and even mental disorders.**
- **Current Adaptation and its Benefits:** Progress in adaptation planning and implementation has been observed across all sectors and regions, generating multiple benefits.
 - However, **adaptation progress is unevenly distributed** with observed adaptation gaps.
 - Many initiatives prioritise immediate and nearterm climate risk reduction which reduces the opportunity for transformational adaptation.
- **Gaps in Adaptation:** The report also highlights large gaps in the adaptation actions that are being taken and the efforts that are required. It says these gaps are a result of **“lack of funding, political commitment, reliable information, and sense of urgency”.**
 - Adaptation is essential to reduce harm, but if it is to be effective, it **must go hand in hand with ambitious reductions in greenhouse gas emissions** because with increased warming, the effectiveness of many adaptation options declines.
 - **Need for Holistic Changes:** It is clear now that minor, marginal, reactive or incremental changes won't be sufficient.
 - **In addition to technological and economic changes**, shifts in most aspects of society are required to overcome limits to **adaptation, build resilience, reduce climate risk to tolerable levels, guarantee inclusive, equitable and just development** and achieve societal goals without leaving anyone behind.

Fifth Session of the United Nations Environment Assembly

Why in News?

Recently, the **Fifth UN Environment Assembly** concluded with **14 resolutions to strengthen actions** for nature to achieve the **Sustainable Development Goals.**

- The **overall theme** for UNEA-5 was **“Strengthening Actions for Nature to Achieve the Sustainable Development Goals”**, which was hosted by the **UN Environment Programme.**
- The Assembly will be followed by **“UNEP@50”**, a two-day Special Session of the Assembly marking **UNEP's 50 anniversary** where member states are expected to address **how to build a resilient and inclusive post-pandemic world**, as well as to endorse a draft Political Declaration.

What is the United Nations Environment Assembly?

- It is the governing body of the **UN Environment Programme.**
- It is the **world's highest-level decision-making body** on the environment.
- The Assembly is made up of the **193 UN Member States** and convenes **every two years** to advance global environmental governance.
- It was created in June 2012, during the **United Nations Conference on Sustainable Development**, also referred to as **RIO+20.**

What are the Key Highlights of the Session?

- **Resolution to end Plastic Pollution:**
- The world's ministers for the environment agreed to **establish an Intergovernmental Negotiating Committee (INC)** with the mandate to forge an international legally binding agreement to end **plastic pollution.**
- INC will **begin its work in 2022**, with the ambition of completing a **draft global legally binding agreement by the end of 2024.**
- This development is **considered the most important environmental deal** since the **2015 Paris Agreement.**

Note:



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Under the legally binding agreement, **countries will be expected to develop, implement and update national action plans** reflecting country-driven approaches to contribute to the objectives of the instrument.

They will be **expected to promote national action plans** to work towards the prevention, reduction and elimination of plastic pollution and to support regional and international cooperation.

➤ **Resolution on Management of Chemicals and Waste:**

- It **supports the establishment of a comprehensive and ambitious science policy panel** on the **sound management of chemicals and waste** and preventing pollution.
- The Ministerial Declaration recognises **humanity's failure to date to manage chemicals and waste**, a threat that is further aggravated by the Covid-19 pandemic through widespread use of single-use plastics and disinfectant chemicals.

➤ **Resolution focused on Nature-based Solutions:**

- In the spirit of the **UN Decade for Ecosystem Restoration (2021-2030)**, it focuses on **nature-based solutions: actions to protect, conserve, restore, sustainably use and manage ecosystems**.
- The resolution calls on **UNEP to support the implementation** of such solutions, which safeguard the rights of communities and indigenous peoples.

➤ **Resolution Prioritising Ecosystem Restoration:**

- Three resolutions **prioritize ecosystem restoration, biodiversity protection, resource efficiency, consumption and production patterns, climate mitigation and adaptation, job creation and poverty reduction**.

➤ **Resolution on Minerals and Metals:**

- It **calls for the development of proposals** to enhance their environmental sustainability along their full lifecycle.

➤ **Resolution on Sustainable Lake Management:**

- It calls on **member states to protect, conserve, and restore, as well as sustainably use lakes,**

while integrating lakes into national and regional development plans.

➤ **Resolution on Sustainable and Resilient Infrastructure:**

- It **encourages member states to integrate environmental considerations** in all their infrastructure plans.

➤ **Resolution on Animal Welfare:**

- It calls on **member states to protect animals, protecting their habitats** and meeting their welfare requirements.
- It recognised the risk for future pandemics and other health risks if humanity doesn't overhaul its patterns of interaction with nature by adopting a holistic approach such as '**One Health**'.

➤ **Resolution on Biodiversity and Health:**

- It calls on member states to **reduce health risks associated with trade in live wildlife** captured for the purposes of food, captive breeding, medicines and the pet trade, through regulation and sanitary controls.

➤ **Resolution to Reduce Nitrogen Waste:**

- It calls for **accelerated actions to significantly reduce nitrogen waste** from all sources, especially through agricultural practices, and saving USD100 billion annually.

➤ **Resolution to strengthen measures Post Covid:**

- The Assembly adopted a "**resolution on the environmental dimension** of a sustainable, resilient and inclusive post-Covid-19 recovery» to strengthen measures to achieve a sustainable, resilient and inclusive global recovery.

➤ **Other Resolutions:**

- Additional resolutions and decisions from the Assembly address the **date and venue for UNEA-6**, the future of the **Global Environment Outlook (GEO)** and the equitable geographical representation and balance in the secretariat of UNEP.



Note:

Key Points

Details

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Summary

Key Points

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Summary