WEEKLY CURRENT AFFAIRS MAGAZINE for

# C.D.S.

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PIONEER ACADEMY's
PATHFINDER
CURRENT AFFAIRS FOR CIVIL SERVICES

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## Topic 1. WHAT IS HEAT INDEX AND WHY IS IT IMPORTANT TO MEASURE?

***Important for the subject: Geography***

**Iran** recorded a scorching heat index of **70 degrees Celsius (°C)** in the coastal part of the country in August, earlier in **July 2023 Persian Gulf Airport** reported a heat index of **66.7 °C**.

**Heat Index:**

- In **2024**, **India** is scheduled to launch its own heat index to quantify the impact of heat on its population and generate impact-based heat wave alerts for specific locations.

**Topic Information**

**What is the heat index?**

- The heat index is the combination of **air temperature** and **relative humidity**, it is the measure of how hot it really feels when relative humidity is factored in with the actual air temperature.

**Aim of the new index**

- To quantify the impact of heat on its population and generate impact-based heatwave alerts for specific locations.

**Parameters to be used**

- Temperature, humidity, wind, and duration of exposure

**Significance**

- The analysis will help generate heat hazard scores, which will be used as thresholds to issue impact-based heatwave alerts for specific locations.

**Heat Waves in India**

- According to IMD data, there was a 24% increase in the number of heat waves during 2010-2019 compared to 2000-2009.
- Between 2000 and 2019, the mortality rate for tropical cyclones decreased by 94% whereas it increased by 62% for heat waves.
- Heat waves is not notified as a natural disaster at the national level in the country.

**How IMD defines Heatwave in India?**

- **Heat Wave** need not be considered till maximum temperature of a station reaches **atleast 40°C** for **Plains** and **atleast 30°C** for **Hilly regions.**
- When **normal maximum temperature** of a station is **less than or equal to 40°C Heat Wave Departure** from **normal** is **5°C** to **6°C** Severe Heat Wave Departure from normal

is **7°C** or more.

- When normal maximum temperature of a station is more than **40°C** Heat Wave Departure from normal is **4°C** to **5°C** Severe Heat Wave Departure from normal is **6°C** or more.

**Impact of heat waves**

- Heat waves cause cramps, exhaustion, stress, heat stroke and very severe heat waves even lead to death. The elderly, children, and people with heart and respiratory problems, kidney diseases and psychiatric disorders are particularly affected.
- Extreme periods of high temperatures can lead to a significant reduction in crop yields and cause reproductive failure in many crops.

**Heat Index Calculation:**

- **Dr. Robert Steadman**, a professor in the textiles and clothing department of Colorado State University, had published a complex formula to calculate **heat index** in **1979.**
- He considered an important factor- **Dew point (14 C),** which is the temperature at which gas is transformed into a liquid state.

**Humidex of Canada:**

**The U.S. National Weather Service (NWS) uses the following chart to determine heat index:**

**Why is it important to measure the heat index?**

- Hot air can hold more moisture than cold air. Humidity is typically higher during **heat waves** — which is why the heat index at the time is usually higher than just the temperature.
- **High humidity** can lead to **heat stress.**
- Humans usually maintain a **core temperature** in the range of **36.1 to 37.2 °C.**
- When the body is unable to get rid of excess heat, the **heart rate increases** due to a **rise in core temperature**, leading to **heat-related exhaustion** and **rashes**, among other symptoms. It can also be fatal if not addressed promptly.
- During high humidity, it is difficult to sweat and then for that sweat to evaporate because the air around is already saturated with moisture. This makes it difficult for the body to lose heat. That is why measuring the heat index is more important than just measuring the temperature.

## Topic 2. ARUNACHAL CHIEF MINISTER REVEALS SIANG RIVER BARRAGE PLAN TO COUNTER CHINESE DAM

***Important for the subject: Geography***


Arunachal Chief Minister warns the center of China's building a mega dam on the **YarlungTsangpo River** in **Tibet's Medog district**.

The mega dam is referred to as a "ticking water bomb for residents downstream (in Arunachal and Assam)". The centre plans to build a **large barrage** – a low-lying structure with gates to control the flow of water – across the **Siang river.**

**The mega dam may cause:**

- The river may shrink due to diversion of water
- Threat of flood if excess water is released
- Land erosion of cultivable land in Assam and Arunachal region

**Why is China building this mega dam?**

- It is mentioned in **China's strategic 14th Five-Year Plan.**
- It is expected to produce **triple the electricity** produced by the **Three Gorges** – the **world's largest power station**.

**YarlungTsangpo river:**

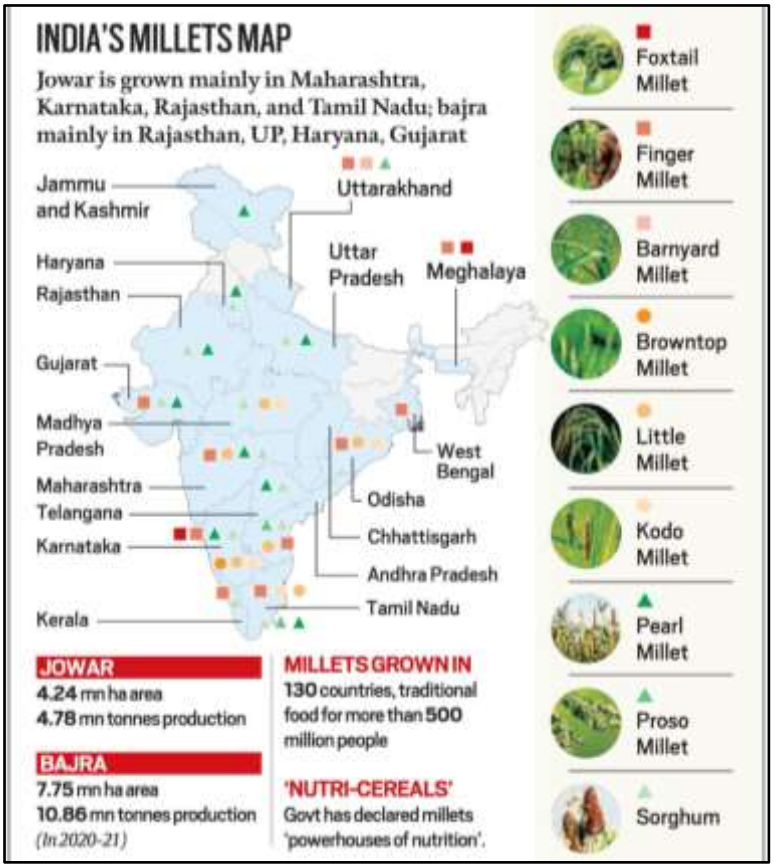
- It is the **longest river of Tibet** and the **fifth longest in China.** Originates at **Angsi Glacier** in **western Tibet,** southeast of **Mount Kailash** and **Lake Manasarovar**.
- The **Tsangpo** flows through **Tibet** before entering **Arunachal Pradesh** as the **Siang.** It becomes the **Brahmaputra** in **Assam** and the **Jamuna** in **Bangladesh** before it empties into the **Bay of Bengal**.
- The river forms the **world's largest and deepest canyon** at an altitude of more than

**1,500 meters (4,900 feet)**, **YarlungTsangpo Grand Canyon.**

- The **YarlungTsangpo River** is the **highest major river** in the world. Its **longest tributary** is the **Nyang River**.
- **In India,** he **tributaries** namely Subansiri, Ronganadi, Dikrong, Buroi, Borgong, Jiabharali, Dhansiri (North) Puthimari, Manas, Beki, Aie, Sonkosh**are the main tributaries on the North,** while the Noadehing, Buridehing, Desang, Dikhow, Bhogdoi, Dhansiri (South), Kopilli, Kulsi, Krishnai, Dhdhnoi, Jinjiran are the main tributaries on the **south**

## Topic 3. CLIMATE CHANGE HAS TRANSFORMED PEARL MILLET CULTIVATION ZONES IN INDIA

***Important for the subject: Geography***




**Shift in Bajra (Pearl millet) production zone:**

Shifted to **18 districts** spread across **eastern Rajasthan** and **Haryana** between **1998 and 2017**.

**Cause:** Increase in rainfall triggered by human-induced climate change.

**Zonal classification:**

- **India** classifies **pearl millet cultivation zones** based on **rainfall patterns** and **soil types**.
- **Zone A:** Semi-arid regions in north and central India, including southern Rajasthan,

Haryana, Gujarat and Uttar Pradesh, which receive more than 400 mm of rainfall per year.

- **Zone A1:** The arid regions of Rajasthan, which receive less than 400 millimeters (mm) of rainfall.
- **Zone B:** Semi-arid regions with heavy soils in southern India and central western India with over 400 mm of rainfall.
- **The new research revised 'A' into three subzones 'G', 'AE1' and 'AE2'.** The study was conducted by **International Crops Research Institute for the Semi-arid Tropics (ICRISAT)** and the **Indian Council of Agricultural Research – All India Coordinated Research Project on Pearl Millet (ICAR-AICRP).**
- **Zone 'G'** covers **Gujarat** while **AE1** covers **eastern Rajasthan** and **Haryana. Zone 'AE2'** covers **12 districts** spread across **Uttar Pradesh** and **Madhya Pradesh**.
- **'AE1'** is now **India's core pearl millet production area** with **39 per cent production.**
- **In AE1 and AE2 zone:** Production of Bajra (Pearl millet) increased significantly due to: **increased rainfall**, **technological investments in irrigation, fertilization** and **new varieties. Pearl Millet** price is lowest in **AE2 zone.**
- **Climate change** is contributing to more rainfall in **Zone 'G'** covering seven districts in **Gujarat,** thus farmers are **switching from pearl millet to cash crops** like **Cotton** or **Cluster Beans.**
- **Recommendation:** A revision of the Indian pearl millet Total Population Environments (TPE).

**ICAR- AICRP on Pearl Millet:**

- **ICAR-All India Coordinated Millet Improvement Project (AICMIP)** was established in the year **1965** with its **headquarters** at the **Indian Agricultural Research Institute, New Delhi**.
- Later on **pearl millet** was separated from the rest of the millet crops and the **All India Coordinated Pearl Millet Improvement Project (AICPMIP)** was established in **1985** with its headquarters at **Jodhpur** in the state of Rajasthan, the state which occupies nearly half of pearl millet area of the country.
- **AICPMIP** has a network of **thirteen centers** in Rajasthan, Maharashtra, Uttar Pradesh, Karnataka, Andhra Pradesh, Madhya Pradesh, Punjab, Haryana, Tamil Nadu and Gujarat. The **AICPMIP** centers pursue mandated activities in pearl millet improvement, production and protection.

## Topic 4. HEATWAVES LEADING TO OZONE POLLUTION, SAYS WMO REPORT

***Important for the subject: Geography***

**Climate Change** induced **heat waves** are **causing wildfires.** These **wildfires** along with **dust** cause a **spike in air pollutants** like **Ozone,** according to a **World Meteorological Organization (WMO)** Report.

**About Report and its findings:**

- The report titled **2023 WMO Air Quality and Climate Bulletin** is the **third** in an annual series.
- Released on **September 7 (International Day of Clean Air for blue skies)**. Report compiled by: **Global Atmospheric Watch Network** under **WMO**.

**Findings:**

- Heat waves along with wildfires contain several chemicals that affect: air quality, health, damages plants, ecosystem and crops, and leads to more carbon emissions.
- **Short-lived reactive gases** such as **nitrogen oxides** and **biogenic volatile organic compounds** lead to the production of **ozone** and **particulate matter (PM).**
- High temperature and high aerosol amount leads to formation of more particulate matters (PM).
- **Impact of increased ground level ozone:** Reduced agricultural productivity, especially for wheat and soybean.
- **WHO Air Quality Guidelines:** WHO's new guidelines recommend air quality levels for **6 pollutants**, where evidence has advanced the most on health effects from exposure.
- **6 classical pollutants** include particulate matter (PM 2.5 and 10), ozone (O3), nitrogen dioxide (NO2) sulfur dioxide (SO2) and carbon monoxide (CO).

**Global Atmospheric Watch Programme (GAWP):**

- An **initiative** of the **World Meteorological Organisation (WMO).**
- The **Global Atmosphere Watch (GAW) Programme** provides information and services on atmospheric composition to the public and to decision-makers relating to:
- the steadily increasing amounts of greenhouse gases, especially carbon dioxide, are impacting the climate the depletion of the protective stratospheric ozone layer has increased ultraviolet radiation, which can lead to more incidences of **skin cancer and other diseases urban air pollution,** especially **fine particles, which is affecting human health**

## Topic 5. APPLE COUNTRY HIMACHAL PRADESH GETS GROUND READY FOR CANNABIS CULTIVATION

***Important for the subject: Geography***

Himachal Pradesh government inching closer to legalize cannabis (hemp) cultivation in the State. A five member committee recommended cultivation of **'non-narcotic use of cannabis for medicinal, industrial, and scientific use'.**

A study suggests that approximately **95%** drug addicts in Himachal Pradesh are using cannabis and its by-products such as marijuana, hashish, charas and ganja/hemp, etc.

**Cannabis:**

- **Hemp** is a botanical class of **Cannabis sativa cultivars** grown specifically for **industrial**

**or medicinal use**.

- It is **produced in parts of Himachal Pradesh** though it is **illegal** under the **Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985** and **NDPS rules 1989.**

**Uses of cannabis (Hemp):**

- Mainly cultivated for its fiber and seeds.
- **Used in-** Phytoremediation, fiber-cloth manufacturing, ropes, baskets, sleepers, medicinal use, and use in the pulp and paper industry.

**Consequences of legalizing cannabis cultivation:**

- **Positive:** Economic boost, increase in employment, increased farmers income, medicinal use of hemp, treatment of patients.
- **Negative:** Allurement among adolescents and youth towards the use-abuse of cannabis, the nexus between illegal producers and suppliers of cannabis getting stronger, the risk of pilferage, and the occurrence of amotivational syndrome.

**NDPS Act 1985:**

- The **NDPS Act of 1985,** imposes a **ban** on extracting the resin and flowers from the plant, but the law determines the method and extent of its cultivation for medicinal and scientific purposes.
- **Section 10 (a) (iii)** of the Act empowers the States to make rules regarding the cultivation of any cannabis plant, production, possession, transport, consumption, use and purchase and sale, and consumption of cannabis (except charas).
- **States** are empowered to **permit**, by general or special order, the **cultivation of hemp only for obtaining fiber or seeds or for horticultural purposes**.
- In **2017 Uttarakhand** became the **first State** in the country to **legalize cannabis cultivation**. **Controlled cultivation** is also being done in some districts of **Gujarat, Madhya Pradesh and Uttar Pradesh**.
- The **NDPS Act** was enacted in order to meet the then **United Nations Conventions on Drug Policy in the year 1985.**

## Topic 6. CROWN SHYNESS: LET OUR REALMS STAY APART

***Important for the subject: Geography***

**What is crown shyness?**

Crown shyness or canopy disengagement, or inter-crown spacing is a feature observed in some tree species, in which the crowns of fully stocked trees do not touch each other, instead forming a canopy with channel-like gaps.

- This is most prevalent among trees of the same species, but also occurs between trees of different species, including **eucalyptus, pine, spiny hackberry (Celtis spinosa),**

**amberoi** and **oak.**

- This **phenomenon** is most common in **temperate deciduous forests.** There exist many hypotheses as to why crown shyness is an adaptive behavior, and research suggests that it might **inhibit spread of leaf-eating insect larvae**.

**Probable cause:**

- This mutual shade avoidance could be a result of buds at the end of twigs being able to sense light from the neighboring tree and refusing to grow in that direction.
- It may be an adaptive mechanism to reduce trees' competition for sunlight, water, and nutrients or reduce the spread of disease.

## Topic 7. HAWAIIAN VOLCANO OBSERVATORY

***Important for the subject: Geography***

The **USGS Hawaiian Volcano Observatory** observed **eruptive activity inKīlauea summit.**

An eruption has commenced within **Halemaʻumaʻu crater** and on the down dropped block to the east in **Kīlauea's summit caldera,** within **Hawaiʻi Volcanoes National Park.**

**Kīlauea:**

- **Location:** Island of Hawaii (Southern part of the island)
- **Elevation:** 1,222 (m) 4,009 (f)
- **Volcano type:** Shield volcano
- **Composition:** Basalt
- **Nearby towns:** Volcano, Pāhoa, Kalapana, Mountain View Kilauea is among the world's most active volcanoes.

**Geography of Kīlauea:**

- Topographically Kīlauea appears as only a bulge on the southeastern flank of **Mauna Loa.**
- Study finds that **Kīlauea** has its **own magma-plumbing system,** extending to the surface from more than 60 km deep in the earth.
- **Other volcanoes on the island:** Mauna Kea, Kohala, Kamaʻehuakanaloa (formerly Lōʻihi) and Mauna Loa.

**What are shield volcanoes?**

- A shield volcano is a type of volcano named for its **low profile,** resembling a warrior's shield lying on the ground.
- It is formed by the **eruption of highly fluid (low viscosity) lava,** which travels farther and forms **thinner flows** than the more viscous lava erupted from a stratovolcano.
- Repeated eruptions result in the steady accumulation of broad sheets of lava, building up the shield volcano's distinctive form.

- Shield volcanoes are found wherever **fluid low-silica lava** reaches the surface of a rocky planet.
- However, they are most characteristic of **ocean island volcanism** associated with hot spots or with continental rift volcanism. They include the **largest volcanoes on earth,** such as**Tamu Massif** and **Mauna Loa.**
- **Giant shield volcanoes** are found on other planets of the Solar System, including **Olympus Mons** on **Mars** and **Sapas Mons** on **Venus.**

## Topic 8. INDIA AND SAUDI ARABIA TO EXPEDITE $50-BILLION WEST COAST REFINERY PROJECT

***Important for the subject: Geography***


**India** and **Saudi Arabia** will set up a **joint task force** to explore early implementation of the **west coast refinery project** for which the **Arabian nation** will invest **$50 billion.** A monitoring committee will also be created to ensure that the progress is as per plans.

**India- Saudi Arabia Strategic Partnership Council:**

- **India-Saudi Strategic Partnership Council** was formed to coordinate on strategically important issues. The council will be **headed by** the **Prime Minister** and **Crown Prince Mohammed** and will meet **every two years.**
- **India** is the **fourth country** with which **Saudi Arabia** has formed such a strategic partnership, after the **UK, France** and **China**.

- **Recent outcome:** Agreement to diversify their hydrocarbons relationship into a comprehensive energy partnership.

**West Coast Refinery Projects:**

- The west coast refinery project is a **trilateral partnership** between **Saudi oil giant Aramco** and **Indian Oil Marketing Companies (OMCs).**
- **India** is setting up the **Ratnagiri Refinery and Petrochemicals (RRPCL) project,** which is a **joint venture** company formed by Indian Oil Corporation (IOCL), Bharat Petroleum Corporation (BPCL) and Hindustan Petroleum Corporation (HPCL).

**Refineries in India:**

- **Assam:** Numaligarh refinery, Bongaigaon refinery, Guwahati refinery, Digboi refinery
- **Gujrat:** Jamnagar refinery, Vadinar refinery, Gujarat refinery (vadodara),
- **Uttar Pradesh:** Mathura refinery
- **Haryana:** Panipat refinery
- **Punjab:** Guru Gobind Singh refinery
- **Madhya Pradesh:** Bina refinery
- **Bihar:** Barauni refinery
- **Maharashtra:** Mumbai refinery
- **Odisha:** Paradip refinery
- **West Bengal:** Haldia refinery
- **Tamil Nadu:** Manali refinery (Chennai), Nagapattnam Refinery
- **Andhra Pradesh:** Visakhapatnam refinery, Tatipaka Refinery
- **Kerala:** Kochi refinery
- **Karnataka:** Mangalore refinery

## Topic 9. KULASEKARAPATTINAM NERVOUS ABOUT ISRO'S ROCKET LAUNCH STATION PROJECT

***Important for the subject: Geography***

The **Indian space agency, ISRO,** is all set to begin work on building the **₹950-crore greenfield rocket launch facility** near the township of **Kulasekarapattinam,** 50 km south of **Tuticorin**, with the land acquisition process being almost complete.

**Kulasekarapattinam (Thoothukudi):**

- **Udangudi thermal power project** of the Tamil Nadu government at **Thoothukudi** district of **Tamil Nadu.**
- **Kulasekarapattinam** is famous for its **Mutharamman temple**.
- The famous **Murugan temple at Tiruchendur** is14 km away.

**Why is Kulasekarapattinam being chosen as a launching site by ISRO?**

- **Proximity to the seashore** makes **Thoothukudi** ideal for **"straight southward"** launches. From **Sriharikota**, such southward-bound launches are not possible as the rockets have to fly around Sri Lanka.
- When rockets are launched from kulasekarapattinam, the Dogleg maneuver will not be required, as there is no landmass along the flightpath in the southward direction.
- **Dogleg maneuver** is a sharp turn that causes a rocket to deviate from a straight flight path.
- This maneuver requires more fuel in the rocket which eats into the payload capacity of the launcher.
- **Nearness to the equator:** Like the **Sriharikota spaceport** in the **Satish Dhawan Space Centre**, Thoothukudi was selected as a spaceport due to its nearness to the equator. A rocket launch site should be on the east coast and near the equator.
- **Logistical ease: ISRO** has its **Liquid Propulsion Systems Centre (LPSC)** at **Mahendragiri in Tirunelveli district**, where it assembles the second and fourthstage engines for the **PSLV.** Instead of transporting the second and fourth stages to **Sriharikota from Mahendragiri**, it would be easier to shift them to the launch pad if it is built in Kulasekarapattinam, which is around 100 km away.

**Concerns of the inhabitants of Kulasekarapattinam:**

- Land encroachment
- Forceful migration
- Fear of radioactive emissions
- Increases in the prices of rent and other commodities

## Topic 10. FLOODPLAIN LOSS: BASINS OF IRRAWADDY, TAPI, INDUS, CAUVERY RIVERS FLOWING THROUGH INDIA ALTERED MOST DUE TO HUMAN ACTIVITIES

***Important for the subject :Geography***

A group of researchers, for the **first time**, has "developed the first publicly available global dataset that quantifies human alterations in 15 million square kilometers of floodplains along **520 major river basins** during the recent **27 years** (1992-2019)".

**Report title:** Human alterations of the global floodplains 1992–2019

- A **floodplain,** according to the Federal Emergency Management Agency, is "any land area susceptible to being inundated by floodwaters from any source".
- The study explained how it **quantified human alteration** by taking stock of **three geospatial datasets** for the said time period **(1992-2019).**
- First, they identified the **global extent of floodplain,** from which they identified **how land use change has unfolded of the corresponding time period** and finally, they used **river basin boundaries** to quantify the process for the rivers assed in the study.

**Report findings:**

- Over **460,000 square kilometers** of **floodplain area** was lost to **agriculture,** while another **140,000 square kilometers** was **redeveloped** to new areas over the existing floodplain.
- **Continent-wise**, **Asia** lost the biggest area of floodplains followed by **South America** and **Africa**.
- In **Amazon** and **Yangtze river basins** the agricultural expansion is proportional to the reduction in the area of forests.
- Highest floodplain loss in the Indian subcontinent is due to human activities. **Irrawaddy river** witnessed the highest floodplain loss.
- **In India, Tapi river basin** recorded the **highest alteration** with over **3 percent** of the floodplain area lost due to human activities, followed by **Indus (3.2 per cent)** and **Cauvery (2.7 per cent).**

## Topic 11. UN REPORT OUTLINES HOW DEVELOPING, DEVELOPED COUNTRIES CAN REDUCE EMISSIONS FROM CONSTRUCTIONS

***Important for the subject :Geography***

Developing countries should switch from unsustainable building practices to using **alternative low-carbon building materials** to reduce greenhouse gas emissions, a new **UN report** highlighted.

**About the report:**

- Report title: **Building Materials and The Climate: Constructing A New Future** Released by: **UNEP** and **Yale Center for Ecosystems and Architecture.**

**Report findings:**

- About **37%** of the **Greenhouse Gas emissions** are traced to the **build environment sector:** buildings, the distribution systems that supply water and electricity, and the roads, bridges, and transportation systems.
- Processing of cement, the binding agent in concrete, contributes 7 per cent of global carbon emissions.
- The report recommends **"Avoid-Shift-Improve" strategies** to reduce emissions. **"Avoiding" emissions** through circularity to ensure waste is eliminated while extending a building's life, **"Shifting"** to sustainable materials, and **"Improving"** the production of conventional materials such as concrete, steel, aluminum, plastics, glass and bricks.
- **Embodied carbon** is the amount of carbon dioxide across the life cycle of the built environment process.
- **Alternative materials and processes in build environment sector to reduce the Greenhouse**

**Gas emissions:**

- Increasing the lifetime of buildings to reduce the aggregate embodied carbon. Switch

towards properly managed biobased materials.

- **Mass timber** has emerged as an attractive alternative to **carbon-intensive concrete** and **steel.**
- Processed bamboo or engineered bamboo.
- **Electrifying** and **decarbonising** the energy that is supplied to the production and maintenance of materials, buildings and urban infrastructure.
- Reducing the **clinker** (produced from limestone and chalk)**-to-cement ratio** and increasing the share of cement alternatives.
- Carbon capture and utilization for concrete production (CCU concrete) technology to reduce carbon emission. CCU concrete can remove 0.1 to 1.4 gigatonnes of CO2 by 2050.
- Avoiding raw material extraction by promoting steel reuse and producing steel from scrap. Using renewable energy for aluminum production.

## Topic 12. IS THE GENETICALLY MODIFIED, NUTRIENT-RICH GOLDEN RICE AS SAFE AS PROMISED?

***Important for the subject :Geography***

In April, the **Philippines' Supreme Court** heeded farmers' and activists' calls to look into the safety promise of **Golden Rice**, a **genetically modified grain** created to tackle the **vitamin A deficiency** that impacts millions, over concerns about its potential impact to rice biodiversity, farmer livelihoods and human health.

- **International Day of Action Against Golden Rice**– 8 august (started in 2013). **The Department of Agriculture's Philippine Rice Research Institute (DA– PhilRice)** and **IRRI (HQ- Manila, Philippines)** is spearheading Golden Rice's development and deployment in the Philippines.
- **MASIPAG,** a network of scientists and farmers who led a petition to the **Philippine Supreme Court** against the **commercial release of Golden Rice**, known here as **Malusog Rice.**
- As legal debates over its safety promise continue, the country's **Golden Rice** rollout is on track and officials aim on cultivating **500,000 hectares** (1.24 million acres) of the crop by **2028.**

**Golden rice or Malusog rice:**

- Introduced in **2004**, the **Golden Rice technology** involves adding **two genes** from **maize** and a **common soil bacterium** into **white rice**, with its developers later donating the technology to combat **Vitamin A deficiency (VAD)** in lessindustrialized nations like the **Philippines**.
- **Syngenta** maintains full **commercial rights** over **Golden Rice,** including all technological enhancements.
- This rice variety's distinct **yellow-orange color** comes from added **beta-carotene,** with turns into **vitamin A** in the body, to tackle the **vitamin A deficiency (VAD)** that impacts millions of Filipino children.

- **VAD** is common in the Global South, but rare in the Global North, according to the World Health Organization.
- **VAD includes:** Diarrheal diseases, irreversible blindness, other sensory losses, and premature death.

**Concern against golden rice cultivation:**

- Potential harm to rice biodiversity and human health. Commercial cultivation is done without any real scientific basis.
- It serves corporate interests, neglects peasants, and poses a risk of genetic contamination to local rice varieties, ultimately endangering local rice biodiversity.
- May increase the use of herbicides like glyphosate which can further contaminate the water. Contamination of local rice varieties by genetically modified Golden Rice.

**Regulatory guidelines for GMOs:**

- **Precautionary Principles** are enshrined in the **Cartagena Protocol on Biosafety**, and countries must ensure adherence to these principles before introducing genetically modified crops. The **WHO** has not yet issued guidance on the consumption of biofortified foods.

**Alternative to golden rice:**

- There are **alternative crops** with **higher beta-carotene content** than **Malusog Rice** and should be used instead to tackle VAD.
- These alternative crops are: tomatoes, squash, malunggay, carrots, and sweet potatoes, various **green and leafy vegetables** like saluyot (jute mallow), alugbati (Malabar spinach), gabi (taro), and kangkong (water spinach).

## Topic 13. THE DEADLIEST AND STRONGEST EARTHQUAKES IN RECORDED HISTORY

***Important for the subject: Geography***

**Deadliest and strongest earthquake in the world:**

A powerful earthquake of magnitude 6.8 struck Morocco capital Marrakech recently. Significant earthquake events database is maintained by the **National Centres for Environmental Information (NCEI)** in the USA.

- The deadliest earthquake in terms of magnitude came in **1960** in **Puerto Montt, Chile** with a magnitude of **9.5.** The deadliest earthquake in terms of death and damage came in **Shaanxi, China** in **1556**, causing a death toll of **8.3 lakh**.

**India:**

- The **Bhuj earthquake (7.6 magnitude)** was the deadliest earthquake in India with a death toll of more than **20000** people.

- In terms of magnitude, the strongest earthquake in **India** came in **Andaman and Nicobar Islands** in **1941** and **1897 Assam** earthquake. Both were of magnitude

**8. Other major earthquakes in India:**

1. Cutch Earthquake (1819) which was 8 magnitude
2. Assam Earthquake (1897) of magnitude 8.
3. Bihar-Nepal Earthquake (1934) of 8 magnitude
4. Koyna Earthquake (1967) of 6.5 magnitude
5. Uttarkashi (1991) of 6.6 magnitude
6. Killari (1993) of 6.4 magnitude
7. Bhuj (2001) of 7.7 magnitude
8. Jammu Kashmir (2005)

**Seismic waves:**

- Seismic waves are the vibrations from earthquakes that travel through the Earth and are recorded on instruments called seismographs. **Seismographs** record a zigzag trace that shows the varying amplitude of ground oscillations beneath the instrument.

**Measurement of earthquake:**

- Two scales are used widely to measure the earthquake:
- The **Mercalli scale** bases its measurement on the observed effects of the earthquake and describes its **intensity**. It is a linear measurement. It measures the intensity of earthquake on a scale of 1-12.
- The **Richter scale** measures the seismic waves, or the energy released, causing the earthquake and describes the quake's **magnitude**. **It is logarithmic.** It measures earthquake magnitude in a scale of 0-10.

## Topic 14. RUBBER BOARD TO INCREASE AREA UNDER RUBBER IN NORTHEAST

***Important for the subject: Geography***

The **Rubber Board,** jointly with the **Central government** and the **Automotive Tyre Manufacturers' Association,** is implementing **a project to expand the area under natural rubber in the Northeastern States**.

- Of the **8.5 lakh hectares** under **rubber** in the country, almost **5 lakh hectares** was in **Kerala** and **Kanyakumari district** of **Tamil Nadu** and **1 lakh hectares** was in **Tripura.**
- To expand the area in non-traditional States, the **Rubber Board** was implementing a project to bring **2 lakh hectares** under **natural rubber** in the **Northeastern States**, except **Sikkim**, but including **West Bengal.**
- The tyre manufacturers, who were the main consumers of rubber, were investing **₹1,000 crore in the five-year project** that commenced in 2021.

**Natural Rubber:**

- **Polymer of isoprene,** an organic compound obtained from **latex** of a tropical tree **Hevea Brasiliensis.**
- **Soil type:** Well drained and well weathered soils, eg. Laterite, alluvial and sedimentary type soils.
- **Precipitation and temperature:** Evenly distributed rainfall with at least 100 rainy days, temperature range should be 20-34oC.
- **Other conditions required:** Humidity of around 80%, 2000 hrs of sunshine and absence of strong winds.

**World's major producer:** Thailand, Indonesia and Malaysia.

- **India: Kerala** (.75% of total production), **Tamil Nadu, Karnataka. Tripura, Assam, Andaman and Nicobar, Goa** etc are some other rubberproducing States.
- India is the **5th largest producer** and **2nd largest consumer** of natural rubber in the world. India imports **40%** of its total rubber consumption.
- The **first rubber plantations in India** were set up in **1895** on the hill slopes of **Kerala.** However, **rubber cultivation on a commercial scale** was introduced in **1902.**
- **Natural rubber** is preferred over **synthetic rubber** due to its **high tensile strength** and **vibration-dampening properties**, along with **tear resistance.**
- This makes it important for the construction and automobile industries.

**Rubber Board:**

- Established: **1955**
- HQ: **Kottayam, Kerala**
- Under: **Ministry of Commerce and Industry**
- Rubber board is responsible for the development of the rubber industry in India. **Rubber Research Institute (RRI)** is under the **Rubber Board.**

**Rubber consumption in India:**

- Automotive tyre sector: 50% (all kind of rubbers)
- Bicycle tyre and tubes: 15%
- Footwear: 12%
- Belts and hoses: 6%
- Camelback and latex production: 7%
- Other products: 10%

## Topic 15. SCRUB TYPHUS IN ODISHA: CHANGING CLIMATE MAY HAVE A ROLE BEHIND OUTBREAK, SAYS EXPERT

***Important for the subject: Science and technology***

A resurgence of scrub typhus cases in **Odisha** has brought forward the role of climate in

driving up the rate of the highly infectious disease. Also reported from **Himachal Pradesh.**

**Scrub typhus:**

- **Scrub typhus** is caused by a **zoonotic rickettsial bacterium** called **Orientia tsutsugamushi,** which is **transmitted** to humans through the **bites of infected mites** in the larveal stage called **chiggers. Mites** carrying the disease are generally found in the bush, jungle and paddy areas, so the disease is also called **jungle or bush typhus**.
- The **chiggers** that transmit the disease generally live in low temperature and high humidity conditions.
- The **symptoms** of **scrub typhus** commonly include **fever, headache, body ache** and **sometimes a rash**.
- In some cases it leads to respiratory distress, brain and lung inflammation, kidney failure and multi-organ failure, ultimately resulting in death. **Test:Elisa tests** for scrub typhus.

**Probable reason for outbreak:**

- Odisha districts have more agricultural and forest land suitable for mites. Global warming and climate change. A study found that **temperature, humidity** and **rainfall** had a major role in the incidence of **scrub typhus.**
- A **2017 study** looking into **scrub typhus cases in China** also found that a **1 degree Celsius increase in mean temperature** was associated with a **3.8 per cent increase in the odds of scrub typhus cases** during the same week.

## Topic 16. UNFOLDING DEMENTIA EPIDEMIC REQUIRES DEALING WITH HUGE SHORTFALLS IN INFRASTRUCTURE AND AWARENESS

***Important for the subject: Science and Technology***

**Introduction**

- India's elderly population is projected to reach **20 crore by 2031**, leading to an increased demand for **a national action plan** to address **Alzheimer's and dementia.**

**Rising Dementia Cases in India**

- A multicentric study revealed a **dementia prevalence rate of 7.4% among individuals aged 60 and above**, equivalent to **nearly 9 lakh Indians** living with dementia.
- The prevalence of dementia is **estimated to rise from 88 lakh in 2016 to 1.7 crore by 2036.**
- The study, titled '**Prevalence of dementia in India: National and State estimates from a nationwide study**', was published in Alzheimer's and Dementia journal in July this year.
- Some states like **Jammu and Kashmir, Odisha, and West Bengal reported higher rates of dementia than expected.**
- **WHO declared dementia a public health priority in 2012** and launched the **Global**

**Action Plan (2017-2025)** emphasizing dementia awareness, risk reduction, diagnosis, treatment, caregiver support, and research.

- **NIMHANS and Dementia India Alliance (DIA)** are collaborating with the **Karnataka** government to formulate a **Karnataka State Dementia Action Plan aligned with WHO's global action plan.**

**Understanding Dementia: Clinical Presentation and Diagnosis**

- Dementia is a **clinical syndrome** caused by various brain diseases or injuries.
- **Alzheimer's disease** is the most common cause of dementia, responsible for up to 70% of diagnoses.
- Early symptoms of dementia include **forgetfulness, difficulty recalling names, disorientation, and reduced social engagement.**
- Advanced stages involve severe **memory loss, mood swings, apathy, and loss of bodily functions.**
- Diagnosis is based on **clinical grounds, neuroimaging, and neuropsychological tests.**
- Cognitive assessments using tools like **MMSE (Mini-Mental State Examination)** and **MoCA (Montreal Cognitive Assessment)** help **differentiate dementia from normal aging.**
- Currently, **there is no genetic or biomarker test for diagnosing dementia.**

**Preventing Dementia: Lifestyle and Risk Factors**

- The WHO emphasizes **preventing Alzheimer's disease as a key** element in fighting the global dementia epidemic.
- **Delaying** the onset of dementia by **even one year** could reduce its prevalence by 11%, while a delay of five years could halve it.
- Lifestyle risk factors such as **sedentary behavior, unhealthy diet, smoking, and excessive alcohol use contribute to dementia risk.**
- Managing vascular risk factors, including **hypertension, high cholesterol, diabetes, and obesity, is crucial in preventing dementia.**
- **Smoking cessation** can reduce dementia risk.
- **Regular exercise, managing depression, and higher education levels** are protective against dementia.
- **The cognitive reserve theory** suggests that education stimulates brain development and delays clinical symptoms.

**Dementia Care: Treatment and Support**

- Dementia care involves **managing the disease's effects and cognitive, neuropsychiatric, and functional symptoms.**
- A dementia care team includes **psychiatrists, therapists, nurses, psychologists, and social workers.**
- **Non-pharmacological** interventions are the **first-line therapy**.

- **Behavioral and psychological symptoms** of dementia are addressed through non-pharmacological interventions.
- Medications like **cholinesterase inhibitors are** used to treat **cognitive symptoms**.
- **Neuropsychiatric symptoms** respond to various therapies, including **aromatherapy, physical therapy, and speech therapy.**

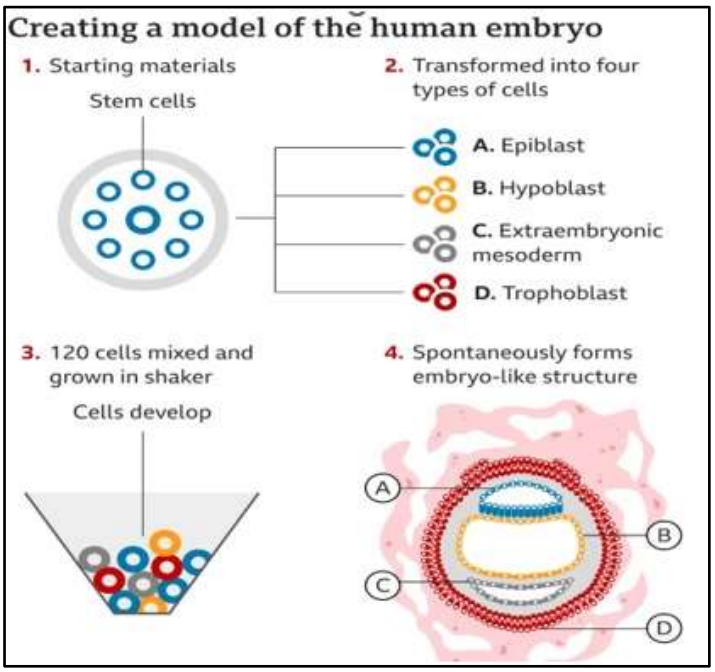
**Commonly known diseases that can cause dementia:**

**Disease Description**

- Alzheimer's Disease
- Accumulation of amyloid plaques and tau tangles in the brain.
- Vascular Dementia
- Reduced blood flow to the brain due to vascular issues.
- Lewy Body Dementia
- Presence of Lewy bodies (abnormal protein deposits) in the brain.
- Frontotemporal Dementia (FTD)
- A group of disorders affects the frontal and temporal lobes.
- Parkinson's Disease Dementia
- Occurs as a **complication** of Parkinson's disease. Huntington's Disease
- A genetic disorder leading to cognitive decline and other symptoms.
- Creutzfeldt-Jakob Disease (CJD)
- A rare, rapidly progressing brain disorder caused by abnormal proteins.
- Wernicke-Korsakoff Syndrome
- Often associated with alcohol abuse and caused by thiamine deficiency.

## Topic 17. ADVANCEMENTS IN SYNTHETIC HUMAN EMBRYO MODELS: A COMPREHENSIVE OVERVIEW

***Important for the subject: Science and technology***




Scientists from the **Weizmann Institute** have achieved a remarkable feat by creating synthetic human embryo models that **closely resemble 14-day-old embryos**.

Unlike traditional methods, these models **do not rely on sperm, eggs, or a womb.**

- This groundbreaking research aims to provide valuable insights into the **early stages of human development, addressing the ethical complexities surrounding embryo research.** Researchers anticipate that these models will enhance understanding of **early human development, infertility, and pregnancy loss.**

**Navigating the Complexity of Early Embryo Development**

- The first few weeks following fertilization are marked by **intricate and rapid changes in cell development.**
- Unfortunately, this period is associated with a **high risk of miscarriage and birth defects,** making it a **poorly understood stage** in human development.

**Key Features of the Synthetic Embryo Model**

- The starting material for these synthetic embryos consists of **naive stem cells**. These **stem cells were skillfully reprogrammed** to give them the potential to **differentiate into any type of tissue** found in the human body.
- While **not entirely "synthetic,**" these models are **distinct from natural embryos** as they originate from cultured cells.

- These synthetic embryos consist of four distinct cell types found in early embryos: **epiblast** cells, which become the **embryo proper** (or foetus) **trophoblast** cells, which become the **placenta hypoblast** cells, which become the supportive **yolk sac extra embryonic mesoderm** cells.
- A meticulous **mixing of approximately 120 of these cells** was followed by the remarkable phenomenon of **spontaneous self-assembly into structures closely resembling human embryos.**

**Ethical Questions and Legal Distinctions**

- One significant question arising from this research is whether synthetic embryo development could extend **beyond the established 14-day limit.**
- Researchers emphasize the **ethical and legal boundaries** surrounding these embryo models, reiterating that **using them to achieve pregnancy is unethical, illegal, and scientifically impossible.**
- The necessity for careful ethical and legal discussions as **these advancements outpace regulatory frameworks.**
- Legal and ethical experts in the **UK** are actively **developing voluntary guidelines for the ethical use of synthetic embryo models.**

**Distinct cell types found in early embryos:**

**Cell Type**

**Function in Early Embryo Development**

- Epiblast Cells
– Precursors to the embryo proper (or fetus)
– Give rise to various tissues and organs in the embryo
– Hold the **genetic blueprint** for the entire organism Trophoblast Cells
– Responsible for forming the **placenta**
– Establish the interface between maternal and fetal blood
– Enable **nutrient exchange** between mother and embryo Hypoblast Cells
– Contribute to the formation of the **yolk sac**
– Provide essential **nutrients** for early embryo development
– Support overall **embryo nourishment** Extraembryonic Mesoderm Cells
– Serve as building blocks for **mesodermal tissues**
– Form the structural framework supporting organ development
– Play a critical role in connecting and supporting organs

## Topic 18. U.K. REJOINING EUROPE'S HORIZON SCIENCE PROGRAMME

***Important for the subject: Science and technology***

**Britain** is rejoining the **European Union's $100 billion** science-sharing program **Horizon Europe**, the two sides announced on September 7.

**Britain** is also rejoining the **Copernicusprogramme.**

- Deal signed between: European Commission President **Ursula von der Leyen** and **British PM Rishi Sunak.**
- Earlier the **EU** blocked the **U.K.** from its **Horizon** programme due to dispute over trade rules with **Northern Ireland,** the only part of the U.K. that shares a border with an **EU member**, the **Republic of Ireland**.

**What is Horizon Europe?**

- It is a **Research and innovation funding programme** until **2027. Horizon Europe** is the **EU's key funding programme** for **research and innovation** with a budget of **€95.5 billion**.
- It tackles **climate change**, helps to achieve the **UN's Sustainable Development Goals** and boosts the **EU's competitiveness and growth**.
- The programme facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges. It supports creating and better dispersing of excellent knowledge and technologies.
- It creates jobs, fully engages the EU's talent pool, boosts economic growth, promotes industrial competitiveness and optimizes investment impact within a strengthened European Research Area.
- Legal entities from the EU and associated countries can participate.

**Copernicus:**

- Named after a great European scientist and observer: **Nicolaus Copernicus. Copernicus** is the **Earth observation component** of the **European Union's Space programme,** looking at our planet and its environment to benefit all
- European citizens. It offers **information services** that draw from **satellite Earth Observation** and **in-situ (non-space) data.** The **European Commission** manages the Programme.
- It is implemented in **partnership** with the Member States, the European Space Agency (ESA), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the European Centre for Medium-Range Weather Forecasts (ECMWF), EU Agencies and Mercator Océan.
- Vast amounts of **global data** from satellites and ground-based, airborne, and seaborne measurement systems provide information to help service providers, public authorities, and other international organizations **improve European citizens' quality of life** and beyond. The information services provided are **free** and **openly accessible to users**.

## Topic 19. INDIA REPORTS FAR FEWER PEOPLE WITH ORPHAN DISEASE

***Important for the subject: Science and technology***

**Rare disease or Orphan disease:**

A **rare disease** is a disease that affects a **small percentage of the population**. In some parts of the world, an **orphan disease** is a **rare disease** whose rarity means there is a lack of a market large enough to gain support and resources for discovering treatments for it, except by the government granting economically advantageous conditions to creating and selling such treatments. **Orphan drugs** are ones so created or sold.

- Most rare diseases are **genetic in origin** and thus are present throughout the person's entire life, even if symptoms do not immediately appear. Many rare diseases appear early in life, and about **30% of children with rare diseases will die before reaching their fifth birthdays**.
- No single number has been agreed upon for which a disease is considered rare. **Global Genes** has estimated that currently approximately **10,000 rare diseases exist globally**, with **80%** of these having identified genetic origins.

**Initiatives by patient groups:**

- Hospitals in India have so far reported less than 500 of these diseases. The Government's **National Policy for Treatment of Rare Diseases** has only recently started making its mark.
- Diseases prevailing in our countries include **cystic fibrosis, hemophilia, lysosomal storage disorders, sickle-cell anemia, etc**. **DART,** the **Dystrophy Annihilation Research Trust,** a body **formed by** parents of patients suffering from **Duchenne's muscular dystrophy.**
- In this condition, muscles in the pelvis begin to waste away from the age of three.
- In partnership with the **IIT** and **AIIMS** located in **Jodhpur**, the **Trust** has begun a clinical trial of an efficient and personalized **antisense oligonucleotide-based therapeutic regimen** for this dystrophy.

**Leprosy free India:**

- leprosy is now considered a rare disease in India.

**Incident rate**: 0.45/10,000 population.

- Recent research on the synthetic antibiotic **rifapentine,** which is widely used against **tuberculosis,** has shown that a single dose of this drug, when administered to household relatives of a leprosy patient, significantly curtailed the spread of leprosy to them over a four-year study period **India** envisages to e**radicate leprosy** by **2027.**

## Topic 20. REGULATOR ISSUES ALERT OVER SALE OF FALSIFIED VERSIONS OF 2 DRUGS

***Important for the subject :Science and Technology***

The **Drugs Controller General of India (DCGI)** has directed the **drugs controllers of all States and Union Territories** to keep a strict vigil on the sale and distribution of **falsified versions** of two drugs, **liver medication Defitelio** and **Takeda's cancer drug Adcetris (injection),** following alerts issued by the **World Health Organization (WHO).**

**WHO Advisory:**

- Against falsified versions of **Adcetris injection 50 mg** manufactured by **Takeda Pharmaceutical Company Limited**, identified in **four different countries** including **India** and **Turkey**.
- Against a falsified version of **Defitelio (Defibrotide) 80 mg/ml** concentrate for solution for infusion, manufactured by **Gentium Srl**.
- Against **Abbott's antacid Digene gel**, citing safety concerns, which is manufactured at a **Goa facility**.

**Adcetris:**

- Adcetris (Brentuximab Vedotin) is a **CD30-directed antibody-drug conjugate** indicated for the treatment of patients with **Hodgkin's lymphoma** after the failure of an **autologous stem cell transplant** and **systemic anaplastic large cell lymphoma**.

**Laws in India to regulate medicines:**

- The **Drugs & Cosmetics Act, 1940** regulates the import, manufacture, distribution and sale of drugs in India.
- **India** is also the **world's leading producer of fake drugs,** according to research by the **Organisation for Economic Co-operation and Development (OECD)** and the **European Union's Intellectual Property Office**.
- In **2003, Mashelkar Committee** noted that although the **Drugs and Cosmetics Act 1940** has been in force, the level of enforcement in many States has been unsatisfactory.

**Central Drugs Standard Control Organisation (CDSCO):**

- The **CDSCO** is **India's national regulatory body** for **cosmetics, pharmaceuticals** and **medical devices.**
- The Indian government has announced its plan to bring **all medical devices,** including implants and contraceptives under a review of the Central Drugs and Standard Control Organisation (CDSCO).
- Within the **CDSCO**, the **Drug Controller General of India (DCGI)** regulates **pharmaceutical and medical devices** and is positioned within the **Ministry of Health and Family Welfare**.

- The **DCGI** is advised by the **Drug Technical Advisory Board (DTAB)** and the **Drug Consultative Committee (DCC)**.
- Divided into **zonal offices**, each one carries out pre-licensing and post-licensing inspections, post-market surveillance, and drug recalls (where necessary).
- Manufacturers who deal with the authority required to name an **Authorized Indian Representative (AIR)** to represent them in all dealings with the **CDSCO** in India. **CDSCO** plans to open an **international office** in **Beijing, China**.

## Topic 21. HOW DID A CHINA-BASED HACKING GROUP COMPROMISE MICROSOFT'S CLOUD SECURITY?

***Important for the subject : Science and Technology***

**Introduction**

**Storm-0558**, a **China-based hacking group**, breached U.S. government-linked email accounts.

The compromised email accounts included those of **top American officials** such as **Commerce Secretary Gina Raimondo** and **U.S. Ambassador to China Nicholas Burns.** The breach stemmed from the **compromise of a Microsoft engineer's corporate account**, allowing hackers to extract a **cryptographic key** for email account access.

**Storm-0558: A China-Based Threat Actor**

- **Microsoft Threat Intelligence** assessed Storm-0558 as a China-based threat actor with **activities aligned with espionage objectives.**
- The group primarily targeted **U.S. and European** diplomatic, economic, and legislative entities, as well as individuals linked to **Taiwan and Uyghur geopolitical interests.**
- Targeting Microsoft accounts using **phishing campaigns** and exploiting **vulnerabilities in public-facing applications** for initial access.

**Compromising Microsoft's Security**

- Storm-0558 compromised Microsoft's cloud security by using an **acquired MSA key** to forge tokens.
- These tokens were used to **access Outlook Web Access (OWA),** Microsoft's **web based mail client,** and **impersonate Azure AD users** for enterprise email access.

**Understanding Cryptographic Keys**

- A cryptographic key is a **string of characters used in encryption algorithms** to **secure data.**

**Types:**

**Symmetric Keys:**

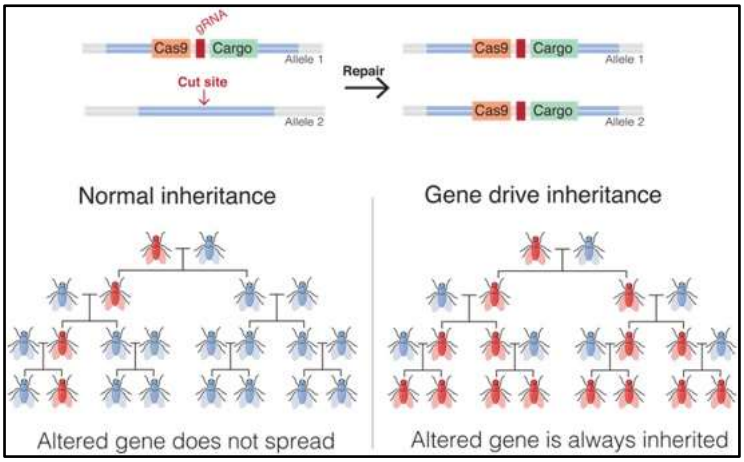
- These use the **same key for both encryption and decryption.** While efficient, **secure sharing** of the key between parties can be **challenging**.

**Asymmetric Keys:**

- Also known as **public-key encryption**. It involves a **pair of keys** – a **public key** and **a private key**. The **public key is shared openly**, while the **private key remains secret**.
- Data encrypted with the **public key can only be decrypted with the private key**, ensuring secure communication and authentication.
- **Digital Signatures**: Cryptographic keys are crucial for creating and verifying digital signatures, which confirm the authenticity and integrity of digital documents or messages.

## Topic 22. BUZZING BREAKTHROUGH: GENETIC ENGINEERING UPGRADES MOSQUITO CONTROL

***Important for the subject : Science and Technology***




**Introduction**

**Mosquitoes** have plagued humans for millions of years, transmitting deadly diseases like **malaria, dengue, Zika, lymphatic filariasis, and yellow fever.**

- Current mosquito control methods include **mosquito nets, insecticides,** and the use of **symbionts** like ***Wolbachia***.
- **Insecticide resistance** in mosquitoes is on the rise, necessitating new approaches to mosquito control.

**Help from Sequencing Tech**

- Advances in **next-generation sequencing techniques** have provided access to the whole genome sequences of mosquito species.
- Researchers from the **University of California, Tata Institute of Genetics and Society, and the Institute of Bioinformatics and Applied Biotechnology** prepared high-quality reference genomes for ***Anopheles stephensi***, a major **malaria vector mosquito**.

**Gene Drive**

- **Genetic manipulation** aims to control mosquito populations by **interfering with their reproduction.**
- Gene-drive technology, conceived by **Austin Burt**, allows mosquitoes to inherit specific genes **not following Mendelian genetics.**
- A **protein cuts** the mosquito's **DNA** at a **non-encoding part** (often using **CRISPR**), leading to the incorporation of a ***drive sequence*** and reducing reproductive capabilities or sterility.
- Researchers **genetically enhanced a gene** in mosquitoes' **midgut** to **secrete antimicrobial substances** that disrupt the ***Plasmodium*** parasite's development, reducing malaria transmission.

**Benefits and Risks**

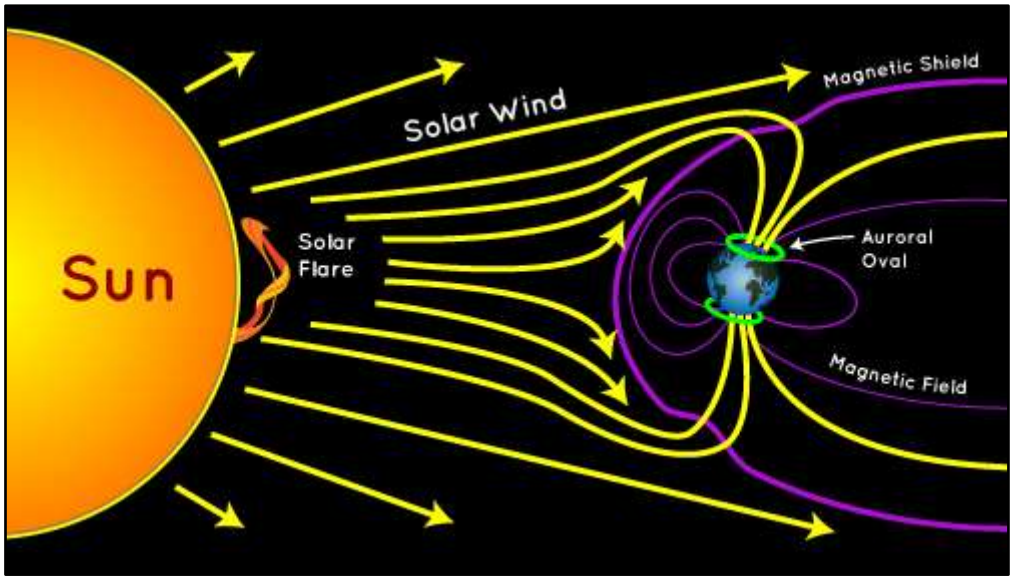
- In 2020, the U.S. Environmental Protection Agency authorized the release of **genetically modified mosquito OX5034**.
- OX5034 males mate with females, but a **self-limiting gene prevents female offspring from surviving**, reducing mosquito populations.
- Promising results from **trials in India, Brazil, and Panama** showed up to **90% mosquito population reductions** and **decreased dengue incidence.**
- **Risks** include potential **ecological disruptions and uncertainty** about the **impact on food chains and ecosystems.**
- Critics raise concerns about **unintended ecological consequences** and the **spread of engineered genes beyond target populations.**
- The **Department of Biotechnology** in India released **guidelines** for genetically engineered insects, outlining procedures and regulations.

**Applications:**

- **Agriculture:** Enhancing crops for increased yield, resistance to pests, and environmental stress tolerance.
- **Vector Control:** Combating diseases by modifying disease-carrying insects like mosquitoes to reduce disease transmission.
- **Conservation:** Addressing invasive species by altering their genetics tomitigate ecological impacts.

## Topic 23. WHAT ARE PICOFLARE JETS?

***Important for the subject: Science and technology***




### Introduction

Researchers from the joint Solar Orbiter mission (ESA and NASA) have detected intermittent jets of charged particles in the sun's outer atmosphere.

### Picoflare Jets

- Picoflare jets are **high-speed charged particle** emissions from the **sun's outer atmosphere.**
- The term "**picoflare**" is derived from the fact that these jets **carry energy approximately equivalent to one trillionth of the sun's largest flares. 'Pico'** is an order of magnitude that denotes **10-12, or one trillionth of a unit.**
- These jets emanate from **coronal holes,** relatively **small regions in the sun's corona.**

### Their Role in Solar Wind

- Emerging research suggests that picoflare jets may serve as a significant source of mass and energy contributing to the solar wind.
- The solar wind primarily consists of **ionized gas**, with **ionized hydrogen** being the predominant component.
- Unlike **Earth's atmospheric circulation**, which circulates around the planet, the solar wind is **continuously ejected outward** into interplanetary space.
- This outward propagation creates a **plasma bubble known as the heliosphere,** which encompasses the planets in the solar system.

### Coronal Holes

- Coronal holes are **dark regions in the sun's outer atmosphere** where **magnetic field**

**lines extend into space**.

- They appear **dark** due to **lower temperature and density** compared to the surrounding corona.
- Coronal holes are **primary sources of the solar wind,** a high-speed stream of charged particles from the sun.
- They **vary in size and location over time**, influencing space weather. Their activity is linked to the **11-year solar cycle**, with a **more prominent presence during solar minimum.**

## Topic 24. THE PHYSICS OF LETTING WAVES GO ONE WAY BUT NOT THE OTHER

***Important for the subject: Science and technology***

**Introduction**

**Non-reciprocity** is a phenomenon essential to many technological advancements, from **quantum computing** to **autonomous vehicles**.

**Reciprocity Principle**

- **Reciprocity** is a fundamental physics principle where if a signal can be sent from Point A to Point B, it can also be sent from Point B to Point A by simply **reversing the direction.**
- Everyday examples include **shining a torchlight at someone**; they can shine it back.
- **Counterintuitive examples** like a **one-way window in police interrogation.**

**Applications of Reciprocity**

- Engineers use reciprocity in **testing antennas** that **receive signals from various directions**.
- Reciprocity is employed in the operation of **radars, sonar, seismic surveys, and MRI scanners.**
- Reciprocity can create issues in scenarios like **espionage and laser transmission.**

**One-Way Traffic**

- In non-reciprocal wave transmission, "**One-Way Traffic**" involves three components:
- **Component A:** Selectively allows specific-direction waves.
- **Component B:** Rotates the wave's direction.
- **Component C:** Permits waves of a particular angle.
- When a wave goes left to right, it passes through all components. In the **reverse direction,** it's **blocked because of polarization changes.**

**Magnet-Based Non-Reciprocity**

- This method uses **magnetic materials and components** A, B **(wave plates)**, and C **(Faraday rotator)**.

- **Component A** allows specific polarization waves.
- **Component B** adjusts polarization.
- **Component C** (Faraday Rotator), with magnetic properties, lets waves pass in one direction, **blocking them in reverse.**

**Applications in Technology**

- **Quantum computing** benefits from non-reciprocal devices, **especially in lowtemperature environments.**
- **Qubits** in quantum computers require non-reciprocal devices for signal amplification.
- Other methods to break reciprocity include **modulation** and **nonlinearity**, each with unique advantages.
- **Modulation**: Modulation is the process of **altering a carrier signal's properties** to encode information for transmission, used in **telecommunications** and **broadcasting**.
- **Nonlinearity**: Nonlinearity refers to systems where the **output does not have a proportional relationship with the input,** often leading to complex behaviors or interactions.

## Topic 25. NEW ALZHEIMER'S DRUGS DON'T DESERVE THE HYPE – HERE'S WHY

***Important for the subject: Science and technology***

**Alzheimer's disease** is a **progressive neurodegenerative disorder** that causes cognitive decline, memory loss, and behavioral changes, **primarily affecting older adults.**

- Introduction to **three drugs (aducanumab, lecanemab, and donanemab)** that target **amyloid**, the **protein linked to Alzheimer's disease.** The breakthrough in **slowing cognitive decline**.

**Four Key Shortcomings of New Alzheimer's Drugs**

**Tiny Benefits**

- In the **donanemab trial**, **drug-treated patients** declined by an average of ten points on a **144-point cognitive scale**.
- The placebo group declined by 13 points, indicating cognitive decline in all groups. The **small difference in cognitive decline reduction** may not be noticeable to doctors.

**Side-Effects**

- Regular MRI scans found evidence of **brain bleeding in one in six lecanemabtreated** individuals and **brain swelling** in one in eight. The **long-term effects** of these brain changes are unknown, and there have been a **few deaths** attributed to these drugs.

**Very Expensive**

- **Aducanumab** was initially marketed in the US for $45,000 per patient per year (later

reduced to $20,000). **Lecanemab** costs $26,500 per patient per year.

- Additional costs include scans for eligibility, side-effect monitoring, infusion clinic staff, and ongoing amyloid clearance monitoring. Patients also face **regular clinic visits** and concerns about side effects.

**Highly Selective Trials**

- The trials were **highly selective, excluding patients with conditions other than amyloid-related pathology** and significant medical problems. The narrow eligibility criteria **raise concerns about translating trial efficacy into real-world clinical effectiveness.**

**Additional Concerns**

- The trials **targeted patients at the earliest disease stages**, but even with successful amyloid clearance, **cognitive decline persisted. Participants in the trials were younger** on average than typical Alzheimer's patients. Advocates **exploring alternative treatment** options **beyond anti-amyloid drugs.**

## Topic 26. WINNERS OF INDIA'S TOP SCIENCE AWARD ANNOUNCED, NO WOMEN ON THE LIST

***Important for the subject: Science and technology***

**Twelve "male" scientists** have been awarded **India's top Shanti Swarup Bhatnagar Prize (SSB) for Science and Technology, 2022**. Annual award named after **Shanti Swarup Bhatnagar**, the **founder-director of CSIR**.

Announcement made at the **inaugural session** of the **Council of Scientific & Industrial Research (CSIR) — National Institute of Science Communication and Policy Research's (NIScPR) One Week One Lab Programme** (a themebased campaign of the CSIR).

- Since its inception in **1958, only 19 women scientists** have been the recipients of the SSB award.

**Scientists (Winner of SSB 2022)**

- **Awarded for Ashwani Kumar from CSIR-Institute of Microbial Technology, Chandigarh.**
- His role in understanding biofilm-induced infections involving cellulose. **Biofilms** are **3D structures** of multiple microorganisms (different bacterial colonies or single types of cells in a group), adhering to the surface.
- **Mycobacterium tuberculosis** forms biofilms that host drug-tolerant bacteria. Kumar's lab found that cellulose is a key component of these biofilms, holding mycobacterial cells together in these biofilms.
- **Maddika Subba Reddy Laboratory of Cell Death and Cell Survival Centre for DNA Fingerprinting Diagnostics, Hyderabad**

- His role in ascribing functions to **phosphatases** in regulating **cellular protein-sorting pathways.**
- **Phosphatases** are enzymes that remove a phosphate group from a protein and protein sorting is a mechanism through which proteins are transported to their appropriate destinations in the cell or outside it to carry out their functions.

**Akkattu T Biju from the Indian Institute of Science**

- The synthesis of biologically important **heterocyclic and carbocyclic compounds. Heterocyclic compounds** and **carbocyclic compounds** are classes of organic compounds. **Heterocycles** are used in many biological fields, due to their activity in multiple illnesses.

**Debabrata Maiti from the Department of Chemistry, IIT-B**

- His role in preparing **value-added materials** by transforming **organic molecules.** His work could find applications in the **agrochemical and pharmaceutical industries.**15/26
- **Vimal Mishra from the Water and Climate Laboratory, Indian Institute of Technology, Gandhinagar**
- His work in the **Earth, Atmosphere, Ocean and Planetary Sciences field.** He examined the **role of anthropogenic** and **natural factors** on **hydrological extremes and water resources** in India.
- His **2021 study** concluded that a roughly **11 per cent decline in the summer monsoon** (June– September) during **1951-2016**, **severe and frequent droughts** (2009, 2014, 2015), and **groundwater pumping for irrigation** have contributed to **groundwater depletion in the Ganga basin.**
- **Dipti Ranjan Sahoo from the Department of Civil Engineering, IIT-D** His work in the area of **seismic design** and **mitigation of seismic effects** on buildings and bridges.
- **Rajnish Kumar, Department of Chemical Engineering, Indian Institute of Technology, Madras** His contribution to the **fundamental understanding of methane recovery** from **marine gas hydrates**. **Marine gas hydrates** are **ice-like substances** known to house huge reserves of methane gas and are being considered as an energy resource.
- They **naturally occur** on the seafloor and in subsurface sediments in water depths of 300 metres and beyond.

**Apoorva Khare from the Indian Institute of Science**

- **Neeraj Kayal from Microsoft Research Lab India** Awarded the SSB prize for **Mathematics.**
- **Dipyaman Ganguli, CSIR-Indian Institute of Chemical Biology** His work on **autoimmunity** and **metaflammation. Autoimmunity** occurs when the immune system attacks the body's own cells and tissues. **Metaimflammation** is chronic low-grade inflammation associated with obesity induced by alterations in metabolism.
- **Anindya Das from the Indian Institute of Science** Das has contributed to the **understanding of electric and thermoelectrical properties** of **strongly interacting 2-D**

**atomically thin materials**. **Atomically thin materials** with thicknesses in the atomic scale (typically less than 5 nanometres) can be used in **rechargeable metal-ion batteries**, **metal sulphur batteries** and **metal-air batteries.**

**Basudeb Dasgupta from the Tata Institute of Fundamental Research**

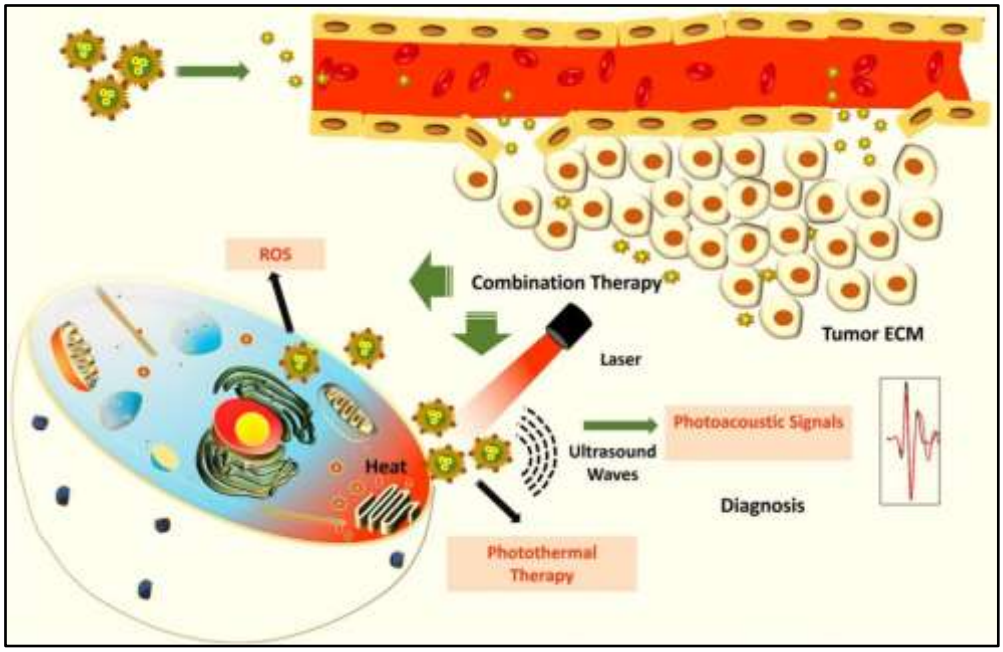
- His research on **coherent interactions of neutrinos** (they have no charge but some mass) in dense astrophysical environments and the nature of dark matter.

**About Shanti Swaroop Bhatnagar:**

- He was an **Indian colloid chemist, academic** and **scientific administrator.** The **first** director-general of the **Council of Scientific and Industrial Research (CSIR)**, he is revered as the **"father of research laboratories"** in India. He was also the **first Chairman** of the **University Grants Commission (UGC)**. He wrote the **'Kulgeet',** or University anthem.

## Topic 27. IISC SCIENTISTS DEVELOP NOVEL APPROACH TO DETECT AND KILL CANCER CELLS

***Important for the subject: Science and technology***




**Indian Institute of Science (IISc)** scientists have developed a new approach to potentially detect and kill cancer cells, especially those which form a **solid tumour mass.**

**Hybrid nanoparticles to detect and kill cancer cells:**

- **Hybrid nanoparticles** made of **gold and copper sulphide,** which can **kill cancer cells** using **heat**, and **enable their detection** using **sound waves**.
- These hybrid nanoparticles have **photothermal, oxidative stress**, and **photoacoustic properties.**

- **Gold nanoparticles,** which can be chemically modified to target cancer cells, have shown **anticancer effects**.
- When **light** is shined on these hybrid nanoparticles, they absorb the light and generate heat, which can kill cancer cells. These nanoparticles also produce singlet oxygen atoms that are toxic for the cells.

**The nanoparticles can also help diagnose certain cancers.**

- Existing methods such as **standalone CT** and **MRI scans** require trained radiology professionals to decipher the images.
- The **photoacoustic property** of the nanoparticles allows them to **absorb light and generate ultrasound waves,** which can be used to **detect cancer cells with high contrast** once the particles reach them.
- The **ultrasound waves** generated from the particles allow for a more accurate image resolution as sound waves scatter less when they pass through tissues compared to light.
- **Scans** created from the **generated ultrasound waves** can also provide **better clarity** and can be used to measure the **oxygen saturation in the tumour,** boosting their detection.
- Earlier nanoparticles are not small enough to show these properties, the IISc team used a novel reduction method to deposit tiny seeds of **gold** onto the **copper sulphide surface (< 8mm).**
- The small size of nanoparticles will allow them to leave the body naturally without getting accumulated in the tissues.

## Topic 28. IOC'S ETHANOL PLANT AT PANIPAT TO REACH 100% CAPACITY UTILIZATION SOON

***Important for the subject :Environment***

Indian Oil Corporation's **₹900-crore 2G ethanol plant,** which was inaugurated by Prime Minister Modi in **August 2022**, is set to reach **100 percent capacity utilization** in a few months from **30 per cent now.**

Feedstock for the bioethanol plant is **rice husk (parali).**

- **Refiners like IOC** are required to supply **petrol** that has **20 per cent (bio) ethanol** by **2025**.
- The **Carbon Offsetting and Reduction Scheme of International Aviation (CORSIA)** of the **International Civil Aviation Organisation** has said that airlines will fly with **2 per cent SAF blends**.

**What is Second Generation (2G) Ethanol?**

- **Second Generation (2G)** differs from **1st generation ethanol** in terms of feedstock and subsequently, the production process. **Second Generation (2G) feed stocks** include agri-residues like rice & wheat straw, cane trash, corn cobs & stover, cotton stalk, bagasse, Empty Fruit bunches (EFB), etc.

**Government step to increase the production of 2G ethanol:**

- Government has launched **"Pradhan Mantri JI-VAN (Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran) Yojana"** for providing **viability gap funding** to provide initial thrust to create **2G ethanol capacity** in the country and attract investment in this sector.
- In this scheme, **financial support** to **twelve Integrated Bio-ethanol Projects** using **lignocellulosic biomass & other renewable feedstock** with **total financial outlay of Rs 1969.50 crore** for the period **2018-19 to 2023-24**.

**CORSIA:**

- It was developed by the **International Civil Aviation Organization (ICAO)** and adopted in **October 2016**.
- It is a **global scheme by ICAO** to address the increase in total **CO2 emissions** from international aviation above 2020 levels.
- Its goal is to have a **carbon neutral growth** from **2020.** It is **one of the largest carbon pricing instruments** in the world in terms of greenhouse gas emissions coverage.
- **CORSIA** uses **Market-based environmental policy instruments** to offset **CO2 emissions:** aircraft operators have to purchase carbon credits from the carbon market.
- **Least Developed Countries, Small Island Developing States** and **Landlocked Developing Countries** can volunteer to participate in **CORSIA,** while it is not mandated on them.
- **All ICAO member states** with airplane operators conducting international flights are required to **monitor, report** and **verify carbon dioxide emissions** from these flights every year from **2019**.
- Starting in **2021,** the scheme is voluntary for all countries until **2027**. All airplane operators with **CO2 emissions less than or equal to 10,000 tonnes** are **exempted** from the **CORSIA** reporting requirements.
- **Emissions** from **domestic air travel** are **not included** in **CORSIA. Emissions** from **domestic aviation** are addressed under the **UNFCCC** and calculated as part of the **Nationally Determined Contributions.**
- For **Indian Operators**, the **CORSIA** offsetting requirements will be applicable from **2027** i.e. the mandatory phase of the CORSIA implementation.
- **CORISA** is expected to complement other planned measures such as: aircraft technology evolution operational improvements the greater use of sustainable aviation fuels.
- In **2018,** the **International Civil Aviation Organization** adopted the international **Standards and Recommended Practices (SARPs)** for **CORSIA**.

## Topic 29. CENTRAL EMPOWERED COMMITTEE: SC HANDS OVER ITS GREEN WATCHDOG COMMITTEE TO ENVIRONMENT MINISTRY

***Important for the subject: Environment***

**Central Empowered Committee (CEC):**

Setup in **2002** by the **Supreme Court of India,** and reconstituted in **2008**.

**Aim:** To flag cases of official non-compliance with its orders related to conservation. The current **CEC** is **chaired** by **retired IAS officer PV Jayakrishnan** and includes **four** other members: Retired Forest service officers **Amarnatha Shetty, Dr Maharaj K Muthoo, SK Patnaik,** and lawyer and naturalist **Mahendra Vyas**.

**Recent development:**

- The **CEC** has been made a **permanent body** that will now report to the **Environment Ministry** which will **nominate** its members and have the **final say** on the merit of its recommendations.
- In case any suggestion or recommendation of the Central Empowered Committee is not acceptable to the State or Central Government, the **Government shall give reasons in writing for not accepting the same** and such decision of the Central Government shall be final.

**Impact:**

It has **diluted** the **CEC's autonomy** on **four key counts:**

- The committee will report to the ministry, instead of the SC; The ministry will pick all the members and the SC will have no role in the process; The ministry, and not the court, will fund the committee;
- The provision of having two NGOs in the committee has been done away with. Now anyone considered an "expert" can be included as a member.

**Significant works of CEC's:**

- It has filed thousands of reports on issues referred to it by the apex court that have shaped the discourse around environment policy.
- **These include:** Compensatory afforestation, Net present value of forests, Kudremukh mining, Aravali forests, Bellary mining, Recommendation to cancel the **double-tracking** of a **railway line** from **Castle Rock** in **Karnataka** to **Kulem** in **Goa, Imprisonment to former Maharashtra minister** for permitting wood mills to operate in violation of the SC's order.

## Topic 30. 67 SPECIES OF REPTILES, 59 AMPHIBIANS RECORDED IN WAYANAD FOREST SURVEY

***Important for the subject: Environment***

**Survey in Wayanad:**

**Survey conducted by:** University of Calicut, Kerala Forest Research Institute, South Wayanad forest department and Aranyakam Nature Foundation. **67 species** of **reptiles** and **59 species** of **amphibians** were identified in the **first herpetofaunal survey** that concluded recently in the **South Wayanad Forest Division**.

- Of these, **four amphibians** and **three reptiles** were spotted for the **first time** at the forest division.
- Of the **126 species identified**, **48 amphibians** and **21 reptiles** are **endemic** to the **Western Ghats**.

**Species found:**

- Important amphibian species recorded are: **Starry Night Frog,** bearing a constellation of blue dots on its obsidian body; **Miniature Night Frog**, the tiniest frog in the country; **Naked Dancing Frog**; and **endangered species** such as **Malabar Torrent Toad** and **Red Stream Toad**.
- Wayanad Dravidogecko, Nilgiri Spiny Lizard, and the Nilgiri Forest Lizard are also sighted.

**Wayanad Wildlife Sanctuary (WWS):**

- **WWS** is a wildlife sanctuary in **Wayanad, Kerala, India** with **four hill ranges** namely **Sulthan Bathery, Muthanga, Kurichiat** and **Tholpetty.**
- **Species**: **gaur, Asian elephant, deer** and **tiger** are found there. It is the **second largest wildlife sanctuary** in **Kerala**.
- **Established** in **1973**, the sanctuary is now an integral part of the **Nilgiri Biosphere Reserve.**
- It is **bounded** by the p**rotected area network** of **Nagarhole National Park** and **Bandipur National Park** in **Karnataka** in the **northeast**, and on the **southeast** by **Mudumalai National Park** in **Tamil Nadu**.
- It is **part** of the **Deccan Plateau Vegetation**: Predominantly of the **south Indian moist deciduous teak forests and west-coast semi-evergreen trees.**
- The wildlife sanctuary comes under **Protect Elephant. Scheduled tribes** : **Paniyas, Kurubas, Adiyans, Kurichiyas, Ooralis** and **Kattunaikkans.**

## Topic 31. SMALL ISLAND NATIONS SEEK PROTECTION FROM OCEAN POLLUTION, CLIMATE CHANGE

***Important for the subject: Environment***

A landmark **climate justice case** will start its hearing in the **United Nations maritime tribunal** in **Hamburg, Germany,** on September 11, 2023.

Regarded as the **first climate justice case** aimed at **saving the ocean.** The **small island nations** that have been disproportionately harmed by the climate crisis will go up against **high-emitting nations**.

- **Basis of the case:** A group of **nine SIDS countries** will urge the **International Tribunal for the Law of the Sea (ITLOS)** to rule on whether greenhouse gas emissions absorbed by the marine environment should be considered pollution. It will also seek the tribunal's advisory opinion on the **obligations countries have to prevent it**.
- The **Law of the Sea**, ratified by **169 parties,** mandates that **countries take measures to prevent, reduce and control marine pollution**.
- **Small Island Developing States (SIDS)** are a group of low-lying island nations that are home to approximately 65 million people and extremely vulnerable to the impacts of climate change — despite being responsible for less than 1 per cent of global greenhouse gas emissions.

**Participants in the case:**

Some **35 countries** and **three intergovernmental organisations:**

- **African Union, International Union for Conservation of Nature and Natural Resources and Pacific Community** and **the Commission of Small Islands States on Climate Change and International Law (COSIS).**
- **Commission of Small Islands States on Climate Change and International Law (COSIS):**

**Formed in: 2021**.

- **Tuvalu, Antigua** and **Barbuda** have established **COSIS** to seek advisory opinions from the **International Tribunal for the law of the sea,** particularly on their endeavors to clarify states' international legal obligations to combat climate change effects.
- **Antigua** and **Barbuda** and **Tuvalu** are the **co-chairs** of the **COSIS**. **6 members:** Antigua, Barbuda, Tuvalu, Niue, Vanuatu, and St Lucia.

## Topic 32. NEW CFR GUIDELINES: EXPERTS SAY REGULATIONS CAN UNDO INDIA'S PROGRESS ON FOREST GOVERNANCE

***Important for the subject :Environment***

The new guidelines issued by the **Union Ministry of Tribal Affairs (MoTA)** for **conservation, management and sustainable use of community forest resources (CFR)** on

September 12, 2023, **disempower Gram Sabhas** (village assemblies) and shift control to the government.

- **MoTA** issued fresh guidelines to **"improve coordination"** at the field level and ensure implementation of the **Scheduled Tribes and Other Traditional Forest**
- **Dwellers (Recognition of Forest Rights) Act, 2006** or **Forest Rights Act (FRA), 2006** in short.
- The **MC Saxena committee** was set up in **2019** for preparation of **CFR guidelines**, but its recommendations were never accepted.

**Key feature of the new guidelines:**

- Formation of the **District Level Committee (DLC)** which entrusts Gram Sabhas or the community about who has rights over forest resources.
- Earlier multiple functionaries, authorities and departments were involved in entrusting these rights under **Section 3(1)(i)** and **Section 5** of FRA.
- **Section 5** underlines duties by empowering the holders of **forest rights, Gram Sabhas** and **village level institutions** for protection of wildlife, forests and biodiversity and ensuring that all neighboring catchment areas, water sources and ecologically sensitive areas are well protected.
- It also specifies that the **habitat of tribals and other traditional forest dwellers** should be protected from any destruction that would harm their culture and natural heritage.
- The section guarantees that **decisions are taken by the Gram Sabha** to regulate access to **CFR** and prevent any activity that would cause harm to wildlife, forests and biodiversity.

**What is a Community Forest Resource?**

- The **Community Forest Resource (CFR)** area is **common forest land** that has been traditionally protected and conserved for sustainable use by a particular community.
- The community uses it to access resources available within the traditional and customary boundary of the village, and for seasonal use of landscape in the case of pastoralist communities.
- Each **CFR** area has a customary boundary with identifiable landmarks recognised by the community and its neighbouring villages.
- It may include forest of any category – revenue forest, classified & unclassified forest, deemed forest, DLC (District Level Committee) land, reserve forest, protected forest, sanctuary and national parks etc.

**What are Community Forest Resource Rights?**

- The **Community Forest Resource rights** under **Section 3(1)(i)** of the **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** (commonly referred to as the Forest Rights Act) provides for recognition of the right to **"protect, regenerate or conserve or manage"** the community forest resource.

- These rights allow the community to formulate rules for forest use by itself and others and thereby discharge its responsibilities under Section 5 of the FRA.
- **CFR rights,** along with **Community Rights (CRs)** under **Sections 3(1)(b)** and **3(1) (c)**, which include **rights over non-timber forest products,** ensure sustainable livelihoods of the community.
- **Once CFRR is recognised for a community,** the ownership of the forest passes into the hands of the **Gram Sabha** instead of the **forest department.**
- Effectively, the **Gram Sabha** becomes the **nodal body** for management of the forests.
- These rights give authority to the **Gram Sabha to adopt local traditional practices of forest conservation and management** within the community forest resource boundary.
- In **2016**, the **Odisha government** was the **first** to recognise **Community Forest Resources (CFRs)** inside the **Simlipal National Park**.

## Topic 33. 'PLANET WRECKERS': 20 COUNTRIES LED BY US TO EMIT 90% CARBON DIOXIDE THROUGH 2050

***Important for the subject :Environment***

Just **20 countries** in the world, led by the **United States**, would be responsible for nearly **90 per cent** of the **carbon dioxide emissions** through **2050,** found a new analysis by research organization **Oil Change International.**

The reason for such a massive share is the **new oil and gas extraction** and **fracking wells** planned by these countries between **2023** and **2050**.

- **Five countries in the global north** — the United States, Canada, Australia, Norway and the United Kingdom — would contribute the **majority(51%)** of emissions through **2050.**
- **Top20 countries include:** Russia, China, Iran, Brazil, UAE, Iraq, Turkmenistan,
- Saudi Arabia, Guyana, Qatar, Argentina, Mexico, Nigeria, India and Kazakhstan. If these 20 countries heed the call from **United Nations (UN) Secretary-General Antonio Guterres** to end new licensing and new extraction, they could help prevent **173 Gt of further CO2 pollution**.
- The USA alone accounted for more than a third of planned global oil and gas expansion through 2050.
- Nearly 60 percent of the fossil fuels in existing fields and mines must stay in the ground to keep global temperature rise to 1.5°C.

**What do the other reports say?**

- Another report by Climate Action Tracker released at the Bonn Climate Change Conference in June 2023 noted that the world's largest fossil fuel-producing countries have neither committed to end oil and gas production nor set a global target for renewable energy.
- the **first global stocktake technical synthesis report** released by the **United Nations Framework Convention on Climate Change** warned that the world is "not on track" to

meet the long-term goal of limiting global temperatures to 2 degrees Celsius.

**UN Climate summit:**

- Held in: **New York, USA** on 20 Sept 2023.
- Goal: The summit would accelerate action by governments, businesses, finance, local authorities and civil society.

**Oil Change International:**

- **Oil Change International** is a research, communication, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy.
- Oil Change International contributes to the greater movement in a number of important ways:
- Oil Change brings unique industry expertise that allows us to research and release timely, hard-hitting, campaign-relevant investigations countering corporate arguments for oil, gas and coal development;
- Oil Change engages in domestic and international policy forums to push a shift of public finances away from fossil fuels and towards clean energy;
- Oil Change provides experience and leadership in organizing resistance to the political influence of the fossil fuel industry, particularly in the United States.

## TOPIC 34. LIGHT POLLUTION DISRUPTS MARINE ORGANISMS' HORMONAL CYCLES, REPRODUCTION: STUDY

***Important for the subject :Environment***

A recent study by Cornell University, United States, argued that we should broaden our outlook to consider light pollution's influence on coastal marine ecosystems, affecting everything from whales to fish, corals and plankton.

- Marine organisms that evolved over millions of years to adapt to **natural light** now face an **ever-increasing flood of light from anthropogenic sources** along the coasts.
- Artificial light can easily wash out the glow of moonlight and starlight, which are important cues for marine organisms.
- This disrupts their hormonal cycles, inter-species behaviour and reproduction.

**Impact of artificial light on turtles:**

- Compared to prior technologies, LEDs often emit more short-wavelength light and can pierce deep into the water. Artificial light at night is harmful to sea turtles in two ways.
- Females trying to find a quiet, dark spot to lay their eggs avoid light and may end up not coming ashore at all.
- The hatchlings head toward inland lights instead of moonlight on the water and then die

of dehydration or starvation.

**Light Pollution:**

- Light pollution can be defined as the **introduction by humans, directly or indirectly, of artificial light** into the environment.
- **Avoidable light pollution** refers to light flow emitted at night by artificial light sources which are inappropriate in intensity, direction and/or spectral range, unnecessary to carry out the function they are intended for, or when artificial lighting is used in particular sites, such as observatories, natural areas or sensitive landscapes.

**Types of Light pollution:**

- **Light trespass:** When unwanted light enters one's property, for instance, by shining over a neighbor's fence.
- **Over-illumination:** It is the excessive use of light.
- **Glare:** Glare is often the result of excessive contrast between bright and dark areas in the field of view.
- **Blind glare:** describes effects such as that caused by staring into the Sun. It is completely blinding and leaves temporary or permanent vision deficiencies.
- **Disability glare:** describes effects such as being blinded by an oncoming cars lights, or light scattering in fog or in the eye reduces contrast, as well as reflections from print and other dark areas that render them bright, with significant reduction in sight capabilities.
- **Discomfort glare:** does not typically cause a dangerous situation in itself, and is annoying and irritating at best. It can potentially cause fatigue if experienced over extended periods.
- **Clutter:** Clutter refers to excessive groupings of lights. Groupings of lights may generate confusion, distract from obstacles (including those that they may be intended to illuminate), and potentially cause accidents. Clutter is particularly noticeable on roads where the street lights are badly designed, or where brightly lit advertising surrounds the roadways.
- **Skyglow:** refers to the "glow" effect that can be seen over populated areas. It is the combination of all light reflected from what it has illuminated escaping up into the sky and from all of the badly directed light in that area that also escapes into the sky, being scattered (redirected) by the atmosphere back toward the ground.

**Impact of light pollution:**

- **Wastes Energy and Money:** Lighting that emits too much light or shines when and where it's not needed is wasteful. Wasting energy has huge economic and environmental consequences.
- **Disrupting the ecosystem and wildlife:** Plants and animals depend on Earth's daily cycle of light and dark rhythm to govern life-sustaining behaviors such as reproduction, nourishment, sleep and protection from predators.
- Scientific evidence suggests that artificial light at night has negative and deadly effects on

many creatures including amphibians, birds, mammals, insects and plants.

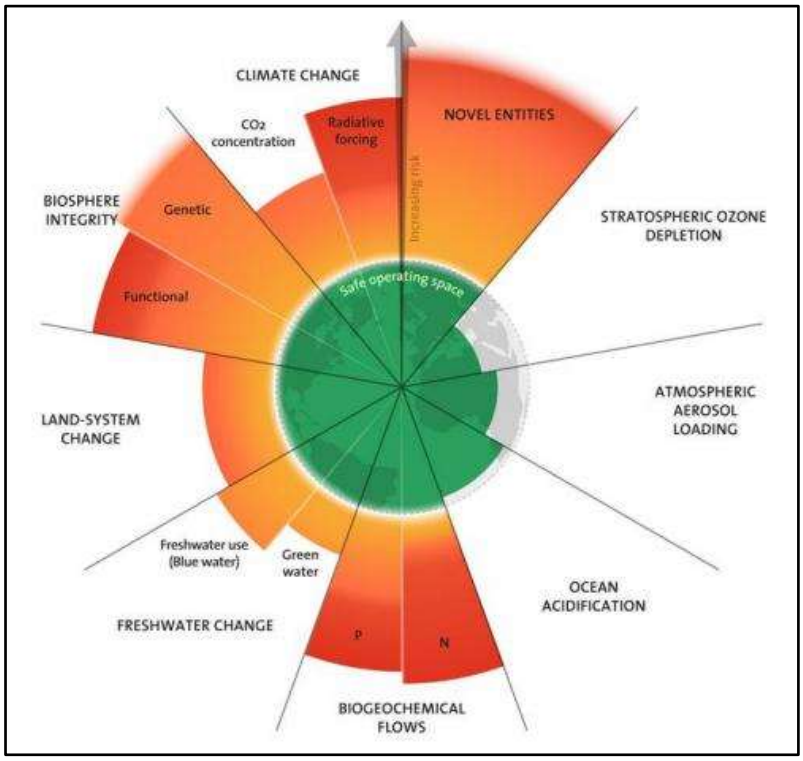
- **Ex:** A study has now shown how nocturnal dung beetles are forced to search for cues in their immediate surroundings when they can no longer navigate using natural light from the night sky.
- The effect of light in the form of fire or lamps attracting migratory and non migratory birds at night, especially when foggy or cloudy, has been known since the 19th century and was and still is used as a form of hunting. The reasons for disorientation of birds through artificial night lighting are not well known. Experts suggest that the navigation of birds using the horizon as orientation for the direction is disrupted by lighting and sky glow.
- **Harming human health:** Like most life on Earth, humans adhere to a **Circadian Rhythm** — our biological clock — a sleep-wake pattern governed by the day-night cycle. Artificial light at night can disrupt that cycle.

**Reduction of Light Pollution**

- Reducing light pollution implies many things, such as reducing sky glow, reducing glare, reducing light trespass, and reducing clutter.
- The method for best reducing light pollution, therefore, depends on exactly what the problem is in any given instance. Possible solutions include:
- Utilizing light sources of minimum intensity necessary to accomplish the light's purpose.
- Turning lights off using a timer or occupancy sensor or manually when not needed.
- Improving lighting fixtures, so that they direct their light more accurately towards where it is needed, and with less side effects.
- Adjusting the type of lights used, so that the light waves emitted are those that are less likely to cause severe light pollution problems.
- Evaluating existing lighting plans, and re-designing some or all of the plans depending on whether existing light is actually needed.

## Topic 35. SIX OF 9 PLANETARY BOUNDARIES HAVE BEEN BREACHED BECAUSE OF HUMAN ACTIVITIES: STUDY

***Important for the subject :Environment***




The world has breached **six of the nine planetary boundaries** necessary to maintain Earth's stability and resilience, according to a new study.

**Study findings:**

- The findings are an update to the **planetary boundaries framework,** which was **first launched in 2009,** to define the **environmental limits** within which humanity can safely operate.
- The **six boundaries** include climate change, biosphere integrity (genetic diversity and energy available to ecosystems), land system change, freshwater change (changes across the entire water cycle over land), biogeochemical flows (nutrient cycles), and novel entities (microplastics, endocrine disruptors, and organic pollutants).

**Research methodology and analysis:**

- The **planetary boundary** for **atmospheric carbon dioxide concentration** and **radiative forcing** (represents the size of the energy imbalance in the atmosphere) should be at **350 parts per million (ppm)** and **1**
- **Watts per square meter (Wm−2)**, respectively. Currently, this has reached **417 ppm** and is **2.91 W m−2.**
- The global area of forested land has reduced from **75%** to **60%.** Normal rate of extinction

should be less than **10 extinctions per million species-years,** but it is greater than **100 extinctions per million species-years.**

- Over **10 percent** of the genetic diversity of plants and animals may have been wiped out over the last 150 years.
- Human impacts on **blue and green water** were calculated to be **18.2 per cent** and **15.8 per cent,** respectively, which is **higher** than the boundary of 10.2 per cent and 11.1 per cent, respectively.

**Flow of nutrients such as nitrogen and phosphorus:**

- Changing nutrient availability has huge consequences for biodiversity and water quality.
- In addition, **reactive nitrogen** [includes oxides of nitrogen (NOx), **ammonia (NH3)**, and **nitrous oxide (N2O)]** can lead to the **production of potent greenhouse gasses** that worsen climate change.
- **Stratospheric ozone depletion, aerosol loading** and **ocean acidification** were found to be within the planetary boundary.
- **Aerosols** are minute particles from combustion processes, biomass burning, and plant/microbial materials suspended in the air. They also trap hear and increases the global temperature.

**Net primary production (NPP) of an ecosystem:**

- This is estimated by the gross productivity minus energy lost in respiration. It the net energy stored in the plants. This energy serves as food for the animals that feed on plants. It is measured as the amount of organic matter produced in a community in a given time.
- It is equal to the difference between the amount of carbon produced through photosynthesis and the amount of energy that is used for respiration.

## Topic 36. LAND THE SIZE OF CENTRAL ASIA LOST SINCE 2015 DUE TO DEGRADATION

***Important for the subject: Environment***

Healthy and productive land the size of Central Asia has been degraded since **2015,** affecting food and water security globally and directly impacting the lives of **1.3 billion people,** according to latest estimates released by the **United Nations Convention to Combat Desertification's (UNCCD).**

**Findings of the report:**

- At least **100 million hectares** of healthy and productive land were degraded every year between **2015 and 2019.**
- This is about the **combined area of five Central Asian nations:** Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

**UN's efforts to reduce land-degradation:**

- The **UN** has set a target to achieve a **land-degradation-neutral world** by **2030**. The **UNCCD 2018−2030 Strategic Framework** was adopted by **CoP13 of UNCCD** in **2017**, which encouraged Parties to apply it in their national policies, programmes, plans and processes relating to desertification land degradation and drought.
- The framework contains **five strategic objectives** that are meant to guide the actions of **all UNCCD stakeholders and partners** in the period **2018-2030:**
- To improve the condition of affected ecosystems, combat desertification/land degradation, promote sustainable land management and contribute to land degradation neutrality
- To improve the living conditions of affected populations
- To mitigate, adapt to and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems
- To generate global environmental benefits through effective implementation of the UNCCD
- To mobilise substantial and additional financial and nonfinancial resources to support the implementation of the Convention by building effective partnerships at global and national level

**Review of the actions taken by the stakeholders:**

- The Parties will review the **assessment of implementation of the framework** along the **Strategic Objectives** at the **21st session** of the **Committee for the Review of the Implementation of the Convention (CRIC 21)**, to be held in **Samarkand, Uzbekistan.**
- **CRIC 21**, one of **UNCCD's official meetings**, will review progress in implementing strategic objectives on the following:
- Promoting sustainable land management
- Building drought resilience
- Supporting women's leadership in sustainable agriculture
- Addressing forced migration due to land degradation and climate change.

**Land Degradation Neutrality (LDN):**

- **UNCCD defines LDN** as "a state whereby the amount and quality of land resources necessary to support ecosystem functions and services to enhance food security remain stable, or increase, within specified temporal and spatial scales and ecosystems."
- The impacts of land degradation will be felt by most of the world's population. Land degradation also changes and disrupts rainfall patterns, exacerbates extreme weather like droughts or floods, and drives further climate change. It results in social and political instability, which drives poverty, conflict, and migration.

**Achieving LDN requires three concurrent actions:**

- firstly, avoiding new degradation of land by maintaining existing healthy land; secondly, reducing existing degradation by adopting sustainable land management practices that can slow degradation while increasing biodiversity, soil health, and food production; and

thirdly, ramping up efforts to restore and return degraded lands to a natural or more productive state.

**The UNCCD's objectives for LDN include:**

- maintaining or improving the sustainable delivery of ecosystem services
- maintaining or improving land productivity to enhance global food security
- Increasing the resilience of land and the populations dependent on it seeking synergies with other social, economic, and environmental objectives reinforcing and promoting responsible and inclusive land governance

## Topic 37. INDIA'S PERSPECTIVE, AHEAD OF THE G20 SUMMIT

***Important for the subject: International Relations***

India is going to host the G20 summit from 9th-10th of September.

**India's innovative** approach of **hosting over 200 G20 meetings** across **50 locations,** reaching **cities and Tier-2 towns,** has set a **new standard in size and scale for G20 Presidencies,** generating widespread awareness.

- India is **discussing an ambitious** set of **proposals** across **various sectors** like **digital public infrastructure, gender, development, multilateral reforms, climate change, health and future pandemics, use of technology,** etc
- India has taken up the **mantle of leading the developing and underdeveloped world during its G20 Presidency.**
- **India** had **written a letter** to the **G20 nations** in which he **proposed that the African Union be given full, permanent membership** of the bloc at the **upcoming summit in New Delhi.** Countries like **Germany, Brazil, and Canada** have also **expressed their support for African Union** membership to the
- G20.With the **negotiations among sherpas** held recently, the **African Union (AU) is set to join the G-20**

**More about India Presidency:**

- **India** assumed the presidency of G20 from **1st of December 2022.**
- The **G20 Presidency** also marked the **beginning of "Amritkaal"**, the **25-year period beginning from the 75th anniversary of its independence on 15 August 2022,** leading up to the centenary of its independence, towards a futuristic, prosperous, inclusive and developed society, distinguished by a human-centric approach at its core.
- **Guest countries** during India's presidency will include **Bangladesh, Egypt, Mauritius, Netherlands, Nigeria, Oman, Singapore, Spain and the UAE**
- **The theme of the G20 summit is -'Vasudhaiva Kutumbakam: One Earth, One Family, and One Future'.**
- The **G20 logo** is created with the **four colors of India's national flag, comprises earth sitting atop a lotus.**

- The **seven petals in the logo signify the seven seas** and the **coming together of seven continents at G20 India 2023.**

**What is G20 Summit:**

- **G-20** was a **group of finance ministers** and **central bank governors from 19 individual countries and the European Union**.
- It was **established in 1999 and** was **elevated to a forum of Heads of Government in 2008** to effectively **respond to the global financial crisis of 2008.**
- G-20 is a forum, **not a legislative body** and its **agreements and decisions have no legal impact,** but they do influence countries' policies and global cooperation.
- The G20 membership accounts for **Two-thirds** of the **world's population, 85%** of global **gross domestic product**, **80%** of **global investment 75%** of **global trade**.
- Contribute **79% of the world carbon emissions** G20 **does not have any permanent secretariat** or headquarters.
- The **G20 Summit** is formally known as the **"Summit on Financial Markets and the World Economy".**

**How G20 works:**

- Since the G20 **has no permanent secretariat**.The**agenda and work are coordinated by** representatives of the G20 countries, known as **'Sherpas**'.
- The **presidency of the G20 rotates every year among members**, and the country holding the presidency, together with the previous and next presidency-holder, forms the '**Troika'.** Troika **ensures continuity of the G20 agenda**.
- **During India's presidency**, **India, Indonesia and Brazil will form the troika.**

**Multilateral conferences, events, and summits hosted by India:**

- **The UNESCO conference in 1956, The Asian Games of 1982, The NAM Summit of March 1983, The Commonwealth Games of 2010, The India-Africa Forum Summit in 2015.**

## Topic 38. 2 AGRI INITIATIVES PILOTED BY INDIA LIKELY TO FIGURE IN SUMMIT OUTCOMES

***Important for the subject: International Relations***

Two key initiatives are likely to figure in the G20 outcome document.

**Proposed key initiative by India at G20:**

Deccan High-Level Principles on Food Security and Nutrition, 2023

An international initiative for research on millets and other ancient grains

**Agriculture Deputies Group (ADP):**

- Created in **2011** during **France's G20 presidency**
- **Aim:** To deal with volatility in global food prices.
- It has **emerged** as a **key forum to enhance cooperation among G20 members on food security and nutrition** in view of challenges posed by **Covid-19** and **Russia-Ukraine conflict** in recent years.
- The working group facilitates "information exchange and cooperation on a range of global issues such as **food security, nutrition, antimicrobial resistance, food waste and loss, sustainability,** and **resilient and inclusive food value chains**."
- **4 ADP meetings were held under India's presidency** in **Indore, Chandigarh, Varanasi** and **Hyderabad.**
- **Key outcome:** Making inclusive digital infrastructure to make it a catalyst for socioeconomic transformation of the agriculture ecosystem and farmer-centric public and private digital innovations.

**Agriculture Deputies Group (ADP) initiative:**

**Agricultural Market Information System**:

- An inter-agency platform to enhance food market transparency and policy response for food security.
- Launched in **2011** by **G20 Ministers of Agriculture** following the **global food price hikes** in **2007-08** and

Headquarters: **Rome, Italy.**

- It assesses global food supplies — it focuses on wheat, maize, rice, and soybeans — and provides a platform to coordinate policy action in times of market uncertainty.

**The Group on Earth Observations Global Agricultural Monitoring Initiative (GEOGLAM):**

- **Aim:** To increase the market transparency and improve food security by producing and disseminating relevant, timely, and actionable information on agricultural conditions and outlooks of production at national, regional, and global scales.
- Launched after the **French G20 Presidency (2011)**.

**Wheat Initiative:**

- Proposed by research and funding organizations from several countries. Originally named as the **International Research Initiative for Wheat Improvement** with the acronym **IRIWI**.
- Launched on **September 15, 2011**.

**Tropical Agriculture Platform (TAP):**

- A **G20 initiative** to promote agricultural innovation in the tropics, was **launched** at the

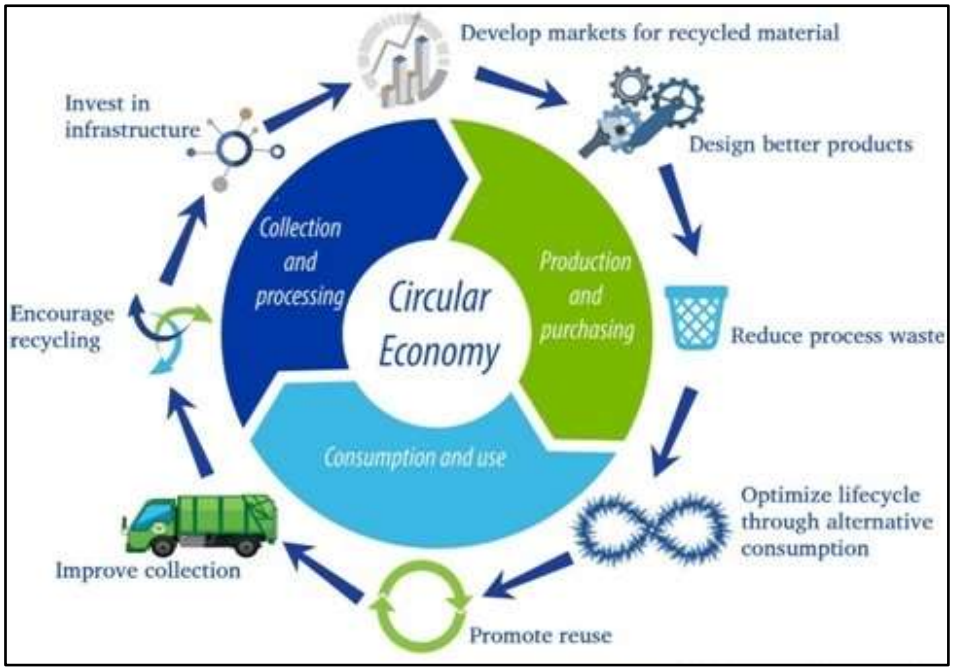
**first G20-led Meeting of Agriculture Chief Scientists** in **September 2012, Mexico.**

**Platform for Agriculture Risk Management (PARM):**

- A global partnership on **agricultural risk management (ARM)** for development, was established in **2013** as an outcome of **G20 discussions on agricultural growth**.

## Topic 39. CIRCULAR ECONOMY, SMART CITIES, URBAN TRANSPORT – G20 DECLARATIONS IMPACT ON CITIES

***Important for the subject: International Relations***




**Introduction:**

In May 2023, a 35-member team from Brazil and other Latin American countries, part of the **G20 Troika Youth for Disaster Risk Reduction and Disaster Resilient Infrastructure**, visited the **Delhi-Meerut Regional Rapid Transit system** in Uttar Pradesh.

**G20 Declarations Affecting Cities:**

**2021 Rome Declaration:**

- Endorsed the G20 **Platform on Sustainable Development Goal (SDG) Localisation** and **Intermediary Cities**.
- Collaborated with the **Organisation for Economic Cooperation and Development (OECD)** and **United Nations-Habitat.**
- An **intermediary city** is a **medium-sized urban area** that falls between large cities and smaller towns, often serving as a **regional economic and administrative center.**

**2019 Japan's Presidency:**

- Briefly mentioned **smart cities in the leaders' declaration.** Emphasized promoting **networking among cities for smart city development.**

**Urban20 Group:**

- Established in **2017**, with its first meeting in **Buenos Aires in 2018**. **Not an official G20 working group**; managed by **C40 (global network of Mayors) and United Cities and Local Governments (UCLG, network of city and local governments).**
- **Chaired by the host city from the host country** each year.

**Urban 20 Mayoral Summit 2023:**

- Held in **Ahmedabad** in **July 2023.**
- With support from the **Union Housing and Urban Affairs Ministry and the National Institute of Urban Affairs (NIUA).**
- Mayors from select G20 and invitee countries gather to draft a **communique**, which is **submitted for inclusion in the leaders' declaration.**
- The communique was endorsed by **105 cities**, the **highest participation in any U20 summit.**
- Focused on **climate finance and urban reforms**, calling for a **"Loss and Damage Fund"** to finance climate change **impact** projects.
- Notably, **no Chinese or Russian cities were represented** in the communique.

**What is a circular economy?**

- It is an economic system aimed at **eliminating waste; and the continual use of resources.**
- It includes **3 R's (Reduce, Reuse and Recycle),** Refurbishment, Recover, and Repairing of materials.

## Topic 40. WORLD INTELLECTUAL PROPERTY ORGANIZATION WORKING TOWARDS TREATY ON TRADITIONAL KNOWLEDGE, FOLKLORE

***Important for the subject : International Relations***

The **Intergovernmental Committee** of **World Intellectual Property Organization (WIPO)** met in **Geneva** to finalize a new treaty regarding **Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore**.

- The treaty would make it mandatory for patent applicants to **declare or disclose their use of genetic resources** and **any associated traditional knowledge**.

**The two main aims of the new treaty are:**

- To enhance the efficacy, transparency and quality of the patent system with regard to genetic resources and associated traditional knowledge; and

- Prevention of patents being granted for inventions that are not novel or inventive.
- **Issues in the draft treaty:** It categorically excludes any provision that is already addressed by other international instruments.
- The **access and benefit-sharing and misappropriation**, which are already dealt with in the **CBD**, the **Nagoya Protocol on Access to Genetic Resources (GR)** and the **Fair and Equitable Sharing of Benefits Arising from their Utilization** to the **CBD,** the **International Treaty on Plant Genetic Resources for Food and Agriculture** and the **Pandemic Influenza Preparedness Framework,** are **not** part of new treaty.
- There is no comprehensive definition of 'Traditional Knowledge' till date. Leaves out the **Digital Sequence Information** from its scope.

**India's stand on this:**

- India wants researchers to disclose the exact source of the GR, instead of merely mentioning the country of origin as the draft treaty stipulates.
- **India has proposed a definition:** "Traditional Knowledge associated with Genetic Resources" means any knowledge which is "evolving, generated in a traditional context, whether documented or not, collectively preserved, and transmitted from generation to generation and including but not limited to know-how, skills, innovations, practices, and learning, that are associated with GRs."

**Biopiracy of genetic resources and associated traditional knowledge:**

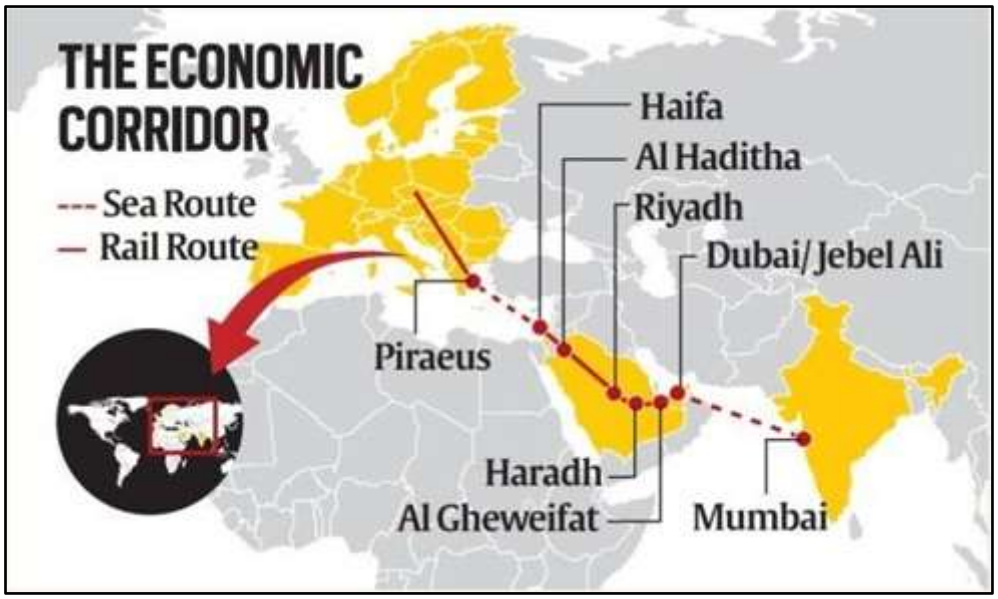
- **Biopiracy** refers to the practice of commercially exploiting naturally occurring biochemical or genetic material, especially by obtaining patents that restrict its future use, while failing to pay fair compensation to the community from which it originates.

**Third World Network:**

- **TWN** is an **independent non-profit international research and advocacy organization** involved in issues relating to development, developing countries and North-South affairs.
- TWN was **formed** in **November 1984** in **Penang, Malaysia** at the concluding session of an International Conference on **"The Third World: Development or Crisis?"** organised by the **Consumers' Association of Penang** and attended by over a hundred participants from 21 countries.
- At this conference, **TWN** was formed to especially strengthen cooperation among civil society groups in the South.
- Its **mission** is to bring about a greater articulation of the needs and rights of peoples in the South, a fair distribution of world resources, and forms of development which are ecologically sustainable and fulfill human needs.

## Topic 41. SAUDI ARABIA, INDIA, U.S. AND EU LAUNCH ECONOMIC CORRIDOR TO INCREASE TRADE

***Important for the subject: International Relations***




**India** and **Saudi Arabia** have joined the **European Union** and the **United States** in launching the **Partnership for Global Infrastructure and Investment (PGII)** and **India-Middle East-Europe Economic Corridor**.

**PGII:**

- The **Partnership for Global Infrastructure and Investment (PGII)** is a collaborative effort by **Group of Seven (G7)** to fund infrastructure projects in developing nations based on the trust principles of the **Blue Dot Network**.
- It is considered to be the bloc's counter to China's Belt and Road Initiative and a key component of the **"Biden Doctrine".**
- Announced in **June 2022** during the **48th G7 summitin Germany**. It is a repackaged version of the **Build Back Better World(B3W) initiative** which President Biden announced at the **47th G7 summit in the United Kingdom**.

**Strategic Partnership Council (SPC):**

- **India-Saudi Strategic Partnership Council** was formed to coordinate on strategically important issues. The council will be headed by the **Prime Minister** and **Crown Prince Mohammed** and will **meet every two years**.
- **India** is the **fourth country** with which **Saudi Arabia** has formed such a **strategic partnership,** after the **UK, France** and **China**.
- **India** is the **second largest trading partner** of **Saudi Arabia** and bilateral trade between the two sides reached **$52.75 billion** during **2022-23.**

**New members of BRICS Group:**

- Current members: **Brazil, Russia, India, China** and **South Africa.**

**A total of six countries will join the BRICS on 1 January 2024:**

- Argentina, Egypt, Ethiopia, Iran, Saudi Arabia, United Arab Emirates.

**Multimodal transport and Energy Corridor (MTEC):**

- Proposed between: **India- Saudi Arabia- UAE- Europe- USA**
- It will connect: **India- Middle East- Europe**
- The project could include other nations like **Israel.**

**The project would involve:**

- building of a railway line across the Arabian peninsula through Saudi Arabia and the UAE.
- Develop shipping connectivity to India and Europe.
- Transport energy through pipeline and data through optical fiber network.

**Significance of the project:**

- India can avoid involvement of **Pakistan for its connectivity to the west**, specially Afghanistan and Central Asia.
- Increased connectivity with **Iran and Eurasia.** It is seen as an alternative to **China's belt and road initiative.**
- It will also mobilize Europe in the development of infrastructure (EU has earmarked 300 million euros for infrastructure development worldwide for a period of 2021-2027).
- The USA and EU have planned to build a **Trans African Corridor** that will connect **Angola, Democratic Republic of Congo** and **Zambia. India** is willing to join it to become deeply involved with Africa.

## Topic 42. G20 SUMMIT: NEW DELHI LEADERS' DECLARATION ADOPTED WITH CONSENSUS ON VARIOUS ENVIRONMENTAL GOALS

***Important for the subject: International Relations***

The **Group of Twenty (G20)** has adopted the **G20 New Delhi Leader's Declaration** on September 9, 2023.

**New Delhi Leader's Declaration:**

- Effective implementation of **Paris Agreement of 2015,** adherence to the c**ommon but differentiated responsibilities and respective capabilities (CBDR),** inclusion of the sustainable development goals (SDG), climate finance, energy transitions, using and restoring natural ecosystems, harnessing and preserving ocean-based economies, plastic

pollution, reducing disaster risk and building resilient infrastructure.

- Taking note of the findings of the **Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Synthesis Report,** the document stated that the "timeframes for peaking may be shaped by sustainable development, poverty eradication needs, equity, and in line with different national circumstances".
- In the declaration under the **Green Development Pact for a Sustainable Future,** the countries have committed to "urgently accelerate our actions to address environmental crises and challenges, including climate change".
- Full and effective implementation of the **Kunming-Montreal Global Biodiversity Framework (GBF)**.
- G20 ambition of **reducing land degradation by 50 per cent by 2040** on a voluntary basis as discussed in **Gandhinagar Implementation Roadmap** and **Gandhinagar Information Platform**.

**In the context of forests:**

- It will avoid discriminatory green economic policies, consistent with **WTO rules** and multilateral environmental agreements.
- Commitment of mobilizing **new and additional finance for forests** from all sources, including **concessional and innovative financing,** in particular for **developing countries.** Commitment to prevention and mitigation of wildfires and remediation of mining-degraded lands".

**Harnessing ocean-based economy:**

- **Chennai High Level Principles for a Sustainable and Resilient Blue / Ocean based economy** and the adoption of "the new international legally binding instrument under the **UN Convention on the Law of the Sea on the conservation and sustainable use of marine Biological diversity of areas Beyond National Jurisdiction" (BBJN Treaty)**

**Disaster Management:**

- Institutionalization of the Disaster Risk Reduction Working Group under the presidency of India, which catalyzed efforts towards disaster risk reduction. Accelerating progress on early warning and early action through strengthening national and local capacities, innovative financing tools, private sector investments and knowledge sharing.
- The members supported the **United Nations' initiatives** such as the **Global Platform for Disaster Risk Reduction (DRR)** and the **Coalition for Disaster Resilient Infrastructure** in "furtherance of such collaboration and sharing".
- Earlier, the **Loss and Damage Fund (LDF)** was agreed upon at **Conference of Parties (COP27)** to **UNFCCC** in **Sharm El-Sheikh, Egypt** in November 2022.

**Global Platform for Disaster Risk Reduction (DRR):**

- Latest session: in 2022 at **Bali, Indonesia.** This global forum is an **avenue to share**

**knowledge and discuss the latest developments and trends in reducing disaster risk.**

- The **UN General Assembly** recognizes the **Global Platform** as a critical mechanism to review progress on the implementation of the **Sendai Framework for Disaster Risk Reduction**.
- At the Platform, governments, the UN system and all stakeholders get together to identify ways to further accelerate the implementation of the Sendai Framework.

**Coalition for Disaster Resilient Infrastructure (CDRI):**

- It was **launched** by the **Indian Prime Minister Narendra Modi** at the **2019 UN Climate Action Summit in September 2019.**
- Today, or as of 2023, the **CDRI** has **39 members**, incl. 31 member states, such as Argentina, Australia, Brazil, Canada, Chile, France, Germany, India, Italy, Japan, the United Kingdom and the United States.
- CDRI is an international coalition of countries, United Nations (UN) agencies, multilateral development banks, the private sector, and academic institutions, that aims to promote disaster-resilient infrastructure.
- Its **objective** is to promote research and knowledge sharing in the fields of infrastructure risk management, standards, financing, and recovery mechanisms.
- **CDRI's initial focus** is on developing disaster-resilience in ecological, social, and economic infrastructure. It aims to achieve substantial changes in member countries' policy frameworks and future infrastructure investments, along with a major decrease in the economic losses suffered due to disasters.

## Topic 43. HOW THE G20 DECLARATION ON HEALTH INCLUDES INDIA'S THREE PRIORITIES AND GIVES A DIGITAL PUSH

***Important for the subject: International Relations***

**Introduction:**

The **G20 New Delhi Leaders' Declaration**, released during India's G20 presidency, prominently features **India's three health priorities** and emphasizes **digital health innovation**.

**Three Priorities for India's G20 Presidency:**

- India's priorities **aimed to address the economic and social disruptions** caused by **COVID-19** and **prevent future losses**.

**The priorities include:**

- Building **resilient systems for health emergency prevention**, **preparedness, and response.**
- Strengthening **pharmaceutical cooperation** to ensure equitable **availability of vaccines, diagnostics, and therapeutics** during pandemics. Creating a **platform for sharing**

**digital health innovations and solutions**, such as **CoWIN and e-Sanjeevani,** to achieve **universal health coverage.**

**Digital Health Programme:**

- India launched the **Global Initiative on Digital Health (GIDH)** under the **World Health Organization (WHO)** to **share scalable digital health solutions.**
- GIDH comprises

**four main pillars:**

- An investment tracker
- A repository of digital health solutions
- Knowledge sharing for implementation
- Monitoring country-specific needs
- **$200 million fund proposal lacked consensus**, but **non-profits pledged support.**
- India provided **digital platforms (CoWIN, e-Sanjeevani, Ayushman Bharat Digital Mission)** as **global public goods.**
- Aimed at **preventing uncoordinated proliferation of similar initiatives.**

**Ayushman Bharat Digital Mission:**

- A **World Bank report** recognized its efforts to **bridge health information gaps and connect health services.**
- As of August 2023, **44.2 crore unique IDs** have been created, and **110 digital health services** have been integrated into the mission. **Concerns** persist regarding **data protection and privacy** in the mission.

**Interim Medical Countermeasure Platform:**

- **No consensus on a permanent platform** for equitable access. Proposal for an **interim platform**.
- **Interim platform's purpose:** Support **research and manufacturing**. Temporary measure **until a legally binding pandemic treaty** is established.

**Concerns:**

- Opposition driven by **G7's patent dominance.** Concerns of replicating **ACT accelerator's failures.** Risk of **delaying a binding pandemic treaty.** Resulting **burden on poorer nations with high vaccination costs.**

**Role of Traditional Medicine:**

- India's G20 presidency advocated **traditional medicine integration.** A **global summit** on this was held alongside the health ministers' meeting. **Outcome**: Emphasis on rigorous scientific validation for traditional medicine in public health systems.

## Topic 44. INDIA AND UK ANNOUNCE INFRASTRUCTURE FINANCING BRIDGE

***Important for the subject: International Relations***

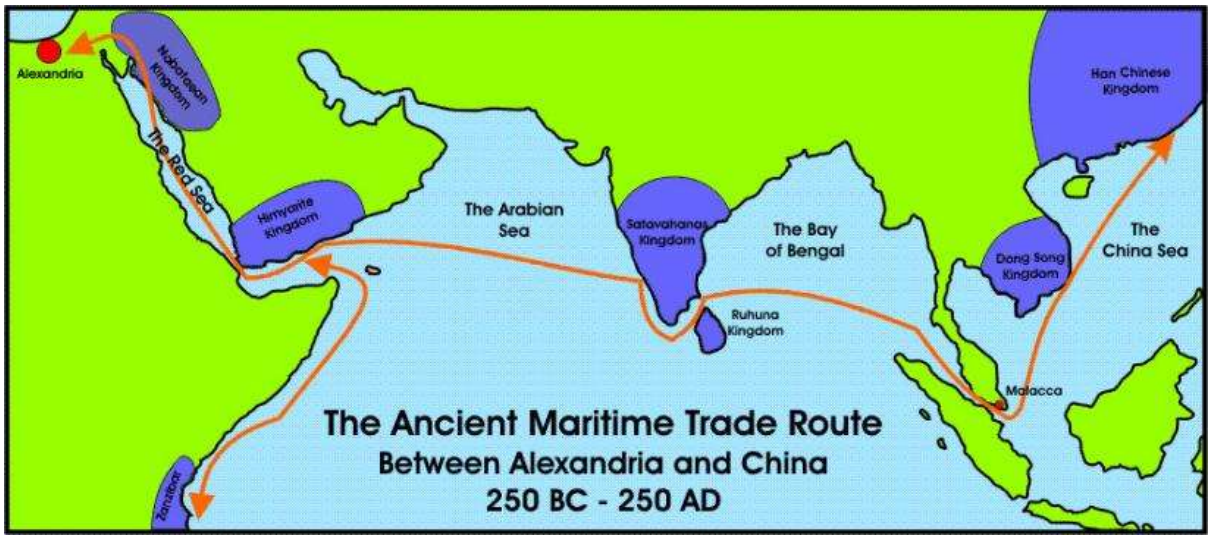
India and UK on Monday announced the launch of the Infrastructure Financing Bridge during 12th **Economic and Financial Dialogue (EFD)**,

EFD is a collaborative initiative which signifies the continuing commitment of both nations to work in close cooperation towards unlock substantial infrastructure investment opportunities in India.

- The **UK-India Infrastructure Financing Bridge (UKIIFB),** is a collaborative initiative led jointly by Niti Aayog and the City of London.
- The primary objective of this collaboration is aimed at **unlocking infrastructure investment** and **leveraging** the City of London's expertise in structuring and phasing major infrastructure projects.
- This partnership seeks to secure long-term investment for vital infrastructure sectors in India.
- UKIIFB Stakeholders will seek to jointly build a **diverse investment and financing system** that is long-term, stable and sustainable with manageable risks, it added.
- The collaboration is committed to sustainable/infrastructure development, prioritising environmentally friendly projects that are aligned with the core principles of the Sustainable Development Goals.

## Topic 45. THE ANCIENT HISTORY BEHIND THE MARITIME TRADE ROUTE BETWEEN INDIA AND EUROPE

***Important for the subject: International Relations***




The **India-Middle East-Europe Economic Corridor** announced at the **G20 Summit.**

This corridor resembles an ancient trade route between the subcontinent and the Roman Empire.

- The existence of this trade, which peaked in the early centuries of the common era, has been known for a long time.
- The head and torso of a magnificent Buddha, the first ever found to the west of Afghanistan, was discovered at the site in Berenike along with a triad of early Vaishnav deities

**What do we know about the ancient Red Sea trade route?**

- There was flourishing trade between Rome and India during ancient times. **Sir Mortimer Wheeler** established the existence of **Indo-Roman trade** in the **1st century CE**.
- Estimates from a source document, **Muziris papyrus**, shows that the trade between **India** and **Rome** is enormous and the **custom taxes** on the **Red Sea trade** with **India, Persia** and **Ethiopia** may have generated as much as **one-third of the income of the Roman exchequers.**
- **Papyrus** also provided the precise details of one cargo sent to the **Egyptian port of Berenike** from **Muziris** aboard the **ship Harmapollon.**
- **Oxyrhynchus** is an **Egyptian archaeological site on the Nile.**
- **Arikamedu:** ancient archaeological site in Kerala. **Euripides' play, Iphegenia Among the Taurians**– mentions India and the language of people of India.

**And how much would the Roman Empire earn from such a cargo?**

- According to the **Muziris Papyrus**, the **import tax** paid on the cargo of almost nine million sesterces was over **two million sesterces.**
- **These vast revenues surpassed those of entire countries: Julius**
- **Caesar** imposed tribute of **40 million sesterces** after his conquests in **Gaul** while the vital **Rhineland frontier** was defended by eight legions at an annual cost of **88 million sesterces**.
- The estimates suggests that **one-third** of total revenue of the **Roman empire** was coming from the **Red Sea trade.**

**What was being traded on this route?**

- **Trade from India includes:** Cinnamon-like plant called malabathrum whose leaves were pressed to create perfume, ivory, pearls, precious gemstones, wild animals like elephants and tigers, spices (mainly pepper).
- **Trade from Rome to India includes:** Gold (mainly in the form of payments and not as an imported goods), roman wine, olive oil and Garum.

**Was there trade on this route before the Common Era?**

- Yes, we have evidence of an Indian diaspora in the Middle East even at the time of **Meluha** (the Indus Valley Civilisation, c. 3300-1300 BCE). But it seems to have been more coastal and involved small quantities of goods.

**How organised was the trade, and how long did a typical journey take?**

- The evidence points to the trade being **highly organised. Contracts** were written between **merchants in Kerala** and **shippers in Alexandria.**
- **Goods** were shipped in containers just like today. There are even references to **insurance**. It was a highly sophisticated trade network.
- With the help of monsoon winds one could reach Egypt in about six to eight weeks, and back again in about the same time at that time.

**Role of Indians in this trade:**

- Of the 219 inscriptions here, dating from the second to the fifth century CE, 192 are in the Indian Brahmi script, and one each in Bactrian and Kharosthi. They give names that are unquestionably Indian: "Vishnu, son of the merchant Ganja", "Skandabhuti, the Sea Captain", or the nicely laconic, "Bhadra arrived".
- There are also images of Buddhist stupas, Shaivite tridents, swastikas, Syrian Christian crosses, and pictures of large three-masted Indian ships, as well as prayers to Krishna and Radha, and invocations to the Buddha.

**How does this route compare with the Silk Road?**

- The centrality of the Indian subcontinent as the ancient economic and cultural hub of Asia, and its ports as the place of maritime East-West exchange.
- **Silk Road** — an overland trade route supposedly stretching all the way across Asia from Xian in China to Antioch in Turkey — was **completely unknown in ancient:** not a single ancient record, either Chinese or Western, refers to its existence.
- Though it existed during the **Mongol period** (13th and 14th centuries CE) when the whole area between **China** and the **Mediterranean** was under one **Mongol Empire.**
- **Marco Polo,** the man now most closely associated with the Silk Road, never once mentions it.
- The term (Silk route) was first coined in **1877** by the **Prussian geographer Baron von Richthofen**.

## Topic 46. VIABILITY GAP FUNDING (VGF) FOR BATTERY ENERGY STORAGE SYSTEMS (BESS)

***Important for the subject: Schemes***

Cabinet approves viability gap funding of ₹3,760 cr for battery energy storage systems.

The approved scheme envisages development of 4,000 megawatt hour (MWh) of BESS projects by 2030-31 with a financial support of up to 40 per cent of the capital cost as budgetary support in the form of VGF.

- The move is expected to bring down the cost of battery storage systems increasing their viability.

- Designed to harness the potential of renewable energy (RE) sources such as solar and wind power, the scheme aims to provide clean, reliable, and affordable electricity to the citizens.
- By offering VGF support, the scheme targets achieving a levelised cost of storage (LCoS) ranging from ₹5.50-6.60 per kilowatt-hour (kWh), **making stored renewable energy a viable option for managing peak power demand across the country.**
- The VGF shall be disbursed in **five tranches** linked with the various stages of implementation of BESS projects.
- A minimum of 85 per cent of the BESS project capacity will be made available to distribution companies (Discoms).
- This will not only enhance the integration of renewable energy into the electricity grid but also **minimise wastage while optimising the utilisation of transmission networks**.
- Consequently, this will reduce the need for costly infrastructure upgrades.

**Benefits of VGF:**

- The selection of BESS developers for VGF grants will be carried out through a **transparent competitive bidding** process, promoting a level playing field for both public and private sector entities. This approach will foster healthy competition and encourage the growth of a robust ecosystem for BESS, attracting significant investments and generating opportunities for associated industries.
- A production-linked incentive programme to promote indigenous manufacturing could also facilitate not only technology and innovation, but also **create employment opportunities**.
- VGF would play a critical role in bridging the development cost that battery manufacturers need during technology development stages. This will also come in handy for pre-commercial battery projects to reach commercial stage.
- This funding from the government has the **benefit of bringing non-dilutive capital to battery tech companies** thus **lowering the pressure of fund raise** during the early technology development stage of various battery tech start-ups.
- Overall, a good move from the government and India is showing its clear intent to develop and promote indigenisation of battery tech in the country, he added.

**Viability gap funding (VGF)**

- Viability Gap Finance means a grant to support projects that are economically justified but not financially viable.
- Generally VGF is provided as a capital subsidy to attract the private sector players to participate in PPP projects that are otherwise financially unviable.
- Projects may not be commercially viable because of the long gestation period and small revenue flows in future.
- The VGF scheme was launched in 2004 to support projects that come under Public-Private Partnerships.

## Topic 47. INDIA CAN NOW ISSUE OIML CERTIFICATES

***Important for the subject: Schemes***

India is now officially authorized to issue **OIML (International Organisation of Legal Metrology) certificates**, a significant development announced by the **Union Consumer Affairs Secretary.**

**Understanding the OIML: International Organisation of Legal Metrology**

- The OIML, established in **1955** and **headquartered** in **Paris**, is a **global standard-setting body.**
- It focuses on **creating regulations and standards for legal metrology authorities and industries.**
- These standards cover measuring instruments like **clinical thermometers, alcohol breath analyzers, radar speed measuring devices, ship tanks, and petrol dispensing units.**

**India's OIML Membership and Metric Convention**

- India became an **OIML member in 1956**, coinciding with its signing of the **metric convention.**
- **The Metric Convention**, **signed in 1875 in Paris,** established the modern metric system, promoting standardized measurements worldwide.
- **Origin**: Born during the **French Revolution**, it aimed to replace diverse regional measurement systems.

**Fundamental Units:**

- Introduced the **meter** (length), **kilogram** (mass), and **second** (time) as base units.
- **International Bureau:** Created the **International Bureau of Weights and Measures (BIPM**) for system maintenance.
- **Non-Adoption:** While most nations embrace metrics, some, like the U.S., maintain alternative systems.

**The Significance of OIML Certificates**

- OIML certificates are part of the **OIML-CS system,** facilitating the issuance and registration of certifications for instruments like **digital balances and clinical thermometers.**
- India's inclusion expands the **number of countries authorized to issue OIML** certificates to **13**.
- India's authorization means that **certificates issued within the country are Boosting the Indian Economy**
- **Increased Exports**: Indian manufacturers can now easily meet international standards, boosting exports.

- **Foreign Exchange Earnings:** India can attract manufacturers from neighboring countries, leading to foreign exchange earnings.
- **Employment Generation**: The influx of certification-related activities can create employment opportunities. **Resource Efficiency:** Eliminating the need for Indian manufacturers to seek certification abroad will reduce redundancy and save resources.

## Topic 48. WILL THE CENTRE'S FIRST-OF-ITS-KIND GREEN CREDIT PROGRAMME IMPLEMENTATION RULES 2023 BE A WINNER OR A GREENWASH?

***Important for the subject: Schemes***

**Green Credit Programme Rules 2023:**

**Proposed by:** The **Union Ministry of Environment, Forests and Climate Change** in the **2023-24 budget.**

It is a **first-of-a-kind instrument** that seeks to incentivise individuals, industries and local bodies to earn from environmentally positive actions.

- **Green Credit** is an incentive that individuals, farmer-producer organisations (FPO), industries, rural and urban local bodies, among other stakeholders, will be able to earn for environment-positive actions. A **green credit** is a singular unit of a credit provided for a specified activity undertaken.

The draft rules identify **eight sectors for these activities:**

- Tree plantation; Water; Sustainable agriculture; Waste management; Air pollution reduction; Mangrove conservation and restoration; ECO Mark (a government scheme to identify environment-friendly products); and Sustainable building and infrastructure.
- Apart from **incentivising individual/community behaviour**, the **Green Credit Programme** will encourage **private sector industries and companies** as well as other entities to meet their existing obligations, stemming from other legal frameworks, by taking actions which are able to converge with activities relevant to generating or buying green credits.
- The **Indian Council of Forestry Research and Education** shall be the administrator of the programme.
- The institute will develop guidelines, processes and procedures for the implementation of the programme and develop methodologies and standards, registration process and associated measurement, reporting and verification mechanisms.
- The **green credits** will be tradable and those earning it will be able to put these credits up for sale on a proposed domestic market platform.

**Concern include:**

- Greenwashing Maintenance and monitoring challenges Fraud in utility of resources

## Topic 49. PMMSY: BRIDGING GAPS IN THE FISHERIES SECTOR

***Important for the subject: Schemes***

A significant sum of **₹20,050 crore** was allocated for the **Pradhan Mantri Matsya Sampada Yojana (PMMSY)** in **2020**, committing the biggest-ever investment in the history of Indian fisheries.

**PMMSY- significant milestones in three years:**

- **It identified key strategic priority areas:** marine fisheries, inland fisheries, fishermen's welfare, infrastructure and post-harvest management, cold water fisheries, ornamental fisheries, aquatic health management, and sea weed cultivation, among others.
- Almost 20,000 hectares of fresh pond area is being brought under inland aquaculture.
- More inclusion of women in fisheries sector.
- **PMMSY** has enabled **900 fish feed plants** and **755 hatcheries**, and is supporting research and genetic improvement of **Indian White Shrimp** at **Chennai,** the development of specific **pathogen-free brood stock**, and domestication of **tiger shrimp** in the **Andaman Islands**.
- **India** is among the **world's top three countries** in **fish and aquaculture production**, and is also the **biggest shrimp exporter in the world.**

**Pradhan Mantri Matsya Sampada Yojana (PMMSY):**

- The **Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying,** Government of India is implementing PMMSY.
- It **aims** to bring about the **Blue Revolution** through **sustainable and responsible development** of the **fisheries sector** in **India** at an estimated investment of **Rs. 20050 crores** for holistic development of the fisheries sector including welfare of fishers.
- **Implemented** in **all the States and Union Territories** for a period of **5 years** from **FY 2020-21 to FY 2024-25.**
- **PMMSY** is designed to address critical gaps in the fisheries value chain from fish production, productivity and quality to technology, post-harvest infrastructure and marketing.
- It **aims** to modernize and strengthen the value chain, enhance traceability and establish a robust fisheries management framework while simultaneously ensuring the socio-economic welfare of fishers and fish farmers.

**PMMSY Objectives:**

- Harness the potential of the fisheries sector in a sustainable, responsible, inclusive and equitable manner
- Enhance fish production and productivity through expansion, intensification, diversification and productive utilization of land and water
- Modernize and strengthen the value chain including post-harvest management and quality improvement

- Double fishers and fish farmers' incomes and generate meaningful employment Enhance the contribution of the fisheries sector to Agricultural GVA and exports Ensure social, physical and economic security for fishers and fish farmers Build a robust fisheries management and regulatory framework

**Targets of PMMSY:**

**Fish Production and Productivity:**

- Increasing fish production to 22 million metric tons by 2024-25 from 13.75 million metric tons in 2018-19. Enhancing aquaculture productivity to 5 tons per hectare from the current national average of 3 tons.
- Augmenting domestic fish consumption from 5 kg to 12 kg per capita.

**Economic Value Adition:**

- Increasing contribution of fisheries sector to the Agriculture GVA to about 9% by 2024-25 from 7.28% in 2018-19.
- Doubling export earnings to Rs.1,00,000 crores by 2024-25 from Rs.46,589 crores in 2018-19.
- Facilitating private investment and growth of entrepreneurship in the fisheries sector.
- Reduction of post-harvest losses from the reported 20-25% to about 10%.

**Enhancing income and employment generation:**

- Generating 55 lakh direct and indirect employment opportunities along the value chain.
- Doubling the incomes of fishers and fish farmers.

**Key achievements:**

- **Enhancement of fish production** from **10.26 Million metric tons** (2014-15) to **13.75 Million metric tons** (2018-19)
- **Productivity increased** from **2.3 tons per hectare** to **3.3 per tons per hectare Exports increased** from **Rs 33,442 crore** to **Rs 46,589 crore (2018-19)**

## Topic 50. 'AYUSHMAN BHAVA' CAMPAIGN TO BE INTRODUCED DURING 'SEVA PAKHWADA'

***Important for the subject :Schemes***

A campaign to ensure **optimum delivery of health schemes to every intended beneficiary**, including those in the last mile, will be launched by the President.

**Ayushman Bhava campaign:**

- Introduced during the **'Seva Pakhwada'** by the Prime Minister of India. Launched on: **13-Sep-2023**

**Ayushman Bhava** is an **umbrella campaign** comprising:

- **Ayushman Apke Dwar 3.0** which is **aimed** at creation and distribution of **Ayushman cards** to all remaining eligible beneficiaries; **Ayushman Mela** as part of which **weekly health melas** will be held at the level of **AB-HWCs** and **Community Health Centres (CHCs)** and
- **Ayushman Sabha,** a village/ward level sabha to be held to enhance awareness about various health care schemes and services. The campaign will eventually ensure gram/nagar panchayat to attain the status of
- **'Ayushman Gram Panchayat'** or **'Ayushman Ward'** with saturation of selected health indicators.

**About Seva Pakhwada:**

- Ayushman Bharat cards will be distributed. An online organ donation pledge registry will be initiated to register the pledges of willing citizens all over the country. All blood banks will organize at least one blood donation camp.
- Cleanliness drives at all public health facilities at primary, secondary and tertiary health care levels.

**Ayushman Bharat scheme:**

- **Ayushman Bharat** is **National Health Protection Scheme,** which will cover over **10 crore poor and vulnerable families (approximately 50 crore beneficiaries)** providing coverage **upto 5 lakh rupees per family per year** for **secondary and tertiary care hospitalization.**
- **Ayushman Bharat – National Health Protection Mission** will subsume the ongoing centrally sponsored schemes – **RashtriyaSwasthya Bima Yojana (RSBY)** and the **Senior Citizen Health Insurance Scheme (SCHIS)**.

**Salient features:**

- A defined benefit cover of **Rs. 5 lakh per family per year**.
- Benefits of the scheme are **portable across the country** and a beneficiary covered under the scheme will be allowed to take **cashless benefits** from **any public/private empanelled hospitals** across the country.
- Entitlement is decided on the basis of deprivation criteria in the **SECC database.**
- To control costs, the payments for treatment will be done on a package rate (to be defined by the Government in advance) basis. One of the core principles is **cooperative federalism** and **flexibility to states.**
- For giving policy directions and fostering coordination between Centre and States, it is proposed to set up **Ayushman Bharat National Health**
- **Protection Mission Council (AB-NHPMC)** at apex level Chaired by Union Health and Family Welfare Minister. States would need to have a **State Health Agency (SHA)** to implement the scheme.

- To ensure that the funds reach **SHA** on time, the transfer of funds from the Central Government to State Health Agencies may be done through an **escrow account directly.**
- In partnership with **NITI Aayog**, a robust, modular, scalable and interoperable IT platform will be made operational which will entail a paperless, cashless transaction.

## Topic 51. LSE LISTING FOR INDIAN FIRMS ONLY AFTER NORM FOR LISTING IN IFSC FINALISED

***Important for the subject: Economy***

Government to explore direct overseas listing of Indian firms on the London Stock Exchange (LSE) only after GIFT IFSC listing of domestic firms.

The government will explore direct overseas listing of Indian firms on the London Stock Exchange (LSE) **only after a plan** for overseas listing of domestic firms in the **GIFT International Financial Services Centre (IFSC)** in Gujarat is implemented

**What are likely benefits of LSE/international listing?**

- Cross-border listing is expected to help Indian firms gain **access to a larger base of investors**,
- Bring their corporate governance standards to the best global practices. Indian entities, to get better access to international markets

**What are the current international listing scenario for Indian companies?**

- Currently, Indian companies are not allowed to list directly on overseas exchanges as per regulations. However, listed Indian companies can use American Depository Receipts (ADR) or Global Depository Receipts (GDR) to make their shares accessible to overseas investors or list debt instruments on overseas exchanges.
- Overseas listing treatment to firms listing in GIFT IFSC would help the Indian firms take advantage of **lenient tax rules** for the offshore facility.
- The **IFSC is being groomed** by the government to make it an in**ternational financial hub on the lines of London** that could act as a catalyst in attracting foreign investors to Indian corporates which are gaining global prominence and need a large pool of capital from the worldwide.

## Topic 52. GDP GROWTH OUTLOOK AND CONSUMER SENTIMENTS DOWN WHILE INFLATION UP

***Important for the subject :Economy***

Centre for Monitoring Indian Economy's (CMIE) Economic Outlook, reports dip in consumer sentiments, along with elevated inflation and low growth outlook.

**CMIE Consumer sentiments Index**

- This Consumer Pyramids survey are measured on the lines of the work done in this regard

by the Survey Research Center at the University of Michigan. This effort, called the **Survey of Consumers**, began in 1946 and has produced several measures that are well established lead indicators in the US.

- Five questions are asked to measure consumer sentiments. The first two questions pertain to consumers perceptions regarding their **current well-being and expectations of their future well-being**. The next two questions take into account **perceptions** that consumers have regarding **current and prospective economic conditions** of the country as a whole.
- The last question is with respect to the **household's propensity to spend** on **consumer durables** around the time of the interview.

**Consumer sentiment:**

- According to the **CMIE's Economic Outlook**, consumer sentiments **fell** by **1.5 per cent** in August 2023.
- With these months being start annual festive it is a concerning development. Consumer sentiments were rising every month since January 2023. The average monthly growth in consumer sentiments in India during the **January July** months of 2023 was **2.6 per cent**.
- Consumer sentiments can have a real impact on the economy and Indian businesses who are gearing up for making the best sales of the year in the forthcoming festive season.
- That's because one of the key constituents of CMIE's consumer sentiments index is the consumers' **intention to buy** consumer durables.
- The sentiment for rural consumers and it has been negative for the past three months. That shows that **sentiments are significantly worse in rural India.**
- The proportion of households that said that they expect their household income to rise a year into the future fell from 25.6 per cent in July 2023 to 23.7 per cent in August **Inflation projection:**
- India's retail inflation eased slightly to 6.83% in August, from the 15-month high of 7.44% in July, but the rise in food prices remained elevated at around 10% and rural consumers continued to face over 7% inflation.

**Growth outlook:**

- India's GDP growth outlook India's potential GDP growth rate has steadily come down from around 8% just before the Global Financial Crisis of 2008-09 to just 6% before the Covid pandemic.
- The bump in India's GDP growth rates immediately after the pandemic hit year of 2020-21 is, to a great extent, illusory because these high rates are coming because of a **lower base**.

**How far did the government's recent cut in LPG prices help the family budgets?**

- According to CMIE's Consumer Pyramids Household Survey, in 2022-23, on average Indian families spent Rs 8,500 on cooking fuel. To be sure, the Rs 8,500 assumes the annual use of 6 LPG cylinders on an average.
- So as a proportion of the expenditure on cooking fuel, the cut is expected to bring a **relief**

**of 14%** , according to CMIE, **expenditure on cooking fuels accounts** for only **4.8 per cent** of total households consumption expenses.

- As such, the net impact of the LPG price cut on average family budgets was less than 1% (0.7% to be precise, 14% x 0.04)

**Potential GDP:**

- The potential GDP growth rate of an economy is the rate at which its GDP can grow without causing high inflation.
- Potential GDP is a theoretical construct, an estimate of the value of the output that the economy would have produced if labor and capital had been employed at their maximum sustainable rates—that is, rates that are consistent with steady growth and stable inflation.

**Understanding base effect**

- When something initially at **value of 100** falls by 25%, and becomes 75. A subsequent **25% increase** only comes up to 93.75 — that's more than 6% below the original number.

## Topic 53. ANALYSING INDIA'S FDI FLOWS

***Important for the subject :Economy***

A relook at India's FDI policy is necessary given the **skewed composition, regional disparity and outdated regulatory framework**. In **FY23**, India **received $46.03 billion** in FDI equity inflows, a decrease from the $58.77 billion recorded in FY22.

**Benefits:**

- FDI remains vital for **strengthening domestic industry**, **stimulating growth**, and **enhancing global competitiveness.**

**Concerns:**

- Geopolitical: As India's international ties deepen, it must carefully consider the **potential risks** of providing foreign investors **unfettered access to critical sectors**.
- Sectoral imbalance: Sector-specific analysis of DPIIT data highlights a notable trend: despite the government's Make in India initiative, more than **90 per cent** of investment has funnelled into **non-manufacturing sectors**, with the manufacturing sector predominantly receiving non-greenfield investments.

**Regional imbalance:**

**Sectoral imbalance:**

- Within sectors, there's a heterogeneous composition.
- In 2022, the services sector saw the lion's share of investment, with the financial sector leading, while research and development received a mere 0.2 per cent (the lowest).
- Similarly, the **computer software and hardware** sector attracted a significant portion of

inflows, constituting nearly 31 per cent of the total.

- However, the **bulk of investments went into computer software** (0.2 per cent in hardware), largely due to ICT industry acquisitions.

**Geopolitical:**

- These sectors deal with sensitive and critical data, including personal and geographical information, making them data-rich and vulnerable.
- Dependence on foreign solutions increases the risk of exploitation, underscoring the need for proactive security measures.

**Regional disparities:**

- Regional disparity in FDI has widened over the years, with **FDI-attracting States maintaining their dominance** while **others miss out on its positive spillover effects**.
- In 2023, the top 10 States attracting FDI include Maharashtra (28.6 per cent), Karnataka (23.6 per cent), Gujarat (16.9 per cent), Delhi (13.3 per cent), Tamil Nadu (4.5 per cent), Haryana (4.15 per cent), Telangana (2.5 per cent), Jharkhand (1.4 per cent), Rajasthan (1.1 per cent), and West Bengal (0.7 per cent), leaving the **remaining 22 States sharing a mere 2.4 per cent** of FDI.

**Consolidated FDI Policy 2020 Highlights**

- Investments under the **'automatic route'** require no prior permission, resulting in minimal monitoring. Sectors like agriculture, manufacturing, airports, ecommerce, pharmaceuticals, railway infrastructure, among others, allow 100 per cent FDI.
- Investments under the 'government route' in sectors like defense (**beyond 49 percent**), **mining (100 per cent), print media (26 percent), and telecom (beyond 49 percent**) necessitate government approval.
- **Security clearances** apply only to specific areas such as broadcasting, defense, private security, civil aviation, and mining, with the **Ministry of Home Affairs (MHA)** and **Ministry of External Affairs (MEA)** overseeing scrutiny and security clearance. Additionally, investments from Pakistan and Bangladesh also require security clearance.
- The primary amendment in the consolidated FDI Policy 2020 aimed to **prevent "opportunistic takeovers of weakened domestic companies by foreign firms"** during the Covid-19 pandemic.
- It explicitly stated that countries sharing land borders with India could no longer invest under the automatic route and must seek approval for proposed investments. This rule applied to China, Bangladesh, Pakistan, Bhutan, Nepal, Myanmar, and Afghanistan
- Additionally, it required government approval when the **beneficial owner** investing in India **belonged to any of these seven countries**.

**Note:**

- A clear **definition of a 'beneficial owner'** is missing in the FDI Policy and causes

ambiguity to both domestic firms as well as foreign investors. The **Companies Act** is the only source of credible reference of definition, so far.

- The Foreign Investment Promotion Board (FIPB), which once processed approval route investments, was replaced by the **Foreign Investment Facilitation Portal (FIFP) i**n 2017 for faster processing. Applications received are then directed to relevant ministries.

## Topic 54. RUSSIAN SELLERS SAID TO STOP FERTILISER DISCOUNTS TO INDIA

***Important for the subject :Economy***

**Russian companies** have ceased offering fertilizers such as **di-ammonium phosphate (DAP)** to **India** at discounted prices due to tightening global supplies after becoming the biggest suppliers to the country last year.

- **India's** fertilizer imports from **Russia** surged **246%** to a record **4.35 million metric tons** in the **2022/23** as suppliers give discounts (10%) to the global market price for DAP, urea and **NPK fertilizers**.
- Discounts provided by Russia led to decline in import of fertilizers from other countries like **China, Egypt, Jordan,** and the **United Arab Emirates**.
- **Current urea price:** approximately **$300** per ton on a CFR basis. **Russia** is the **world's biggest exporter of fertilizer,** followed by **Canada, China, Belarus, and the United States.**
- **Brazil** is the top importer of fertilizers. **India** imports most of its Fertilizer from **China, United Arab Emirates** and **Spain** and is the **3rd largest importer** of Fertilizer in the World.

**Impact of the decision:**

- Increased import cost
- Increased subsidy burden

**Di-Ammonium Phosphate (DAP):**

- **Urea** and **DAP** are two largely consumed fertilizers in the country. **Diammonium phosphate (DAP)** is the **world's most widely used phosphorus fertilizer.**
- **DAP** fertilizer is an excellent source of **Phosphorus** and **nitrogen (N)** for plant nutrition.
- It's **highly soluble** and thus dissolves quickly in soil to release plant-available phosphate and ammonium.
- A notable property of DAP is the **alkaline pH** that develops around the dissolving granule.
- Being a basic nutrient for **Rabi crops,** the **DAP fertiliser** has to be sprinkled at the time of sowing crops like mustard and wheat. Any delay in its supply could adversely impact the sowing of crops.

## Topic 55. HIGH COURT RULING ON SERVICE CHARGE OR 'TIPS' AT EATERIES

***Important for the subject: Polity***

Delhi HC said on service charge: Use term 'staff contribution', amount can't be over 10% of bill. The Delhi High Court in an interim order Tuesday directed members of the

- **Federation of Hotel and Restaurant Association of India (FHRAI)** to replace the term **'service charge'** with **'staff contribution',** while adding that the amount charged **should not exceed 10% of the total bill**
- FHRAI-associated hotels and restaurants will now **specify on their menus in bold** that ***tips need not be given after staff contribution is paid***.
- The order was passed on **pleas filed** by the National Restaurant Association of India (NRAI) and the FHRAI, challenging the July 4, 2022, **guidelines issued by** the **Central Consumer Protection Authority (CCPA)**.

**What did the CCPA guidelines say?**

- The guidelines said that restaurants or hotels should not automatically add service charge to the bill or collect it from consumers under any other name.
- High Court **stayed the CCPA guidelines** Important for the subject to fulfillment of certain conditions.

**What did the HC say?**

- The association members should ensure that the **levying of service charge** in addition to the amount and taxes is "**duly and prominently displayed on the menu or other places"**
- There should be no scope of confusion **between service tax and service charge** as service tax is no longer being imposed on restaurants
- A complaint against unfair trade practices could also be lodged electronically with the Consumer Commission through the ***eDaakhil portal*** for speedy redressal or otherwise.
- Complaints could also be submitted to the District Collector of the district concerned for investigation and subsequent proceedings by the CCPA, either through email or in person.

**Central Consumer Protection CCPA**

- CCPA was established in 2020, with powers to pass orders of discontinuation of practices that are unfair and prejudicial to consumers' interests and impose penalties in case of false or misleading advertisements.
- It initiated country-wide campaign to prevent sale of spurious and counterfeit goods that violate **Quality Control Orders** (QCOs) published by the Central Government to include consumer durables such as electric immersion water heaters, electric iron, domestic gas stove, microwave oven, sewing machines etc.
- CCPA has also issued Safety Notices to alert consumers against buying household goods

which do not have valid ISI mark, like electric immersion water heater, sewing machine, aluminum foil for food packaging etc.

- Violation of compulsory standards for such goods endangers public safety putting consumers at the risk of suffering severe harm or injury.
- In furtherance of the campaign, CCPA has taken suo-moto cognizance against ecommerce entities found to be selling Pressure Cookers in violation of the Domestic Pressure Cooker (Quality Control) Order, 2020 issued by the Central Government under Section 16 (1) of the BIS Act, 2016 on 21st January 2020.
- The power of CCPA to take **Class action** is a unique feature that was not present in the previous Consumer Protection Act, of 1986.
- **Before the 2019 Act, there was nomechanism** to deal with issues of unfair trade practices and misleading advertisements which impacted consumers as a class. As a result, such practices continued unrestrained, without any accountability.
- CCPA through **class action protects the right of the consumers even the sleeping consumers who are unaware of their rights**.

## Topic 56. DISASTER RELIEF IN INDIA

***Important for the subject: Polity***

Uttarakhand asks Centre for declaration of 'national disaster' after major floods.

**What qualifies as "national disaster"?**

There is no official or defined category of "national disasters". Disasters of this nature come under the **2005 Disaster Management Act**, which defines a "disaster" as "a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area".

The setup:

- The Act saw the creation of the **National Disaster Management Authority** (**NDMA**), to be headed by the Prime Minister, and State Disaster Management Authorities (**SDMAs**) headed by respective Chief Ministers.
- Together with district-level authorities, an **integrated Disaster Management setup** was to be created in India.
- The Act also led to the **National Disaster Response Force**. It has several battalions or teams, which are responsible for on-ground relief and rescue work in several states.

**How is disaster relief funded ?**

- The **National Disaster Relief Fund (NDRF)** is mentioned in the 2005 Disaster Management Act. Similarly, SDRFs exist for the states and are the primary funds

available to state governments for responses to notified disasters. The Central Government contributes **75%** to the SDRF in **general** states and **90%** in **northeastern and Himalayan states**.

- Successive Finance commission (set-up under the Article 280 of the Constitution from time-to-time), determines the allocation of the State Disaster Response Fund (SDRF) of each State for each of the financial years for entire Award period.
- The **15th Finance Commission** had adopted a **new methodology** for state-wise allocations which is a **combination of capacity (as reflected through expenditure), risk exposure (area and population) hazard and vulnerably (**risk index), instead of existing methodology of expenditure based.
- The 15th Finance Commission has allocated a total corpus of Rs. 1,28,122.40 crore in SDRF to all States for the Award Period (2021-22 to 2025-2026), of which Central Share is Rs. 98,080.80 crore and State Government's share is Rs. 30,041.60 crore.

**Who finances when and what ?**

- The SDRF is to be used only for meeting the expenditure for providing **immediate relief** to the **victims of notified calamities** like cyclones, droughts, earthquakes, fires, floods, tsunamis, hailstorms, landslides, avalanches, cloud bursts, pest attacks and frost/cold waves.
- The **state government is primarily responsible** for undertaking **rescue, relief and rehabilitation measures** in the event of a disaster. But these can be supplemented with Central assistance.
- In the event of a calamity of a severe nature, where the requirement of funds for relief operations is beyond the funds available in the State's Disaster Response Fund account, **additional Central assistance is provided from National Disaster Response Fund**, after following the laid down procedure.
- Rs. 54,770 crore has been allocated by the **15th Finance Commission** under **National Disaster Response Fund (NDRF)**.
- In addition, an amount of Rs 32,030 crore has been allocated by the commission under the **State Disaster Mitigation Fund (SDMF),** which is for carrying out works such as restoration of forests, raising public awareness, etc. and Rs. 13,693 crore for the **National Disaster Mitigation Fund (NDMF**) for the Award Period (2021-22 to 2025-26).

**National Disaster Response Fund (NDRF)**

- It is constituted under Section 46 of the Disaster Management Act, 2005, supplements SDRF of a State, in case of a disaster of severe nature, provided adequate funds are not available in SDRF.

**National Disaster Response Fund**

- It is a fund managed by the Central Government and is used for meeting the expenses incurred during emergency relief, disaster response and rehabilitation in the event of a disaster.

- The NDRF is placed in the "Public Account" of GOI under "reserve funds not bearing interest". Since it is placed in the public accounts, the government does not require parliamentary approval to take money out of this fund.

## Topic 57. LORD OF DANCE

***Important for the subject: History***

The magnificent **Nataraja sculpture** has been installed at **Bharat Mandapam** It is the tallest statue of Lord Shiva's dancing form in the world.

The statue is an **ashtadhatu (eight-metal alloy) piece of art**, crafted by **sculptors from Swamimalai in Thanjavur** district of Tamil Nadu. The statue is **27 feet tall** and weighs about **18 tonnes.**

- The **design draws inspiration** from **three revered Nataraja idols** i.e. **the Thillai Nataraja Temple in Chidambaram, the Uma Maheswarar Temple in Konerirajapuram, and the Brihadeeswara (Big) Temple, a UNESCO World Heritage Site, in Thanjavur**.

**More about Nataraja:**

- **Nataraja**, also known as the **Lord of the Dance**, is represented in **metal or stone** in many Shaivite temples, particularly in South India. It is an **important piece of Chola sculpture.**

**The Nataraja sculpture is characterized by various features:**

- The **drum, symbolizing the sound of creation**, is held in the **upper right hand**. It is **signified that all creations originate from the great sound** of **the damru.** The **eternal fire, representing destruction,** is held in the **upper left hand,** emphasizing that **destruction precedes and complements creation.**
- The **lower right hand** is raised in the **Abhay mudra**, which signifies **benediction and the assurance to devotees** not to be afraid. The **lower left hand points** towards the **upraised foot, indicating the path of salvation.**
- The **figure of a small dwarf** serves as the base upon which **Shiva is depicted dancing, symbolizing ignorance and individual ego. Shiva's matted and flowing locks symbolize the** flow of the Ganges River.
- In terms of ornamentation, **one ear of Shiva is adorned with a male earring**, while the **other features a female earring**. This represents the **fusion of male and female** energies and is often referred to as **Ardhanarishwar.**
- A **snake is elegantly twisted** around **Shiva's arm**, symbolizing the **kundalini power,** which **resides in the dormant stage** within the **human spine and, when awakened, leads to true consciousness.** The Nataraja is **surrounded by a nimbus of glowing lights**, symbolizing the **vast unending cycles of time, reminding observers of the eternal nature of the universe** and the **perpetual dance within it.**