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PIONEER ACADEMY's

PATHFINDER

CURRENT AFFAIRS FOR CIVIL SERVICES

INDEX

Topic 1. EURASIAN OTTER RAISES HOPE FOR J&K STREAM

Important for subject : Environment

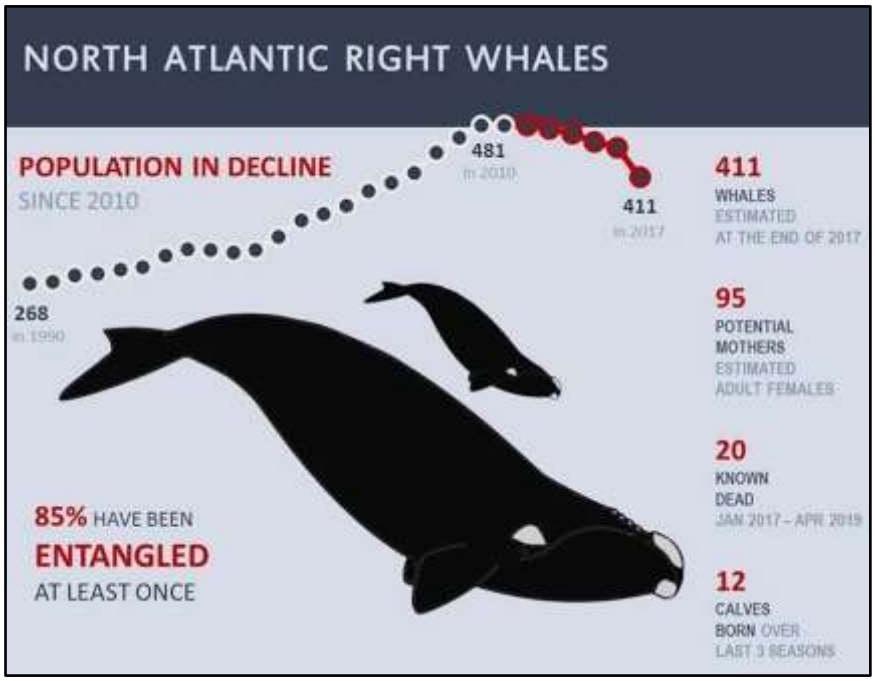
The first photographic record of the semi-aquatic carnivorous mammal has indicated that some stretches of the Neeru stream, a tributary of the Chenab River, are still unpolluted.

- A trio of scientists from the University of Jammu's Institute of Mountain Environment (IME) at Bhaderwah **camera-trapped three Eurasian otters** – two adults and one sub-adult – in the Neeru stream of the Chenab catchment.
- Apart from putting an end to doubts about the animal's presence in the upper Chenab catchment, their findings have **confirmed that some stretches of the Neeru remain unpolluted**. The Neeru is a tributary of the Chenab river.
- **Eurasian otter:**
- Eurasian otter (Lutralutra) is a **semi-aquatic mammal** found in Europe, Asia, and parts of North Africa. Mammals of the **family Mustelidae** with seven genera and 13 species
- **Habitat**: Eurasian otters are **found in freshwater habitats** such as rivers, streams, and lakes, although they may **also occur in coastal areas**.
- They are generally found in areas with **abundant fish populations**.
- The Eurasian otter **covers the largest range of any Palearctic mammal**, covering parts of three continents – Europe, Asia, and Africa.

- **Diet**: Eurasian otters **are carnivorous and feed primarily on fish,** although they may also **consume other aquatic prey such as crabs, frogs, and insects**. They are **active mainly at night and are generally solitary**, although family groups may sometimes be observed.
- **Adaptations:** Eurasian otters **have webbed feet and a sleek, streamlined body** that is well adapted for swimming and diving. Their fur is thick and waterproof, providing insulation and protection from the cold water.
- **Conservation status: The** Eurasian otter is listed as "**Near Threatened**" by the IUCN Red List.
- **Threats:** habitat loss and degradation, pollution, and hunting. **Ecological role:** Eurasian otters play an **important ecological role as top predators** in freshwater ecosystems. They help regulate fish populations and maintain the health of aquatic habitats.

Topic 2. NORTH ATLANTIC RIGHT WHALE

Important for subject : Environment



Why Some Anti-Renewable Groups Have Developed Sudden Interest in Whales.

- Hundreds of dead whales have **washed up on the Atlantic coast** of the US since 2017, including the critically endangered north Atlantic right whale.
- Their giant corpses have littered the east coast, from Florida in the south to Maine in

the north. Government scientists have linked **most cases to entanglements in fishing lines and collisions with ships**, though many deaths lack data due to decomposition and time constraints.

- Fossil-fuel-backed lobby groups have capitalised on the deaths to supercharge their fight against offshore wind farms, according to conservation groups, watchdogs and researchers.
- Proponents of the theory are often vague on how exactly the developments are killing whales, but generally attribute their deaths to the sonar used during underwater surveys or from loud noises emitted by operational turbines.

North Atlantic right whale:

- North Atlantic right whale (Eubalaena glacialis) is a **species of large baleen whale** found in the North Atlantic Ocean.
- **Habitat:** North Atlantic right whales are **found primarily in coastal waters along the eastern coast of North America,** from Florida to Canada, as well as in the Gulf of St. Lawrence. They are **known for their slow, graceful swimming and distinctive V-shaped blow**.
- **Diet:** North Atlantic right whales are baleen whales, meaning they **feed on small organisms like zooplankton and krill.** They use baleen plates in their mouths to filter food from the water as they swim.
- **Conservation status:** The North Atlantic right whale is one of the most endangered large whale species in the world.It is **listed as "Critically Endangered" by the IUCN Red Lis Threats:** The North Atlantic right whale faces a number of threats, including **entanglement in fishing gear, ship strikes, and habitat loss** due to human activities. Climate change may also be affecting their food sources, leading to declines in populations.
- **Conservation efforts:** There are a number of conservation efforts underway to protect the North Atlantic right whale, including regulations to reduce fishing gear entanglement and shipping speed limits in areas where the whales are known to occur.

Topic 3. BIOLUMINESCENT NIGHTS IN KERALA'S KUMBALANGI

Important for subject : Environment

The electric blue luminescence has been drawing people to the shrimp farms of Kumbalangi, a sleepy fishing village in Kochi.

- In Kochi, approximately 15 kilometres from Ernakulam, has been hosting a natural neon party. The **vast stretches of shrimp farms lined along with the backwaters** have been shimmering in bioluminescence, a phenomenon that makes it glow in electric blue and fluorescent green sparkles in the night**.**
- According to an official in the Central Marine Fisheries Research Institute (CMFRI), Kochi, the **phenomenon is caused by dinoflagellate algae**, which have luminescent properties.
- Any **movement on the surface of the water** — waves, a sudden surge, fish swimming, or a disturbance on the surface of the water **can trigger the luminescence**.
- A combination of environmental factors leads to the multiplication of the algae in a particular area. **Nutrient-rich water, favorable temperature and salinity** causes the **algae to multiply at a faster rate**. Changes in wind, and current patterns, level of nutrients or any other factors in the water can alter the multiplication of the algae.

Bioluminescence:

- Bioluminescence is the **ability of living organisms to produce and emit light** through a chemical reaction within their bodies. This phenomenon is found in a wide range of organisms, including **bacteria, fungi, algae, and animals such as fish, squid, and fireflies**.
- In bioluminescence, an **enzyme called luciferase catalyzes the reaction between a molecule** called luciferin and oxygen, resulting in the release of light energy.
- The color and intensity of the light produced can vary depending on the type of luciferin and the organism that produces it.
- Bioluminescence has evolved in many organisms **as a means of communication, defense, and hunting.** For example, some deep-sea creatures use bioluminescence to attract mates or prey, while others use it to produce flashes of light to confuse or distract predators.

- Bioluminescence also has important applications in science and medicine. It is **used as a tool for studying cellular processes and for detecting the presence of specific molecules** in biological samples. In medical research, bioluminescent molecules are used as tags to track the location and behavior of cells in the body, which can help in the development of new therapies and treatments.

Topic 4. IQAIR REPORT: TAKE THE FINDINGS WITH A PINCH OF SALT

Important for subject : Environment

Many developing countries, unlike India, do not have proper air monitoring systems; if they did, India's ranking would be better.

- The fifth World Air Quality Report by IQAir shows that **India is still facing a severe air pollution crisis**. The report **revealed that 39 Indian cities** were among the world's 50 most polluted cities based on PM2.5 levels in the air.
- Delhi was **ranked fourth on the list of the world's most polluted cities**, and it was also the most polluted metropolitan city in the world.
- **Bhiwadi in Rajasthan was the most polluted city** in India and the third most polluted city in the world with an annual average PM2.5 level of 92.7.
- Out of 131 countries, **India ranked eighth** with a population-weighted average PM2.5 level of 53.3 μg/m3 in 2022.
- According to the report, there was a **slight decline in pollution levels in Delhi's neighboring towns** of Gurugram, Noida, Ghaziabad, and Faridabad. The decline ranged from 34% in Gurugram to 21% in Faridabad.

IQAir Report

- IQAir is a company that **specializes in air quality monitoring and solutions**. The company **produces an annual report** on air quality around the world, called the IQAir Report.
- The IQAir Report is an annual report that provides information on air quality levels in countries and cities around the world.
- The report **draws on data from ground-based monitoring stations**, satellite data, and other sources.
- The report **uses a global Air Quality Index (AQI) to rank countries** and cities

based on their air quality.

- The report **provides information on different sources of air pollution**, including industrial emissions, transportation, and indoor pollution.

Topic 5. SECOND HOME FOR GUJARAT LIONS

Important for subject :Environment

The Gujarat government has planned to translocate 40 adult and sub-adult lions to the Barda Wildlife Sanctuary in the state, according to a new report by Wildlife Institute of India (WII) under the Union Ministry of Environment Forest and Climate Change.

- **Barda sanctuary**, about 100 kilometres away from Gir National Park, has been identified as a **potential site to accommodate the Asiatic Lions**, said the report entitled Lion@2047: A vision for Amrutkal
- As per the last count in 2020, there are **674 lions in the state.**
- Experts have **demanded translocation of lions** in India for the past two decades as the **big cats have been geographically isolated in Gir**. A second home would protect the lion population from extinction in case of diseases like the Canine Distemper Virus leads to their deaths.
- The **Supreme Court of India in 2013 had also ordered relocating some lions** to Madhya Pradesh; however, 10 years later, the transfer has not yet happened.
- **Gir and Barda are too geographically close** to make the latter a solution for creating an alternative lion habitat in the country.
- Members of the **Maldhari community** will also have to be **relocated along with the big cats** as it is important to **restore around 1,000 km of 'exclusive lion habitat'** under Project Lion through incentivised voluntary relocation of forest villages.
- **Maldharis are local pastoral communities settled within Gir Protected Areas and the Barda WLS**. The report also talks about providing 'an appropriate rehabilitation package for incentivised relocation' to the communities.
- **Asiatic lion**
- Asiatic lion (Panthera leo persica) is a sub-species of lion that is found only in the Gir Forest National Park and Wildlife Sanctuary in Gujarat, India.
- The Asiatic lion is one of the most endangered big cats in the world, with a population of **less than 700 individuals in the wild.**

- The Asiatic lion is found **only in the Gir Forest National Park and Wildlife Sanctuary**, which is a protected area covering an area of about 1412 sq km in Gujarat.
- The Asiatic lion is **slightly smaller than its African counterpart**, with a distinctive fold of skin on its belly and a shorter, less bushy mane.
- The Asiatic lion's diet mainly consists **of deer, antelope, and wild boar,** although it may also prey on domestic livestock in areas surrounding the Gir forest.
- Cultural significance: The Asiatic lion has c**ultural significance in India, where it is revered as a symbol of power, courage, and royalty,** and is depicted in several ancient Indian artworks and scriptures.

Conservation Status

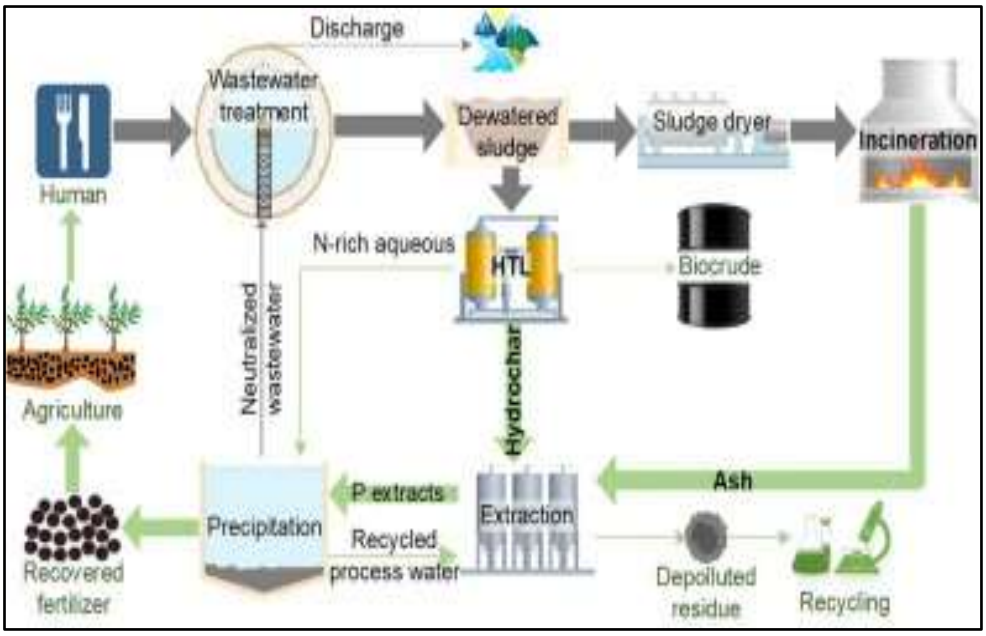
- Wildlife (Protection) Act 1972: **Schedule 1**
- CITES :**Appendix I**
- IUCN Red List: **Endangered**
- The Asiatic lion faces several challenges to its survival, including habitat loss, fragmentation, and human-wildlife conflict.

Barda Wildlife Sanctuary

- Barda Wildlife Sanctuary is a protected area **located in the Porbandar district** of Gujarat, India. It covers an area of about 192 sq km and is located in the **foothills of the Aravalli Range in Gujarat.**
- The vegetation in the sanctuary includes **dry deciduous forest, scrubland, and grassland.**
- The sanctuary is home to a **diverse range of flora and fauna**, including leopard, hyena, jackal, sloth bear, jungle cat, Indian civet, and several species of birds and reptiles.
- Barda Wildlife Sanctuary is **connected to several other protected areas in the region**, including Gir National Park and Wildlife Sanctuary, Pania Wildlife Sanctuary, and Jamjir Wildlife Sanctuary, which together form a contiguous wildlife habitat.
- Barda Wildlife Sanctuary is **recognized as an Important Bird Area (IBA) by Bird Life International.** Threats: The Barda Wildlife Sanctuary faces several threats, including poaching, habitat loss and fragmentation, and human-wildlife conflict.

Topic 6. TREASURE IN EXCRETA: FAST-DEPLETING PHOSPHORUS CAN BE EXTRACTED FROM FAECAL SLUDGE

Important for subject :Environment



India needs more nitrogen, phosphorus and potassium for its agriculture.

- Presence of phosphorus is **essential in soil for crop growth** and its shortfall can result in reduction of crop yield. But the **reserves of phosphate rock, the main source of the element is fast depleting**.
- With an annual increase of 2.3 per cent in its **demand, phosphorus reserves will most likely get exhausted in another 50 to 100 years,** states a 2015 study by professors of the West Bengal State University, Kolkata.
- An important phosphorus resource from where a huge reserve can be generated has been largely ignored. **Human excreta is indiscriminately disposed into drains every day**.
- About **11 per cent of phosphorus entering Earth systems** is lost in human urine and excreta, but phosphorus and nitrogen in it can be recovered by up to about 90 per cent. If recovered, this **could supply 22 per cent of the current global demand for phosphorus.**

Case Study:

- In Tamil Nadu's Nilgiri district, a project was started in 2018 to **use recycled water**

for agriculture. It also **helped treat and reuse faecal sludge as co-compost for farming.** Started by Rural Development Organisation Trust, along with FINISH and WASTE, it now sells compost at Rs 8 per kg to replace chemical fertilisers, which costs Rs 15 per kg.

- The project **found 15 per cent increase in crop yield and 20 per cent increase in farmers' annual income**. Some farmers who used the compost to grow garlic, beetroot and carrot reported that the size of garlic increased and beetroot and carrots were more shiny and rich in colour.

Phosphorus

- Phosphorus is a chemical element with the **symbol P and atomic number 15** Phosphorus exists in several forms, including **white, red, and black phosphorus**.
- **White phosphorus** is the most reactive and is used in the **production of chemicals and munitions**. **Red phosphorus** is used in the **production of flame retardants** and other materials, while **black phosphorus** has potential applications in **electronics** and other fields.
- Phosphorus is an abundant element in the Earth's crust, but is **typically found in nature** in the form of phosphates, which are compounds that contain phosphorus and oxygen.
- Phosphate is **naturally found in rocks, soil, and water**, and is a key component of many biological processes. It is also **present in several food sources, including dairy products, meat, fish, and nuts.**
- Phosphorus has many important uses in industry and agriculture. It is used to make **fertilizers, detergents, and other chemicals**. It is also used in the production of steel and other metals.
- Phosphorus is generally safe for consumption in small amounts, but **excessive intake of phosphorus can have negative health effects**, including kidney damage, osteoporosis, and cardiovascular disease.
- Phosphorus can have both positive and negative environmental impacts. It is essential for **plant growth and is a key component of many ecosystems**.
- However, excessive use of phosphorus fertilizers can lead to runoff into waterways, causing eutrophication, algal blooms, and other environmental problems.

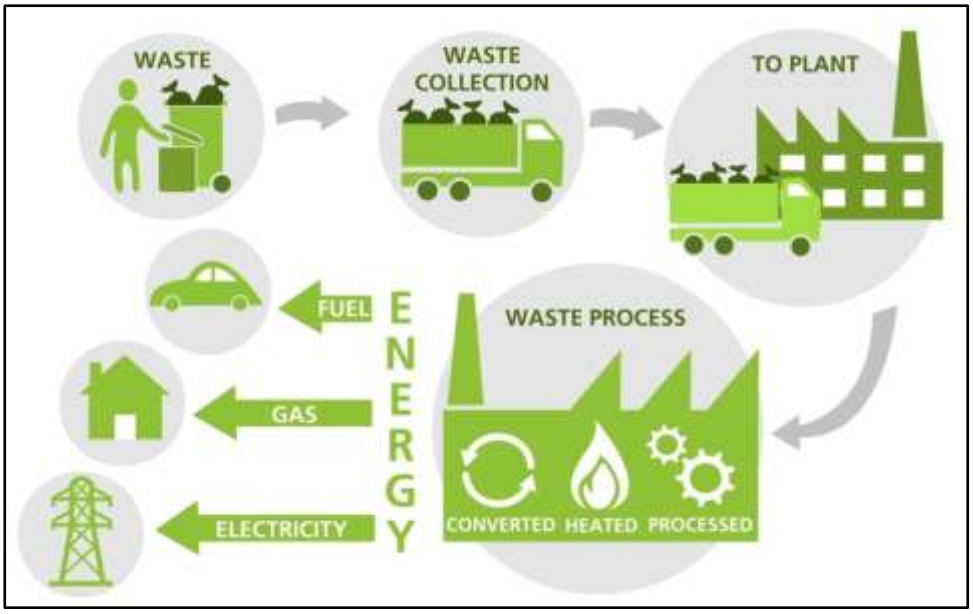
- Phosphorus is primarily **mined from phosphate rock deposits**, which are found in several countries, including **Morocco, China, and the United States**.
- The **global demand** for phosphorus is **expected to increase in the coming years**, driven by population growth and increasing demand for food. However, the supply of phosphate rock is limited, and there are concerns about future shortages and price volatility.

Phosphorus cycle

- The phosphorus cycle is a **biogeochemical cycle** that describes the movement of phosphorus through the Earth's ecosystems.
- **Phosphorus sources:** The primary source of phosphorus is rock, which contains phosphorus-rich minerals. **Weathering and erosion of rock releases phosphorus into the soil**, where it becomes available to plants.
- **Uptake by plants**: Plants take up phosphorus from the soil through their roots, and use it to build DNA, RNA, and other important molecules.
- **Transfer to animals**: Animals obtain phosphorus by eating plants or other animals that have consumed plants.
- **Decomposition and mineralization:** When plants and animals die, their bodies are **decomposed by bacteria and fungi**, which release phosphorus back into the soil in the form of inorganic phosphate ions.
- **Runoff and erosion**: In some cases, phosphorus can be carried away from the soil by runoff or erosion, and can accumulate in bodies of water. This can **lead to eutrophication, or the overgrowth of algae** and other aquatic plants, which can have negative impacts on water quality and aquatic ecosystems.
- **Geological processes**: Over long periods of time, some **phosphorus may be buried and eventually incorporated into rock,** where it can remain for millions of years.
- Human impact: **Human activities such as agriculture, mining, and wastewater treatment can greatly alter the phosphorus cycle**. For example, excessive use of phosphorus fertilizers can lead to runoff and eutrophication, while mining of phosphorus-rich rock can deplete this nonrenewable resource.

Topic 7. WASTE-TO-ENERGY

Important for subject : Environment



The Kerala government recently announced the State's first waste-to-energy project in Kozhikode. The planned facility is expected to be built in two years and generate about 6 MW of power.

Waste to energy:

- Waste-to-energy is a process that involves the **conversion of various types of waste materials into energy,** typically in the form of electricity or heat.
- Waste-to-energy can be used to **convert a variety of waste materials, including municipal solid waste, industrial waste, agricultural waste, and sewage sludge**.
- Waste-to-energy systems typically **generate electricity or heat, which can be used to power homes and businesses**, or sold to the grid.
- Generally, solid waste in India is **55-60% biodegradable organic waste**, which can be **converted into organic compost or biogas**; 25-30% non-biodegradable dry waste; and around 15% silt, stones, and drain waste.
- Waste-to-energy systems can provide several benefits, including **reducing the amount of waste that goes to landfills, reducing greenhouse gas emissions from waste, and generating renewable energy**.

Waste-to-energy technologies:

- **Incineration:** Incineration is a waste-to-energy technology that **involves burning waste at high temperatures to produce heat and electricity.** This process can be used for **both municipal solid waste and industrial waste**. Incineration systems typically have advanced pollution control systems **to minimize emissions** of pollutants.
- **Pyrolysis**: Pyrolysis is a process that involves **heating waste materials in the absence of oxygen** to produce a liquid or gaseous fuel. Pyrolysis can be used for a variety of waste materials, including plastics and rubber.
- **Gasification:** Gasification is a waste-to-energy technology that involves **heating waste at high temperatures in the presence of limited oxygen** to produce a gas that can be used to generate electricity or heat. Gasification can be used for a variety of waste materials, including municipal solid waste, biomass, and industrial waste.
- **Plasma gasification:** Plasma gasification is a **high-temperature process that involves heating waste materials in the presence of plasma** to produce a gas that can be used to generate electricity or heat. Plasma gasification can be used for a variety of waste materials, including municipal solid waste and hazardous waste.
- **Hydrothermal carbonization:** Hydrothermal carbonization is a process that involves **heating wet organic waste materials in the presence of water** to produce a solid fuel. This process can be used for a variety of waste materials, including sewage sludge and agricultural waste.
- **Anaerobic digestion:** Anaerobic digestion is a waste-to-energy technology that involves the **breakdown of organic waste materials by microorganisms in the absence of oxygen**. This process produces biogas, which can be used to generate electricity or heat. Anaerobic digestion can be used for a variety of waste materials, including food waste, agricultural waste, and sewage sludge.
- **Mechanical biological treatment**: Mechanical biological treatment (MBT) is a waste-to-energy process that **involves first separating recyclable materials from waste, and then using biological treatment** (such as composting or anaerobic digestion) to break down the remaining organic waste. The resulting biogas can be used to generate electricity or heat.

Why do waste-to-energy plants often fail?

- Waste-to-energy plants can fail for a variety of reasons, including technical, economic, and environmental factors.
- **Technical issues**: Waste-to-energy plants can be complex and require specialized equipment and processes. If the **technology is not properly designed or maintained**, it can **result in breakdowns or inefficiencies** that can impact the plant's ability to operate effectively.
- **High capital costs:** Waste-to-energy plants can require **significant investment in capital equipment and infrastructure**, which can make them expensive to build and maintain. If the plant is not able to generate enough revenue from energy sales or other sources, it can result in financial difficulties.
- **Lack of waste feedstock:** Waste-to-energy plants **require a consistent and sufficient supply of waste feedstock to operate effectively**. If there is a shortage of waste feedstock due to changes in waste generation or management practices, the plant may not be able to operate at full capacity or may be forced to shut down.
- **Environmental concerns**: Waste-to-energy plants **can generate emissions and produce ash or other waste products** that can have negative environmental impacts. If these impacts are **not properly managed or mitigated**, it can result in public opposition or regulatory challenges that can lead to the closure of the plant.
- **Regulatory challenges**: Waste-to-energy plants are **Important for subject to a range of regulations related to environmental and health impacts,** as well as energy and waste management policies. If the plant **is not able to comply with these regulations or faces challenges in obtaining necessary permits**, it can result in delays or shutdowns.

How can the plant overcome these challenges?

- There are several ways in which waste-to-energy plants can overcome the challenges that may lead to their failure:
- **Technical improvements**: Waste-to-energy plants can improve their performance and reliability by investing in better equipment and maintenance practices. This can involve upgrading existing systems or adopting new technologies that are more efficient and cost-effective.

- **Diversification of revenue streams:** Waste-to-energy plants **can reduce their financial risks by diversifying their revenue streams**. This can include selling excess heat or steam to nearby industrial users, or partnering with local utilities to sell electricity to the grid.
- **Increased waste collection and sorting**: Waste-to-energy plants can work **with local governments and waste management companies to ensure a consistent supply of high-quality waste feedstock**. This can involve increasing waste collection and sorting efforts to ensure that the plant receives the right mix of waste materials to optimize energy generation.
- **Environmental management and monitoring**: Waste-to-energy plants can mitigate environmental concerns **by implementing rigorous management and monitoring practices.** This can include measures to **reduce emissions and ash production**, as well as monitoring air and water quality to ensure compliance with regulatory requirements.
- **Stakeholder engagement**: Waste-to-energy plants can build support for their operations by **engaging with local communities and stakeholders**. This can involve providing information about the benefits of waste-to-energy, addressing concerns and feedback from stakeholders, and involving the community in decision making processes.
- By addressing these challenges and implementing effective management practices, waste-to-energy plants can overcome the barriers to success and continue to provide a valuable source of renewable energy while reducing the amount of waste sent to landfills

Topic 8. HORSESHOE CRABS

Important for subject :Environment

Horseshoe crabs disappearing off Odisha has scientists alarmed.

- Horseshoe crabs, **medicinally priceless and one of oldest living creatures** on the earth, appear to be disappearing from their familiar spawning grounds along Chandipur and Balaramgadi coast in Odisha's Balasore district.
- Scientists have urged Odisha government to **immediately come up with a robust protection mechanism** before the living fossil becomes extinct due to destructive

fishing practices.

- Paleontological studies say the **age of Horseshoe crabs is 450 million years**.
- The creature **has lived on earthy without undergoing any morphological change.** Scientists are surprised to find strong immune system in animal that helped it survive millions of years. The animal is **critical for human health**. If we don't put any efforts now, Horseshoe crabs would not be found in India in next few years.

Horseshoe crabs

- Horseshoe crabs are **ancient marine arthropods** that have been around for **more than 450 million years.** They are found in **shallow waters along the Atlantic coast of North America and in the Gulf of Mexico** and are known for their unique appearance, with a hard exoskeleton and a long, pointed tail.
- The crabs are represented by four extant species in the world. Out of the four, **two species are distributed along the northeast coast of India.**
- Only T gigas species of the horseshoe crab is found along Balasore coast of Odisha.
- The crab was **included in the Schedule IV** of the **Wild (Life) Protection Act, 1972,** under which, the catching and killing of a horseshoe crab is an offence.
- Horseshoe crabs play an **important ecological role as a food source** for migratory shorebirds and other animals, and their eggs are an important food source for fish and other marine animals.
- Horseshoe crabs are also **important to the biomedical industry** because of their blue blood, which contains a substance called Limulus amebocyte lysate (LAL) that is **used to test for bacterial contamination** in medical equipment and vaccines. It is such an important animal that **all COVID-19 vaccines were tested against blood of Horseshoe crabs to ascertain if the vaccine was free from any contamination.**
- However, horseshoe crab populations **have been in decline in recent years due to overharvesting for bait and biomedical purposes**, habitat loss, and pollution.
- Conservation efforts have been undertaken to protect horseshoe crab populations, **including regulations on harvesting, habitat restoration, and research into alternatives to LAL testing.**

Topic 9. WORLD WEATHER ATTRIBUTION

Important for subject :Environment

World Weather Attribution

- World Weather Attribution (WWA) is an **international collaboration** of climate scientists who **conduct rapid assessments of extreme weather events** to determine the extent to which climate change may have contributed to them.
- The World Weather Attribution (WWA) initiative, a **collaboration between climate scientists at Imperial College London in the UK,** KNMI in the Netherlands, IPSL/LSCE in France, Princeton University and NCAR in the US, ETH Zurich in Switzerland**, IIT Delhi in India and climate impact specialists at the Red Cross / Red Crescent Climate Centre (RCCC) around the world**, has been founded to change this, and provide robust assessments on the role of climate change in the aftermath of the event.
- The initiative is led by Drs Friederike Otto at Imperial College, and Sjoukje Philip and Sarah Kew at KNMI.
- The primary objective of WWA is to **provide timely and scientifically rigorous information about the links between extreme weather events and climate change**. Its work is aimed at informing policymakers, the media, and the public about the potential impacts of climate change and the urgent need to take action to mitigate its effects.
- WWA **uses a standardized, transparent methodology to conduct its analyses**, which includes comparing the likelihood and severity of an extreme weather event in a world with climate change versus a world without it. The **organization collaborates with climate scientists from around the world to conduct these analyses**, and all results are Important for subject to peer review to ensure scientific rigor.
- WWA response to an extreme meteorological event has three parts:
- **Define the event**: the geographic region affected, which weather parameters are of interest. **Gather historical data**: weather data from the region from 1950 to the present. From this historical data statistics on normal and extreme weather patterns for the locale can be computed.
- **Simulate the event many times with computer models**, comparing simulations with

present-day greenhouse gas conditions against previous greenhouse-gas conditions.

- **Methods used by World Weather Attribution**
- **Observational Data:** WWA uses observational data from weather stations, satellites, and other sources to analyze the characteristics and intensity of extreme weather events.
- **Climate Models:** WWA uses climate models to **simulate the weather patterns and conditions that would have occurred in a world without climate change**, and compares these results to the observed weather patterns to determine the extent to which climate change may have contributed to the event.
- **Statistical Methods:** WWA uses statistical methods to **analyze the probability of an extreme weather event occurring in a world with and without climate change**, and to estimate the potential influence of climate change on the event.
- **Attribution Methods:** WWA uses a range of attribution methods **to determine the extent to which climate change may have contributed to an extreme weather event**. These methods include event attribution, probabilistic event attribution, and causal inference.
- **Ensemble Methods**: WWA uses ensemble **methods to account for the uncertainty in climate models and observations.** Ensemble methods involve running multiple climate models with different parameters to generate a range of possible outcomes and reduce the uncertainty in the analysis.
- **Peer Review**: WWA's analysis is **Important for subject to peer review by independent climate scientists to ensure scientific rigor and accuracy**.
- Finally, these results are disseminated through media channels, making our expertise available to provide additional explanations and context.

Topic 10. RUN-UP TO UN WATER CONFERENCE

Important for subject :Environment

Expansion of bottled water industry works against achieving the Sustainable Development Goal to supply safe drinking water to all by affecting investments.

- The rapidly growing bottled water industry is helping mask a crippling world problem: the **failure of public systems to supply reliable drinking** water for all, a review report published in the run-up to the United Nations 2023 Water Conference next

week.

- Supply of reliable drinking water is **a key Sustainable Development Goal (SDG) target.** But, the expansion of the bottled water industry works against achieving it or at slowing progress towards it.
- This, it does by adversely affecting investments and the role of the state in longterm public water supply infrastructure development and improvement, **according to Global Bottled Water Industry: A Review of Impacts and Trends.**
- **The UN conference in New York City from March 22-24 i**s likely to raise awareness on global water crisis and decide on concerted action to achieve the internationally agreed water-related goals and targets.

Findings in the report:

- Half of what the **world pays for bottled water annually at present** would pay to provide clean and long-term public water supply for hundreds of millions of people without it.
- The report has mapped and ranked the top 50 countries in the world by total and per capita bottled water sales both in dollars and litres.
- The **Asia-Pacific region constitutes about half of the global bottled water market**, and the Global South countries together make up about 60 per cent.
- The report noted that like many other industries, the **bottled water industry was a high consumer of water**. The main source of water that is bottled across the globe is groundwater.
- Groundwater is a **precious resource with over two billion worldwid**e relying on it as their primary water source. The report noted that in certain areas, the **amount of groundwater extracted exceeded the amount that was recharged naturally.**

United Nations University Institute for Water, Environment and Health (UNUINWEH):

- UNU-INWEH is a **research and training institute established in 1996** to address global water and environmental challenges. It **is hosted at McMaster University in Canada** and **operates under the auspices of the United Nations University**, which is a global network of research and training centers focused on sustainable development.

- **Funding**: UNU-INWEH is funded by a **combination of government contributions, philanthropic donations, and research grants**. Its work is supported by a range of international organizations, foundations, and academic institutions.
- UNU-INWEH employs a **team of researchers, technicians, and support staff from around the world**. Its staff includes experts in fields such as hydrology, environmental engineering, public health, and social sciences.
- UNU-INWEH **works closely with a range of partners, including other United Nations agencies, governments, NGOs, and academic institutions**. It is also a member of several global networks focused on water and environmental issues.
- UNU-INWEH **produces a range of publications, including research reports, policy briefs, and academic articles.** It also hosts a series of webinars and other events to share its research findings and engage with stakeholders.
- Some key areas of research and expertise at UNU-INWEH include:
- **Water security:** UNU-INWEH works to promote sustainable and equitable management of water resources, particularly in developing countries where water scarcity and poor water quality are major challenges.
- **Environmental health:** UNU-INWEH studies the impacts of environmental factors, such as **air and water pollution, on human health and wellbeing.** It also explores the links between environmental health and social and economic development.
- **Ecosystem services:** UNU-INWEH investigates the **ways in which ecosystems provide benefits to human societies**, such as clean water, food, and climate regulation. It also explores strategies for sustainable management of these services.
- **Climate change adaptation:** UNU-INWEH works to promote resilience to climate change impacts, particularly in vulnerable communities and regions.

UN Water

- UN-Water is the **United Nations inter-agency coordination mechanism** for all freshwater-related issues.
- It was **established in 2003 with the aim of strengthening coordination and cooperation among UN agencies** and other international organizations working on water and sanitation issues
- UN-Water **has 32 UN agency members and 41 international partners**. It is chaired

by the Executive Director of the United Nations Environment Programme (UNEP) and has a secretariat based in Geneva, Switzerland.

- UN-Water works **closely with a range of partners, including governments, NGOs, academic institutions, and the private sector**. It also collaborates with other UN initiatives and programs, such as the UN Framework Convention on Climate Change (UNFCCC) and the UN Convention to Combat Desertification (UNCCD).
- UN-Water **aims to promote coherence and collaboration among UN agencies** and other organizations working on water and sanitation issues. It also seeks to enhance policy dialogue, advocacy, and knowledge management in this area.
- UN-Water's priorities **include achieving universal access to safe drinking water and sanitation, promoting integrated water resources management**, improving water governance, and building resilience to water-related disasters and climate change.
- UN-Water carries out a range of activities, **including supporting the implementation of the Sustainable Development Goals (SDGs) related to water and sanitation**, coordinating UN-wide activities on World Water Day, and producing reports and assessments on water-related issues.
- UN-Water produces a range of reports and assessments on water-related issues, such as the **World Water Development Report, the Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) report, and the Integrated Monitoring Report for SDG 6.**
- UN-Water has **launched a number of initiatives** aimed at addressing specific water-related challenges, such as the **Water Supply and Sanitation Collaborative Council (WSSCC)** and the **United Nations International Decade for Action "Water for Life" 2005-2015.**

UN Water Conference:

- The Conference, **co-hosted by the Governments of Tajikistan and the Netherlands**, will feature an opening and closing ceremony, six plenary meetings and five multi-stakeholder interactive dialogues. It will also feature a number of high level special events and side events organized by Member States, the UN system and other stakeholders.
- The **outcome of the Conference will be a summary of the Conference proceedings**

and new commitments, pledges and actions by Governments and all stakeholders towards achieving SDG 6 and other water-related goals and targets, compiled in the Water Action Agenda.

- The UN 2023 Water Conference and the Water Action Agenda will unite the world for water. The key building blocks of the Water Action Agenda are: **commitment to action sustained and scalable implementation follow-up and review processes**

Topic 11. SAMUDRAYAAN MISSION: INDIA SET TO DIVE TO EXPLORE MARINE BIODIVERSITY

Important for subject :Environment

In order to explore the potential of the seabed, the **National Institute of Ocean Technology's (NIOT) MATSYA 6000** will dive 6,000-meter into the Indian Ocean under the **Samudrayaan mission.**

Samudrayaan Mission (India's Deep Ocean Mission)

- Samudrayaan, or the journey into the sea, is a **mission launched in 2021** to unlock the mysteries of the deep ocean for mineral resources and develop deep sea technologies for sustainable use of ocean resources.
- A sub-component of India's Deep-Sea Mission, the Samudrayaan mission aimed at supporting the Blue Economy initiatives of the Indian government by developing niche technology, vehicles to carry out subsea activities.

- The **MoES is the nodal ministry** to implement this multi-institutional ambitious mission.
- The estimated cost of the mission will be **Rs 4077 crore for a period of 5 years** to be implemented in a phase-wise manner – cost for the first phase (2021-2024) would be Rs 2823.4 crore.
- **Indian Space Research Organization (ISRO), Indian Institute of Tropical Meteorology (Pune) and Defence Research and Development Organisation (DRDO**) will actively participate in this mission.
- It was conceptualised based on the forthcoming Gaganyaan mission – ISRO's attempt at a crewed mission into space – **expected in late 2024 or 2025**.

MATSYA 6000

- It is a **manned submersible vehicle developed by NIOT under the Samudrayaan mission** to facilitate humans in the deep ocean in exploring mineral resources like Nickel, Cobalt, Rare Earths, Manganese, etc.
- **Expected to be launched in 2024-25, it would make India only one among six countries (US, Russia, Japan, France, and China**) to have piloted a crewed under-sea expedition beyond 5,000 metres.
- **MATSYA-6000 is a spherical, titanium hull (made by ISRO**) equipped with lifesupport, capable of floating underwater and collecting soil and rock samples from the seabed with attached robotic arms.
- Three navigators, over a fortnight and about 1,500 km away from Kanyakumari will undertake multiple trips – each lasting about 12 hours (descent and ascent will be 8 hours and rest is exploration, surveying and scientific activity).
- At a depth of 6,000 metres, the weight of water would be nearly 600 times that at sea level which makes the pressurised hull the most important component of the submersible.
- About 60% of the submersible was manufactured in India. Components such as cameras, sensors, and communication systems were bought from international vendors.
- Over the years, NIOT has consulted with crewed-submersible experts from several countries – Japan, Russia, France and the know-how to ensure a safe ascent and

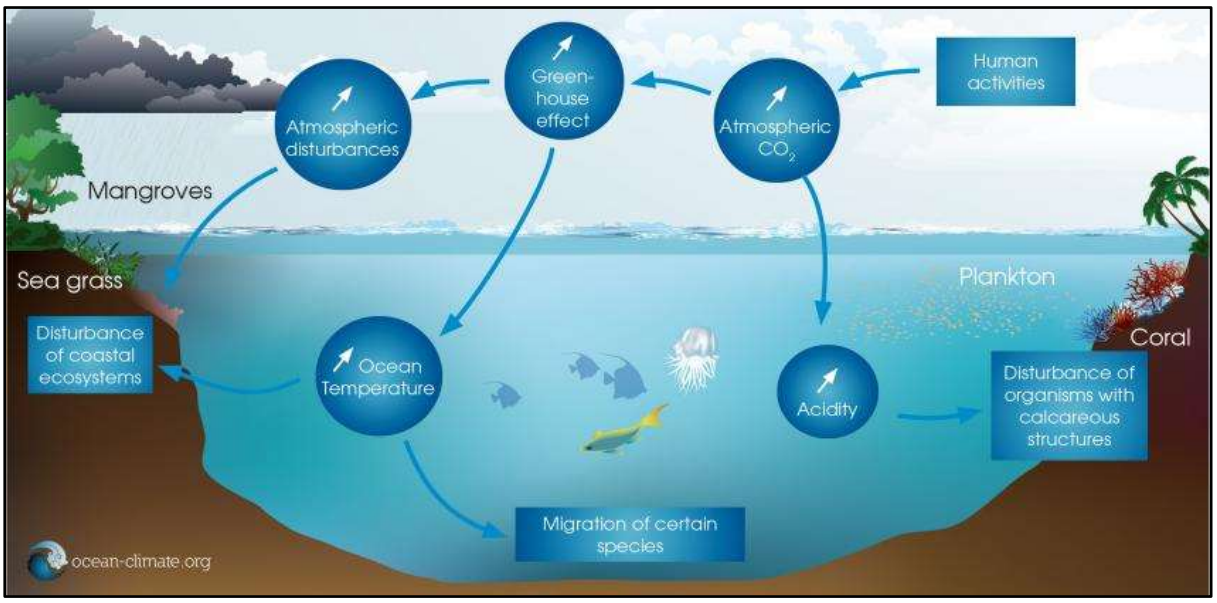
descent.

National Institute of Ocean Technology

- Established in 1993 as an **autonomous society under the Ministry of Earth Sciences** (MoES), NIOT is based in Chennai.
- The major aim of starting NIOT was to **develop reliable indigenous technologies to solve various engineering problems as**sociated with **harvesting of non-living and living resources in India's exclusive economic zone (EEZ).**
- **Significance**
- India's seabed and the **relevant zones with economic potential are not deeper than 6,000 metres.**
- India's energy needs and increasing competition to harness ocean resources are the key thrust for the Samudrayaan mission.
- The **International Seabed Authority (ISA) has allocated about 75,0000 square kilometres in the Central Indian Ocean Basin (CIOB)** to conduct exploratory mining (of polymetallic nodules).
- **Note :**Just this month the **UN passed the High Seas treaty (India too has committed to this) that seeks to protect 30% of the world's ocean by 2030**.

Topic 12. CLIMATE CHANGE AND OCEANS

Important for subject : Environment



Impact of Climate Change on Oceans:

Sea Surface Temperature (SST)

- Sea surface temperature the temperature of the water at the ocean surface is an important physical attribute of the world's oceans.
- The **surface temperature of the world's oceans varies mainly with latitude**, with the warmest waters generally near the equator and the coldest waters in the Arctic and Antarctic regions.
- **As the oceans absorb more heat, sea surface temperature increases**, and the ocean circulation patterns that transport warm and cold water around the globe change.
- **Melting Of the Polar Region**
- Wintertime **Arctic sea ice continues to dip to new lows** as the oceans warm.
- Meanwhile, **Antarctica is shrinking underwater**, as submerged ice is rapidly melting, according to recent studies.
- The **effects of this warming on iconic species such as polar bears are well documented.** Under the surface, though, the problem is no less urgent.
- **Dwindling sea ice results in the loss of vital habitat for seals, walruses, penguins**, whales and other megafauna.
- Sea ice is **a critical habitat for Antarctic krill**, the food source for many seabirds and mammals in the Southern Ocean. As sea ice has receded in recent years, Antarctic krill populations have dropped, resulting in declines in the species that depend on the krill.

Rise in sea level

- When **land-based polar ice melts, it finds its way to the sea.** But when water warms, it **expands to take up more space** a major yet unheralded cause of sealevel rise.
- With **sea-level rise accelerating at a rate of about one-eighth of an inch per year**, the effects on humanity are plain:
- 4/26**Higher ocean temperatures are melting polar ice and glaciers from the Greenland and Antarctic sheets at a rapid rate**, resulting in an unprecedented rise of sea levels that has the **potential to displace more than 680 million people** living across low-lying coastal communities, according to a 2019 UN report.

- Recent research revealed that s**everal major coastal cities could be almost entirely underwater due to sea level rise by the middle of the century**, including Ho Chi Minh City, Vietnam; Shanghai, China; and Mumbai, India.

Marine heatwaves

- Marine heatwaves have **doubled in frequency**, and have become **longer-lasting, more intense and extensive.** The IPCC says that **human influence has been the main driver of the ocean heat increase** observed since the 1970s.
- The majority of heatwaves took place between 2006 and 2015, **causing widespread coral bleaching and reef degradation.** In 2021, **nearly 60 percent of the world's ocean surface experienced at least one spell of marine heatwaves**.

Warming oceans alter currents

- Climate change **affects ocean temperatures as well as wind patterns** taken together, these **can alter oceanic currents**.
- The impacts of changes in ocean currents on humanity could be severe, as currents play a major role in maintaining Earth's climate. For example, **Europe's relatively mild climate is maintained in part by the large Atlantic current** called the Gulf Stream, which is **experiencing an "unprecedented slowdown**." Changing these currents will have major implications worldwide for the climate, including **changes in rainfall**, with more rain in some areas and much less in others and fluctuating air temperatures.

Ocean Acidification

- Burning of fossil fuels that increases greenhouse gas levels in the atmosphere, is also altering the chemical composition of seawater by making it more acidic. The ocean **absorbs 30 percent of the carbon dioxide in the atmosphere and when that carbon dissolves into the water, it forms carbonic acid.**
- **Acidification can dissolve the calcium carbonate shells of marine species** such as corals, scallops, lobsters and crabs, and some microscopic plankton that are a foundation of the food web throughout the ocean. These shell-forming organisms provide critical habitats and food sources for other marine life. **Increased acidification can also limit the ability of certain fish to detect predators,**

disrupting the entire marine food chain.

Dead Zones

- Warming **oceans impair water movement, which leads to poor exchange of oxygen** between the surface waters and deeper waters. This **results in oxygen minimum zones** and dead zones in the ocean.
- The ideal oxygen levels in the oceans should lie between 7 and 8 milligrams per litre (mg/l). Marine organisms start to leave their homes when the levels drop to 4 mg/l

Loss of marine biodiversity

- Rising temperatures in**crease the risk of irreversible loss of marine and coastal ecosystems**. Today, widespread changes have been observed, including damage to coral reefs and mangroves that support ocean life, and migration of species to higher latitudes and altitudes where the water could be cooler.
- Latest estimates from the UN Educational, Scientific and Cultural Organization warn that **more than half of the world's marine species may stand on the brink of extinction** by 2100.
- At 1.1°C increase in temperature today, an **estimated 60 percent of the world's marine ecosystems have already been degraded** or are being used unsustainably. A **warming of 1.5°C threatens to destroy 70 to 90 percent of coral reefs, and a 2°C increase means a nearly 100 percent loss – a point of no return.**

Role of Oceans in reducing Climate Change:

- **Oceans are the largest heat sink on the planet**: The ocean **generates 50 percent of the oxygen we need, absorbs 25 percent of all carbon dioxide emissions and captures 90 percent of the excess heat generated by these emissions**. It is not just 'the lungs of the planet' but also it is largest 'carbon sink' – a vital buffer against the impacts of climate change. The ocean is **central to reducing global greenhouse gas emissions** and stabilizing the Earth's climate.

Mitigating role of Marine Ecosystems:

- Ocean habitats such as **seagrasses and mangroves**, along with their associated food webs, can **sequester carbon dioxide from the atmosphere** at rates up to **four times**

higher than terrestrial forests Their ability to capture and store carbon make mangroves highly valuable in the fight against climate change.

- **Mangroves** also **support healthy fisheries**, improve water quality, and **provide coastal protection against floods and storms**. **Coral reefs** are among the most ecologically and economically valuable ecosystems on our planet. Covering less than 0.1 percent of the world's ocean, **they support over 25 percent of marine biodiversity** and serve up to a billion people with coastal protection, fisheries, sources of medicine, recreational benefits, and tourism revenues.
- **Marine protected areas –** areas of the ocean set aside for long-term conservation aims – offer one of the best options to maintain the ocean's health. Today marine protected areas cover 6.35 percent of the ocean – almost ten times as much as in 2000.

Oceans are incredible source of renewable energy

- **Off-shore wind power** is generated by the airflow through wind turbines that mechanically turn electric generators.
- Wind power could cover more than one third of global power needs, becoming the world's foremost energy source Ocean energy systems **use the kinetic and thermal energy of seawater – waves or currents for instance – to produce electricity or hea**
- These energy sources **don't emit carbon dioxide or other greenhouse gases** that contribute to global warming.

The prospects of green shipping

- Approximately **80 percent of world trade is transported by maritime shipping** – which accounts for nearly 3 percent of global greenhouse gas emissions. **Reducing the CO2 emissions of ships to zero by 2050** is crucial in the fight against climate change. This means moving away from traditional fossil fuels to new zero-emission energy sources, such as hydrogen, ammonia, methanol, or wind.
- **Green shipping corridors** – **maritime routes between two ports that support zero-emissions technologies** for ships – are one **way to accelerate the decarbonization of the shipping sector**.

Topic 13. PROBLUE

Important for subject : Environment

- PROBLUE is an Umbrella Multi-Donor Trust Fund (MDTF) administered by the World Bank that supports the **development of integrated, sustainable and healthy marine and coastal resources**.
- With the Blue Economy Action Plan as its foundation, PROBLUE contributes to the **implementation of Sustainable Development Goal 14** (SDG 14) and is fully aligned with the World Bank's twin goals of ending extreme poverty and increasing the income and welfare of the poor in a sustainable way.
- PROBLUE **supports the World Bank's overall oceans portfolio**, which is worth over $9 billion in active projects as of June 2021.
- PROBLUE focuses on four key areas:
- The **management of sustainable fisheries and aquaculture Addressing threats posed to ocean health** by marine pollution, including litter and plastics, from marine or land-based sources
- The **sustainable development of key oceanic sectors** such as tourism, maritime transport and off-shore renewable energy **Building government capacity** to manage marine resources, including nature-based infrastructure such as mangroves, in an integrated way to deliver more and long-lasting benefits to countries and communities

Need for PROBLUE

- **Oceans are reaching a tipping point**, under threat from many fronts, from overfishing and marine pollution to coastal erosion, all of which are exacerbated by climate change. Healthy oceans provide jobs, food, drive economic growth and keep the planet cool, so a break from business as usual is required.
- PROBLUE was established in **response to client demand, and it helps us identify current trends and emerging threats to oceans**, and solutions for action.
- Trust funds like PROBLUE can **play a key role in raising awareness and promoting investment**.

Donors for PROBLUE

- Norway was an early partner to PROBLUE, announcing their contribution at the 2018

World Bank Group and IMF Spring Meetings, followed by Sweden, Iceland, France and Germany. Today, PROBLUE is supported by Australia, Canada, Denmark, the European Commission, France, Germany, Iceland, Ireland, Norway, Sweden, the United Kingdom and the United States.

Topic 14. MILLIONS OF DEAD FISH WASH UP AMID HEAT WAVE IN AUSTRALIA

Important for subject : Environment

- Millions of fish have washed up dead in southeastern Australia in a die-off that authorities and scientists say is **caused by depleted oxygen levels in the river after recent floods and hot weather.**
- People north of Menindee say there's **cod and perch floating down the river everywhere.**
- The Department of Primary Industries said the **fish deaths were likely caused by low oxygen levels as floods recede,a situation made worse by fish needing more oxygen because of the warmer weather.**
- State agencies also started to release higher-quality water where **possible to boost dissolved oxygen levels in the area.**

Dissolved Oxygen (DO)

- Dissolved oxygen (DO) is **defined as the amount of oxygen that is present in water.**
- The **average dissolved oxygen content in freshwater is 0.0010 percent by weight** (10 parts per million or 10 ppm), which is **150 times lower than the oxygen concentration in an equivalent volume of air.**
- Adequate dissolved oxygen is crucial for all forms of life and is required for excellent water quality.
- Aquatic life is stressed **when dissolved oxygen levels fall below 5.0 mg/L. Lower concentrations result in more stress.**
- Large fish kills can occur when oxygen levels fall below 1-2 mg/L even for a few hours.
- The **decrease in the level of dissolved oxygen** is termed as **Biological Oxygen Demand (BOD).**
- Because bacteria that feed on sewage multiply in numbers and respire, any release of

raw sewage into a river results in a fall in dissolved oxygen level. This respiration depletes oxygen in the water quickly, resulting in fish deaths.

Factors affecting DO

- Presence of **organic and inorganic wastes in water decreases the dissolved oxygen** content of the water.
- A number of factors like surface turbulence, photosynthetic activity, O2 consumption by organisms and decomposition of organic matter are the factors which determine the amount of DO present in water.
- The **quality of water increases with an increase in DO levels**.

Biochemical Oxygen Demand

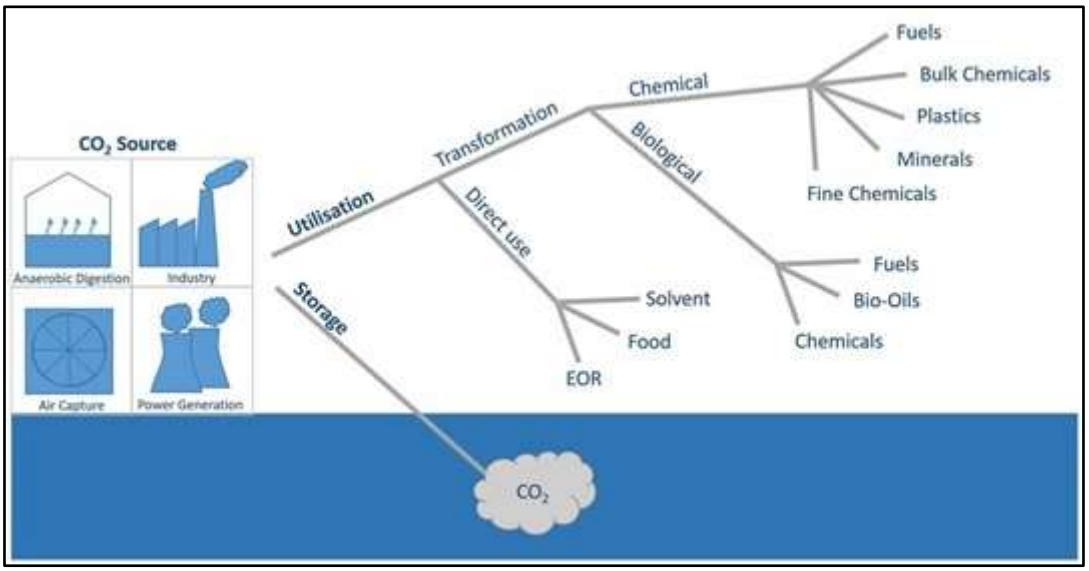
- Water pollution by organic wastes is measured in terms of **Biochemical Oxygen Demand (BOD).**
- BOD is the **amount of dissolved oxygen needed by bacteria in decomposing the organic wastes present in water. I**t is expressed in milligrams of oxygen per litre of water.
- The **higher value of BOD indicates low DO content of water.**
- Since BOD is limited to biodegradable materials, it is not a reliable method of measuring water pollution.

Chemical Oxygen Demand (COD)

- COD measures the **amount of oxygen in parts per million required to oxidise organic (biodegradable and non-biodegradable) and oxidizable inorganic compounds in the water sample.**

Topic 15. DASTUR ENERGY WORKING WITH CARBON RECYCLING INTERNATIONAL TO PRODUCE GREEN METHANOL FROM CAPTURED CARBON DIOXIDE

Important for subject : Environment



What is Carbon capture?

- Human activities often result in emissions of carbon dioxide. Often, in order to stop or reduce the emissions, we have no option but to stop or reduce the activity itself. For example, if somebody is using a wood-fired cookstove, she can shift to a gas-fired cookstove to reduce emissions. However, in some cases, the emitted carbon dioxide can be 'captured', so that the gas doesn't rise up in the atmosphere and cause (further) global warming. For example, it is possible to collect the fumes coming out of the chimneys of coal-fired power plants and 'box' them up. Carbon capture' refers to the techniques used to gather carbon dioxide emissions and put them away so that they don't cause harm.

How does it work?

- There are essentially two ways of approaching Carbon capture and storage, or CCS.
- **Technology solutions** entail putting up machinery to capture fumes (such as from factories, large engines etc) and removing carbon dioxide from them. The next step is, of course, to figure out a way of disposing off the carbon dioxide. The most basic way to do this is to bury the gas underground – in pores of sedimentary rock formations, or

in dead oilfields, that is, in sands that once held oil or gas, or in underground coal seams. This works if you don't have to transport the carbon dioxide over large distances to the burial ground. The captured carbon dioxide could be injected into living oil and gas wells so as to push out the hydrocarbons.

- Scientists have also suggested that the carbon dioxide could also be injected into gas hydrates (frozen gas-water mixture), where upon the carbon dioxide will push out the gas in the hydrate and take its place.
- **Nature-based solutions** do not 'capture' carbon dioxide but offset the emissions by sucking up the gas from the atmosphere – whether these should really come under 'carbon capture and storage' is a moot question. Nature-based solutions essentially involve growing trees. Mangroves are said to have an enormous potential to suck up carbon dioxide and are therefore in the limelight today.

Why important?

- 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 preindustrial levels.
- CCUS technologies also provide the foundation for carbon removal or **"negative emissions"** when the CO2 comes from **bio-based processes** or directly from the atmosphere.
- There are around **35 commercial facilities applying CCUS** to industrial processes, fuel transformation and power generation.
- **CCUS facilities** currently capture almost **45 Mt CO2 globally,** but this needs to increase.

Does it help in reducing global warming?

- If done on the scale required, it would definitely help reduce global warming. In 2019 (the pre-pandemic year), the world emitted 36.7 billion tons of carbon dioxide. Today, CCS projects are negligible in comparison with the emissions.
- **Is carbon capture happening on the ground? If so, where?**
- The earliest CCS projects are believed to be Sleipner and Snovhit projects in Norway,

which have captured and sequestered about 24 million tons of carbon dioxide in their 23 years of operations. In 2014, the Boundary Dam project in Canada was built to capture and bury around 6 million tons of carbon dioxide a year, but the project has been experiencing some problems. A few more projects have come up since then. According to the Global CCS Institute, as of 2018, there were 43 large-scale facilities – 18 in commercial operation, five under construction and 20 in various stages of development.

If it is in vogue for decades, why has it taken off in a big way?

- CCS is costly. Typically, if you want to do CCS in a thermal power project, the process would take away between 6 and 10 per cent of the power generation for itself. Then, there are capital and maintenance costs. Until now, there was no great urgency to do CCS projects.

What is Indian government's plan with respect to carbon capture?

- The Indian government's plans are more in the realm of 'nature-based solutions'. It is very difficult to see technology CCS coming up in India, unless financially supported by the developed countries.

Carbon Avoidance

- Carbon avoidance involves measures aimed at **preventing carbon from being released into the atmosphere.**
- Carbon avoidance can occur either via **carbon offsets** or via **direct carbon reduction measures.**
- Many human activities carry a significant **carbon footprint,** but particularly intense are the **industrial burning of fossil fuels, and the destruction of natural carbon sinks** such as forests.
- **Carbon avoidance projects** aim to curb these emissions by targeting these activities and capturing the emission they create, or preventing the activities altogether.

The impact of carbon avoidance on emissions

- Carbon avoidance via offsets does not work at the core issue of reducing overall CO2 emissions. Carbon avoidance via direct carbon reduction measures does work at the

core issue of reducing overall CO2 emissions.

- The effectiveness of carbon avoidance via carbon offsets depends on the type of project and if the project is realized, additional, permanent, meets certain key criteria and project standards, and does not engage in greenwashing. Carbon avoidance via direct carbon reduction measures is effective because it cuts emissions at their source.

The main benefits of carbon avoidance

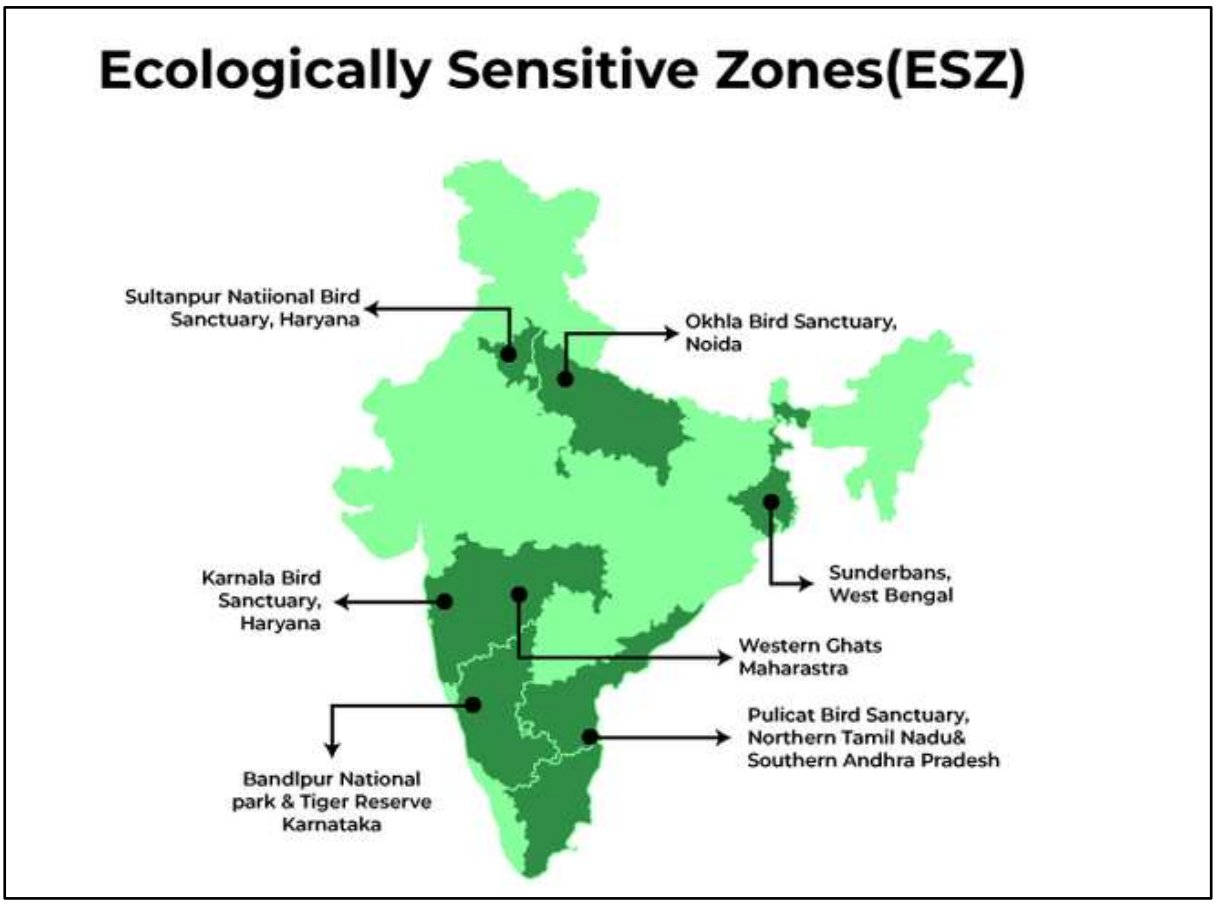
- Carbon avoidance aids in climate change mitigation, improves air quality, and protects ecosystems.

The main drawbacks of carbon avoidance

- Carbon offset limitations and global reliance on fossil fuels are drawbacks to carbon avoidance measures

Topic 16. ECO-SENSITIVE ZONES (ESZ)

Important for subject :Environment



The Supreme Court on March 16, 2023, indicated that it may relax restrictions imposed on development activities in the Eco-Sensitive Zones (ESZ) spread over a one kilometre radius of protected areas (PA) such as national parks and wildlife sanctuaries.

- The basic aim of ESZ 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
- ESZs are notified by MoEFCC, Government of India under **Environment Protection Act 1986**
- The guidelines include a broad list of **activities that could be allowed, promoted, regulated or promoted**. This is an important checklist for conservationists to keep in mind while identifying threats in ESZs.
- For this purpose, the ministry has asked **all states to constitute a committee** comprising the wildlife warden, an ecologist and a revenue department official of the area concerned to suggest the requirement of an eco-sensitive zone and its extent.
- The width of the ESZ and type of regulation may vary from protected area to area.
- However, as a general principle, **the width of the ESZ could go up to 10 kms around the protected area**.

Western Ghats:

- Still there is no consensus among six states and union over notification of ESZ in western ghats, as there is need for balance between ecology and economic growth Union Government in 2010 had set up the **Western Ghats Ecology Expert Panel headed by Dr. Madhav Gadgil**. In his report submitted in 2011, Dr. Gadgil had recommended that **large swathes of areas falling within the Western Ghats be marked as ecologically sensitive areas** and excluded from damaging activities.
- However, owing to opposition from states, the MoEF set up another committee in August 2012 called the **High Level Working Group headed by former ISRO Chief Dr. K. Kasturirangan** who **further reduced the area to be notified as ESAs**.
- However, this report too was rejected by many states.

Topic 17. FINDINGS OF SYNTHESIS REPORT

Important for subject: Environment

The Intergovernmental Panel on Climate Change (IPCC) published its Synthesis Report (SYR) on March 20, 2023.

- It summarizes the findings of six reports released during its Sixth Assessment Cycle — the 1.5 C report of 2018, the Special Reports on Land and Oceans of 2019, and the three Assessment Reports published between 2021 and 2022.
- The SYR is presented in the wake of major global upheavals brought about by the COVID-19 pandemic, the Russian invasion of Ukraine and the subsequent global energy crisis.

Findings of Synthesis Report:

- Excess emissions from human activities have **raised global temperature by 1.1°C above** 1850-1900. **Human activities have 'unequivocally' caused global warming**, says the IPCC, with global **net anthropogenic greenhouse gas (GHG) emissions** clocking in at **59 gigatonnes of carbon dioxide equivalent** (GtCO2e), 54 per cent higher than the level in 1990.
- **Current policy action** will **lead to further temperature rise**, and the impacts on human and other forms of life will become more severe.
- Nationally Determined Contributions (NDC) announced by countries till October 2021 make **it likely that warming will exceed 1.5°C during the 21st century** and make it **harder to limit warming below 2°C.** With every increment of global warming, **climatic extremes will become more widespread and pronounced**.
- There may be some **irreversible changes in the climate system when tipping points are reached**, such as the loss of the Greenland and West Antarctic ice sheets.
- At current emissions levels, we **will deplete the remaining carbon budget.**
- We need to cut GHG emissions across all sectors urgently, within this decade and no later GHG emissions **must be cut by 43 per cent by 2030 compared to 2019 levels**, and **CO2 emissions must be cut by 48 per cent**. This must be accompanied by **reaching global net zero CO2 emissions in the early 2050s**.
- We **have all the solutions we need to shift to low-carbon economic systems** Systemic changes like widespread electrification, **diversifying energy generation** to

include more **wind, solar, and small-scale hydropower**, deploying more battery-powered electric vehicles, and conserving and restoring forests while also reducing tropical deforestation.

- **Political commitment and equity are key to enabling this shift** – there is enough finance, it needs to be directed to climate action.
- Some parts of the world have already reached their adaptation limits. Certain **tropical, coastal, polar and mountain ecosystems, the report stated, have reached their hard limits of adaptation**, where adaptive actions cannot avoid negative impacts.
- Adaptation in some places has **also reached its soft limits**. This situation arises when **technological and socioeconomic options for adaptive action are not immediately available,** resulting in impacts and risks that are currently unavoidable.
- **Adaptation gaps exist** and will continue to grow if no action is taken; the lower-income group will suffer the most.
- There is **increased evidence of maladaptation in various sectors** and regions. Maladaptation affects marginalised and vulnerable groups adversely.
- There are **multiple barriers to implementing carbon capture and storage** (CCS), a technology tool that removes carbon dioxide from the atmosphere. The report **highlighted some of the barriers are technological, economic, institutional, ecological, environmental and socio-cultural barriers.**
- The report stated that **carbon dioxide removal (CDR) would be necessary to achieve net-negative CO2 emissions.** If warming exceeds 1.5 degrees Celsius, the report suggested additional CDR deployment is needed.
- The report has pointed out that **most vulnerable populations are greatly affected by Loss &Damage linked to burgeoning climatic impacts**; and experts contended that almost the **whole of India, particularly its coastal and mountain regions, qualify under the category**.

Topic 18. WORLD SPARROW DAY

Important for subject :Environment

A citywide enumeration of the house sparrow population undertaken recently by the Travancore Nature History Society a few days ago **recorded only nearly 130 birds**.

- The house sparrow population in the **Thiruvananthapuram** city has recorded a **significant reduction this year** due to several unfavourable factors.
- The survey was taken in the run-up to the World Sparrow Day that was observed on Monday. **Oppressive heat and scarcity of food materials** in the traditional pockets of the city have **contributed to the fall in population**. The society had recorded as many as 326 sparrows last year.
- The **house sparrow population in Nedumangad continued to remain stable** for several years. This was **attributed to the undisturbed ecosystem** that is prevalent in the market vicinity having a steady supply of food and without construction activities.

House Sparrow:

- The House Sparrow (Passer domesticus) is a small bird belonging to the **family Passeridae**. **Distribution:** The House Sparrow is a **cosmopolitan bird** found across Europe, Asia, and Africa. It is also found in **North America, South America, and Australia**, where it was introduced by humans.
- **Physical characteristics**: The House Sparrow is a small bird, **about 14 to 16 cm in length**, with a wingspan of about 20 to 25 cm. The **male has a gray crown, black throat, and white cheeks**, while the **female has a brown crown and a buffcolored stripe behind the eye**.
- **Habitat:** The House Sparrow is a common bird found in **urban and rural areas**, and is often seen **around human habitation, such as houses, buildings, and parks.**
- **Diet:** The House Sparrow is an **omnivorous bird and feeds on a variety of food**, including seeds, insects, and scraps of food from humans.
- **Breeding:** The House Sparrow breeds **throughout the year and can lay up to 4 to 5 eggs at a time**. The incubation period is about 11 to 14 days, and the chicks fledge after about 14 to 16 days.

Conservation status:

- IUCN Status**: Least Concern**
- The Wildlife Protection Act,1972: **Schedule IV Cultural significance:** The House Sparrow has been an **important part of human culture for** centuries and is mentioned in many folktales, songs, and poems.
- **House Sparrow is the State bird of Bihar and Delhi.**
- **Significance in agriculture**: The House Sparrow is **considered a pest in some agricultural areas due to its habit of feeding on crops** such as wheat and rice.
- **Threats:** Despite its large population size, the House Sparrow has experienced declines in some areas, particularly in urban areas, **due to habitat loss, pesticides, and other factors.**
- **Conservation steps:** In Odisha, the Rushikulya Sea Turtle Protection Committee started a campaign in 2007. They **distributed earthen pot bird nests to homes** in Odisha. This has **led to an increase in the sparrow population**.

Topic 19. THIRUNELLY'S SEED FESTIVAL CELEBRATES TRADITIONAL CLIMATE-RESILIENT SEEDS AND FARM PRODUCE

Important for subject :Environment

Cheruvayal Raman, in his early 70s, is a winner of a 2023 Padma Shri, one of India's top civilian honours. He narrated how he conserved 55 native rice varieties, lining up mementos and medals on the porch of his 150-year-old mud house.

- The **1960s saw the Green Revolution as a remedy to widespread food shortage**. This ambitious effort to **feed the hungry** had **unintended consequences**, including **cuts in the cultivation of indigenous grains and millets**.
- The **market-based agri-ecosystem** is **energy and carbon intensive**, **responsible for over 30% of greenhouse gas emissions.** Farm and cattle production, land-use change such as deforestation, pre- and post-production processes, consumption, and food disposal — all these activities **emit carbon dioxide, methane, nitrous oxide, and fluorinated gases.** However, **local, hardy varieties use less resources and are tolerant to the vagaries of weather.**
- Farmers and indigenous peoples **have sown, saved, and shared rich, diverse crops**, which are a central part of their lives, livelihoods, and celebrations.
- Events such as the T**hirunelly Seed Festival bring together farmers, environmental activists, agriculture scientists, conservationists, and support**

organisations to conserve local seed varieties.

Thirunelly Seed Festival

- Thirunelly Seed Festival was **initiated in 2013-14** by the conservation NGO Thannal **along with the Save our Rice Campaign** and a few other seed-saving groups and individuals, with the **support of the panchayat and Kudumbasree**, a government-run network of local women's self-help groups.
- The Thirunelly Seed Festival is **an annual festival held in the Thirunelly temple in Wayanad district,** Kerala, India. It is a unique festival that **celebrates the planting of seeds** and the start of the agricultural season in the region.
- The festival is celebrated in the month of Kumbham (February-March) and lasts for three days.
- The festival is **centered around the Thirunelly temple**, which is dedicated to **Lord Vishnu.**
- The festival **begins with the planting of seeds in the temple courtyard** by the priests and devotees.
- The festival also includes a cattle fair, where farmers come to buy and sell livestock.
- The festival is a celebration of the **importance of agriculture in the region and the traditional knowledge and practices associated** with it.
- The Thirunelly Seed Festival is **a reminder of the need to preserve and promote traditional agricultural practices and biodiversity.**

Reason for disappearing of Indigenous seeds:

- The **introduction of modern agriculture, hybrid and genetically modified crops** has led to a decline in the cultivation of indigenous seeds and crops.
- The **promotion of monoculture and high-yielding varieties** has resulted in the displacement of indigenous seeds and crops.
- **Urbanization and industrialization** have also contributed to the disappearance of indigenous seeds and crops, as traditional farming practices are being replaced by industrial agriculture.
- **Climate change is also affecting the cultivation of indigenous seeds and crops**, as changes in temperature and rainfall patterns are making it difficult to grow these

varieties.

Need for Traditional Climate-Resilient seeds:

- Traditional climate-resilient seeds are **plant varieties that have been developed and cultivated by farmers over generations**, which are adapted to local environmental conditions and are more resilient to climate change impacts.
- Traditional climate-resilient seeds are an **important component of sustainable agriculture**, as they are **adapted to local weather patterns and soil conditions**.
- These seeds are often **more resilient to climate change impacts such as drought, flooding, and pest infestations**, which makes them more reliable in times of climatic variability.
- The cultivation of traditional climate-resilient seeds p**romotes food security**, as these varieties are often **more resistant to crop failures** due to weather-related events.
- Traditional climate-resilient seeds are often cultivated using traditional agricultural practices, **such as intercropping and crop rotation**, which help to **maintain soil fertility and enhance biodiversity.**
- The preservation and promotion of traditional climate-resilient seeds is important for **maintaining plant genetic diversity**, as these varieties are often replaced by modern, high-yielding varieties.
- Traditional climate-resilient seeds can provide economic **benefits to small-scale farmers**, who may not have access to modern agricultural technologies.

Steps to promote indigenous seeds:

- **Preserve seed banks:** Seed banks can **be established to preserve indigenous seeds and crops**. This helps to maintain their genetic diversity and prevent their extinction.
- **Provide financial incentives**: Governments and other organizations can provide financial incentives **to farmers who cultivate indigenous seeds and crops**. This can include subsidies, tax breaks, and other incentives.
- **Encourage research:** Research can be conducted **to identify the potential benefits and uses** of indigenous seeds and crops. This can help to increase their value and promote their cultivation.
- **Develop markets**: Developing markets for indigenous seeds and crops can **help to**

increase their demand and encourage their cultivation. This can include promoting them in local markets, developing value-added products, and creating export opportunities.

- **Collaborate with indigenous communities**: Collaboration with indigenous communities is important in promoting indigenous seeds and crops. This includes working with them **to identify and protect their traditional knowledge and practices** related to seed and crop cultivation.

Topic 20. INDIA LOST 668400 HA OF FOREST COVER IN THE LAST 30 YEARS

Important for subject: Environment

India clocked in the second highest rate of deforestation among countries worldwide between 1990 and 2020.

- The study highlighted the trend of deforestation of 98 countries with data collated from 1990 to 2000 and from 2015 to 2020 by Our World In Data, an online data repository.
- **India's deforestation rose from 384,000 hectares** between 1990 and 2000 **to**
- **668,400 hectares** between 2015 and 2020 **India ranked the second highest for the rate of deforestation** after losing 668,400 hectares of forest cover in the last 30 years, a report by UK-based Utility Bidder said.
- Brazil and Indonesia clocked in at first and third respectively with Brazil recording 1,695,700 hectares and Indonesia recording 650,000 hectares of deforestation.
- India also **topped the chart for biggest increase in deforestation between 1990 and 2020** with a difference of 284,400 hectares in forestry loss.
- In India, the study **blamed pressures due to expanding human settlements**: "As the country with the **second largest population in the world**, India has had to compensate for the increase in residents – this has come at a cost in the way of deforestation."

Forest Cover in India as ISFR 2021:

- The total tree-and-forest cover in the country includes an **increase of 1,540 square kilometres of forest cover and 721 sq km of tree cover** compared to the 2019 report.
- India's total forest and tree cover is now spread across 80.9 million hectares, which is

62 per cent of the geographical area of the country.

- **Area-wise, Madhya Pradesh has the largest forest cover** in the country followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.
- There is an **increase of 17 sq km in mangrove cover** in the country as compared to the previous assessment of 2019.
- **Bamboo forests have grown from 13,882 million culms (stems) in 2019 to 53,336 million** culms in 2021.
- The total carbon stock in the country's forests is estimated at 7,204 million tonnes, showing an increase of 79.4 million tonnes since 2019.

Topic 21. WOMEN TAKE THE WHEEL FOR SAFER TOURISM IN SATPURA TIGER RESERVE

Important for subject: Environment

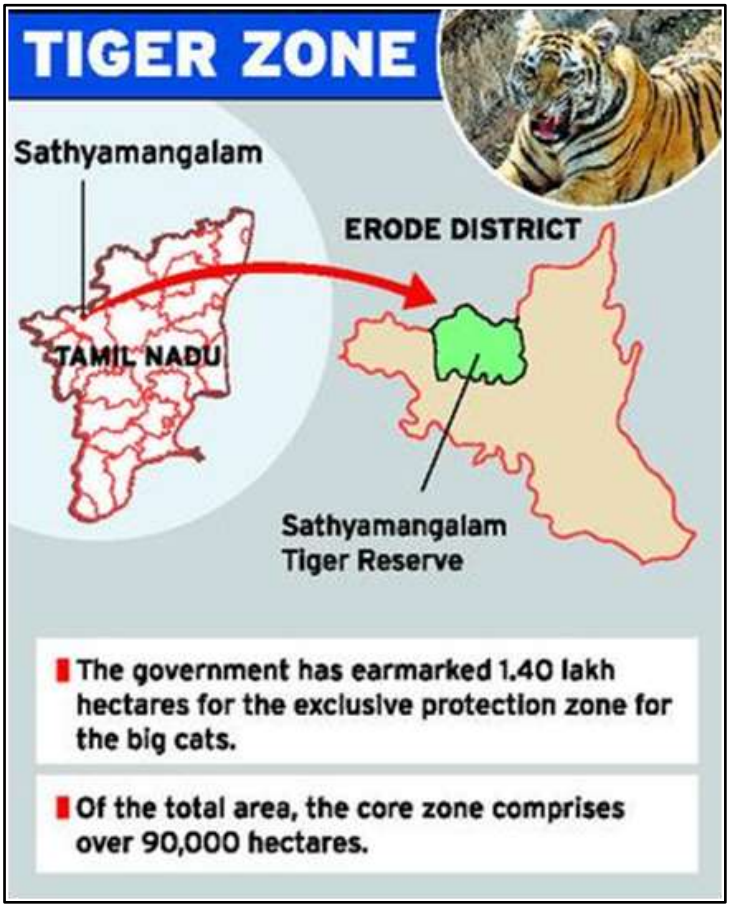
As part of the 'Safe Tourism Destination for Women' project launched by the Madhya Pradesh government, women drivers have been appointed to take tourists on safaris at the Satpura Tiger Reserve.

- Safe Tourism Destination for Women aims to **provide employment opportunities to women from local communities**, living in and around tourist destinations, while also ensuring the safety of women at these spots.
- The project was **developed using the central government's Nirbhaya Fund** that was set up in 2013 to enhance the safety and security of women in the country.
- **Satpura Tiger Reserve**
- The Satpura Tiger Reserve is located in the **Hoshangabad district of Madhya Pradesh** and is spread over an area of 1427 square kilometers. It was declared a **tiger reserve in 1999 under the Project Tiger initiative.**
- The Satpura Tiger Reserve is **located in the Satpura Range** of Central India, which is a part of the Deccan Plateau.
- Satpura tiger reserve comprises of **three protected areas** namely, **Satpura National Park, Bori Sanctuary, and Pachmarhi Sanctuary.**
- **Denwa river is the main water source of the park**. It originates from southeastern part of the Hoshangabad district in Madhya Pradesh and flows from east to west direction before **joining the Tawa river** at the south of Ranipur.

- The Satpura Tiger Reserve is also **connected to other wildlife reserves in the region like the Pench Tiger Reserve, Kanha Tiger Reserve, and Bandhavgarh Tiger Reserve**. This connectivity helps in the movement of animals and **also ensures genetic diversity.**
- The Satpura Tiger Reserve is home to a wide variety of flora and fauna. The reserve has a large area of **teak forest, which is interspersed with other trees like sal, bamboo, and grasslands.**
- The reserve is home to a variety of animals such as **tigers, leopards, Indian bison, wild boars, sloth bears,** and many species of birds. The reserve also has a **large population of the endangered Indian giant squirrel.**
- Satpura Tiger Reserve faces various challenges such as **human-wildlife conflict, illegal poaching, and habitat loss.**

Topic 22. SATYAMANGALAM TIGER RESERVE

Important for subject : Environment



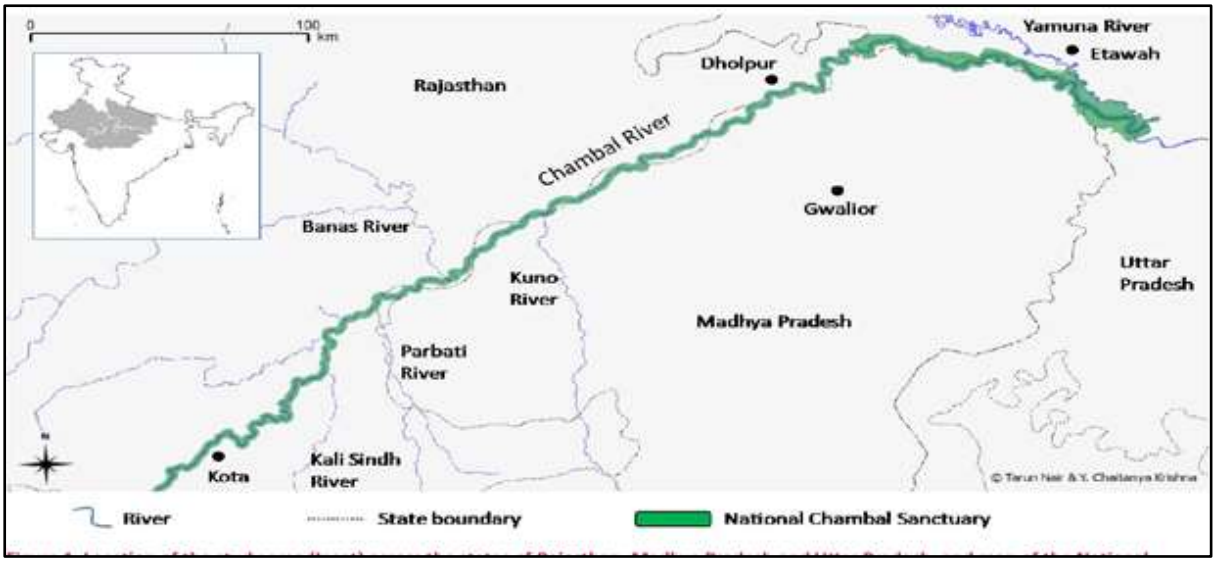
- Sathyamangalam Tiger Reserve is located in the strategic confluence region of

Western and Eastern Ghats. An area of 1,40,924 ha is declared as Tiger Reserve on 15.03.2013 from erstwhile Wild Life Sanctuary with an area of 1,41,161 ha. It comprises of 2 divisions; Sathyamangalam and Hasanur with District headquarters at Erode.

- This area holds a significant population of tiger, and it is also contiguous to other Tiger conservation landscapes like BRT, Bandipur, Mudumalai and Nagarahole.
- The region is also a part of Nilgiri-Eastern Ghats Elephant Reserve and is an abode to about 800 to 1000 Elephants as per Synchronised Elephant Census conducted during 2012.
- The Sathyamangalam Tiger Reserve is the confluence of two distinct geographical regions of bio diversity landscape; Western Ghat and Eastern Ghat. The diversity of habitat has got an assemblage of several species of rare plants, animals, birds, invertebrates, fishes, amphibians, and reptiles.
- The wildlife sanctuary is part of Project Tiger and Project Elephant conservation programmes.These forests are home to indigenous tribal people belonging largely to the Irula tribe (also known as the Urali) and Soliga communities
- **Flora:** It is mostly tropical dry forest, part of the South Deccan Plateau dry deciduous forests ecoregion. There are five distinct forest types: tropical evergreen (Shola), semi-evergreen, mixed-deciduous, dry deciduous and thorn forests.
- **Fauna**: It links the Eastern Ghats and Western Ghats allowing gene flow between diverse fauna populations of the two eco-regions. Important fauna include- Bengal tigers, Black Buck, Indian elephants, gaurs, leopards ,spotted deer, blackbucks, sambar deer, barking deer ,four-horned antelopes, wild boars, sloth bears , striped hyenas and feral buffaloes .
- **Birds:** Many bird species including treepies, bulbuls, babblers, mynahs , crows and critically endangered Indian vulture (Gyps indicus) are noted.

Topic 23. STATES CHIP IN TO STOP ILLEGAL SAND MINING IN CHAMBAL SANCTUARY

Important for subject: Environment



Three States namely Rajasthan, Madhya Pradesh and Uttar Pradesh have begun a joint action **to put an end to the illegal sand mining** in the **National Chambal Sanctuary**, situated at the **trijunction of these states**.

- Coordination between the three States was discussed at a high-level meeting in Jaipur with special emphasis on protecting the fragile ecosystem critical for the breeding of Gharials.
- **National Chambal Sanctuary** is known for the critically endangered Gharial populations. Gharials are a species of fish-eating crocodiles.
- Illegal sand mining is threatening the flora and fauna of the sanctuary and close collaborations are required to address the issues associated with illegal mining.

National Chambal Sanctuary

- It was set up in 1979 as a riverine sanctuary along an approximately 425 km length of the Chambal River.
- Its ravines **stretches over 2-6 km wide along the Chambal River** near the tri-point of Rajasthan, Madhya Pradesh and Uttar Pradesh.
- The National Chambal Sanctuary is listed as **an Important Bird Area (IBA) and is a**

proposed Ramsar site.

- The **Chambal river which is a tributary of River Yamuna cuts through the mazes of ravines and hills in the sanctuary.**

Ecological Significance:

- The National Chambal Sanctuary is **home to critically endangered Gharial** (small crocodiles), the **red-crowned roof turtle and the endangered Ganges River dolphin**.
- Chambal supports the largest population of Gharials in the wild. Only known place **where nesting of Indian Skimmers is recorded in large numbers.**
- Chambal supports **8 rare turtle species out of the 26 found in the country.**
- Chambal is one of the **cleanest rivers in the country.**
- Chambal supports more than 320 resident and migrant birds.

Economic Support:

- Locals directly depended on various resources of the Sanctuary. They farm along the river, extract river water for irrigation, practice sustenance and commercial fishing, and quarry sand.

Chambal River

- It is one of the **most pollution-free rivers of India**.
- It's a 960 km. long river that originates at the SingarChouri peak in the northern **slopes of the Vindhya mountains** (Indore, Madhya Pradesh). From there, it flows in North direction in Madhya Pradesh for a length of about 346 km and then follows a north-easterly direction for a length of 225 km through Rajasthan.
- It enters U.P. and flows for about 32 km before joining the Yamuna River in Etawah District.
- It is a **rainfed river and its basin is bounded by the Vindhyan mountain ranges and the Aravallis**. The Chambal and its tributaries drain the Malwa region of northwestern Madhya Pradesh. Tributaries: **Banas, Kali Sindh, Parbati**.
- **Main Power Projects/ Dam:** Gandhi Sagar Dam, Rana Pratap Sagar Dam, Jawahar Sagar Dam, and Kota Barrage.

Topic 24. MCMAHON LINE

Important for subject : International relations

- A recent bipartisan Senate resolution in the United States **recognizes the McMahon Line as the international boundary between China and Arunachal Pradesh.**

About McMahon Line:

- It is a **geographical border between Northeast India and Tibet.**
- **It** is the **boundary between China and India**, although its **legal status is disputed by the Chinese**
- It was negotiated **between Tibet and Great Britain at the end of the Shimla Conference in 1914.**
- It is named **after Henry McMahon, who was the foreign secretary of British India and the chief negotiator of the convention at Shimla.**
- The length of this **boundary is 890 kilometers**.
- It **runs from the eastern border of Bhutan along the crest of the Himalayas until it reaches the great bend in the Brahmaputra River**, where that river emerges from its Tibetan course into the Assam Valley.
- Though **India considers the McMahon Line as the legal national border**, China **rejects it, contending that Tibet was not a sovereign state** and therefore did not

have the power to conclude treaties.

What is The Shimla Treaty of 1914?

- It was signed in 1914 by delegates from India and Tibetto establish a clear demarcation between the two countries.
- China was not present in this treaty since Tibet was an autonomous region at the time.
- According to the treaty the McMahon Line is the clear boundary line between India and China.
- The British rulers, on behalf of India, considered Tawang in Arunachal Pradesh and the southern portion of Tibet to be part of India, which the Tibetans consented to.
- As a result, Arunachal Pradesh's Tawang region became a part of India.

Line of Actual Control (LAC)

- LAC is a demarcation line that separates Indian-controlled territory from Chinese controlled territory.
- India considers the LAC to be 3,488 km long, while the Chinese consider it to be only around 2,000 km.
- It is currently the de-facto border between the two countries.
- The Line of Actual Control (LAC), is divided into three sectors:
- Western (Ladakh, Kashmir), Middle (Uttarakhand, Himachal) and Eastern (Sikkim, Arunachal): Here, the alignment of the LAC is along the McMahon Line.

Topic 25. RECALIBRATE BIMSTEC

Important for subject: International relations

BIMSTEC

- The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is a regional multilateral organization.
- Its members lie in the littoral and adjacent areas of the Bay of Bengal constituting a contiguous regional unity.
- Out of the 7 members,
- **Five are from South Asia – Bangladesh, Bhutan, India, Nepal,and Sri Lanka. Two are from Southeast Asia – Myanmar, Thailand.**

- BIMSTEC not only connects South and Southeast Asia, but also the ecologies of the Great Himalayas and the Bay of Bengal.
- It mainly aims to create an enabling environment for rapid economic development; accelerate social progress; and promote collaboration on matters of common interest in the region.

Genesis of BIMSTEC

- This sub-regional organization came into being in 1997 through the Bangkok
- Declaration. Initially, it was formed with four Member States with the acronym 'BIST-EC' (Bangladesh, India, Sri-Lanka and Thailand Economic Cooperation).
- It became renamed 'BIMST-EC' in 1997, following the inclusion of Myanmar. With the admission of Nepal and Bhutan in 2004, the name of the grouping was changed to 'Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation' (BIMSTEC).

Topic 26. JAPAN-SOUTH KOREA SUMMIT WHAT HAS KEPT THE TWO SIDE APART

Important for subject: International relations

Japan and South Korea agreed to resume regular visits between their leaders after 12 years.

What are the issues:

- **Colonization of Korean Peninsula by Japan**
- Japan effectively colonized the Korean Peninsula between **1910 and 1945**, in a regime that **imposed Japanese names and language on Koreans**.
- During this period, Japan **conscripted many into forced labor or forced prostitution** in military brothels.
- Japan **paid $800 million in reparations to South Korea's military-run government** in **1965**, but this money was never distributed to victims.
- Recently, **Seoul has offered Tokyo concessions on South Korean demands** for compensation over **wartime forced labor**.However, it remains to be seen whether the South Korean public will accept reconciliation.
- **Longstanding territorial dispute**
- The two sides also have a longstanding **territorial dispute** over a group of **islands**

controlled by South Korea and claimed by Japan.

- Regular visits between top leaders of both the countries **ended in 2012** after **South Korean President Lee Myung-bak** visited the disputed islands.
- **Escalation of tensions in recent years**
- Tensions escalated in the **past 10 years** as **conservative Japanese governments moved to rearm the country** while stepping up attempts to whitewash Japan's wartime atrocities.
- In **2018** South Korea's **Supreme Court ordered Japan's Nippon Steel** and **Mitsubishi Heavy Industries to compensate forced labour victims**.
- In **2019,** Japan placed **export controls on chemicals** used to make semiconductors and displays used in smartphones and other high-tech devices.

Topic 27. IRAN- SAUDI DEAL

Important for subject : International relations

Saudi Arabia and Iran have announced that they are restoring full diplomatic relations in a deal brokered by China.

More about the Deal:

- Saudi Arabia and Iran, represented by their national security advisers, **signed an agreement in Beijing, China**, to **re-establish diplomatic ties,** respect each other's sovereignty and **maintain non-interference in the other's domestic affairs**.
- This agreement **ends seven years of diplomatic estrangement** between the two Gulf neighbours.
- The deal has been **necessitated by mutual interests of both nations.**
- For instance, Saudi Arabia, which is undergoing rapid changes, wants peace in its neighbourhood. Also, **Iran, which is under the U.S.-imposed sanctions**, wants more diplomatic and economic openings.
- **Earlier Efforts Towards Brokering Peace Deal:**
- Saudi Arabia and Iran **started directly talking** to each other in **2021** and had held **multiple rounds of negotiations** thereafter, **first in Iraq and then Oman.**
- However, **no breakthrough** was achieved as issues that divide the two countries like the **wars in Syria and Yemen, and Saudi concerns relating to Iran's mobilization of Shia communities** in the region against the Arab states were left unaddressed.

- **Emergence of China as a Power Broker in West Asia:**
- China has been **involved in multilateral peace talks** such as the **2015 Iran nuclear deal** from which the **U.S. unilaterally withdrew in 2018.**
- But this is the **first time Beijing is using its leverage directly** to bring conflicting parties to reconciliation.
- Also, **unlike the U.S., which has hostile ties with Iran,** Beijing **enjoys good ties with Tehran and Riyadh,** as a leading oil buyer and trading partner, respectively.
- This has hence put **China in a unique position to bring two of the region's most significant powers closer.**
- **West Asia's Strategic Realignments in Recent Years:**
- In **2020**, the **UAE became the first Arab country** to **normalize relations with Israel** in a quarter century.
- In the following years, **Israel and Arab countries deepened their partnerships**.
- In **2021**, **Saudi Arabia, the UAE and their allies decided to end their failed blockade of Qatar.**

Govt. names Mohanty as chairperson of PFRDA

- PFRDA is a statutory body established by an Act of Parliament to promote old age income security by establishing, developing and regulating pension funds, to protect the interests of subscribers to schemes of pension funds and for matters connected there with or incidental thereto.
- PFRDA performs the function of appointing various intermediate agencies like Pension Fund Managers, Central Record Keeping Agency (CRA) etc.
- It develops, promotes and regulates the pension industry under National Pension System and also administers the Atal Pension Yojana.

Atal Pension Yojana

- The scheme was launched on 9th May, 2015, with the objective of creating a universal social security system for all Indians, especially the poor, the under privileged and the workers in the unorganised sector.
- **Administered By**: Pension Fund Regulatory and Development Authority through National Pension System (NPS).

- Any citizen of India can join the APY scheme. The age of the subscriber should be between 18-40 years. The contribution levels would vary and would be low if a subscriber joins early and increases if she joins late.

Benefits:

- It provides a minimum guaranteed pension ranging from Rs 1000 to Rs 5000 on attaining 60 years of age.
- The amount of pension is guaranteed for lifetime to the spouse on death of the subscriber. In the event of death of both the subscriber and the spouse, the entire pension corpus is paid to the nominee.
- Contributions to the Atal Pension Yojana (APY) are eligible for tax benefits similar to the National Pension System (NPS).

National Pension System

- NPS is a government-sponsored pension scheme. It was launched in 2004 for government employees.
- Now, any individual citizen of India (both resident and non-resident) in the age group of 18-65 can join NPS. ECB backs big rate increase despite Credit Suisse chao

Topic 28. U.S. RELEASES VIDEO OF ALLEGED COLLISION OF DRONE AND RUSSIAN JET

Important for subject : International Relations

- The Black Sea is a marginal sea of the Atlantic Ocean lying between Europe and Asia. It is bordered by Bulgaria, Georgia, Romania, Russia, Turkey, and Ukraine.
- It is supplied by major rivers, principally the Danube, Dnieper, and Don.
- The Black Sea ultimately drains into the Mediterranean Sea, via the Turkish Straits and the Aegean Sea.
- The Bosporus Strait connects it to the small Sea of Marmara which in turn is connected to the Aegean Sea via the Strait of the Dardanelles.
- To the north, the Black Sea is connected to the Sea of Azov by the Kerch Strait.
- The Black Sea covers 436,400 km2 (not including the Sea of Azov), making it the world's largest inland body of water.

Topic 29. TONNES OF URANIUM MISSING IN LIBYA, SAYS UN NUCLEAR WATCHDOG

Important for subject: International Relations

According to the United Nations nuclear watchdog 2.5 tons of natural uranium stored in a site in war-torn Libya have gone missing, raising safety and proliferation concerns.

However, forces allied to a warlord battling the Libyan government based in the capital of Tripoli claimed on Thursday night that they recovered the material. U.N. inspectors said they were trying to confirm that.

Can natural uranium be used to make bomb?

- Natural uranium **cannot immediately** be used for energy production or bomb fuel, as the enrichment process typically requires the metal to be converted into a gas, then later spun in centrifuges to reach the levels needed.
- But each ton of natural uranium — if obtained by a group with the technological means and resources — can be refined to 5.6 kilograms (12 pounds) of weapons-grade material over time, experts say. That makes finding the missing metal important for nonproliferation experts.

Uranium enrichment

- Uranium enrichment is a process that is necessary to create an effective nuclear fuel out of mined uranium by increasing the percentage of uranium-235 which undergoes fission with thermal neutrons.
- Nuclear fuel is mined from naturally occurring uranium ore deposits and then isolated through chemical reactions and separation processes.
- These chemical processes used to separate the uranium from the ore are not to be confused with the physical and chemical processes used to enrich the uranium.
- Naturally occurring uranium does not have a high enough concentration of Uranium-235 at only about 0.72% with the remainder being Uranium-238.
- Due to the fact that uranium-238 is fissionable and not fissile, the concentration of uranium-235 must be increased before it can be effectively used as a nuclear fuel.

IAEA

- Widely known as the world's **"Atoms for Peace and Development**" organization within the United Nations family, the IAEA is the international centre for cooperation in the nuclear field.

Establishment:

- The IAEA was created in 1957 in response to the deep fears and expectations generated by the discoveries and diverse uses of nuclear technology.
- Headquarter: Vienna, Austria.

Objective:

- The Agency works with its Member States and multiple partners worldwide to promote safe, secure and peaceful use of nuclear technologies.
- In 2005, it was awarded the Nobel Peace Prize for their work for a safe and peaceful world.

Board of Governors:

- 22 member states (must represent a stipulated geographic diversity) — elected by the General Conference (11 members every year) – 2 year term.
- At least 10 members states — nominated by the outgoing Board.
- Board members each receive one vote.

Functions:

- It is an independent international organization that reports annually to the United Nation General Assembly.
- When necessary, the IAEA also reports to the UN Security Council in regards to instances of members' non-compliance with safeguards and security obligations.

Topic 30. SRINAGAR GEARS UP FOR TOURISM MEET

Important for subject: International relations

Srinagar, the summer capital of the Union Territory of Jammu and Kashmir, is all set to host a working group meeting of tourism delegates from the G20 nations in the last week of May.

It will be interesting to see how Saudi Arabia and Turkey, both members of the **Organisation of Islamic Cooperation (OIC)** and the **G20 grouping**, respond to the invitation

- The Organisation of Islamic Cooperation (OIC) is the second largest intergovernmental organization after the United Nations with a membership of 57 states.
- It is **the collective voice of the Muslim world**. It endeavors to safeguard and protect the interests of the Muslim world in the spirit of promoting international peace and harmony among various people of the world.
- It was established upon a decision of the historical summit which took place in Rabat, Kingdom of Morocco on the 25th of September 1969.
- **Headquarters**: Jeddah, Saudi Arabia.
- **India is not a member of the OIC**. However, India was invited as a guest of honour at 46th Session of the Council of Foreign Minister in 2019. 2019 is the 50th anniversary of OIC.

Topic 31. UNIVERSAL HEALTH COVERAGE

Important for subject :International Relations

- The right to health is one of the fundamental rights of every human being. India's constitution guarantees the right to life, which includes the right to health, as a basic human right.
- The World Health Organization (WHO) has defined health as a certain totality of health to the realms of mental and social well-being and happiness beyond physical fitness, and an absence of disease and disability.
- However, achieving health in its wider definition requires addressing health determinants, which necessitates intersect oral convergence beyond medical and health departments.

The Alma Ata Declaration of Primary Health Care:

- In 1978, the **International Conference on Primary Health Care** was held in Alma Ata, Kazakhstan.
- The Alma Ata declaration of primary health care, which mandated **basic health care for all citizens, was not implemented in its entirety, r**esulting in partial coverage of

the population and partial responsibility of the government to pay for health care.

- It mandated all health promotion activities, and the prevention of diseases including vaccinations and treatment of minor illnesses and accidents to be free for all using government resources, especially for the poor.

Newer concept of UHC:

- The **focus on primary care**, as mandated by the Alma Ata declaration of primary health care, **must be revived** to ensure that healthcare services are accessible, affordable, and of good quality for all citizens.
- A tax-funded model of Universal Health Care would ensure that healthcare services are available to all citizens without discrimination.
- It would also ensure that the burden of healthcare financing is shared by the government and the citizens, with the government taking the responsibility for providing healthcare services to all citizens.
- Such a model would also prioritise primary healthcare services, which are essential for promoting good health and preventing diseases.
- Additionally, a tax-funded model would ensure transparency and accountability in shealthcare delivery.
- Government should also focus on intersectoral convergence beyond medical and health departments, such as women and child development, food and nutrition, agriculture and animal husbandry, civil supplies, rural water supply and sanitation, social welfare, tribal welfare, education, and forestry, to address health determinants.

India and UHC

- **India**, through its National Health Policy 1983, committed itself to the **'Health for All'** goal by 2000.
- The **National Rural Health Mission (NRHM) in India**, which operationalized a **Comprehensive Primary Health Care model**, is a sensible move towards achieving UHC.
- The **National Health Mission** with concurrent intersectoral thrusts on Poshan Abhiyan, National Food Security, the Mahatma Gandhi National Rural Employment Guarantee Act, water sanitation, Sarva Shiksha Abhiyan, etc. is a better **model of fully taxfunded Universal Health Care**, **but the Ayushman Bharat Jan Arogya**

Bhima Yojana damages (AB-JAY) that approach.

Limitations of AB-JAY:

- While the intentions of the Ayushman Bharat Jan Arogya Bima Yojana (AB-JAY) are noble, it has received criticism from various quarters.
- One of the primary concerns is that it is an insurance-based model and not a tax funded model, which means that the financial burden of the scheme falls on the government and the beneficiaries.
- The scheme provides insurance cover to only those who have been identified as being below the poverty line, which means that a large section of the population is excluded from the scheme.
- Additionally, the scheme has been criticised for its narrow focus on secondary and tertiary care, which ignores the importance of primary care in promoting good health.

Topic 32. VANDALISM BY PRO-KHALISTAN PROTESTORS AT INDIAN HIGH COMMISSION, LONDON

Important for subject : International Relations

- Hours after a group of people chanting pro-Khalistan slogans took down the Indian flag at the High Commission in London, the Indian government on Sunday summoned the "senior-most" UK diplomat, Deputy High Commissioner Christina Scott, and lodged a strong protest.
- An explanation was demanded for the complete absence of the British security that allowed these elements to enter the High Commission premises.
- She was reminded in **this regard of the basic obligations of the UK Government under the Vienna Convention.**
- **Vienna Convention on Diplomatic Relations 1961**
- The Vienna Convention on Diplomatic Relations was adopted in 1961 by the United Nations Conference on Diplomatic Intercourse and Immunities held in Vienna, Austria.
- It provides a **complete framework for the establishment, maintenance and termination of diplomatic relations** on a basis of consent between independent sovereign States.
- This treaty **lays down the rules and regulations for the privileges that diplomats**

enjoy in other countries.

- The treaty entered into force in April 1964 and currently, there are 192 parties to the convention.
- The Vienna Convention **applies not only to diplomats but also to both military and civilian personnel from the military departments**, who are present in the country under the authority of the chief of the diplomatic mission.
- Although this convention formalizes diplomatic immunity and codifies rules for diplomatic relations between nations, informally these regulations were in practice for at least 200 years.
- In ancient times, the Indian, Greek and Roman civilizations had privileges for diplomats of foreign countries.
- The first attempt in modern times to codify diplomatic immunity occurred in 1815 at the Congress of Vienna.
- An important aspect of the treaty is the **provision of legal immunity for diplomats** so that they don't have to face prosecution according to the laws of the host country.
- The Vienna Convention holds that persons working as diplomats are "inviolable" and therefore cannot be detained or arrested.
- Host nations are also obliged to protect diplomats from attacks on their freedom and dignity.
- Another related treaty is the Vienna Convention on Consular Relations, adopted in 1963 and effective from 1967.
- **Obligations of a "receiving State" under the Vienna Convention**
- As per the Vienna Convention, a "receiving State" refers to the host nation where a diplomatic mission is located.
- **Article 22 of the Convention** deals with obligations with regards to the premises of the Mission.
- Part 2 of this article states that "The receiving State is under a special duty to take all appropriate steps to protect the premises of the mission against any intrusion or damage and to prevent any disturbance of the peace of the mission or impairment of its dignity".

Did the UK not fulfil its obligations in this instance?

- The fact that protestors were able to climb the walls of the High Commission premises indicates a breach.
- India finds the UK government's indifference to the security of Indian diplomatic premises and personnel in the UK unacceptable.
- UK has condemned the event and promised to take the security of the Indian High Commission in London seriously.

Other Popular Vienna Conventions

- Vienna Convention on Diplomatic Relations (1961)
- Vienna Convention on Consular Relations (1963)
- Vienna Convention on the Law of Treaties (1969)
- Vienna Convention on Civil Liability for Nuclear Damage (1977)
- Vienna Convention on Succession of States in respect of Treaties (1978)
- Vienna Convention on the Physical Protection of Nuclear Material (1987)
- Vienna Convention on the Protection of the Ozone Layer (1985)
- Vienna Convention for the Protection of the Stratospheric Ozone Layer (1985)

Topic 33. INDIA CONCLUDED ITS EIGHTH STINT AT UNSC

Important for subject : International Relations

India completed its eighth stint at UNSC as a non-permanent member.

Achievements of India's two year stint:

- The focus area of India was **maritime security, terrorism, UN peacekeeping, reformed multilateralism and the Global South.**
- India was elected **Chair of three important UNSC Committees:** the **Taliban Sanctions Committee, Libyan Sanctions Committee and Counterterrorism Committee.**
- The **Prime Minister** of India **chaired for the first time a UNSC meeting** on maritime security.
- The **Presidential Statement** issued was the **first holistic document** on this issue which, for the first time, had a **direct reference to the UN Convention on the Law of the Sea** as **international law** setting out the **legal framework** in the context of maritime activities. It also called for, inter alia, freedom of navigation, antipiracy and

combating terror and transnational crime at sea.

- India has enhanced the **focus on terrorism.** As a Chair of the UNSC Counterterrorism Committee (CTC), the CTC meeting to India in October 2022.This resulted in the **listing of Abdul Rehman Makki,** Deputy Amir/Chief of the Lashkar E Taiba as a terrorist.
- In August 2021, **India piloted the first UNSC resolution** in more than five decades, calling for **accountability for crimes** against peacekeepers.

More about UNSC

- The Security Council was established by **the UN Charter in 1945**. It is one of the **six** principal organs of the **United Nations.**
- The other 5 organs of the United Nations are—**the General Assembly (UNGA), the Trusteeship Council, the Economic and Social Council, the International Court of Justice, and the Secretariat.**
- Its primary responsibility is **to work to maintain international peace and security.**
- The council is **headquartered in New York.**

Members:

- The council has **15** members: the **five permanent members and ten nonpermanent members** elected for **two-year terms.**
- The **five permanent members are the United States, the Russian Federation, France, China and the United Kingdom.**
- India, for the **eighth time**, has entered the UNSC as a **non-permanent member** last year (2021) and will stay on the council **for two years i.e 2021-22**.
- **Each year,** the General Assembly **elects five non-permanent members** (out of ten in total) for a two-year term. The ten non-permanent seats are **distributed on a regional basis.**
- The **council's presidency is a capacity that rotates every month among its 15 members.**

Voting Powers:

- Each member of the Security Council **has one vote**. Decisions of the Security Council

on matters are **made by an affirmative vote of nine members including the concurring votes of the permanent members.** A "No" vote from one of the five permanent members blocks the passage of the resolution.

- Any member of the United Nations which is **not a member of the Security Council may participate**, without vote, in the discussion of any question brought before the Security Council whenever the latter considers that the interests of that member are specially affected

Topic 34. IMF CLEARS $3BILLION BAILOUT FOR SRI LANKA

Important for subject: International Relations

- The **International Monetary Fund (IMF**) has cleared a **$3-billion Extended Fund Facility for Sri Lanka,** which is struggling to recover from an economic meltdown.
- The IMF package will help Sri Lanka access up to $7 billion in funding from IMF and various other International Financial Institutions.
- An IMF "governance diagnostic mission" has also started assessing Sri Lanka's governance and anti-corruption framework in its first such exercise in Asia.
- Sri Lanka's top three bilateral creditors namely India, Japan and China played a key role in unlocking the IMF assistance to the country, by providing financing assurances.

IMF Bailout Conditions

- In September 2022, International Monetary Fund (IMF) and the Sri Lankan authorities reached a staff-level agreement to support Sri Lanka's economic policies with a 48-month arrangement under the Extended Fund Facility (EFF) of about $3 billion.
- The objectives of Sri Lanka's new Fund-supported program are –
- To restore macroeconomic stability and debt sustainability, Stepping up structural reforms to address corruption vulnerabilities and unlock Sri Lanka's growth potential.

Extended Fund Facility

- The Extended Fund Facility (EFF) is a lending facility of the Fund of the IMF and it was established in 1974.
- The EFF provides financial assistance to countries facing serious medium-term balance of payments (BoP) problems because of structural weaknesses that require

time to address.

- To help countries implement medium-term structural reforms, the EFF offers longer program engagement and a longer repayment period.
- **Eligibility :**All member countries of IMF facing actual or potential external financing needs are eligible.
- **Conditions**:Countries' policy commitments are expected to focus on structural reforms to address institutional or economic weaknesses, in addition to policies to maintain macroeconomic stability.
- **Duration :**Typically approved for periods of 3 years, but may be approved for periods as long as 4 years to implement deep and sustained structural reforms.
- **Repayment :**Over 4½–10 years in 12 equal semi-annual instalments.
- **Has India availed the EFF in the past?**
- In **1980, India had borrowed $ 3.9 billion ,a record amount then under an extended fund facility from the IMF.**
- However, the then Government did not avail of the full amount as the economy recovered.
- During the **1991 economic crisis, India borrowed $ 2.2 billion from the IMF under two standby arrangements, between 1991 and 1993.**
- A little over a **decade later, India emerged as a creditor to the Fund** — as its economy recovered and its balance of payments position improved substantially.

Topic 35. GLOBAL SECURITY INITIATIVE (GSI)

Important for subject : International Relations

The **Global Security Initiative (GSI), a China-led framework** aiming to **restore stability and security in Asia,** appears to be more of a **counter-narrative to U.S. leadership** rather than a genuine attempt to establish a sustainable security order.

It was **stated that the five major pillars to implement GSI would be**:

1. Mutual respect
2. Openness and inclusion
3. Multilateralism
4. Mutual benefit

5. Holistic approach

Key Principles of GSI :

- China held that the Global security initiative is envisaged to uphold the principle of "indivisible security".
- The **principle of "indivisible security"** means that **no country can strengthen its own security at the expense of others.**
- This initiative would **build an Asian security model** of mutual respect, openness and integration.
- It would **oppose the destruction of the international order under the banner of so-called rules.**
- It will also oppose the dragging of the world under the cloud of the new cold war.
- This **initiative will oppose the use of the Indo-Pacific strategy to divide the region and create a new Cold War, a**nd the use of military alliances to put together an Asian version of NATO.

Topic 36. RESEARCHERS FIND 'PLASTIC ROCKS' ON ISLAND OFF BRAZIL

Important for subject : Science and technology

- The geology of Brazil's volcanic Trindade Island has fascinated scientists for years, but the discovery of rocks made from plastic debris in this remote turtle refuge is sparking alarm.
- **Melted plastic has become intertwined with rocks on the island**, located 1,140 km from the southeastern state of Espirito Santo, which researchers say is evidence of humans' growing influence over the earth's geological cycles.
- Santos' team ran chemical tests to find out what kind of plastics are in the rocks called "**plastiglomerates**" because they are made of a mixture of sedimentary granules and other debris held together by plastics.
- They found that the pollution coming from fishing nets is the common debris on Trinidade Island's beaches.

Plastiglomerate

- Plastiglomerate is a **rock made of a mixture of sedimentary grains, and other natural debris** (e.g. shells, wood) that is held together by plastic.

- It has been considered a potential marker of the Anthropocene, an informal epoch of the Quaternary proposed by some social scientists, environmentalists, and geologists.
- Plastiglomerate could **potentially form a marker horizon of human pollution on the geologic record** and may survive as future fossils.
- Plastiglomerate may also conceivably form in plastic-polluted regions affected by lava flows or forest fires.
- They have been **found on the surface as well as beneath the sand**.
- This suggests that plastiglomerates are being actively deposited into the sedimentary record.
- **Trindade and MartimVaz Archipelago**
- Trindade and MartimVaz is an archipelago located in the South Atlantic Ocean about 1,100 kilometres (680 miles) east of the coast of the Brazilian state of Espírito Santo, of which it forms a part.
- The **islands are of volcanic origin and have rugged terrain**. They are largely barren, except for the southern part of Trindade.
- They were discovered in 1502 by Portuguese explorer Estevao da Gama and stayed Portuguese until they became part of Brazil at its independence in 1822.

Topic 37. STARBERRY-SENSE: A LOW-COST STAR SENSOR

Important for subject : Science and technology

Researchers at the **Indian Institute of Astrophysics** (IIA) have developed a **lowcost star sensor** for astronomy and small CubeSat class satellite missions.

Star Sensor

- Any satellite needs to know where it is pointed in space, and the instrument used for this purpose is called a **star sensor.**
- The position of stars in the sky is fixed relative to each other and can be used as a stable reference frame to calculate the orientation of a satellite in orbit.
- This is done by correctly identifying the stars in the sky towards which the star sensor is pointed.
- **The star sensor is essentially a celestial compass.**
- **High cost of Star Sensors**

- In recent years CubeSats and small satellite missions have gained huge popularity.
- These missions utilize commercially available components for their design and development, but the typical cost of a commercially available star sensor often exceeds the total budget for a CubeSat.

Starberry-Sense

- Based on commercial/off-the-shelf components, this **star sensor costs less than 10% of those available in the market.**
- It is made from a **single-board Linux computer called Raspberry Pi**, which is widely used among electronics hobby enthusiasts.
- The star sensor has successfully undergone the vibration and thermal vacuum test that qualifies it for a space launch and operations.
- These tests were conducted in-house at the environmental test facility located at the CREST Campus of IIA in Hosakote.

Applications

- Starberry-Sense can help **small CubeSat class satellite missions find their orientation in space.**
- Its modular design **allows for quick and easy customization for various requirements**.
- For e.g., even though StarBerry-Sense is meant for space-based applications, a modified version will be interfaced with the Major Atmospheric Cherenkov
- Experiment (MACE), located at the Indian Astronomical Observatory (IAO), Hanle, Ladakh.
- The **Starberry-Sense is ready for launch on the PS4-Orbital Platform by ISRO** and can be **used for CubeSats and other small satellite missions in the future**.

CubeSats

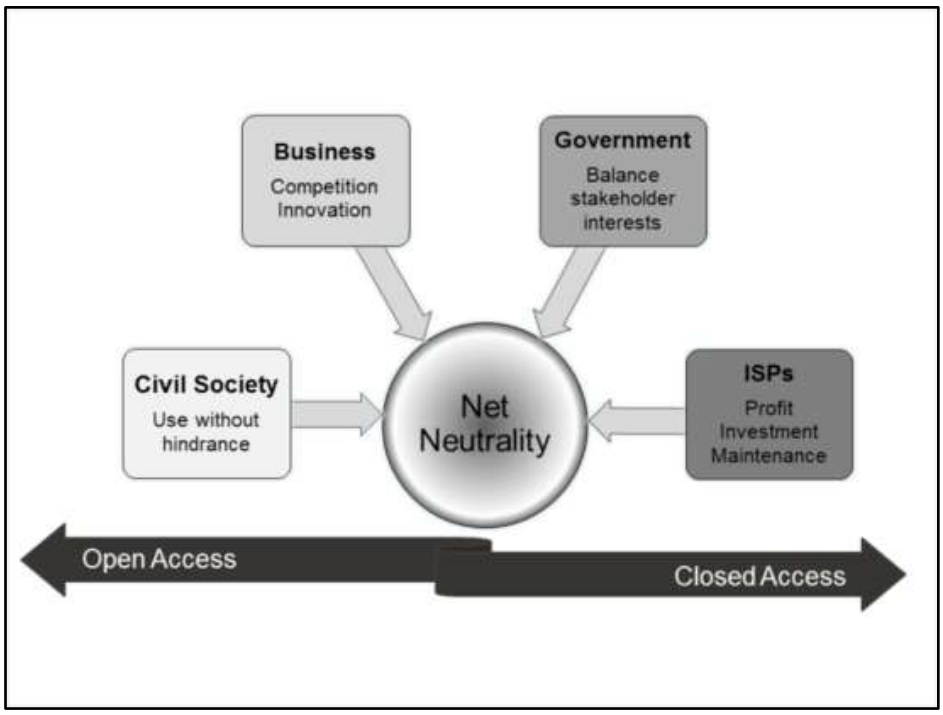
- CubeSats are a **class of research spacecraft called nanosatellites**.
- CubeSats are **built to standard dimensions** (Units or “U”) of 10 cm x 10 cm x 10 cm.
- They can be 1U, 2U, 3U, or 6U in size, and typically weigh less than 1.33 kg per U.
- These are **employed for the In-Orbit Demonstration (IOD) of miniaturised**

technologies and for small payload-driven missions.

- CubeSats **reduce launch costs in two fundamental ways**.
- They don't weigh that much, which means a rocket doesn't need a lot of fuel to heft them.
- In most cases, they also share a rocket with a larger satellite, making it possible to get to space on the coattails of the heavier payload.
- There are some design challenges with cubesats.
- However,the electronics are smaller and are therefore more sensitive to radiation.
- Their low cost also means they are generally designed to last for a shorter duration of time.

Topic 38. NET NEUTRALITY DEBATE

Important for subject : Science and technology



- Since November 2022, the **Cellular Operators Association of India** (COAI), which represents major telecom operators in India, **has been demanding that platforms such as YouTube and WhatsApp pay a share of revenue to make up for the network costs.**
- In an immediate response to this demand, the Broadband India Forum (BIF), which represents Internet firms such as Meta and Google, wrote a letter to the Department of

Telecommunications (DoT) rebutting the COAI's demands.

- This has reignited the debate around Net Neutrality.
- **Different Stakeholders in Internet Space**
- Consumers of any internet service, Telecom Service Providers (TSPs) or Internet Service Providers (ISPs), Over-the-top (OTT) service providers (those who provide internet access services such as websites and applications), and Government, who may regulate and define relationships between these players.

Net Neutrality

- The principle of net neutrality states that internet users should be able to access all content on the internet without being discriminated by TSPs.
- This means that –
- All websites or applications should be treated equally by TSPs, All applications should be allowed to be accessed at the same internet speed, and All applications should be accessible for the same cost.
- Net neutrality argues that the internet should be accessible to everyone and requires all ISPs to provide the same level of data access and speed to all traffic.
- Traffic to one service or website cannot be blocked or degraded.

What will happen if there is no Net Neutrality?

- If there no net neutrality, ISPs will have the power (and inclination) to shape internet traffic so that they can derive extra benefit from it.
- For example, **several ISPs believe that they should be allowed to charge companies for services like YouTube and Netflix because these services consume more bandwidth compared to a normal website.**
- Basically, these ISPs want a share in the money that YouTube or Netflix make.
- Without net neutrality, the internet as we know it will not exist. Instead of free access, there could be package plans for consumers.
- For example, if you pay Rs 500, you will only be able to access websites based in India. To access international websites, you may have to pay a more.
- Or maybe there can be different connection speed for different type of content, depending on how much you are paying for the service and what add-on package you

have bought.

- Instead of an open and free internet, without net neutrality, we are likely to get a web that has silos in it and to enter each silo, you will have to pay some "tax" to ISPs.

Regulation of Net Neutrality

- Until now, **net neutrality has not directly been regulated in India by any law or policy framework.** Earlier, in **2016, the TRAI had ruled in favour of net neutrality**.
- However, **despite lack of formal rules, ISPs in India mostly adhere to the principal of net neutrality.**
- There have been some incidents where Indian ISPs have ignored net neutrality but these are few and far between.
- Internationally, **countries like the USA, Japan, Brazil, Chile, Norway, etc. have some form of law, order or regulatory framework in place** that affects net neutrality.
- The US Federal Communications Commission (telecom regulator in the USA) released new internet rules in March 2015, which mainly disallow blocking, throttling or slowing down, and paid prioritization of certain applications over others.
- While the UK does not allow blocking or throttling of OTT services, it allows price discrimination.

Topic 39. C-VEDA PROJECT

Important for subject : Science and technology

The journey from childhood to adulthood is uneven: some mental attributes surface faster than others, some are more pronounced in girls, and poverty and trauma have an outsized influence on cognitive development, says one of the largest studies of its kind, spanning nearly 9,000 children and young adults from India.

About C-Veda Project

- The **Consortium on Vulnerability to Externalizing Disorders and Addictions (VEDA)** is **jointly funded** by **the Indian Council for Medical Research (ICMR**) and the Newton Grant from the Medical Research Council (MRC), **United Kingdom**.
- The Consortium on Vulnerability to Externalizing Disorders and Addictions (cVEDA), based in India, **aims to examine environmental influences on genomic**

variations, neurodevelopmental trajectories and vulnerability to psychopathology, with a focus on externalizing disorders.

- The VEDA has **established the largest neurodevelopmental database in India, comparable to global datasets, with detailed environmental characterization**.
- This should permit identification of environmental and genetic vulnerabilities to psychopathology within a developmental framework.
- Neuroimaging and neuropsychological data from this study are already yielding insights on brain growth and maturation patterns.

Methodology:

- 10**,000 individuals between 6 and 23 years of age, of all genders**, representing five geographically, ethnically, and socio-culturally distinct regions in India, and exposures to variations in early life adversity **have been assessed using age appropriate instrument**s to capture socio-demographic information, temperament, environmental exposures, parenting, psychiatric morbidity, and neuropsychological functioning.
- All data and biological samples are maintained in a databank and biobank, respectively.

Topic 40. MAGELLAN SPACECRAFT RECORDS VOLCANIC ACTIVITY ON VENUS

Important for subject: Science and Technology

Recently, NASA Magellan spacecraft captured images of Venus' surface from different orbits. A few locations, including those suspected to have volcanic activity, were observed two or three times over two years.

Findings of the Magellan spacecraft

- A **2 square kilometre volcanic vent on Venus changed shape** in eight months, **indicating volcanic activity**.
- It showed signs of drained lava, hinting at activity and eight months later, radar images indicated that the same vent had doubled in size and the lava lake seemed to have reached the rim.
- The vent is **associated with Maat Mons, Venus's second-highest volcano.**

- It sits in the Atla Regio, a vast highland **region near Venus' equator**. These changes were likely due to lava flow escaping the vent, hinting at a possible volcanic activity.

Magellan spacecraft Mission

- NASA's Magellan mission to Venus was one of the most successful deep space missions.
- It was the first spacecraft to image the entire surface of Venus and made several discoveries about the planet it was **launched on May 4, 1989.**

About Venus

- It is the **second closest planet to the sun** and the sixth-largest planet in the solar system. It is also **known as earth's twin.**
- It is the **hottest planet in the solar system** and its extreme temperatures (450o C) and acidic clouds make it an unlikely place for life.
- Along with Uranus it spins backwards with respect to other planets i.e. Its **sun rises in the west and sets in the east.**
- Along with Mercury it has **no moons and no rings**.
- **Upcoming Expeditions to Venus**
- The **Indian Space Research Organisation is also working on Shukrayaan-1 to study Venus.** The orbiter will likely study the planet's geological and volcanic activity, emissions on the ground, wind speed, cloud cover, and other planetary characteristics from an elliptical orbit
- The new study will help to identify target areas for future missions such as Europe's **Envision that is scheduled to launch in 2032.**
- Two missions are being planned to Venus that are **NASA's VERITAS and DAVINCI are expected to observe venus in the 2030s.**

Topic 41. MICROSOFT 365 CO-PILOT

Important for subject: Science and Technology

Microsoft has launched **Copilot,** bringing in the power of generative artificial intelligence to most of its apps in the **Microsoft Office 365 suite.**

- **Copilot** is integrated into **Microsoft 365** in **two ways.** Firstly, it has been **integrated**

with the apps such as **Word, Excel, PowerPoint, Outlook, and Teams.**

- Secondly, it has launched **Business Chat,** which works across your calendar, emails, chats, documents, meetings and contacts to lessen your drudgery and make you more productive.
- Earlier this month **Microsoft** unveiled **Dynamics 365 Copilot.**
- The **AI tool** is meant to **assist applications** that handle tasks such as sales, marketing and customer service.
- Based on technology from OpenAI, the software can draft contextual chat and email answers to customer-service queries.

What can copilot do?

- Copilot can give you a first draft, based on the prompts you give, to edit and iterate on. This can save you a lot of effort and time.
- In **Power Point**, it can help you in creating 'beautiful' presentations with a simple prompt, adding relevant content from a document you made last week or last year.
- Copilot in **Excel** can analyse trends and create professional-looking data visualisations in seconds.
- In **Outlook**, Copilot helps you clear your inbox in minutes.
- In **Teams**, it can summarise key discussion points — including who said what and where people are aligned, and where they disagree.
- One can ask it to write a message to one's team about the updated product strategy. In no time, it can generate a quick summary based on the meeting one held an hour ago based on the meetings, emails and chat threads around the meeting.

Topic 42. WHAT IS GPT-4 AND HOW IS IT DIFFERENT FROM CHATGPT?

Important for subject: Science and Technology

Model	Parameters	Dataset
GPT-1 (2018)	117M	5GB
GPT-2 (2019)	1.5B	40GB
GPT-3 (2020)	175B	45TB

AI powerhouse **Open AI** announced **GPT-4,** the next big update to the technology that powers ChatGPT and Microsoft Bing, the search engine using the tech.

- **GPT-4** is supposedly **bigger, faster, and more accurate than ChatGPT,** so much so, that it even clears several top examinations with flying colours, like the Uniform Bar Exam for those wanting to practice as lawyers in the US.
- Where GPT-3.5-powered ChatGPT only accepted text inputs, GPT-4 can also use images to generate captions and analyses. But that's only the tip of the iceberg.
- **About GPT 4.0:**
- Generative Pre-training Transformer or GPT-4 is a large multimodal model created by OpenAI.
- **Multimodal models** can encompass more than just text – **GPT-4 also accepts images as input.**
- **GPT-3** and **GPT-3.5** only operated in one modality, text, meaning users could only ask questions by typing them out.
- Open AI says that **GPT-4** also **"exhibits human-level performance on various professional and academic benchmarks."**
- The language model can pass a simulated bar exam with a score around the top 10 per cent of test takers and can solve difficult problems with greater accuracy.
- **For example,** it can "answer tax-related questions, schedule a meeting among three busy people, or learn a user's creative writing style."
- **GPT-4** is also capable of handling over **25,000 words of text,** opening up a greater number of use cases that now also include long-form content creation, document search and analysis, and extended conversations.
- **How is it different from GPT 3.0?**
- The **most noticeable change to GPT-4 is that it's multimodal,** allowing it to understand more than one modality of information.
- **GPT-3** and **ChatGPT's GPT-3.5** were limited to **textual input and output,** meaning they could only read and write.
- However, **GPT-4** can be fed images and asked to output information accordingly.
- It can analyse the image as well unlike the Google lens which can only provide information related to the image.
- One of the biggest drawbacks of Generative models is that they get the facts mix up

and provide misinformation. OpenAI claims that GPT 4.0 has been trained to avoid those mistakes.

- **GPT-4 can process a lot more information at a time:**
- **ChatGPT's GPT-3.5 model** could handle **4,096 tokens or around 8,000 words** but **GPT-4** pumps those numbers up to **32,768 tokens or around 64,000 words.**
- **GPT-4** has an improved accuracy, **upto 40%** higher than that of **GPT 3.5.**
- GPT-4 is better at understanding languages that are not English.

Applications of GPT 4.0:

- **GPT-4** has already been **integrated** into products like **Duolingo, Stripe, and Khan Academy** for varying purposes.
- Microsoft has confirmed that the new Bing search experience now runs on GPT-4.

Topic 43. BACKGROUND RADIATION HIGHER IN KERALA, BUT NO RISK: STUDY

Important for subject :Science and Technology

In parts of Kerala, **background radiation levels** are nearly three times more than what's been assumed, a pan-India study by scientists at **the Bhabha Atomic Research Centre (BARC) has found.**

Background radiation

- **Background radiation** is a **measure of the level of ionizing radiation present in the environment** which is **not due to deliberate introduction** of radiation sources.
- Background radiation originates from a variety of sources, both natural and artificial.
- Background radiations are the radioactive radiations **such as alpha, beta, and gamma.**

How radiation occurs?

- Radiation results from the disintegrating nucleus of an unstable element and these can be from anywhere, including from inside our bodies to the constituents of matter.
- Gamma rays are a kind of radiation that can pass unobstructed through matter.
- Though extremely energetic, they are harmless unless present in large concentrated doses.

Limitations on radiation exposure:

- The **International Atomic Energy Agency (IAEA) specifies maximum radiation exposure levels** and this **has also been adopted by India's atomic energy establishment.**
- Public exposure should **not exceed 1 milli-Sievert every year**.
- Those who work in plants shouldn't be exposed to over 30 milli-Sievert every year.

Current levels in Kerala:

- The present study found that average natural background levels of gamma radiation in India was roughly 0.8 milli sievert/year.
- This doesn't mean that those at Kollam are being exposed to higher, dangerous levels of radiation.

Causes of background radiation in India:

- The **higher radiation levels in Kollam** (Kerala) are **attributed to monazite sands that are high in thorium.**
- In **southern India**, because of the **presence of granite and basaltic, volcanic rock** has higher levels of radiation from uranium deposits.
- **Sievert (symbol: Sv)**
- It is a **unit in the International System of Units** (SI) intended to **represent the stochastic health risk of ionizing radiation**, which is defined as the probability of causing radiation-induced cancer and genetic damage. The sievert is important in dosimetry and radiation protection.

Topic 44. DIRT CHEAP BACKUP: WHY FINLAND'S INSTALLATION OF THE WORLD'S 1ST SAND BATTERY MAY BE A GAME-CHANGER

Important for subject : Science and Technology

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.
- The battery uses **sand as a medium to store thermal energy.**It was invented by **Polar Night Energy.**

- The**battery has four metres wide** and **seven metres high steel container** with **100 tonnes** of recycled sand.
- The latest battery model can **store up to 8 megawatt-hours of energy**as heat.
- The reservoir is so well-insulated from the outer environment that**it can retain temperatures up to 600 degrees Celsius** and prevent heat losses over time.
- The sand at the core is very far from the boundary, so the heat stored in the core does not easily get lost, even if we wait for days or weeks.
- The battery receives electricity from the grid through excess solar and wind power, which is converted to heat and transferred to the sand.

Why sand?

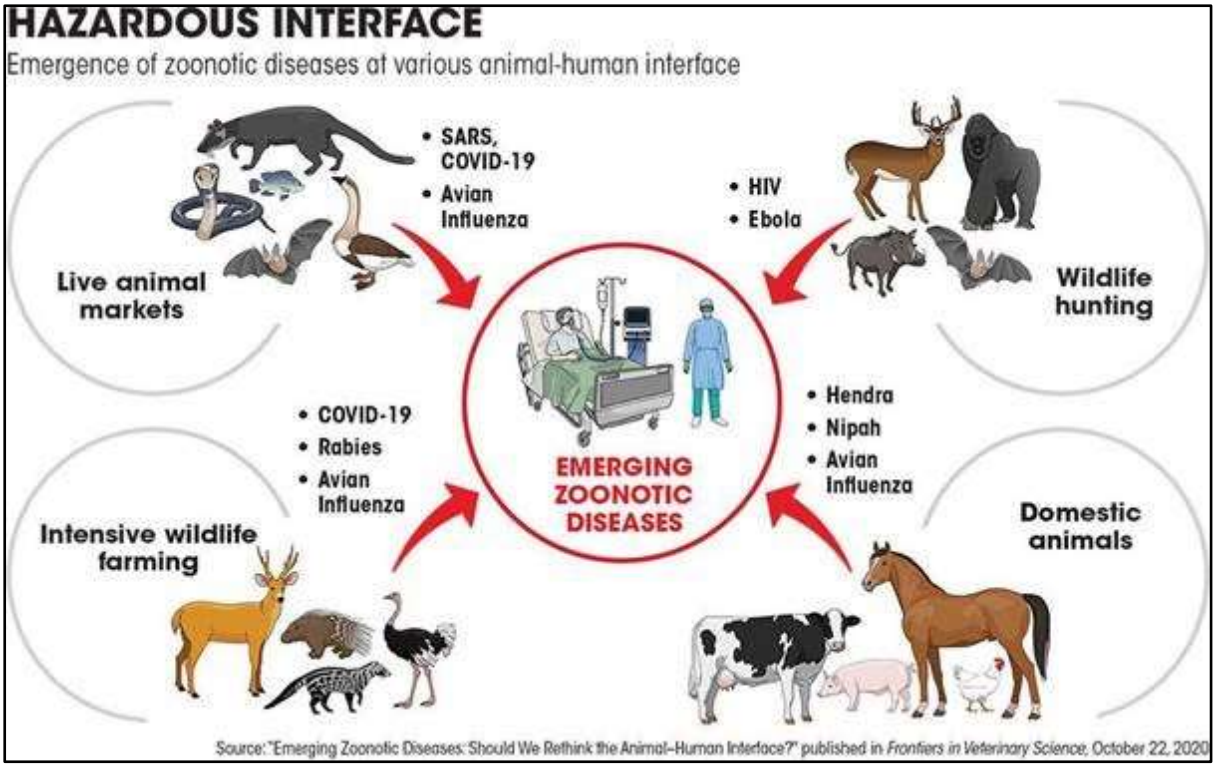
- Sand is a very effective medium for retaining heat over a long period, storing power for months at a time.
- Its main purpose is to **work as a high-power and high-capacity reservoir for excess wind and solar energy.**The energy is stored as heat, which can be used to heat homes, or to provide hot 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.

Significance:

- **Water-based storage systems** are a **renewable alternative** to produce building heat.
- The **sand battery** can store heat up to **600 degrees Celsius,** thus having a great significance.

Topic 45. ZOONOSES THEORY

Important for subject : Science and technology



Undisclosed genetic data from a food market in Wuhan has been unearthed and is being used to support the zoonoses theory over the lab leak theory.

These findings were presented to the Scientific Advisory Group for the Origins of Novel Pathogens, an expert body constituted by the WHO.

Zoonosis

- A zoonosis is an infectious disease of humans caused by a pathogen (an infectious agent, such as a bacterium, virus, parasite or prion) that can jump from a non human (usually a vertebrate) to a human and vice versa.
- **Examples :**
- Major modern diseases such as Ebola virus disease and salmonellosis are zoonoses.
- HIV was a zoonotic disease transmitted to humans in the early part of the 20th century, though it has now evolved into a separate human-only disease.
- Most strains of influenza that infect humans are human diseases, although many strains of bird flu and swine flu are zoonoses. These viruses occasionally recombine with human strains of the flu and can cause pandemics such as the 1918 Spanish flu or

the 2009 swine flu.

Modes of Transmission

- **Direct Zoonosis**
- Zoonoses have different modes of transmission. In direct zoonosis the disease is **directly transmitted from non-humans to humans** through media such as air (influenza) or through bites and saliva (rabies).
- **Reverse zoonosis or Anthroponosis**
- In contrast, **transmission can also occur via an intermediate species** (referred to as a vector), which **carry the disease pathogen without getting sick**.
- When **humans infect non-humans**, it is called **reverse zoonosisor anthroponosis**.

Causes of Zoonoses

- The emergence of zoonotic diseases originated with the domestication of animals.
- Zoonotic transmission can occur in any context in which there is contact with or consumption of animals, animal products, or animal derivatives.
- This can occur in a companionistic (pets), economic (farming, trade, butchering, etc.), predatory (hunting, butchering or consuming wild game) or research context.
- According to a report from **the United Nations Environment Programme** and **International Livestock Research Institute** large part of the **causes are environmental like climate change, unsustainable agriculture, exploitation of wildlife, land use change.**

Topic 46. INS ANDROTH

Important for subject: Science and technology

The INS Androth, the second in a series of eight Anti-Submarine Warfare Shallow Water Craft (ASW SWC), was launched recently.

About INS Androth:

- It is an **Anti-Submarine Warfare Shallow Water Craft** (ASW SWC). It is built by **Garden Reach Shipbuilders and Engineers (GRSE) in Kolkata** for the Indian Navy.
- **Primary Role**: To conduct anti-submarine operations in coastal waters, low-intensity

maritime operations, and mine-laying operations.

- It is also capable **of full-scale sub-surface surveillance of coastal waters** and various surface platforms and coordinated ASW operations with aircraft.

Features:

- It is about 77.6 meters long and 10.5 meters wide and requires a draught of only 2.7 meters.
- It is **propelled by three diesel-driven water jets**.
- It can attain a **maximum speed of 25 knots.**
- It carries lightweight torpedoes, ASW rockets and mines, a close-in weapon system (with a 30 mm gun), and 16.7 mm stabilized remote-controlled guns.
- It will be fitted with hull-mounted sonar and a low-frequency variable depth sonar.
- External Affairs Minister, S. Jaishankar announced the rollout of a technological platform in partnership with the UN — '**UNITE Aware'** — to help **enhance the safety of UN peacekeepers.**
- The launch of the UNITE AWARE platform came as **India assumed the Presidency of the 15-nation UN Security Council for the month of August.**
- This project aims to demonstrate the impact of **modern surveillance technology** on the **detection of asymmetric threats.**
- **Situational Awareness Software Programme:** It utilises modern surveillance technology for real time threat assessments to peacekeepers in maintaining security.
- India has developed the technology platform in partnership with **the UN Department of Peacekeeping Operations** and the **Department of Operational Support.**
- Deployment: The platform will be deployed **initially in four UN Peacekeeping**
- **Missions:** MINUSMA (Mali), UNMISS (South Sudan), UNFICYP (Cyprus) and AMISOM (Somalia).
- India's Contribution: **India has contributed USD 1.64 million for this project.**

UN Peace keeping:

- **Joint Effort:** It is a joint effort between the **Department of Peace Operations** and the **Department of Operational Support.**
- It deploys troops and police from around the world, integrating them with civilian

peacekeepers to address a range of **mandates set by** the **UN Security Council (UNSC)** and the **General Assembly.**

- **Every peacekeeping mission is authorized by the Security Council.**

Financial Contribution: The financial resources of UN Peacekeeping operations are the **collective responsibility of UN Member States**.

- According to the UN Charter, **every Member State is legally obligated** to pay their respective share for peacekeeping.
- **India's Contribution –** India is a major contributing nation to UN peacekeeping activities.
- Currently, there are 5506 troops and police from India who have been deployed to nine different UN peacekeeping missions, the **second highest amongst troop-contributing countries.**
- India has a long tradition of sending **women on UN peacekeeping missions.**
- In 2007, India became the first country to deploy an all-women contingent to a UN peacekeeping mission.

The top 5 providers of assessed contributions to United Nations Peacekeeping operations for 2020-2021 are:

1. United States (27.89%).
2. China (15.21%).
3. Japan (8.56%).
4. Germany (6.09%).
5. United Kingdom (5.79%).

Topic 47. TOO-BIG-TO-FAIL BANKS

Important for subject : Economy

The failure of Silicon Valley Bank and Signature Bank in the US has raised questions about the safety of deposits. Such failures are unlikely in the Indian system. Also, RBI has classified SBI, ICICI Bank, and HDFC Bank as D-SIBs.

Resilience of Indian Banks

- In banking, confidence is important and no amount of capital will save a bank if the

trust is lost.

- **During the 2008 crisis** triggered by the collapse of investment bank Lehman Brothers, **domestic banks in India backed by sound regulatory practices showed strength and resilience.**
- A reason why an SVB-like failure is unlikely in India is that **domestic banks have a different balance sheet structure.**
- Unlike the US, where a **large portion of bank deposits are from corporates, household savings constitute a major part of bank deposits in India**, which cannot be withdrawn in bulk quantities.
- A large chunk of Indian deposits is with public sector banks, and most of the rest is with very strong private sector lenders such as HDFC Bank, ICICI Bank and Axis Bank.
- Customers need not worry about their savings, as the **government and the regulators (SEBI, RBI) have always stepped in when banks have faced difficulties**. For example, the rescue of Yes Bank where a lot of liquidity support was provided.

Domestic-Systematically Important Banks

- A **bank is considered a D-SIB if its failure might seriously disrupt the financial system due to the bank's size, cross-jurisdictional activities, complexity, lack of substitutability and interconnectedness**.
- Under the D-**SIB framework announced by the Reserve Bank of India (RBI) in 2014**, the central bank was required to –
- Disclose the names of banks designated as D-SIBs, and Place them in appropriate buckets depending upon their Systemic Importance Scores (SISs).
- Depending on the bucket in which a D-SIB is placed, an additional common equity requirement [Common Equity Tier 1 (CET1)] is applicable to it.
- Tier 1 capital (measured by the capital adequacy ratio (CAR)) is the core measure of a bank's financial strength from a regulator's point of view.
- It means that these banks have to earmark additional capital and provisions to safeguard their operations.
- RBI has **classified SBI, ICICI Bank and HDFC Bank as D-SIBs.**

G-SIBs

- Similarly, the **Basel – Switzerland-based Financial Stability Board (FSB**), an initiative **of G20 nations,** has identified, in consultation with the Basel Committee on Banking Supervision (BCBS), a **list of G-SIBs.**
- There are **30 G-SIBs currently (no Indian bank**), including JP Morgan, Citibank, HSBC, Bank of America, Bank of China, Barclays, BNP Paribas, Deutsche Bank, and Goldman Sachs.

Selection of D-SIBs

- The RBI **follows a two-step process to assess the systemic importance of banks**.
- First, a **sample of banks to be assessed** for their systemic importance is decided.
- All banks are not considered, as burdening smaller banks with onerous data requirements on a regular basis may not be prudent.
- Banks are selected based on an analysis of their size (**based on Basel-III Leverage Ratio Exposure Measure)** as a percentage of GDP.
- Banks having a size **beyond 2% of GDP** will be selected in the sample.
- Based on a range of indicators, a **composite score of systemic importance is computed for each bank.**
- Next, the D-SIBs are **segregated into buckets** based on their systemic importance scores.
- A D-**SIB in the lower bucket will attract a lower capital charge**, and a D-**SIB in the higher bucket will attract a higher capital charge.**
- **Additional Common Equity Requirement Applicable to D-SIBs**
- The cost of public sector intervention, and the consequential increase in moral hazard, required that future regulatory policies should **aim at reducing the probability of the failure of SIBs.**
- **SIBs are perceived as banks that are 'Too Big To Fail (TBTF**)', due to which these banks enjoy certain advantages in the funding markets.
- However, this perception creates an expectation of government support at times of distress, which encourages risk-taking, reduces market discipline, and increases the probability of distress in the future.
- It is therefore felt that SIBs should be Important for subjected to additional policy

measures to guard against systemic risks and moral hazard issues.

Why was it Considered Essential to Establish SIBs?

- During the 2008 crisis, problems faced by certain large and highly interconnected financial institutions hampered the orderly functioning of the global financial system.
- The failure of a large bank anywhere can have a contagion effect around the world.
- The impairment or failure of a bank will likely cause damage to the confidence in the banking system as a whole (chain effect) → affecting the domestic real economy → interconnectedness/globalisation → affect global economy.
- Therefore, government intervention was considered necessary to ensure financial stability in many jurisdictions.
- In **2010, the FSB recommended that all member countries should put in place a framework to reduce risks attributable to Systemically Important Financial Institutions (SIFIs) in their jurisdictions.**

Topic 48. IS DEPOSITORS' MONEY SAFE?

Important for subject: Economy

Serious thought to insuring deposits was given by the RBI and the Centre after the failure of the Palai Central Bank Ltd. and the Laxmi Bank Ltd. in 1960. **The Deposit Insurance Act, 1961 came into force on January 1, 1962.**

- **The preamble of the Deposit Insurance and Credit Guarantee Corporation Act,** 1961 states that it is an Act to provide for the establishment of a Corporation for the purpose of insurance of deposits and guaranteeing of credit facilities and for other matters connected therewith or incidental thereto.
- **The Deposit Insurance and Credit Guarantee Corporation (DICGC) is a wholly owned subsidiary of the Reserve Bank of India, taking care of insuring bank deposits.** The management of the Corporation vests with its Board of Directors, of which a Deputy Governor of the RBI is the Chairman.

Though the **scheme's prime objective is to protect bank depositors from the impact of bank failures, it has also served other unstated purposes like:**

- Bailing out cooperative banks at the cost of commercial banks

- Generating income for the central government by way of income tax
- Penalising depositors of government banks without any utility
- Diverting sizable deposit funds to the DICGC.

Banks covered by Deposit Insurance Scheme

- **All commercial banks** including the branches of foreign banks functioning in India, Local Area Banks and Regional Rural Banks.
- **Co-operative Banks** – All eligible co-operative banks as defined in Section 2(gg) of the DICGC Act are covered by the Deposit Insurance Scheme.
- All State, Central and Primary co-operative banks functioning in the States/Union Territories which have amended their Co-operative Societies Act as required under the DICGC Act, 1961, empowering RBI to order the Registrar of Co-operative Societies of the respective States/Union Territories to wind up a co-operative bank or to supersede its committee of management and requiring the Registrar not to take any action for winding up, amalgamation or reconstruction of a co-operative bank without prior sanction in writing from the RBI, are treated as eligible banks. At present all Cooperative banks are covered by the Scheme. The Union Territories of Lakshadweep and Dadra and Nagar Haveli do not have Co-operative Banks.
- **Under Section 11 of the DICGC Act, 1961**, all new commercial banks are required to be registered as soon as may be after they are granted licence by the Reserve Bank of India under Section 22 of the Banking Regulation Act, 1949.

Insurance coverage

- Initially, under the provisions of Section 16(1) of the DICGC Act, the insurance cover was limited to 1,500/- only per depositor(s) for deposits held by him (them) in the "same right and in the same capacity" in all the branches of the bank taken together. However, the Act also empowers the Corporation to raise this limit with the prior approval of the Central Government. Accordingly, the insurance limit was enhanced from time to time as follows:

1. 5,000/- with effect from 1st January 1968
2. 10,000/- with effect from 1st April 1970
3. 20,000/- with effect from 1st January 1976
4. 30,000/- with effect from 1st July 1980

5. 1,00,000/- with effect from 1st May 1993 onwards.
6. 5,00,000/- with effect from 4th February 2020 onwards.

Types of Deposits Covered

- DICGC insures all bank deposits, such as saving, fixed, current, recurring, etc. except the following types of deposits.
- Deposits of foreign Governments;
- Deposits of Central/State Governments;
- Inter-bank deposits
- Deposits of the State Land Development Banks with the State co-operative banks;
- Any amount due on account of and deposit received outside India
- Any amount which has been specifically exempted by the corporation with the previous approval of the RBI.

Premium:

- The Corporation has revised the premium further to **12 paise per 100 of assessable deposits per annum** from the half year beginning April 1, 2020 onwards with the objective of maintaining a strong DIF.
- The premium paid by the insured banks to the Corporation is required to be absorbed by the banks themselves so that the benefit of deposit insurance protection is made available to the depositors free of cost. In other words the **financial burden on account of payment of premium should be borne by the banks themselves and should not be passed on to the depositors.**
- Under Section 15A of the DICGC Act, the Corporation has the **power to cancel the registration of an insured bank if it fails to pay the premium for three consecutive half-year periods**. However, the Corporation may restore the registration of the bank, which has been de-registered for non-payment of premium, if the concerned bank makes a request on this behalf and pays all the amounts due by way of premium from the date of default together with interest.

Tax liability:

- The Corporation has been paying income tax since 1987-88. It is assessed for Income Tax as a 'company' as defined under the Income Tax Act, 1961, is also Important for

subject to service tax on premium income from October 1, 2011 and is liable to Goods and Services Tax with effect from July 1, 2017.

History:

- The Government of India, in consultation with the Reserve Bank of India, introduced a Credit Guarantee Scheme in July 1960. The Reserve Bank of India was entrusted with the administration of the Scheme, as an agent of the Central Government, under Section 17 (11 A)(a) of the Reserve Bank of India Act, 1934 and was designated as the Credit Guarantee Organization (CGO) for guaranteeing the advances granted by banks and other Credit Institutions to small scale industries. The Reserve Bank of India operated the scheme up to March 31, 1981.
- The Reserve Bank of India also promoted a public limited company on January 14, 1971, named the Credit Guarantee Corporation of India Ltd. (CGCI). The main thrust of the Credit Guarantee Schemes, introduced by the Credit Guarantee Corporation of India Ltd., was aimed at encouraging the commercial banks to cater to the credit needs of the hitherto neglected sectors, particularly the weaker sections of the society engaged in non-industrial activities, by providing guarantee cover to the loans and advances granted by the credit institutions to small and needy borrowers covered under the priority sector.
- With a view to integrating the functions of deposit insurance and credit guarantee, the above two organizations (DIC & CGCI) were merged and the present Deposit Insurance and Credit Guarantee Corporation (DICGC) came into existence on July 15, 1978. Consequently, the title of Deposit Insurance Act, 1961 was changed to 'The Deposit Insurance and Credit Guarantee Corporation Act, 1961 '.
- Effective from April 1, 1981, the Corporation extended its guarantee support to credit granted to small scale industries also, after the cancellation of the Government of India's credit guarantee scheme. With effect from April 1, 1989, guarantee cover was extended to the entire priority sector advances, as per the definition of the Reserve Bank of India. However, effective from April 1, 1995, all housing loans have been excluded from the purview of guarantee cover by the Corporation.

Topic 49. AMID HEAT OVER ADANI STOCKS, NSE SAYS ALL ITS DECISIONS 'TRANSPARENT'

Important for subject :Economy

- Amid criticism by the **Opposition of its decision to exclude three Adani group stocks from short-term surveillance**, NSE on Sunday defended its action, saying such moves are based on non-discretionary, pre-announced and automatically applicable rules and involve no human interventions.
- After the National Stock Exchange (**NSE) and BSE** last week **announced that three Adani group companies — Adani Enterprises, Adani Power and Adani Wilmar — will move out of the short-term additional surveillance measure (ASM**), the Congress had asked why the stock exchange regulator, the Securities and Exchange Board of India (Sebi), is standing by and allowing investors to take on added exposure to such stocks.

Additional Surveillance Mechanism (ASM)

- The **ASM was introduced in 2018 by SEBI** with the **intention to protect investors from market volatility and unusual changes in share price.**
- The shortlisting of securities for placing in ASM is based on criteria that are jointly decided by the Securities and Exchange Board of India (SEBI) and exchanges, covering the parameters of:
- High low variation, Client concentration, Close-to-close price variation, Market capitalization [Market Cap = Current Share Price * Total Number of Shares Outstanding. For example, a company with 20 million shares selling at $100 a share would have a market cap of $2 billion]
- Volume variation, Price-Earnings Ratio, (Read below) Delivery percentage, and Number of unique PANs.
- Put simply, an **ASM shortlisting signals to investors that the stocks have seen unusual activity.**
- The shortlisting of securities under ASM is **purely on account of market surveillance and it should not be construed as an adverse action against the concerned company / entity.**
- Stricter measures are imposed on those stocks to discourage speculators and intraday

traders from taking heavy positions in stocks.

Stricter Exchange Rules imposed on ASM stocks:

Percentage price band

- If Stock A enters the surveillance list today (say July 31), it will be moved into a percent price band on August 1. That is, its price can move only 5 percent either way from the previous day's closing level. The stock will be halted from trading for the rest of the day if it breaches the 5 percent limit.
- From the fifth trading day (August 7, in our example), 100 percent margin money will be required to trade Stock A.

Trade-To-Trade Settlement

- A stock in the surveillance list will be moved to a Trade-To-Trade Settlement if its PE ratio shoots above 100. It will be moved out of the list if its PE falls below 10 or below the ratio of Nifty 500 Index.
- Trade to Trade settlement is a segment where shares can be traded only for compulsory delivery basis.
- It means Trade to Trade shares cannot be traded on intraday. Each share purchased/sold which are parts of this segment need to be taken delivery by paying full amount.
- **Price to Earnings Ratio** or **Price Earnings Multiple** is the ratio of share price of a stock to its earnings per share (EPS).
- PE ratio is one of the most popular valuation metrics of stocks. It provides an indication of whether a stock at its current market price is expensive or cheap.

Topic 50. OUTCOME BUDGETING

Important for subject: Economy

What is outcome budgeting?

- Over the year's performance budget was seen as following output, rather than outcomes (Budget speech of 2005-06 highlighted this).
- Outcome budgeting lays emphasis on linkages between money allocated (outlay) and the outcomes (and not just outputs).

- It shifts the focus to the short and long-term **outcomes of governance**
- The outcomes are not just in Rupee terms, but in actual unit achieved (Ex- Actual KMS of road laid) and qualitative target it helped achieved.
- Outcome Budget was first introduced in India in 2005-06.
- From the 2006-07 financial year, every ministry handling a sector presents a preliminary outcome budget to the Ministry of Finance, which is responsible for compiling them

Understanding outlay, output and outcome

- **Outlays** are financial resources deployed for achieving certain outcomes.
- **Outputs** are a measure of the physical quantity of the goods or services produced through a government scheme or programme. They are usually an intermediate stage between 'outlays' and 'outcomes. For example, construction of a health care centre is the 'output', while increase in the literacy rate is the 'final outcome' or 'impact'.
- **Outcomes** or impact are the end results of various government initiatives. Going beyond mere 'outputs', they cover the quality and effectiveness of the goods or services.

Topic 51. RING-FENCING OUR BANKS

Important for subject: Economy

Banking crisis in US

- While dealing with increased financial distress, banks look to the central bank or the government to come to their rescue. Liquidity Coverage Ratio is the financial shield that protects a bank from an impending bankruptcy
- A major fault line that the financial crisis of 2008 exposed in banking sectors worldwide was the improper monitoring of the liquidity risk. A steep fall in the US housing market led to extreme financial stress in the US between mid-2007 and early 2009. Numerous banks worldwide recorded huge losses and relied on central banks to avoid bankruptcy.
- Liquidity Coverage Ratio was thus devised to control and monitor the liquidity of financial firms from 2009. Comprehensive measures were undertaken to respond to the global financial crisis, called the "**Basel III post-crisis reforms".**

Liquidity Coverage Ratio: what is it?

- When the financial crisis hit, many banks worldwide faced a liquidity shock. They didn't have enough assets that could be converted into cash to avoid defaulting.
- Liquidity Cover Ratio (LCR) requires a bank to maintain a certain stock of High Quality Liquid Assets (HQLA) to help it weather a stressful period, like the financial crisis of 2008.
- It helps the bank stay afloat during a financial crisis, at least until the government or the central bank can come to its rescue.
- In India, the Reserve Bank of India (RBI) implemented LCR on 1st January 2015, after the Indian framework for LCR requirements was issued on 9th June 2014.
- The LCR is designed to ensure that banks hold a sufficient reserve of high-quality liquid assets (HQLA) to allow them to survive a period of significant liquidity stress lasting 30 calendar days.

Topic 52. BIS AND BASEL NORM

Important for subject: Economy

What is Basel Committee?

- The Basel Committee – initially named the **Committee on Banking Regulations and Supervisory Practices** was established by the central bank Governors of the Group of Ten countries at the **end of 1974** in the aftermath of serious disturbances in international currency and banking markets
- The BCBS is the **primary global standard setter for the prudential regulation of banks** and provides a forum for **cooperation on banking supervisory matters**.
- Its mandate is to **strengthen the regulation, supervision and practices of banks** worldwide with the purpose of enhancing financial stability.
- The BCBS **does not possess any formal supranational authority**.
- Its decisions do not have legal force. Rather, the BCBS relies on its members' commitments
- **BCBS members** include organisations with **direct banking supervisory authority and central banks.**

Basel Accords

- The Basel Accords are **three series of banking regulations** (Basel I, II, and III) set by the Basel Committee on Bank Supervision (BCBS).
- The committee provides recommendations on banking regulations, specifically, concerning capital risk, market risk, and operational risk. The accords ensure that financial institutions have enough capital on account to absorb unexpected losses.
- In 2010, Basel III guidelines were concluded. These guidelines were introduced in response to the financial crisis of 2008. The guidelines aim **to promote a more resilient banking system** by focusing on four vital banking parameters viz**. capital, leverage, funding and liquidity**.

Topic 53. CRR

Important for subject :Economy

It is a certain minimum amount of deposit that the commercial banks have to hold as reserves with the central bank.

- The percentage of cash required to be kept in reserves, vis-a-vis a bank's total deposits, is called the Cash Reserve Ratio.
- The cash reserve is either stored in the bank's vault or is sent to the RBI. Banks do not get any interest on the money that is with the RBI under the CRR requirements.

Primary purposes of the Cash Reserve Ratio

- Since a part of the bank's deposits is with the Reserve Bank of India, it ensures the security of the amount. It makes it readily available when customers want their deposits back. Also, CRR helps in keeping inflation under control.
- At the time of high inflation in the economy, RBI increases the CRR, so that banks need to keep more money in reserves so that they have less money to lend further.

Topic 54. STATUTORY LIQUIDITY RATIO

Important for subject: Economy

Statutory Liquidity Ratio popularly called SLR is the minimum percentage of deposits that the commercial bank maintains through gold, cash and other securities. However, these deposits are maintained by the banks themselves and not with the RBI or Reserve Bank of India.

- Section 24 and Section 56 of the Banking Regulation Act 1949 mandates all scheduled commercial banks, local area banks, Primary (Urban) co-operative banks (UCBs), state co-operative banks and central co-operative banks in India to maintain the SLR.
- Assets held under SLR are ones that can easily be converted into cash, gold and SLR securities:

Dated securities

- **Treasury Bills of the Government of India;**
- **Dated securities of the Government of India issued from time to time under the market borrowing programme and the Market Stabilization Scheme;**
- **State Development Loans (SDLs) of the State Governments issued from time to time under the market borrowing programme** Any other instrument as may be notified by the Reserve Bank of India

Topic 55. CREDIT SUISSE 17BILLION AT 1 BONDS HIT

Important for subject: Economy

- Swiss authorities brokering Credit Suisse's rescue merger with UBS have said 16 billion Swiss francs (**$17 billion or Rs 1.4 lakh crore approximately) of its Additional Tier 1 (AT1) debt will be written down to zero.**
- AT1 bond holders rank below those holding equity stakes in Credit Suisse who can expect to receive 0.76 Swiss francs per share.
- The writing down of the $17bn AT1 bonds to zero could result in chaos to the $ 275bn size of AT1 market in Europe.
- **Additional Tier-I Bonds**
- AT-1 bonds are a **type of unsecured, perpetual bonds** that **banks issue to shore up their core capital base to meet the Basel-III norms**.
- There are two routes through which these bonds can be acquired:
- Initial private placement offers of AT-1 bonds by banks seeking to raise money. Secondary market buys of already-traded AT-1 bonds.
- AT-1 bonds are **like any other bonds issued by banks and companies, but pay a slightly higher rate of interest compared to other bonds.**
- These bonds are also listed and traded on the exchanges. So, if an AT-1 bondholder

needs money, **he can sell it in the secondary market.**

- Investors **cannot return these bonds to the issuing bank and get the money**. i.e there is no put option available to its holders.
- However, the **issuing banks have the option to recall AT-1 bonds issued by them** (termed call options that allow banks to redeem them after 5 or 10 years).
- **Banks** issuing AT-1 bonds **can skip interest payouts for a particular year or even reduce the bonds' face value.**
- **AT-1 bonds are regulated by RBI.** If the RBI feels that a bank needs a rescue, it can simply ask the bank to write off its outstanding AT-1 bonds without consulting its investors.

Topic 56. FOREIGN BANKS IN INDIA

Important for subject : Economy

The proposed takeover of Swiss bank Credit Suisse by its bigger rival UBS

What are foreign Banks?

- Financial institutions that serve customers outside of their own country are referred to as "Foreign Banks." A Foreign Bank branch operates as a kind of international bank, Important for subject to the regulations of both its home country and the country in which it has a physical presence. As of the year 2022, 46 international banks have established operations in India, as reported by the country's central bank. A total of 45 international banks operate in India, with most of their roughly 300 branches concentrated in the country's largest cities.
- Their presence but their presence is relatively small—with a 6 per cent share in total assets,4per cent in loans, and 5 per cent in deposits. They are more active in the derivative markets (forex and interest rates),where theyhavea50per cent share.
- Most are there as branches of the parent bank, with only a few present as a wholly owned subsidiary. But they retain capital,liquidity, and make annual report disclosures similar to Indian banks. The five biggest foreign banks in India by assets are **HSBC, Citibank**(which has sold its consumer business to Axis), **Standard Chartered, Deutsche Bank,** and **JP Morgan Chase** (the largest US bank)

Why are they important?

- Foreign companies operating in a country may have a positive impact in two ways: they can raise the volume of the country's exports and imports, and they can provide more job possibilities for the country's skilled workers.
- **Functioning of foreign Banks :**
- Foreign banks in India account for only 1% of the country's branch network, but they contribute 11% of the country's banking sector profits. This is because these banks are specialised in areas like trade finance, wholesale lending, external commercial borrowing, treasury service, and investment banking rather than general retail banking.

Topic 57. CHENAB RIVER

Important for subject : Geography

River Chenab originates from **Lahaul valley of H.P Snow** bound mountains and have copious discharge all the year round and flow with steep bed slopes in the mountain reaches with a series of loops and bends, which can be economically harnessed for hydel generation. Total economic potential of Chenab Basin has been estimated to the tune of 3600 MW (firm) & installed capacity of 11,400 MW.

Physiography

- Detailed soil survey in the Chenab basin has not been carried out so far. However, in Himachal Pradesh part predominant types of soils found are sub-mountane in Chamba district, and sub-montane, glaciers and eternal snow in Lahul and Spitidistt.
- In J&K part, predominant soil are brown hill (on sand stones and shales) and sub-montane soils in Doda distt. Adnsub-mountain and mountain meadows in Udhampur district while in Jammu district, brown hill (on sand stones and shales) and alluvial soils are generally found. The Chenab, Indus & Jhelum basin has characterized by a wide variety of soils.
- The soils of the high Himalayas in the north are Important for subject to continuous erosion and thick silt sediment layers are deposited to form a wide valley plain.

River System

- The river Chenab (or Chandra Bhaga) is formed after the two streams the **Chandra** and the **Bhaga** merge with each other. The Chandra and the Bhaga originate from the southwest and north-west faces of **Barelacha pass** respectively in the **Himalayan canton** of **Lahul**and **Spiti**valley in **Himachal Pradesh.**
- The Chandra initially flowing southeast for about 88 kms. sweeps round the base of the mid-Himalayas and joins the Bhaga at Tandi, after traversing a total length of about 125 kms.
- The course of Bhagaupto the confluence is 80 kms only having a steep slope with an average fall of about 24 metres per kilometer. Thereafter the united stream, known as the Chenab or Chandra Bhaga, flows in a north-westerly course for about 46 kms where it receives its first major tributary the Miyar Nalla on the right bank.
- Then it flows for another 90 km generally in a northerly direction in Himachal Pradesh when it crosses the Pangi valley before entering to Padder area of Doda district of Jammu province in Jammu & Kashmir State.
- The river flows in a northwest direction in this reach for a distance of 56 km. when it is joined on the right by its biggest tributary, the Marusudar at Bhandalkot. Further Downstream, the river flows in a southerly direction for a distance of 34 km. uptoThathri and then takes a west ward course.
- In this reach about 17 kms downstream of Thathri, Niru Nallah joins the Chenab on

its left bank. The river Chenab thereafter flows generally in a northwest direction for another 41 km. till it receives a tributary Bichleri on the right bank.

- Afterwards, the river traverses in a westerly direction for a distance of about 50 kms. In this reach a number of small streams join in, namely Chaini, Talsuen, and Ans on the right bank, Yabu Nallah, Mandial and PainthalKhad on the left bank.
- of Ans river confluence the river changes its direction and flows in southerly course for about 45 kms. Upto Akhnoor where-after it enters into Sialkot district of Pakistan. Total length of the river from confluence of Chandra &Bhaga to Akhnoor is about 504 km.
- The main tributaries in its passage upto Kishtwar are the **Thirot, the Sohal, the Bhut nallah, the Liddrari and the Marusuda**r. The **Marusudar**is the biggest tributary of the Chenab and meets the Chenab at **Bhandalkot**. Between Kishtwar and Akhnoor, it receives the waters of the **Kalnai, the Neeru, the Raghi, the Bichleri** and the **Ans.** The **Tawi** and **ManawarTawi** join Chenab in Pakistan.
- In India, the watershed of the Chenab basin covers part of two States viz. **Himachal Pradesh** and **Jammu and Kashmir.** Upper Chenab catchment lies in Lahoul area and Pangi Tehsil of Chamba District of Himachal Pradesh.
- Brief description of some of the important tributaries of Chenab :

The Miyar Nalla.

- The Miyar Nalla rises in Himalayas from its southern near Lopen jot at about 5100m. After traversing of about 35 km in south-east direction, it takes a big loop and turn towards south west direction, After flowing about 60 km it joins the Chenab on its right bank opposite Udaipur. Its total length upto the confluence with Chenab river is tough high mountains on either side.

The Bhut Nalla.

- The Bhut Nalla is formed by two major streams near Matsel one flowing from north-west and the other from south-east. From Matsel it flows in the direction of south west. After traversing a distance of about 25 km it joins the Chenab on its right bank down stream of Gulabgarh. The total course of the river is through high mountains on either side.
- **The Marusudar.**

- The Marusudar is the biggest right bank tributary of the Chenab river. It originates from an elevation of about 5175 m. In the beginning two streams namely Batkot and Gumbar merge to form Warwan river, which is known as the Marusudar in the lower reaches. The Marusudar flows almost the north to south direction. Its catchment is almost fan shaped.
- The upper reaches are covered with glacier and the permanent snow line is considered generally around 4700m. The seasonal snowline is below this and glaciers descend upto an elevation of around 2500m. The entire reach of the Marusudar is through mountainous terrain with steep slopes and sharp bends between very high cliffs.

The Ans.

- The river is formed by two major streams. One flowing from west to east and the other from south west. The Ans after flowing for a distance of about 20 km in almost southerly direction joins the Chenab in its right bank, up stream of Salal H.E. project.

The Niru

- The Niru originates near Bhadarwah. It flows in north-west direction and after traversing a distance of about 30 km it joins the Chenab on its left bank near Doda. In this reach, the Niru takes a few sharp bends and also joined by two-three small nallas.

The Tawi River.

- The Tawi river is a major left bank tributary of the Chenab. It originates from outer Himalaya ranges in Udhampur district at an elevation of about 1220m. Initially it flows in westerly direction for about 16km and then takes a turn towards north west direction and flows for a distance of 27 km upto Sudhmahadev. There after it flows in westerly direction for about 5 km upto Chenani and further down in a westerly course upto Udhampur after which it takes a southerly course for about 24 km. The river finally joins the Chenab a little downstream of the international border in Pakistan. The total length of the river is about 141 km. The river generally flows through steep hills on either side except the lower reach of about 35 km.

Topic 58. NATIONAL INSTITUTE OF OCEAN TECHNOLOGY TO SET UP GREEN, SELF-POWERED DESALINATION PLANT IN LAKSHADWEEP

Important for subject : Geography

NIOT is providing potable water in six islands of Lakshadweep using Low Temperature Thermal Desalination technology.

- Stepping up from its ongoing initiative of **providing potable water in six islands of Lakshadweep** using Low Temperature Thermal Desalination (LTTD) technology, the Chennai-based National Institute of Ocean Technology (NIOT) is working at making this process free of emissions.
- Currently the desalination plants, each of which **provides at least 100,000 litres of potable water every-day**, are powered by diesel generator sets — there being no other source of power in the islands.
- However, **the need for diesel power** to reduce the water pressure means that the **process is not fossil-fuel free and also consumes diesel**, a precious commodity in the islands that has to be shipped from the mainland critical for powering the electric grid.

Low Temperature Thermal Desalination (LTTD) technology

- Low Temperature Thermal Desalination (LTTD) is a technology used for **desalination of seawater**, developed by the National Institute of Ocean Technology (NIOT), India.
- LTTD is a process that **uses the difference in temperature between surface seawater and deep seawater** to produce fresh water.
- **Working principle:** LTTD works on the **principle of thermodynamic heat exchange**, where the heat from warm surface water is used to evaporate a lowboiling-point fluid, such as ammonia, which is then condensed using the cold deep seawater.
- **Efficiency:** LTTD technology **has an efficiency of up to 35%,** which means that it can produce one cubic meter of fresh water using only 2-3 kWh of energy.
- **Applications**: LTTD technology has **applications in areas where there is a shortage of fresh water,** such as islands, coastal regions, and arid regions.
- **Advantages:** LTTD technology has several advantages over other desalination

methods, including **low energy consumption, low operating cost, and minimal environmental impact.**

- **Challenges:** One of the main challenges of LTTD technology is the maintenance of the heat exchanger, which requires special materials and techniques to withstand the corrosive nature of seawater.
- Future prospects: LTTD technology has the potential to be a sustainable and cost effective solution for desalination, and can play a crucial role in addressing the global water crisis.

National Institute of Ocean Technology

- The National Institute of Ocean Technology (NIOT) is an **autonomous organization** under **the Ministry of Earth Sciences,** Government of India.
- NIOT was **established in 1993** with the **aim of developing technology related to ocean exploration and ocean resource utilization**.
- The main objectives of NIOT include developing **technology for offshore exploration and exploitation of ocean resources,** promoting sustainable development of coastal areas, and providing technical support for marine science research.
- NIOT **is involved in research areas** such as ocean observation, marine biotechnology, underwater vehicles, ocean renewable energy, marine minerals, and coastal engineering.
- NIOT has **state-of-the-art facilities for oceanographic research**, including research vessels, underwater vehicles, moored buoys, and coastal monitoring systems.
- NIOT **collaborates with other national and international organizations** to advance research and development in ocean technology.
- NIOT has **implemented several projects related to offshore oil and gas exploration**, marine aquaculture, deep-sea mining, coastal protection, and ocean renewable energy.
- NIOT provides **technical support for environmental impact assessment studies** related to coastal and offshore development projects.
- NIOT **provides training and capacity building programs** for scientists, engineers, and technicians in the field of ocean technology.

Topic 59. BRO OPENS STRATEGIC ZOJILA PASS IN RECORD 68 DAYS

Important for subject :Geography

- The Zojila Pass is a strategic link between **Ladakh** and **Kashmir**. It is the only road link that connects the Ladakh region to the rest of India. The pass is critical for the Indian Armed Forces' operational preparedness in the region. The reopening of the pass will also help ease the transportation of essential supplies and trade between Ladakh and Kashmir.

Topic 60. DEATH OF THE NILE

Important for subject :Geography

Mega dams have killed the river's ability to flush carcinogens, slowly killing its delta

- Large-scale **pollution from untreated agricultural drainage and wastewater is putting existential pressure on the delta system** of the world's longest river, according to a new study.
- **Pollution, coastal erosion and seawater intrusion** challenge the sustainability of the delta, on which the population of Egypt rely for food security, noted the document published in the journal Earth's Future.
- In this study, the **researchers evaluated the levels of heavy metal pollution** along the two delta branches of the iconic river to identify their sources and explore the implications of damming on heavy metal concentration.
- They arrived at this conclusion after analysing eight heavy metals — lead, chromium, cadmium, copper, zinc, iron, manganese and nickel — **present in samples of sediment collected from the bottom of two branches of the river's delta.**
- The high concentrations of cadmium, chromium, copper, lead, nickel and zinc **are carcinogenic and can adversely affect plant and human health.** They can drastically harm plant growth, causing necrosis and chlorosis in leaves and death of the plant as well.
- **Mega-dams built upstream disrupt the river's natural flow; sediments thus accumulated adversely affect its ability to flush contaminants out into the Mediterranean Sea**, leaving toxins to build up in bottom sediment over time.
- Alarmingly, much of this contamination by heavy metals is irreversible. However, the study claimed that science-based conservation measures could alleviate environmental

degradation and restore the Nile delta's ecosystem to relatively healthy levels.

River Nile:

- The River Nile is **one of the world's longest rivers**, flowing through 11 countries in Africa, including Egypt, Sudan, Ethiopia, and Uganda.
- The Nile River **has two major tributaries: the White Nile**, which originates in East Africa and flows through Sudan, and the **Blue Nile**, which begins in Ethiopia and **joins the White Nile in Sudan** before flowing into Egypt and the Mediterranean Sea.
- The Nile is **known for its annual flooding**, which has been an **important natural cycle for agricultural production** in Egypt and other countries along the river for thousands of years. However, the construction of dams and other water infrastructure has disrupted this natural cycle in some areas.
- The **ancient Egyptian civilization, which flourished along the Nile River**, is one of the oldest and most significant in world history. The Nile provided water for irrigation, transportation, and other activities that supported the development of this civilization.
- The Nile Delta, where the **river meets the Mediterranean Sea in northern Egypt**, is one of the most fertile agricultural regions in the world. It is home to a variety of crops, including cotton, wheat, and citrus fruits.
- The Nile Basin is **home to over 300 million people**, many of whom depend on the river for their livelihoods.
- One of the most controversial dam projects on the Nile is the **Grand Ethiopian Renaissance Dam (GERD), which is being built by Ethiopia on the Blue Nile**, a major tributary of the Nile. The GERD has been a source of tension between Ethiopia, Sudan, and Egypt, as downstream countries fear the dam will impact their water supply.

Topic 61. AFRICA'S SPLITTING PLATES COULD GIVE BIRTH TO A NEW OCEAN

Important for subject: Geography

The emergence of a new coastline is on the horizon, but not without its consequences. Scientists, in 2020, predicted a new ocean would be created as Africa gradually splits into two separate parts.

- The division of the continent is connected to the East African Rift, a crack that

stretches 56 kilometres and appeared in the desert of Ethiopia in 2005, triggering the formation of a new sea.

- The geological process will inevitably divide the continent, resulting in currently landlocked countries, such as Uganda and Zambia, obtaining their own coastlines in due time, which would take five to 10 million years.
- The **necessary evacuation of people and the potential loss of lives** will be an unfortunate cost of this natural phenomenon.
- However, on the upside, the **emergence of new coastlines will unlock a myriad of opportunities for economic growth**. The countries will have **access to new ports for trade, as well as fishing grounds and sub-sea internet infrastructure**, which will undoubtedly transform their economic potential.
- The three plates — the Nubian African Plate, Somalian African Plate and Arabian Plate — are separating at different speeds. The Arabian Plate is moving away from Africa at a rate of about an inch per year, while the two African plates are separating even slower, between half an inch to 0.2 inches per year.
- **Somali and Nubian tectonic plates continue to pull apart from each other,** a smaller continent will be created from the rift, which will include present-day Somalia and parts of Kenya, Ethiopia, and Tanzania.
- The Gulf of Aden and the Red Sea will eventually flood into the Afar region in Ethiopia and the East African Rift Valley, leading to the formation of a new ocean.
- The **new ocean will result in East Africa becoming a separate small continent** with its own unique geographic and ecological characteristics.

Great Rift Valley

- The Great Rift Valley is a **massive geological formation** that stretches around 6,400 kilometers from **northern Syria to central Mozambique** in East Africa.
- The valley **is home to the Jordan River**, which flows through the Jordan Valley and **eventually empties into the Dead Sea on the border** between Israel and Jordan.
- The **Gulf of Aden is an eastward continuation of the Rift**, and from there it extends southeastward as part of the mid-oceanic ridge of the Indian Ocean.
- In eastern Africa, the **valley divides into the Eastern Rift and the Western Rift**.
- The Western Rift, also known as the Albertine Rift, contains some of the deepest

lakes in the world.

Rifting:

- Rifting refers to the **process of the Earth's crust and lithosphere being pulled apart**, resulting in the formation of a rift valley or basin. This process can o**ccur at divergent plate boundaries**, where two tectonic plates move away from each other, or within a continent, where **tensional forces can cause the crust to stretch and thin**.
- In the case of divergent plate boundaries, **rifting is often associated with the formation of mid-ocean ridges**, where new oceanic crust is created as magma rises up from the mantle and solidifies. As the **plates move apart, the distance between the ridges increases and the ocean basin widens.**
- Within a continent, **rifting can lead to the formation of a rift valley or basin,** which may eventually become a new ocean basin if the rift continues to widen and eventually splits the continent in two. The **East African Rift Valley** is one example of an active rift zone that is currently in the process of pulling apart the African continent.
- Rifting can have a significant impact on the Earth's surface, **leading to earthquakes, volcanic activity, and the creation of new landforms.** It is also an important geological process in the formation and evolution of the Earth's crust and lithosphere.
- One example of an **active rift zone is the East African Rift Valley**, which stretches over **6,000 km from Syria in the north to Mozambique** in the south.
- This region is undergoing active rifting and is characterized by volcanoes, hot springs, and seismic activity.

Topic 62. HABITAT PRESERVATION IN THE WESTERN GHATS CAN HELP ENHANCE BIODIVERSITY IN THE HOTSPOT

Important for subject: Geography

In one of the first studies on rock dwelling fauna, published in January 2023, a group of scientists found **that even species that can adjust to extremely variable climates on lateritic plateau habitats are vulnerable to changes to land-use pattern, such as agroforestry and paddy cultivation.**

- The Western Ghats of India are broadly divided into three subdivisions — the

northern, central and southern — separated by the Goa gap and the Palghat gap respectively.

- Due to their **climatic stability and terrain ruggedness**, they are a museum and cradle of species diversity. Over the years, a series of studies on a range of habitats in the Western Ghats have shown **how drought, rainfall and elevation, influence evolutionary processes** and play an important role in shaping this rich diversity.
- Habitats classified as **wastelands are vulnerable to land-use change** which reduces the area of suitable habitat for the amphibian and reptile species found here, negatively impacting their diversity and abundance.
- In the study, which is currently a preprint that needs to be certified by peer review, researchers from the Nature Conservation Foundation, Bombay Environmental Action Group, and Reliance Foundation compared the prevalence of **two endemic herpetofauna in the northern Western Ghats — Seshachari's caecilian (Gegeneophisseshachari) and white-striped viper gecko (Hemidactylus albofasciatus) — with a commonly found snake, the saw-scaled viper (Echiscarinatus),** as well as the composition of other rock-dwelling animals across undisturbed plateau sites, agroforestry plantation sites and abandoned paddies on plateaus. They found that the responses of species to land-use change were context specific.
- The **conversion of lateritic plateaus to agroforestry plantations and paddy** negatively impacted the **threatened and endemic reptile H. albofasciatus and the generalist snake E. carinatus**. But interestingly, G. seshachari, an endemic amphibian that occurs in forests and plateaus, was more prevalent in the abandoned paddy than in less-disturbed plateaus and orchards in the Western Ghats.
- The study found that **seasonal flooding in the Western Ghats diversified the ecologically important Myristicaceae family** of which Myristica fragrans, commonly known as jaiphal (nutmeg), is also economically important as a source of local livelihood.
- Another study found **seasonal flooding brought in unique morphological and physiological adaptations**, like aerial roots in the species occurring across two main habitat types mainly seasonally flooded habitats such as riparian and swamps, and non-flooded habitats such as upland evergreen and semi-evergreen forest.
- Habitat preservation and restoration is vital to conserve and enhance biodiversity,

which in turn can boost the various ecosystem services they provide.

Western Ghats:

- Western Ghats is a **mountain range that runs parallel to the western coast** of the Indian peninsula.
- It is also known as the Sahyadri Range and is a **UNESCO World Heritage site**.
- The **range covers an area of about 160,000 square kilometers** and is home to a diverse array of flora and fauna.
- The Western Ghats are also **important for their ecological services**. The region is a **major source of freshwater for the surrounding areas**, and the forests help regulate the local climate by absorbing carbon dioxide and releasing oxygen.
- **Biodiversity**: The Western Ghats are **one of the eight "hottest hotspots" of biodiversity** in the world. The region **has a high degree of endemism**, with many plant and animal species found only in the Western Ghats. The Western Ghats are **home to several threatened and endangered species**, including the lion-tailed macaque, the Nilgiritahr, and the Malabar civet.
- **Hill ranges:** The Western Ghats are a chain of hill ranges that run parallel to the western coast of India, stretching for over 1,600 km from the state of Gujarat to
- Tamil Nadu. The **highest peak** in the Western Ghats is **Anamudi in Kerala, which rises to a height of 2,695 meters. The mountains have an average elevation of 1600 – 2500m.**
- **Dodabetta** is the highest peak of Nilgiris **Anamudi** is the highest peak of Annamalai and South India.
- **Agastimalai** is the highest peak of Cardamom hills.
- **Rivers:** The Western Ghats are the source of many important rivers in India, including **the Godavari, Krishna, and Cauvery**. These rivers are a lifeline for millions of people living in the surrounding areas, providing water for irrigation, drinking, and other uses.
- **Landforms:** The Western Ghats have a unique topography, **characterized by steep escarpments, deep valleys, and high plateaus.** The region is also home to several important geological formations, including the Deccan Traps, a vast volcanic plateau.
- **Climate**: The Western Ghats **have a humid tropical climate, with heavy rainfall**

during the monsoon season (June-September). The region's forests play an important role in regulating the local climate and reducing the impact of natural disasters like floods and landslides.

- **Forests**: The Western Ghats are **covered with dense tropical and subtropical forests** that are home to a variety of wildlife, including tigers, elephants, leopards, and many endemic bird species. The forests also play an important role in regulating the region's climate and water resources.
- **Cultural Heritage:** The Western Ghats have a rich cultural heritage, with many ancient temples, forts, and other historical sites scattered throughout the region.
- The Western Ghats have **been inhabited for thousands of years by indigenous communities** and other ethnic groups, each with their own unique culture and traditions.
- The Western Ghats face **several threats, including deforestation, habitat destruction, and fragmentation due to agricultural expansion, mining, and infrastructure development**. Climate change is also a growing threat, with rising temperatures and changing rainfall patterns affecting the region's biodiversity and ecosystem services.
- To address these challenges, conservation efforts have been initiated by various organizations and government agencies. The **Western Ghats Ecology Expert Panel (WGEEP), a high-level committee appointed by the Ministry of Environment and Forests**, has recommended measures to protect the region's biodiversity and ecosystem services.

Myristica swamps

- Myristica swamps are a **unique type of wetland ecosystem** found in the Western Ghats region of India. Here are some of the unique features of Myristica swamps:
- **High biodiversity**: Myristica swamps are known for their high levels of biodiversity and are **home to many rare and endemic plant and animal species**. Some of the endemic species found in Myristica swamps include the **Myristica dactyloides tree and the Myristica malabarica shrub**.
- **Myristica trees**: Myristica swamps are named after the Myristica trees that dominate the ecosystem. These **trees are known for their aromatic seeds**, which are used to make nutmeg and mace.

- **Waterlogging**: Myristica swamps are **characterized by waterlogged soils that are often saturated with water.** The waterlogging creates a unique environment that supports the growth of unique plant species.
- **Low nutrient levels**: The waterlogged soils in Myristica swamps have low nutrient levels, which **limits the types of plants that can grow there**. This creates a specialized habitat for plants that are adapted to the low nutrient levels.
- **Soils:** The soils in these swamps are typically **composed of organic matter, and are often acidic and nutrient-poor.**
- **Threats:** Myristica swamps are threatened by deforestation, agricultural expansion, and other human activities. Many species that are unique to these swamps are endangered or at risk of extinction. Protecting these ecosystems is important for preserving the biodiversity and cultural heritage of the Western Ghats region.

Topic 63. COASTAL CRISIS

Important for subject : Geography

Odisha is fast losing its shoreline to rising sea levels. Its adaptation plans must not only be immediate but also fool proof

Why in news?

- 74 villages in the state are severely affected by shoreline erosion—the highest in the country.

Integrated Coastal Zone Management (ICZM):

- ICZM aims **to improve livelihood of coastal communities and conserve the coastal ecosystem.**
- The ICZM **plan involves identification of infrastructure requirements and livelihood improvement means in coastal districts**. **Conservation of mangroves is among the components.**
- The national component of the project includes **mapping of the country's coastline and demarcation of the hazard line.**
- It is a **World Bank assisted project**.
- It is being **implemented by the Department of Forests and Environment with assistance from the Union Ministry of Environment, Forests and Climate**

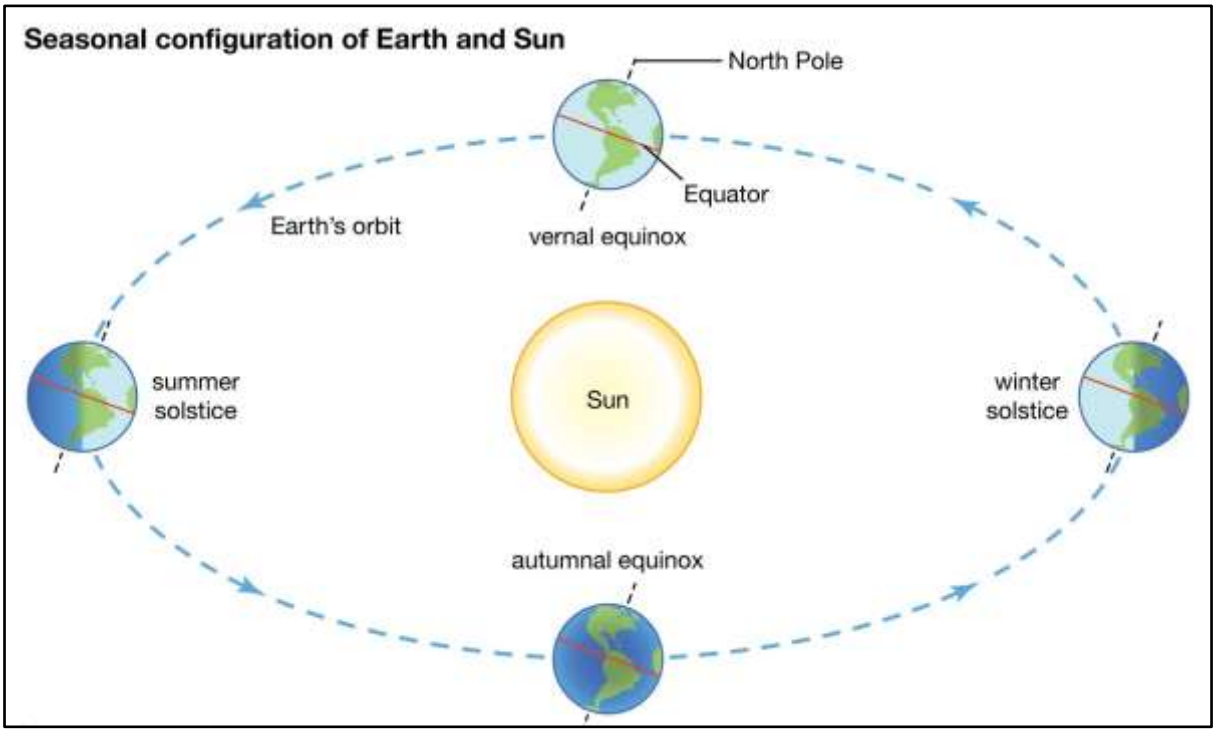
Change (MoEFCC).

- The **National Centre for Sustainable Coastal Management (NCSCM), Chennai, will provide scientific and technical inputs**.
- **Society of Integrated Coastal Management (SICOM)**
- SICOM has been **established under the aegis of the Ministry of Environment, Forests and Climate change, Government of India with a vision for vibrant, healthy and resilient Coastal and Marine Environment for continuous and enhanced outflow of benefits to the Country and the Coastal Community.**
- **Main Roles, Responsibilities and Objectives: –**
- Nodal agency for strategic planning, management, execution, monitoring and successful **implementation of Integrated Coastal Zone Management (ICZM)** practices in across the country and National Project Management Unit (NPMU) for the ICZM Project and **ENCORE project in all the 13 Coastal States/UTs.**
- To act as **a technical Secretariat to the National Coastal Zone Management Authority (NCZMA) r**elated to **regulatory provisions and CRZ classification** of coastal stretches of the country.
- Coordinating agency and an interface for various ministries of Govt. Of India and the Govts and various line departments of the 13 Coastal State/UTs., Funding Institutions (World Bank) for **Enhancing Coastal and Ocean Resource Efficiency Project (ENCORE**)
- To support **to check violations to CRZ through improved technologyenabled** enforcement strengthened institutions and regulatory and legal reforms.
- SICOM has also embarked upon **the Pilot Blue Flag Programme,** a first in India under **Beach Environment & Aesthetic Management Services (BEAMS**) for development of world class Beaches in India
- **Capacity building of Coastal State Units** in planning, implementation and management of Integrated Coastal Zone Management programs and other national and State organization / agencies associated with the projects
- **Serving as an interface among coastal communities, experts, and governments**, including providing with and disseminating examples of best practices and guidelines for coastal and marine ecological security and livelihood security of coastal and island communities

- To **undertake any additional work or function as may be assigned by MOEF&CC** from time to time in the areas of coastal management and other related activities.

Topic 64. EQUINOX

Important for subject : Geography



Equinox today (March 21) marks the end of winter in northern and summer in southern hemisphere.

About Equinoxes (Vernal & Autumnal)

- The word equinox is derived from two Latin words – aequus (equal) and nox (night).
- There are **only two times of the year when the Earth's axis is tilted neither toward nor away from the sun,** which results in a nearly equal amount of daylight and darkness at all latitudes. These events are referred to as Equinoxes.
- The equinoxes happen **in March (about March 21) and September (about September 23)** on these days the **Sun is exactly above the Equator**
- The equator and places near the equator experience nearly 12 hours of the day and 12 hours of the night.

Reasons:

- The phenomenon occurs due to **the Earth's axial tilt, or the angle by which the planet is tilted relative to the Sun.**
- The imaginary axis of our planet is not straight up and down but is tilted by 23.5 degrees.
- This is why different regions of the Earth experience different measures of sunlight.

Implications:

- The days become a little longer at the higher latitudes (those at a distance from the equator) because it takes the sun longer to rise and set.
- The **solstices, together with the equinoxes, are connected with seasons, harvests and livelihood**.
- Therefore, many cultures celebrate various combinations of the solstices, the equinoxes, and the midpoints between them, leading to various holidays arising around these events.

Solstices (Summer & Winter)

- The two solstices happen in **June (20 or 21) and December (21 or 22**). These are the days when the **Sun's path in the sky is the farthest north or south from the Equator**.
- In the **Northern Hemisphere, the June solstice marks the start of summer**, this is when the **North Pole is tilted closest to the Sun**, and the Sun's rays are directly overhead at the Tropic of Cancer.
- The summer solstice occurs when the **sun is directly over the Tropic of Cancer** which is located at 23.5° latitude North and for every place north of the Tropic of Cancer, the sun is at its highest point in the sky and this is the longest day of the year.
- The **winter solstice marks the shortest day and longest night of the year**, it occurs when the **sun is directly over the Tropic of Capricorn,** which is located at 23.5° south of the equator.

Topic 65. GOVERNOR CANNOT PRECIPITATE THE FALL OF AN ELECTED GOVT.: SC

Important for subject : Polity

- The Supreme Court has held **that Governors could undermine democracy if they use their constitutional office to call for a trust vote, citing dissension within a ruling party, and precipitate the fall of a legitimately established government**.
- The Chief Justice of India (CJI) who led a Constitution Bench of the Supreme Court has said that calling for a trust vote could lead to the toppling of a functioning government and **Governors must refrain from using their offices for effectuating a particular result and precipitate the fall of a government.**
- The CJI further added that the Governor using his/her powers to precipitate the fall of an elected government is a very serious issue for Indian democracy.
- The Bench was referring to the then Maharashtra Governor whose call for a trust vote in the Assembly, eventually led to the fall of the Maha Vikas Aghadi (MVA) government in 2022.

Governor and Floor test

- A floor test is primarily taken to **know whether the executive enjoys the confidence of the legislature.**
- This happens both in the Parliament and the State Legislative Assemblies.
- It is a **constitutional mechanism under which a Chief Minister appointed by the Governor can be asked to prove majority on the floor of the Legislative Assembly** of the state.

Appointment of Chief Minister:

- As per the Constitution, the Chief Minister is appointed by the Governor of the state.
- When a single party secures the majority of the seats in the house, the Governor appoints the leader of the party as the Chief Minister.

Vote of confidence:

- In case the majority is questioned, the leader of the party which claims majority has to

move a vote of confidence and prove majority among those present and voting.

- The vote is taken through physical voting, or through an electronic ballot.

In case of failing to prove majority:

- The **incumbent Chief Minister:**
- The Chief Minister has to resign if they fail to prove their majority in the house.

Forming a government:

- The legislature is convened, and the Speaker presides over the affairs.
- The governor then invites the leader of the second largest party to prove his/her majority and form a government.

If it is a newly elected government:

- If it is a newly elected government, the House is presided over by Speaker Pro-tem, chosen by the Governor.
- **Role of Pro-tem Speaker**
- Pro-tem speaker is a **temporary speaker**.
- He/she is appointed for a limited time period to conduct the works in Lok Sabha or in state legislatures.
- When the Lok Sabha and Legislative Assemblies have been elected, but the vote for the speaker and deputy speaker has not taken place, the pro-tem speaker is chosen for the conduct of the house.

Constitutional provisions:

- **Article 175(2) of the Indian Constitution**:
- It gives the Governor the power to summon the members of the House and call for a floor test to prove whether the incumbent government has the majority in the State Legislative Assembly (Vidhan Sabha).
- On the central or national level, this power lies with the President.

Article 164 of the Indian constitution:

- It states that, “The council of ministers shall be collectively responsible to the

Legislative Assembly of the State."

- And so, if they do not enjoy the Legislature's support, the Executive has to step down.

R. Bommai case:

- In this landmark cas, the Supreme Court ruled that the refusal of the Chief Minister to undergo the floor test will be considered as the Government losing the faith of its own legislature.

Composite floor test

- There is another test, **Composite Floor Test, which is conducted only when more than one person stakes claim to form the government.**
- When the majority is not clear, the governor might call for a special session to see who has the majority.

How?

- The majority is counted based on those present and voting. This can also be done through a voice vote where the member can respond orally or through division voting. Some legislators may be absent or choose not to vote. In division vote, voting can be done through electronic gadgets, ballots or slips.

The result or the tie:

- The person who has the majority will form the government. In case of tie, the speaker can also cast his vote.

Topic 66. FOREIGN LAWYERS AND FIRMS CAN OPERATE IN INDIA, SAYS BCI

Important for subject : Polity

- The **Bar Council of India** (BCI), which is a **statutory body** governing legal practice in India, has now **opened up law practice in India to foreign lawyers and law firms.**
- The BCI has formulated the "**Bar Council of India Rules for Registration of Foreign Lawyers and Foreign Law Firms in India, 2021**" which facilitate foreign lawyers and law firms to practise foreign law, diverse international law and international arbitration matters in India in a well-defined, regulated and controlled

manner **based on the principle of reciprocity.**

About the new rules

- According to the **Advocates Act**, **advocates enrolled with the Bar Council alone are entitled to practise law in India.**
- All others, such as a litigant, can appear only with the permission of the court, authority or person before whom the proceedings are pending.
- **Foreign lawyers and law firms can practice in India :**
- The **notification essentially allows foreign lawyers and law firms to register with BCI** to **practise in India** if they are entitled to practise law in their home countries.
- However, **the foreign lawyers or foreign Law Firms have not been permitted to appear before any courts, tribunals or other statutory or regulatory authorities**.
- They are **allowed to practise transactional work /corporate work s**uch as joint ventures, mergers and acquisitions, intellectual property matters, drafting of contracts and other related matters on a reciprocal basis.
- **Same restrictions for Indian lawyers working with foreign law firms :**
- Indian lawyers working with foreign law firms will also be Important for subject to the same restriction of **engaging only in non-litigious practice**.

Significance

- According to BCI the move **would mutually benefit lawyers from India and abroad** and the legal fraternity in India would not experience any disadvantage.
- Further, the latest move is expected to address the concerns over the flow of Foreign Direct Investment (FDI) into the country and **would help make India a hub**

Topic 67. FRICTION OVER FORMULA: WHY SOME STATES GET MORE FROM CENTRE

Important for subject : Polity

The Centre's tax collections are pooled-in from the states and a part of it is transferred to the states **based on the formula devised by Finance Commission**.

15th Finance Commission

- The Finance Commission (FC) is a **constitutional body**, that determines the method

and formula for distributing the tax proceeds between the Centre and states, and among the states as per the constitutional arrangement and present requirements.

- **Under Article 280 of the Constitution**, the President of India is required to constitute a Finance Commission at an interval of five years or earlier.
- The 15th Finance Commission was constituted by the President of India in
- November 2017, under the chairmanship of NK Singh. Its **recommendations will cover a period of five years from the year 2021-22 to 2025-26.**

Vertical Devolution (Devolution of Taxes of the Union to States):

- It has recommended maintaining the vertical devolution at 41% – the same as in its interim report for 2020-21.
- It is at the same level of 42% of the divisible pool as recommended by the 14th Finance Commission.
- It has made the required adjustment of about 1% due to the changed status of the erstwhile State of Jammu and Kashmir into the new Union Territories of Ladakh and Jammu and Kashmir.

Horizontal Devolution (Allocation Between the States):

- For horizontal devolution, it has **suggested 12.5% weightage to demographic performance, 45% to income, 15% each to population and area, 10% to forest and ecology and 2.5% to tax and fiscal efforts.**

Topic 68. PANEL TO LOOK INTO RAJASTHANI AS SECOND OFFICIAL LANGUAGE

Important for subject : Polity

On March 16, 2023, Education Minister of Rajasthan, Dr. B.D. Kalla said in the assembly that the Minister of State for Languages has approved the **formation of a committee in connection with declaring Rajasthani language as the second official language of Rajasthan.**

Background

- Kalla said that on August 25, 2003, a resolution was unanimously passed by all the members of the State Legislative Assembly regarding **recognition of Rajasthani**

language and its inclusion in the Eighth Schedule of the Constitution.

- The Central Government has been urged from time to time to include Rajasthani language in the Eighth Schedule of the Constitution.
- In this regard, requests have been made to the Central Government by the Chief Ministers in the years 2009, 2015, 2017, 2019, 2020 and 2023. He told that at present the matter is under consideration at the level of the Government of India.
- The education minister said that it has come to the notice of the state government that different languages have been made official languages in different states.
- **At present, the Rajasthan Official Languages Act-1956 is in force in the state**.
- The matter is being **examined for amendment in the said Act to include Rajasthani language in the official language.**
- He said that **Mahapatra Committee has also considered Rajasthani language eligible to be included in the Eighth Schedule of the Constitution**. Dr. Kalla said that in this regard, the members of the party and the opposition should unite and request the Prime Minister.

Official Language of the State

- The Indian **Constitution does not specify the official language of different states.**
- The **State legislature may adopt any one or more of the languages in use in the state or Hindi as the official language of that state**. Until that is done, English is to continue as the official language of that state.
- The **choice of the state to adopt state official language is not limited to the languages listed in the 8th Schedule of the Indian Constitution.**
- The **Official Languages Act (1963**) lies down that **English should be used for purposes of communication between the Union and the non-Hindi states.**
- When the **President (on a demand being made) is satisfied that a significant proportion of the population of a state prefers the use of any language spoken by them to be recognised by that state, then he may direct that such language shall also be officially recognised in that state.**
- This provision aims at protecting the linguistic interests of minorities in the states.

Topic 69. RULE 50 NOTICE IN KERALA ASSEMBLY

Important for subject : Polity

- Stalemate in the Kerala assembly continued for the fourth day as the Opposition obstructed the proceedings **over the denial of the adjournment motion notice under Rule 50 of the house** and the **police case against seven UDF MLAs.**
- Later, Speaker assured the Opposition that he will **protect their rights to move notice under Rule 50 on important Important for subjects.**
- **Rule 50 –** Important for subject to the provisions of these Rules, **a motion for an adjournment** of the business of the Assembly for the purpose of discussing a definite matter of urgent public importance **may be made with the consent of the Speaker.**
- **Adjournment Motion in Parliament (Rule 184 of Lok Sabha)**
- Adjournment motion is **introduced only in the Lok Sabha to draw the attention of the House to a definite matter of urgent public importance.**
- It **involves an element of censure against the government, therefore Rajya Sabha is not permitted** to make use of this device
- It is regarded as an **extraordinary device** as it interrupts the normal business of the House. It **needs the support of 50 members to be admitted**.
- The discussion on this motion **should last for not less than two hours and thirty minutes.**
- However, right to move a motion for an adjournment of the business of the House is **Important for subject to the following restrictions**. i.e. It should:
- Raise a matter which is definite, factual, urgent and of public importance.
- Not cover more than one matter.
- Be restricted to a specific matter of recent occurrence.
- Not raise a question of privilege.
- Not revive discussion on a matter that has been discussed in the same session.
- Not deal with any matter that is under adjudication of court.
- Not raise any question that can be raised on a distinct motion.

Topic 70. SEVEN STATES TO GET TEXTILE PARKS

Important for subject : Schemes

The Centre has selected sites in Tamil Nadu, Telangana, Karnataka, Maharashtra, Gujarat,

MP and UP to set up new textile parks, a year and a half after the **PM Mega Integrated Textile Regions and Apparel (PM MITRA) scheme** was announced.

PM Mega Integrated Textile Regions and Apparel (PM MITRA) Scheme

- The Ministry of Textiles has launched (2021) the scheme to strengthen the Indian textile industry by way of Enabling scale of operations, Reducing logistics cost by housing entire value chain at one location, Attracting investment, Generating employment and augment export potential.
- The Scheme has a **budget outlay of 4445 Crore** including administrative expenses of Rs 30 crore **over 7-year period up to 2027-28.**
- The scheme will develop an integrated large scale and modern industrial infrastructure facility (parks) for total value-chain (spinning, weaving, processing, printing, etc) of the textile industry.
- These parks are envisaged to be located at sites which have inherent strengths for the textile industry to flourish and have necessary linkages to succeed.
- The scheme envisages to **leverage the Public Private Partnership (PPP) model** for fast paced implementation in a time-bound manner.
- PM MITRA mega textile parks will boost the textiles sector **in line with 5F (Farm to Fibre to Factory to Fashion to Foreign) vision.**

Implementation

- These parks will be set up on the **basis of proposals received from State Governments** having ready availability of contiguous and **encumbrance-free land parcels of minimum 1000 acres.**
- The State Government will transfer land to the **Special Purpose Vehicle (SPV**), which will be a legal entity (with **51% equity shareholding of State and 49% of Central Government).**
- The selection of PM MITRA Park sites will be **done in a two stage** (Selection of Sites, Development of the Park) selection process on **Challenge Method**.
- The "**Challenge Method"** is a type of selection process that is **often used in competitions and challenges to determine the best candidate or solution**.

Significance

- The textile industry has been unorganised in the country and increased wastage and logistical costs impacts the competitiveness of the country's textile sector.
- This **cluster-based approach** will solve several problems of the sector and will function as centres of opportunity to create an integrated textiles value chain.
- The parks in the seven selected States would provide state-of-the-art infrastructure for the textiles sector, **attract an investment of nearly ₹70,000 crore into these parks, with employment generation for about 20 lakh people.**
- The **Ministry of Textiles** will provide financial support in the form of Development **Capital Support upto ₹500 crore per park to the Park SPV.**
- A **Competitive Incentive Support (CIS) upto ₹300 crore per park** to the units in PM MITRA Park shall also be provided to incentivise speedy implementation.
- Convergence with other Government of India schemes shall also be facilitated in order to ensure additional incentives to the Master Developer and investor units.

Topic 71. EKLAVYA SCHOOLS

Important for subject: Schemes

- As the Union Ministry of Tribal Affairs looks to finalise the recruitment rules for hiring over 38,000 teachers and support staff for 740 Eklavya Model Residential Schools across the country, the jobs of around 4,000 teachers are hanging by a thread — teachers who are already working at nearly 400 of these schools.
- **About Eklavya Model Residential Schools** Eklavya Model Residential Schools (EMRS) started in the **year 1997-98 to** impart **quality education to ST children in remote areas**.
- The schools focus not only on academic education but on the all-round development of the students.
- The objective of EMRS is to provide **quality middle and high level education to Scheduled Tribe (ST) students in remote area**s, not only to enable them to avail of reservation in high and professional educational courses and as jobs in government and public and private sectors but also to have access to the best opportunities in education at par with the non ST population.
- Each school has a capacity of 480 students, catering to students from **Class VI to XII**.
- The EMR School **follows the CBSE curriculum**.
- These are being set up by grants provided **under Article 275(1) of the Constitution**.

Eklavya Model Residential Schools (EMRSs) are **funded by the Ministry of Tribal Affairs.**

- In order to give further impetus to EMRS, it has been decided that by the year 2022, every block with more than 50% ST population and at least 20,000 tribal persons, will have an EMRS.
- **Eklavya schools are on par with NavodayaVidyalaya** and have special facilities for preserving local art and culture besides providing training in sports and skill development.

Topic 72. PM GATI SHAKTI: 156 CRITICAL INFRA GAP PROJECTS IDENTIFIED

Important for subject :Schemes

PM Gati Shakti

- "PM Gati Shakti — National Master Plan" for infrastructure development aims at boosting multimodal connectivity and driving down logistics costs.
- PM Gati Shakti is a **digital platform that connects 16 ministries** — including Roads and Highways, Railways, Shipping, Petroleum and Gas, Power, Telecom, Shipping, and Aviation — with a view to ensuring holistic planning and execution of infrastructure projects.
- The portal will offer 200 layers of geospatial data, including on existing infrastructure such as roads, highways, railways, and toll plazas, as well as geographic information about forests, rivers and district boundaries to aid in planning and obtaining clearances.
- The portal will also allow various government departments to track, in real time and at one centralised place, the progress of various projects, especially those with multi-sectoral and multi-regional impact.
- The objective is to ensure that each and every department now have visibility of each other's activities providing critical data while planning and execution of projects in a comprehensive manner.
- Through this, different departments will be able to prioritise their projects through cross–sectoral interactions.
- The government expects the platform to enable various government departments to synchronise their efforts into a multi-modal network.

- It will also offer satellite imagery for monitoring of projects.
- It is also expected to help state governments give commitments to investors regarding timeframes for the creation of infrastructure.
- The portal would help states avoid both cost and time overruns, and allow them to provide the benefit of valuable infrastructure to their residents sooner.

Network Planning Group

- Infrastructure projects, entailing investment of over₹500 crore, would now route through the network planning group (NPG) constituted under the PM Gati Shakti initiative with the Finance Ministry issuing the necessary instructions and creation of the national masterplan digital platform.
- NPG consists of heads of the network planning wing of respective infrastructure ministries and it will assist the empowered group of secretaries (EGOS), which is headed by the cabinet secretary. EGOS consists of secretaries of 18 ministries as members and Head of Logistics Division, under the DPIIT, as member convener.
- The PM Gati Shakti plan was announced last year with an aim to break departmental silos and bring in more holistic and integrated planning and execution of projects with a view to addressing the issues of multi-modal and last-mile connectivity.

How will this impact coordination between ministries for projects?

- Currently, any inter-ministerial issues that arise relating to a project are addressed in regular meetings of infrastructure-related ministries. These issues are raised in advance, and then taken up.
- Goyal said that through the PM PRAGATI (Pro-Active Governance And Timely Implementation) portal, many issues were resolved even prior to such meetings.
- He said the Gati Shakti portal would help reduce the human intervention required as ministries will be in constant touch, and projects will be reviewed by the project monitoring group in real time.
- The portal will also highlight all the clearances any new project would need, based on its location — and allow stakeholders to apply for these clearances from the relevant authority directly on the portal.

Topic 73. SUPREME COURT DIRECTS GOVT TO CLEAR 28000 CR OROP ARREARS

Important for subject : Schemes

- The Supreme Court on Monday **directed the Centre to clear all One Rank One Pension (OROP) arrears totalling Rs 28,000 crore for ex-servicemen by February 28 next year,** saying the government is duty-bound to comply with its 2022 judgement on the matter.
- It noted that out of 25 lakh Defence pensioners, four lakh did not qualify for the OROP scheme as they were getting enhanced pensions.
- The bench at the outset **refused to accept the sealed cover report** submitted **by Attorney General** R Venkataramani and asked him to read the report as pertained to compliance of the court's judgement.
- The bench said there cannot be anything secret about the report which cannot be divulged to the ex-service personnel seeking payment of OROP arrears.

One Rank One Pension Scheme (OROP)

- OROP for Defence Forces Personnel implies that uniform pension be paid to Personnel retiring in the same rank with the same length of service, regardless of their retirement date.
- Before OROP, ex-servicemen used to get pensions as per the Pay Commission's recommendations of the time when they had retired.
- This will bridge the gap between the rates of pension of current and past pensioners at periodic intervals.
- The historical decision to implement OROP was taken by the Government in 2015, with benefits effective from 1st July, 2014.
- The implementation of the scheme was **based on recommendation of the Koshiyari committee,** a 10-member all-party parliamentary panel formed under the **chairmanship of Bhagat Singh Koshiyari**.
- **Re-fixation of pension**– Pension of the past pensioners would be re-fixed on the basis of pension of retirees of calendar year 2013.
- Pension will be re-fixed for all pensioners on the basis of the average of minimum and maximum pension of personnel retired in 2013 in the same rank and with the same

length of service.

- Pension for those drawing above the average shall be protected.
- Arrears will be paid in four equal half yearly installments.
- However, all the family pensioners including those in receipt of Special/ Liberalized family pension and Gallantry award winners shall be paid arrears in one installment.
- In future, the pension would be re-fixed every 5 years.
- **Nodal Implementation Agency** – Department of Ex-Servicemen Welfare, **Ministry of Defence.**
- **Payment** – OROP is **not paid as a separate element as it is an integrated part of pension.**
- **Inapplicability** – Personnel who opt to get discharged henceforth on their own
- request under Rule 13(3)I(i)(b), 13(3)II(i)(b), 13(3)III(iv) or Rule 16B of the Army Rule 1954 or equivalent Navy or Air Force Rules will not be entitled to the benefits of OROP.

Sealed Cover Jurisprudence

- It is a **practice used by the Supreme Court and sometimes lower courts**, of asking for or accepting information from government agencies in **sealed envelopes that can only be accessed by judges.**
- There is **no law specifying the sealed cover jurisprudence** but the SC derives its power from – Rule 7 of Order XIII of the Supreme Court Rules and Section 123 of the Indian Evidence Act of 1872
- Under **Rule 7 of Order XIII (“**Copying”) **of the Supreme Court Rules, 2013**, if the Chief Justice or court directs certain information to be kept under sealed cover or considers it of confidential nature, no party would be allowed access to the contents of such information.
- Under **Section 123 of the Indian Evidence Act of 1872**, the unpublished official documents about state affairs are given protection and a public servant cannot be forced to disclose such information.

Topic 74. GOVT TABLES BILL FOR BETTER FUNCTIONING OF TRI-SERVICES ORGANIZATIONS

Important for subject :Defense

- The government on Wednesday tabled a bill in Lok Sabha to empower commanderin-chiefs or any other officers posted in tri-services organisations with disciplinary and administrative powers in respect of personnel serving in them.
- This has a **direct impact on the command, control and discipline-related issues in the inter-services organisations** like the **Andaman and Nicobar Command**, the **Defence Space Agency, and joint training establishment like National Defence Academy**, the bill said.

Current Procedure

- The service personnel of Indian Air Force, Army and Navy are governed by the provisions of the Air Force Act, 1950, the Army Act, 1950 and the Navy Act, 1957 respectively.
- **Only officers of the respective services are empowered to exercise disciplinary powers over the service personnel** under the respective service
- Acts under current norms and regulations.
- **The Commander-in-Chief or Officer-in-Command of inter services organisations are not empowered to exercise disciplinary or administrative powers over the personnel belonging to other services.**

Salient Features of The Bill

- It includes empowering the central **government to constitute inter-services organisation by notification**, which may include a joint services command, comprised of units or service personnel Important for subject to the Air Force Act, 1950, the Army Act, 1950 and the Navy Act, 1957.
- It also seeks to **empower the commander-in-chief, officer-in-command or any other officer, specially empowered by the central government**, with all the disciplinary and administrative powers in respect of personnel serving in or attached to their inter-services organisations, irrespective of the service to which they belong,

for the maintenance of discipline and proper discharge of their duties, according to the bill.

- The proposed legislation will also pave the way for various other tangible benefits such as expeditious disposal of cases, saving of time and public money by avoiding multiple proceedings and greater integration and joint man ship among armed forces personnel.
- The tabling of the bill also **comes amid the government's ambitious theaterisation plan.**

Andaman and Nicobar Command

- The Andaman and Nicobar Command (ANC) is India's **only integrated tri-services military command** that has been playing a key role in keeping a strict vigil in the Indian Ocean.
- It was **created in 2001** to **safeguard India's strategic interests in Southeast Asia** and the **Strait of Malacca** by increasing rapid deployment of military assets in the islands.
- It is **commanded by a three star officer from Navy**, under whom officers and men from all three services (Navy, Air Force, Army) work.
- It **conducts bi-annual coordinated patrols (CORPATs) with the navies of Thailand and Indonesia, the annual SIMBEX maritime exercise with Singapore, and the biennial Milan multilateral naval exercise.**
- It also patrols India's exclusive economic zone to suppress gun running, narcotics smuggling, piracy, and poaching, and conducts maritime surveillance, humanitarian assistance and disaster relief (HADR).

Topic 75. DEFENCE ACQUISITION PROPOSALS VALUED AT ₹70500 CR. CLEARED

Important for subject : Defence

- The Defence Acquisition Council is **the highest decision-making body in the Defence Ministry for deciding on new policies and capital acquisitions** for the three services (Army, Navy and Air Force) and the Indian Coast Guard.
- The **Minister of Defence is the Chairman of the Council**.
- The objective of the Defence Acquisition Council is to **ensure expeditious**

procurement of the approved requirements of the Armed Forces in terms of capabilities sought, and time frame prescribed, by **optimally utilizing the allocated budgetary resources**.

Topic 76. SHIROMANI GURUDWARA PRABANDHAK COMMITTEE

Important for subject: History

Amid a police crackdown against radical preacher Amritpal Singh and his associates, the **Shiromani Gurdwara Parbandhak Committee (SGPC)** on Monday asked the Punjab government to stop arresting "innocent" Sikh youths.

About Shiromani Gurdwara Parbandhak Committee

- The Shiromani Gurdwara Parbandhak Committee (or SGPC) is an organization in India responsible for the management of gurdwaras, Sikh places of worship in three states of Punjab, Haryana, and Himachal Pradesh and union territory of Chandigarh.
- SGPC also administers Darbar Sahib in Amritsar.
- It is also called as **mini-parliament of Sikhs**, is directly elected through election by the Sikh sangat i.e. Sikh male and female voters above 18 years of age who are registered as voters under the provisions of the **Sikh Gurdwaras Act, 1925**.
- The SGPC is governed by the chief minister of Punjab.
- The SGPC manages the security, financial, facility maintenance and religious aspects of Gurdwaras as well as keeping archaeologically rare and sacred artifacts, including weapons, clothes, books and writings of the Sikh Gurus.
- It was **formed in 1920.**
- The first and the only woman and also incumbent President of SGPC is Jagir Kaur.

The Singh Sabha Movement

- **The Singh Sabha Movement** was founded at Amritsar in 1873 with a two-fold objective, to make available modern western education to the Sikhs, and to counter the proselytising activities of Christian missionaries as well as the Brahmo Samajists, Arya Samajists and Muslim maulvis.
- For the first objective, a network of Khalsa schools was established by the Sabha throughout Punjab.
- In the second direction, everything that went against the Gurus' teachings was

rejected, and rites and customs considered to be consistent with Sikh doctrine were sought to be established.

Gurudwara Reform Movement

- The Akali movement (also known as Gurudwara Reform Movement) was an offshoot of the Singh Sabha Movement.
- It aimed at liberating the Sikh gurudwaras from the control of corrupt Udasi mahants.
- The government tried its repressive policies against the non-violent non-cooperation satyagraha launched by the Akalis in 1921 but had to bow before popular demands.
- The government passed the Sikh Gurudwaras Act in 1922 (amended in 1925) which gave the control of gurudwaras to the Sikh masses to be administered through Shiromani Gurudwara Prabandhak Committee (SGPC) as the apex body.
- The Akali Movement was a regional movement but not a communal one.