WEEKLY CURRENT AFFAIRS MAGAZINE for

C.D.S.

JUNE-VOL-III-2023

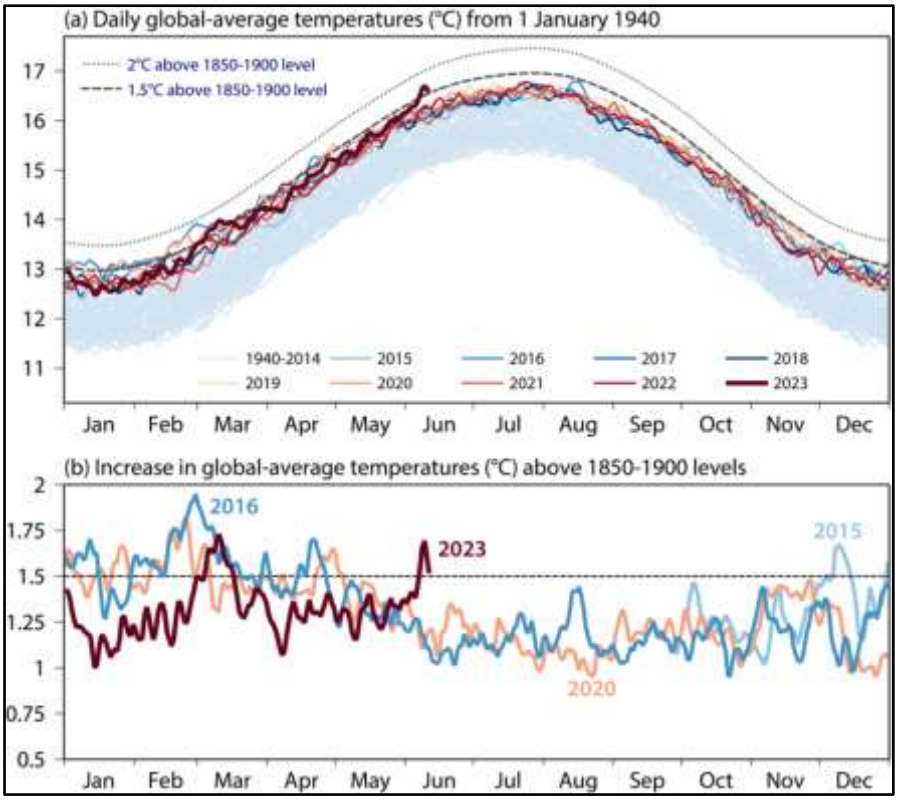
16 June to 22 June

PIONEER ACADEMY's
PATHFINDER
CURRENT AFFAIRS FOR CIVIL SERVICES

- UPSC/MPSC/NDA/CDS/CAPF/AFCAT
- PUNE/THANE/DADAR/ANDHERI/KALYAN/ PCMC/NERUL/BORIVALI/SATARA
- Offline/Online batches/Video course
- www.pioneeracademypace.com/.in
- IVR No. – 75060 10635

Topic 1. GLOBAL WARMING BREACHES 1.5°C THRESHOLD IN SUMMER FOR 1ST TIME

Important for the subject: geography



For the **first few days of June, global mean temperatures were more than 1.5 degrees Celsius higher than pre-industrial averages,** the **European Centre for Medium Range Weather Forecast (ECMWF)** said, making this the first time the 1.5 degree- threshold was breached in the summer months.

- There have been earlier instances of the **daily global temperature exceeding preindustrial averages by more than 1.5 degrees Celsius,** but **only in the Winter and spring months** when deviations from the past trends are more pronounced.
- This threshold was **first exceeded in December 2015,** and then repeatedly in the Northern Hemisphere winters and springs of 2016 and 2020.

The goal of Paris Agreement 2015:

- The goal of the **2015 Paris Agreement** is to ensure that the rise in global mean temperatures, as compared to pre-industrial times, does not exceed 2 degrees

- Celsius, and preferably be restricted within 1.5 degrees. But The thresholds mentioned in the Paris Agreement are not about daily or even annual global temperatures.
- Rather, those thresholds refer to long-term warming, meaning global temperatures over a period of 20 to 30 years, on average, must not exceed 1.5 degrees or 2 degrees Celsius.

Breach of 1.5-degree thresholds:

- Short-term breaches of these thresholds, even a few years at a stretch, are considered inevitable now.
- **The world is projected to overshoot the 1.5 degrees threshold before coming back.** The **World Meteorological Organization (WMO)** had said that there was a **66 per cent chance** that **in one of the next five years (2023-27)**, **annual global temperatures would breach the 1.5 degrees threshold.**
- Last year (2022), it was **1.15 degrees Celsius higher** than the pre-industrial times.
- The **warmest ever year,** so far, has been **2016** when **global mean temperatures** were **1.28 degrees Celsius higher**. In its statement last month, WMO said It was nearly certain that **one of the next five years (2023-27) would leave 2016 behind**.

Topic 2. LANDFALL OF A CYCLONE

Important for the subject: geography

The **Landfall process** of cyclone Biporjoy is continuing and by midnight it will be completely over the land. Part of the eye (of the cyclone) is over the land," the IMD said.

What is the landfall of a cyclone?

- **Landfall** is the event of a **tropical cyclone coming onto land** after being over water. According to the **IMD**, a **tropical cyclone** is said to have made landfall **when the center of the storm — or its eye — moves over the coast.**
- A **landfall** should not be confused with a **'direct hit'**, which refers to **a situation where the core of high winds (or eye wall) comes on shore but the center of the storm may remain offshore.**
- Because the **strongest winds in a tropical cyclone** are not located precisely at the center, it is possible for a cyclone's strongest winds to be experienced over land even if landfall has not occurred.

Damage caused by the landfall:

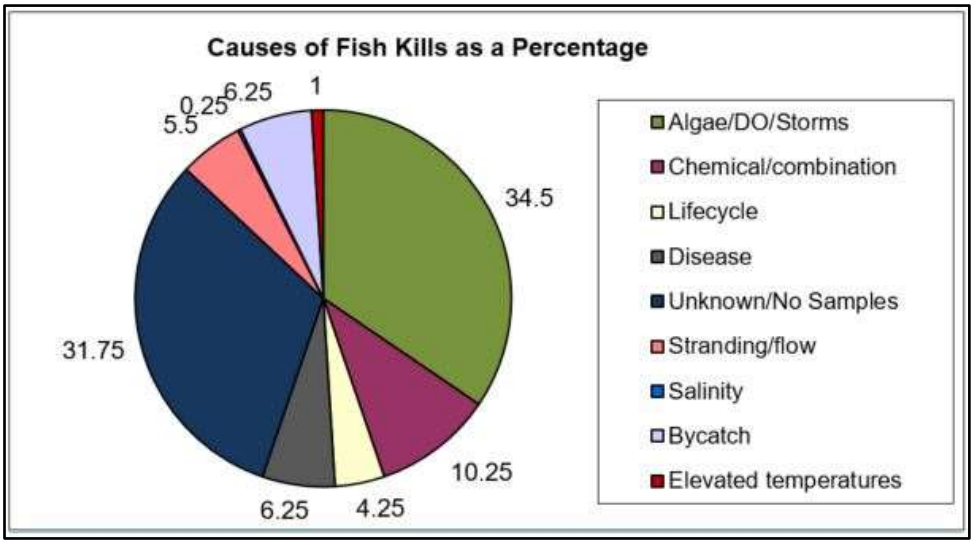
- The damage caused by the landfall will depend on the severity of the cyclone — marked by the speed of its winds.

How long a landfall lasts?

- Landfalls can last for a few hours, with their exact duration depending on the speed of the winds and the size of the storm system.
- **Cyclones lose their intensity once they move over land** because of a **sharp reduction of moisture supply** and an **increase in surface friction.**
- This means that while landfalls often bring the most devastating moments of a cyclone, they also mark the beginning of its end.

Topic 3. WHAT IS 'FISH KILL' AND WHY IT HAPPENS

Important for the subject: geography



Thousands of dead fish washed up on multiple beaches in southeast Texas, USA.

- Among the dead fish covering the shores were mostly **menhaden** but there were also some **sharks, trout, bass, catfish and stingrays.**

Fish kill phenomenon:

- The incident took place due to a phenomenon called **"fish kill".** It is the **sudden and unexpected death** of many fish or other aquatic animals over a short period and mostly

within a particular area.

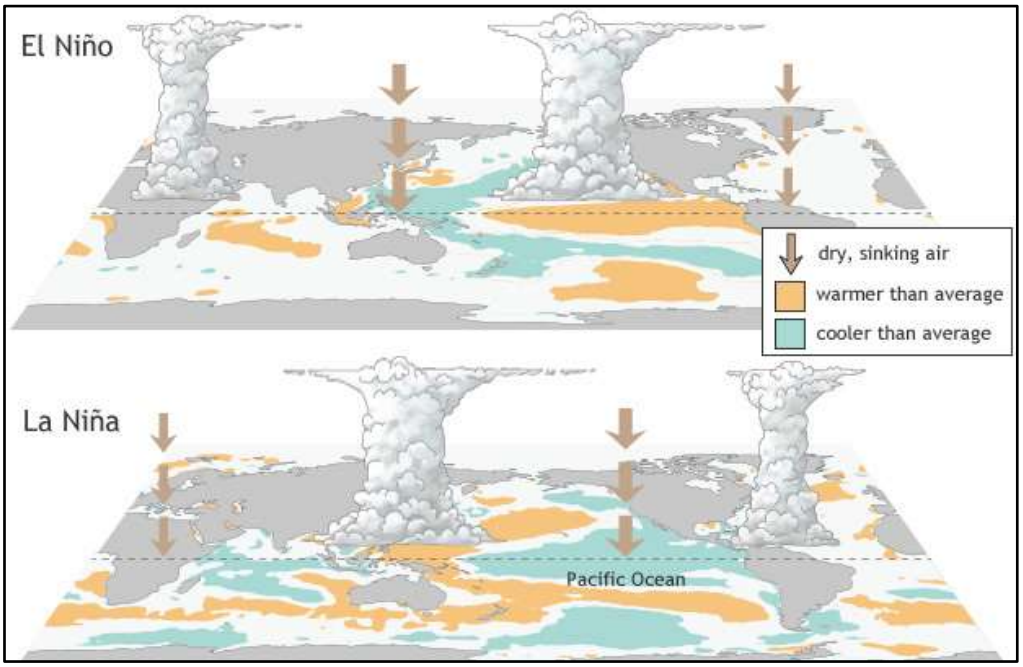
- It occurs mainly due to **low levels of dissolved oxygen** in the water that causes suffocation of the fish.

A combination of phenomena led to the occurrence of this event:

- **Warm water** and rising **sea surface temperature** led to difficulty in breathing Group of fish trapped in **shallow water** leads to more warming of water
- **Calm water:** Due to calm water, wind does not get mixed with the water, thus leading to scarcity of dissolved oxygen.
- Due to **cloudy skies,** phytoplankton were unable to carry out the process of **photosynthesis,** which is another way of producing oxygen in the water.
- Texas experiences fish kills every year during summers when the temperatures of the sea surface rise. With the rising temperature in the oceans, this phenomenon may become more prevalent.

Topic 4. EL NINO: HOW THE CLIMATE PATTERN MAY PROLONG FOOD INFLATION

Important for the subject: geography



The latest El Nino climate phenomenon has arrived, threatening floods in some areas of the

world and droughts in others. Previous disruptive weather patterns cost the global economy trillions and stoked inflation.

El-Nino phenomenon:

- El Nino, which is Spanish for Little Boy, is marked by **warmer-than-average sea surface temperatures** in the central and eastern Pacific Ocean near the equator.
- This weakens the **trade winds — east-west winds that blow near the Equator.**
- Due to El Niño, easterly trade winds that blow from the Americas towards Asia change direction to turn into western lies. It thus brings warm water from the western Pacific towards America.
- It fuels flooding to the Americas, tropical storms to the Pacific and brings droughts to many other parts of the world, including southern Africa.

Effects of El Niño Phenomenon

- **Weather –** El Niño causes dry, warm winters in Northern U.S. and Canada and increased flooding risk on the U.S. gulf coast and southeastern U.S. It brings drought to Indonesia and Australia. In India, an El Nino event is strongly linked to suppressed rainfall in the monsoon season.
- **Marine resource –** Under El Niño, upwelling (deeper waters rise towards the surface) of deeper waters is reduced, thus reducing phytoplankton off the coast. Fish that eat phytoplankton are affected, followed by other organisms higher up the food chain.
- **Warm water –** Warmer water carries tropical species towards colder areas, disrupting multiple ecosystems.
- **Airflow above the ocean –** Heat redistribution on the surface impacts airflows above the ocean.

The economic impact of El Nino:

- Following El Nino in **1982-83,** the financial effects were felt for another half - decade, totalling some **$4.1 trillion (€3.7 trillion).** After the 1997-98 El Nino season, the damage to global economic growth was $5.7 trillion.
- Researchers estimated that the negative economic effects from the latest El Nino season could reach $3 trillion between now and 2029.

Most hit sectors:

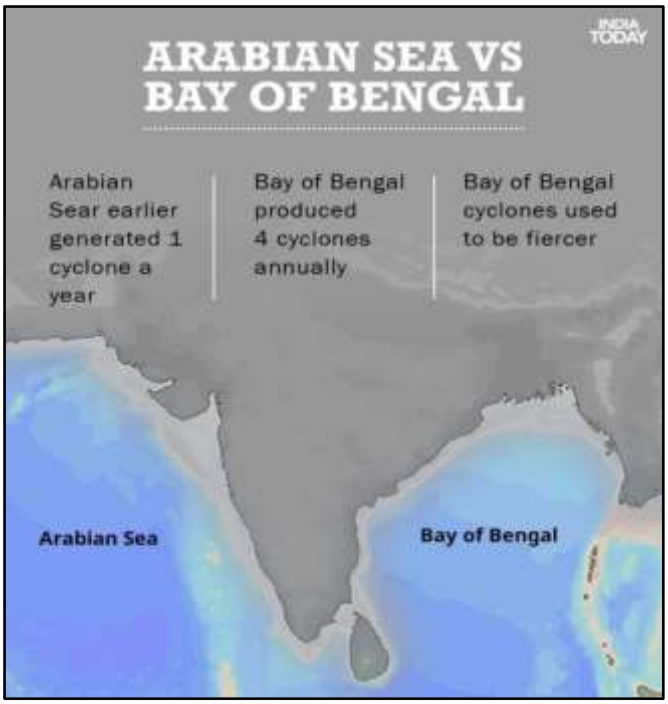
- Fisheries industries
- The big agricultural regions of Africa, South America and even several regions of North America.
- If harvests are poor and infrastructure is damaged by storms, the insurance sector will also suffer.

Food, energy inflation spikes:

- big agricultural regions of Africa, South America and even several regions of North America. Then, if harvests are poor and infrastructure is damaged by storms, the insurance sector will also suffer.
- The latest El Nino phase could be the warmest and costliest ever. The rise in prices of Coffee, Cocoa and sugar is rising.

Topic 5. WARMING OCEANS CHALLENGE ARABIAN SEA CYCLONE FORECASTS

Important for the subject: geography



The data suggest that it takes more time for the agency to accurately forecast the trajectory of

storms that originate in the Arabian Sea, than those in the Bay of Bengal.

- Historically, most cyclones around India tend to originate in the Bay of Bengal but global warming is causing the Arabian Sea to be heating up more than average and whetting greater – and increasingly stronger – cyclones like Biparjoy.
- IMD has predicted the path of cyclone Mocha (a storm of Bay of Bengal) more accurately than that of Cyclone Biporjoy. IMD has predicted the path of Cyclone Sitrang, Yaas, Mandous and Gulaab more accurately, all of which are an storm of Bay of Bengal region.
- However IMD failed to predict accurately the path of Arabian sea cyclone Tauktae.

Reason:

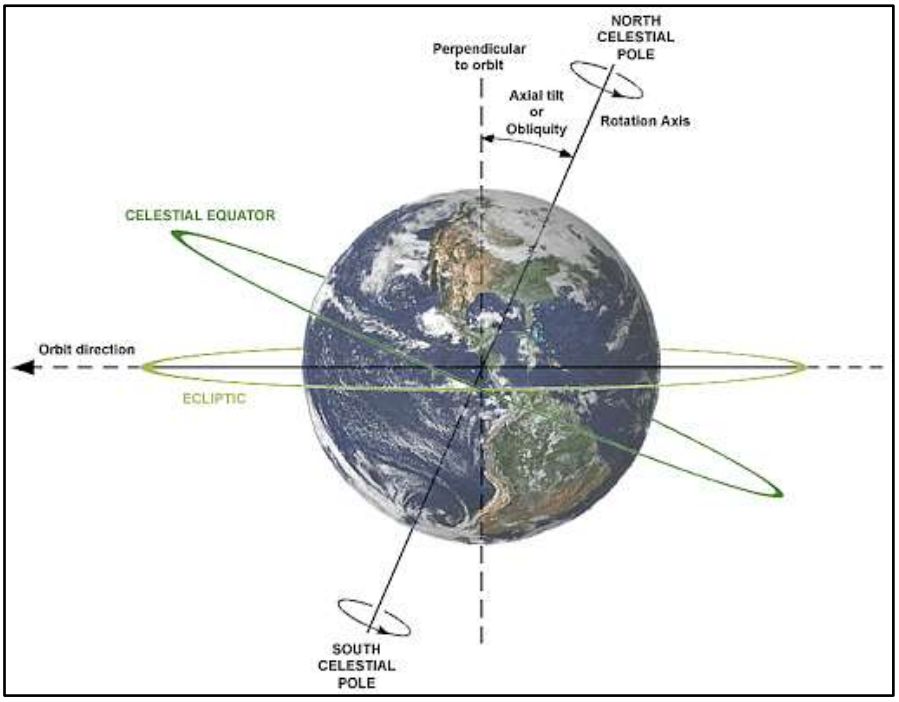
- The **Bay of Bengal** has more frequent cyclones and were better understood. The **Arabian Sea cyclones,** historically have been fewer because of relatively colder sea surface temperatures. Nearly 48% of cyclones here never reached land, as opposed to only 13% in the Bay of Bengal.
- There is an increasing prominence of Arabian Sea cyclones with a 52% rise in such cyclones from 2001-2019 and an 8% decrease in those over the Bay of Bengal.
- It is the **winds in the upper reaches of the atmosphere,** called **steering winds**, that **influence the direction and recurving,** whereas the **heat within the ocean layers determined the strength and duration of cyclones.**
- While the latter is better captured in the (prediction) models, the wind component is not always fully captured in the models.
- The weather models used to predict the **Arabian Sea** and **Bay of Bengal cyclones** were the same and the **IMD incorporated inputs from Indian as well as several international models** to estimate the track and intensity of cyclones.

There are factors unique to the Arabian Sea, but absent in the Bay of Bengal, which influence a cyclone's intensity and movement:

- The **Arabian Sea has a much deeper – up to 40 meters – layer of warm water** compared to that in the **Bay of Bengal.**
- Many times, these **sub-surface values aren't captured in the cyclone prediction models** and that's why, the **strength and speed of the cyclones aren't accurately captured** in advance.

Topic 6. GROUNDWATER EXTRACTION HAS TILTED EARTH'S SPIN; HOW LIKELY IS IT TO FUEL CLIMATE CHANGE?

Important for the subject: Geography



Humans have caused marked tilts in the Earth's axis by pumping water out of the ground and moving it elsewhere, according to a new study.

Study findings:

- A 2021 study found that the **direction of polar drift moved from southward to eastward** in **1995** and that the **average drift speed** from **1995-2020** was **17 times quicker** than from **1981-1995.**
- Pronounced shifts in the Earth's axis of rotation can impact our planet's climate. **Groundwater pumping** has **tilted the planet nearly 80 centimeters east** between 1993 and 2010 alone.
- The **water circulated across the planet determines how mass is distributed.** Scientists had predicted that between **1993** and **2010**, people pumped **2,150 gigatons of groundwater**, or **more than 6 millimeters (0.24 inches)**, of sea level increase.
- However, it is difficult to validate that estimate.

Shift of Earth's axis:

- In the past, the **poles' drift was only caused by natural forces** like **ocean currents** and the **convection of heated rock deep beneath the Earth.**
- But the new research pitched the redistribution of **groundwater as the primary culprit for the drift.**
- Water's role in altering the Earth's rotation was discovered in 2016, and until now, the contribution of groundwater to drifts has been unexplored.
- The **planet's geographic north and south poles** are where its axis intersects the surface; however, **they are not fixed.** The axis and hence the poles fluctuate due to variations in the Earth's mass distribution.

Risk involves:

- The **rotational pole** normally changes by several metres within about a year, so changes due to **groundwater pumping** don't run the risk of shifting seasons.
- But on **geologic time scales, polar drift** can have an impact on climate. **Redistributing water from the mid-latitudes** significantly **influences polar drift;** therefore, the **location of redistribution determines polar drift.**
- During the study period, most redistribution occurred in western North America and northwestern India — both located at mid-latitudes.

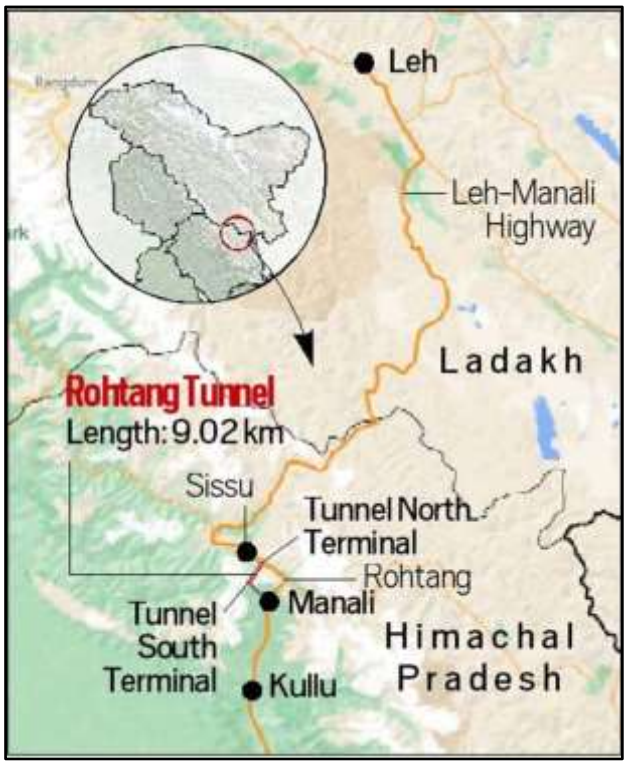
Earth's Axis of Rotation:

- It is the **line along which it spins** around itself as it revolves around the Sun. **Earth's axial tilt** (also known as the obliquity of the ecliptic) is about **23.5 degrees.**
- Due to this axial tilt, the sun shines on different latitudes at different angles throughout the year. **This causes the seasons.** The points on which the axis intersects the planet's surface are the **geographical north and south poles.**
- The **location of the poles is not fixed.** The axis moves due to **changes in how the Earth's mass is distributed around the planet.** Thus, the poles move when the axis moves, and the movement is called **"polar motion"**.
- Generally, **polar motion** is caused by changes in the **hydrosphere, atmosphere, oceans, or solid Earth.** But now, climate change is adding to the degree with which the poles wander.

- According to **NASA**, data from the 20th century shows that the spin axis drifted about 10 centimeters per year. Meaning over a century, polar motion exceeds 10 meters.

Topic 7. ROHTANG PASS

Important for the subject: Geography



The name Rohtang means 'ground of corpses' due to the number of people who lost their lives while crossing this difficult mountain range. It is located on the **Pir Panjal Mountain Range** of the Himalayas and serves as the gateway to Pangi and the valley of Leh. The Rohtang Pass is a natural divide between the humid Kullu Valley, which has a predominant Hindu culture and high altitude Lahaul and Spiti Calleys, which are predominantly Buddhist.

- It is a high mountain pass (elevation 3,980 m) on the eastern Pir Panjal Range of the Himalayas around 51 km from Manali.
- It connects the Kullu Valley with the Lahaul and Spiti Valleys of Himachal Pradesh, India.
- The pass lies on the watershed between the Chenab and Beas basins. On the southern side of this pass, the Beas River emerges from underground and flows southward and on its northern side, the Chandra River, a source stream of the river Chenab, flows westward.

Topic 8. WHAT MADE CYCLONE BIPARJOY UNIQUE, WHY ITS PATH WAS DIFFICULT TO PREDICT

Important for the subject: Geography

Biparjoy had some characteristics that not only made it difficult to predict its path, but also made the cyclone potentially more dangerous.

Details:

- Cyclones usually give adequate warning of their arrival. Cyclones take **4-5 days to reach the Indian landmass** from both, the Arabian sea and the Bay of Bengal.
- If a **sufficient number of weather instruments** are monitoring them, from the oceans as well as from satellites, everything about the cyclones — **speed, intensity, trajectory, associated wind speeds** — can be predicted accurately.

Cyclone Biporjoy:

- It developed from **very severe cyclonic storm** into a **extremely severe cyclonic storm** in a **10-day period,** which was longer than the average but not the longest.
- One of the reasons for its **longer stay** on the sea was its **relatively slow speed.** Cyclones in the **Arabian Sea** typically progress with a **speed of about 12-14 km per hour.**
- Biparjoy, through most of its life, moved at a **speed of 5-7 km an hour** while covering a distance of nearly 1200 km to Gujarat. Biparjoy was sandwiched between **two anticyclonic systems.** One of them had the effect of aiding its **northwards movement,** while the other was sort of pulling it back. The combined effect was that it moved relatively slowly.
- The influence of these **anticyclonic systems** also made its **trajectory wobble**. It is called the **recurving tracks cyclone.** The trajectory of such cyclones tends to change directions frequently.
- Predicting the trajectory of recurving cyclones is extremely challenging, with an extra element of uncertainty.

Unpredictable path:

- **Cyclone Biparjoy** was earlier predicted to proceed towards **Karachi** in Pakistan. Most cyclones of this intensity complete the landfall in about three to four hours. **Biparjoy**

took about five hours. The slow speed meant that even after reaching land, the **cyclone remained close enough to the sea to draw moisture and sustain itself.**

- **Longer landfalls have a greater potential to cause destruction.** The most dramatic landfall was in the case of the **Odisha super cyclone of 1998,** the most devastating cyclone to have hit India in recent decades. That process had continued for nearly 30 hours.

Topic 9. 68 DEAD IN BALLIA AMID HEATWAVE: HOW HIGH TEMPERATURES COMBINED WITH HIGH HUMIDITY CAN BE FATAL

Important for the subject: Geography

Amidst the scorching heat wave conditions, the temperatures soar up to 43.5 degrees Celsius in the eastern Uttar Pradesh region.

Details:

- The **IMD** in its forecast mentioned that **Ballia's maximum temperature** on Monday (June 19) is likely to **touch 45 degrees Celsius** but would come down by **2 degree Celsius** the next day. The mercury in the city is expected to go below 40 degrees Celsius only after June 22.

What are heat waves?

- A **Heat Wave** is a **period of abnormally high temperatures,** more than the normal maximum temperature that occurs during the summer season in the North-Western parts of India. **Heat Waves typically occur between March and June**, and in some rare cases even extend till July. The extreme temperatures and resultant atmospheric conditions adversely affect people living in these regions as they cause physiological stress, sometimes resulting in death.

The Indian Meteorological Department (IMD) has given the following criteria for Heat Waves:

- 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
- When actual maximum temperature remains 45°C or more irrespective of normal maximum temperature, heat waves should be declared. Higher daily peak temperatures and longer, more intense heat waves are becomingly increasingly frequent globally due to climate change. India too is feeling the impact of climate change in terms of increased instances of heat waves which are more intense in nature with each passing year, and have a devastating impact on human health thereby increasing the number of heat wave casualties.

About Heat Index:

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 impactbased heat wave 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.

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.

Why do heat waves cause deaths?

- **High temperatures** alone aren't fatal in nature. It's when **high temperatures are combined with high humidity,** known as the **wet bulb temperature,** heat waves become lethal.
- Humans lose heat generated within their bodies by producing sweat that evaporates on the skin. The cooling effect of this evaporation is essential in maintaining a stable body temperature.
- As humidity rises, sweat does not evaporate —just like clothes take a long time to dry in humid locations – and makes it difficult to regulate body temperature. And this could cause a **heat stroke,** which **takes place only when the body temperature goes above 40 degrees Celsius.**
- What happens is that **excessive heat increases metabolic activity in the body,** leading to a **drop in blood pressure and oxygen levels** with **increased sweating** — this is a condition called **hypoxia.**
- Metabolism goes haywire (in such conditions), creating a **toxin overload** which affects multiple organs. At that stage, things are extremely difficult to manage outside ICU care.
- **Prolonged exposure** to even moderate heat, with **poor nutrition and hydration levels** in these circumstances, can lead to **hypoxia.** Those with **pre-existing metabolic disorders** like diabetes, the obese or the elderly, are more vulnerable.

Topic 10. ICIMOD REPORT RINGS WARNING BELLS FOR RIVERS OF EAST AND NORTHEAST INDIA

Important for the subject: Geography

Rivers in eastern and northeastern India including the **Brahmaputra, Ganga and Teesta** will see a **rapid increase in stream flow** followed by **water** scarcity, a new report released by the **International Centre for Integrated Mountain Development (ICIMOD)** on June 20, 2023, warned.

Report details:

- The report — **Water, ice, society, and ecosystems in the Hindu Kush Himalaya** — pointed out that **glaciers in the HKH region** can lose up to **80 per cent** of their current volume by the end of the century (with) **Himalayan glaciers disappearing 65 percent faster in the 2010s** than in previous decade.
- The glaciers lost a mass of 0.28 metres of water equivalent per year (m w.e.) between 2010 and 2019 compared to 0.17 (m w.e.) per year between 2000 and 2009.
- The **Karakoram range,** which was known to be stable, has also **started showing a decline in glacier mass**, losing **0.09 m w.e. per year** during **2010-2019. Floods and landslides** are projected to increase over the coming decades.

India-specific findings:

- The **Union Ministry of Earth Sciences** also informed that glaciers feeding the Ganga and the Brahmaputra river basins were melting at a fast rate.

- The **mean retreat rate of the Hindu Kush Himalayan glaciers** was **14.9-15.1 meters per annum,** which varied from **12.7-13.2 meters per annum** in the **Indus, 15.5-14.4 meters per annum** in the **Ganga** and

20.2-19.7 meters per annum in the **Brahmaputra** river basins.

- The **Eastern Ganga region (EGR)** is already facing **Erratic and extreme rainfall, extreme floods and landslides, droughts, low flows, and scorching wet bulb heat.**
- Eastern Himalayas, also called lesser Himalayas, have fewer glaciers compared to their Western counterparts.
- Hence, rivers in the region get less contribution from such glaciers; and are less likely to be affected overall.

Loss of permafrost:

- The report highlighted the limited available information on permafrost — ground that remains at or below 0°C for at least two consecutive years — in the Hindu Kush region.
- Studies have estimated that western Himalaya lost 8,340 square km of permafrost area between 2002 and 2004 and 2018 and 2020, and about 965 square km of area disappeared in Uttarakhand Himalaya between 1970 and 2000 and 2001 and 2017.
- The loss of permafrost could lead to infrastructure damage, costing the world several billion dollars.

Hindukush-Himalaya Region:

- Stretching over **3500 kilometers** and across **eight countries** – **Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar and Pakistan** – the **Hindu Kush Himalay**a is arguably the **world's most important 'water tower',** being the source of ten of Asia's largest rivers as well as the largest volume of ice and snow outside of the Arctic and Antarctica.
- Together these rivers support the drinking water, irrigation, energy, industry and sanitation needs of **1.3 billion people** living in the mountains and down stream.

Biodiversity of HKH region:

- The mountain ecosystems of the **Hindu Kush Himalaya (HKH)** are diverse with one of the **highest diversity of flora and fauna** providing varied ecosystem services to one

fourth of humanity. With **four out of 36 global biodiversity hotspots** the **HKH** is a cradle for **35,000+ species of plants** and **200+ species of animals**.

- At least **353 new species—242 plants, 16 amphibians, 16 reptiles, 14 fish, two birds, and two mammals**, and **at least 61 invertebrates**—have been discovered in the Eastern Himalayas between 1998 and 2008, equating to an **average of 35 new species finds every year.**
- The **Hindu Kush Himalaya (HKH) region** is of global importance due to its unique biodiversity and is home to **4 of 34 global biodiversity hotspots, 6 UNESCO natural World Heritage sites, 30 Ramsar sites, 330 Important Bird Areas (IBAs)** and **53 Important Plant Areas (IPAs).**
- In total, there are **60 eco region types (6 per cent of the world total),** of which **30** are critical eco regions.
- HKH countries have established roughly **488 protected areas** in the region with varying degrees of protection and status, covering **39 per cent of HKH terrestrial land.**

Significance of Hindu kush- Himalaya region (HKH):

- The biodiversity of the region — **40 per cent of which is under protected areas** — is dependent on the **cryosphere** as it is an important source of water for maintaining ecosystem health, supporting biological diversity, and providing ecosystem services.
- Glaciers occupy an area of approximately 73,173 square kilometres (km2) in the HKH. The average temperature in the region has increased by **0.28°C per decade** between **1951 and 2020.**
- The HKH region harbors the **highest mountain ranges in the world.** It also contains the **largest volume of ice on earth outside of the polar areas** and is called **"Asia's water tower"**.
- The region is undergoing **"unprecedented and largely irreversible"** changes triggered by global warming.
- Ice and snow in the Hindu Kush Himalaya are an important source of water for **12 rivers** that flow through **16 countries in Asia**, providing fresh water and other vital ecosystem services to **240 million people** in the mountains and a further **1.65 billion downstream**.

Topic 11. WHY JEERA PRICES ARE SHOOTING UP IN WHOLESALE MARKETS

Important for the subject: Geography

- The price of **Cumin,** commonly known as **jeera**, the **aromatic see**d that adds an extra punch of taste to Indian dishes, has crossed the **50,000 per quintal mark** at the APMC mandi of Unjha in Gujrat's Mehsana district. The next day it crossed **Rs.54, 000 mark.**

What explains this unprecedented price spike?

- The increase in price is due to **supply-demand imbalance.** The **market season** for jeera begins from mid-February and peaks in May. The arrival of jeera in the market this year have been half of the demand. As per the **government estimates** the **Jeera production in India** has **fallen** from
- **9.12 lakh tonnes (lt)** in **2019-20** to **7.95 lt** in **2020-21** and **7.25 lt** in **2021-22.** For **2022-23** it is estimated to be marginally lower mainly due to unseasonal rains.The opening stock or carry-forward is also very low. According to the **Federation of Indian Spice Stakeholders (FISS)** – an Unjha-based body of spice seed processors, traders and exporters – these stood at about **35 lakh bags (of 55 kg each) in February 2022,** before the beginning of the last crop marketing season.
- This time's carry-forward from the **2021-22** crop has been just **3-4 lakh bags.** The low inventory with traders, coupled with a dip in production, is what has resulted in prices being pushed up.

Other factors include:

- China has been importing Indian cumin aggressively. Over the past three months alone, **China has imported 25,000-30,000 tonnes of cumin from**
- **India,** as crop there is not sufficient to meet the demand. Demand has gone up this year as hotels and restaurants are reopening after long-drawn Covid-19 restrictions.
- There is demand from Bangladesh and Pakistan also, because of the Bakrid festival towards the end of this month.

Which are the major producers of jeera?

- **India** accounts for some **70% of the world's production of this seed spice.** Other countries such as **Syria, Turkey, UAE** and **Iran** make up the **balance 30%.** Many of

them, unlike India, have been facing production disruptions from civil war and natural disasters.

- **Jeera is grown on about 8 lakh hectares area in India.** Out of the total **7.25 lt production** in 2021-22, two states – **Gujarat (4.20 lt)** and **Rajasthan (3.03 lt)** – had a **combined 99.7% share**. India's jeera production is meant for both its **domestic market** as well as for **export.**
- During **2022-23 (April-March)**, **exports of cumin seeds** amounted to **1.87 lt** (valued at Rs 4,193.60 crore), as against **2.17 lt** (Rs 3,343.67 crore) in the previous fiscal.
- The **top export destinations** include **China, Bangladesh, US, UAE, Pakistan, Saudi Arabia** and **Turkey.**

Why do others not cultivate cumin?

- Jeera crop is **sown in October-November and harvested in February-March. Jeera** is an **extremely weather-sensitive crop.** It requires a **moderately cool and dry climate sans any humidity**, which is **conducive for fungal infestation** during the crop's flowering and seed development stages.
- That naturally limits the area of cultivation to **Saurashtra, Kutch** and the **northern parts of Gujarat** and adjoining districts of **western Rajasthan** such as **Jalore, Barmer, Jodhpur, Jaisalmer, Pali and Nagaur. Unjha,** enjoying the strategic advantage of being in the centre of the country's jeera cultivation belt, has become the price-setting market for the crop.

How much have farmers benefited from high prices?

- **Unjha APMC** is the **World's largest wholesale market for the spice.** An estimated **80% of this year's jeera harvest** has already been marketed. It's only the remaining 20% crop that will command prices of Rs 50,000-plus per quintal.

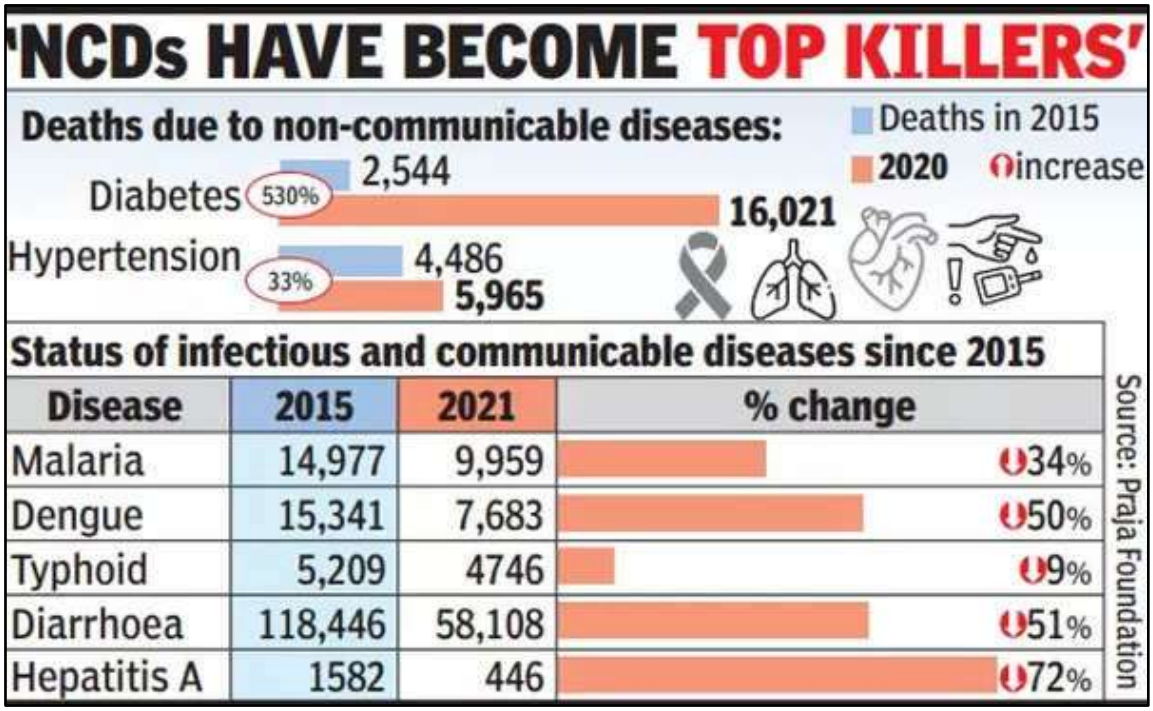
What do the high prices mean for consumers?

- **Jeera isn't an essential food,** but a **premium seed spice** that imparts **aroma** to everything from curries to rice to soft drinks.
- But the overall quantities for such applications is generally very low. Unlike in the case of onions and potatoes, which have a bearing on the **consumer price index,** the government

may not be inclined to intervene much in the market to control its prices.

Topic 12. ARE NON-COMMUNICABLE DISEASES INCREASING IN INDIA?

Important for the subject: Science and technology



The new national estimates for diabetes and other non-communicable diseases (NCD) shows that 31 million more Indians became diabetic in four years (2019- 2021).

Non-communicable diseases

- Non-communicable diseases are **diseases that are not spread through infection or through other people**, but are typically caused by unhealthy behaviors.
- They are the leading cause of death worldwide and present a huge threat to health and development, particularly in low- and middle-income countries.

Four types of non-communicable diseases account for over two thirds of deaths globally:

- Cardiovascular diseases
- Cancers
- Diabetes
- Chronic respiratory diseases

- Yet these diseases are largely preventable.

The recent findings:

- In 2021, a study found that India has 101 million people with diabetes and 136 million people with prediabetes.
- Additionally, 315 million people had high blood pressure; 254 million had generalized obesity, and 351 million had abdominal obesity.
- 213 million people had hyper cholesterolaemia (wherein fat collects in arteries and puts individuals at greater risk of heart attack and strokes). 185 million had high low-density lipoprotein (LDL) cholesterol.

Funding:

- The decade-long nationwide study was funded by the Indian Council of Medical Research and Department of Health Research, Ministry of Health and Family Welfare and co-ordinated by the Madras Diabetes Research Foundation.

Significance of the study

- There are two big trend indicators in the study. First, diabetes and other metabolic non-communicable diseases, such as hypertension, obesity and dyslipidemia are much more common than estimated previously in India and Second, while currently urban regions had higher rates of all metabolic NCDs than rural areas, with the exception of prediabetes, rural India will see a diabetes explosion in the next five years if left unregulated.

Interstate and inter-regional variations

- The highest diabetes prevalence was found in Goa, Puducherry and Kerala. While pre diabetes was prevalent in Sikkim, hypertension was highest in Punjab.
- Generalized obesity and abdominal obesity were highest in Puducherry. Kerala had high hypercholesterolemia and high LDL cholestrol. The lowest prevalence of NCDs was found in U.P, Mizoram, Meghalaya and Jharkhand.

How does this study impact India?

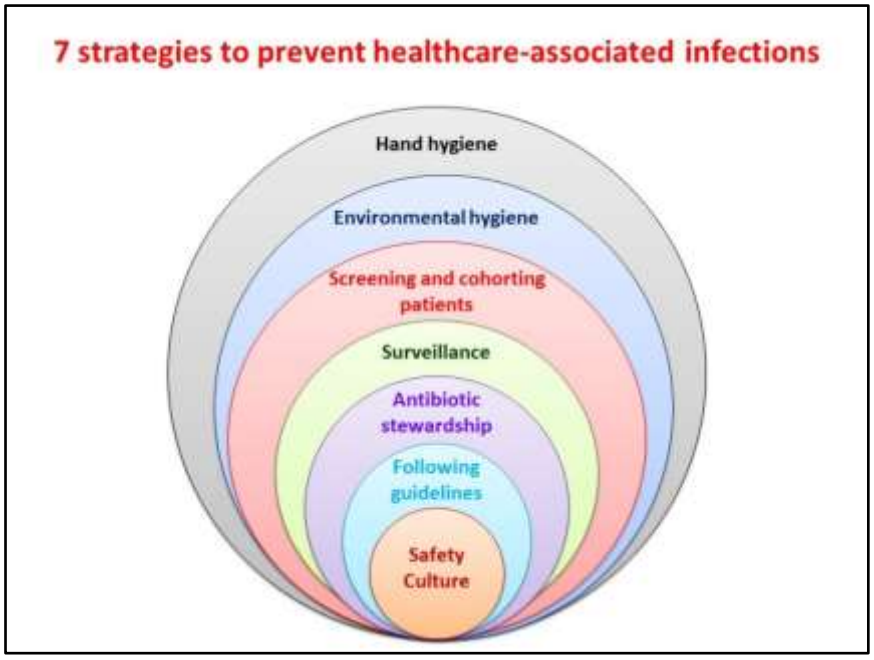
- The study gives us an early warning that if not controlled, this population is predisposed

to NCDs and life-altering medical conditions including strokes. India is facing the dual problem of malnutrition and obesity.

- There is availability of surplus food, but after being exposed to fast foods, a lack of sleep, exercise and stress creates a perfect setting for NCDs to latch-on.

Topic 13. WASH IN HEALTHCARE FACILITIES CAN HELP PREVENT ANTIMICROBIAL RESISTANCE

Important for the subject: Science and technology



The importance of preventing infections has become more crucial, with the existing antibiotics becoming increasingly ineffective due to the growing burden of **antimicrobial resistance (AMR)** and the thin and dry drugs in the pipeline.

Antimicrobial resistance (AMR):

- **Prevention** refers to practices that can limit or avert the emergence and spread of infections, such that antimicrobial use can be reduced.
- **AMR** occurs when **bacteria, viruses, fungi and parasites** develop resistance against the antimicrobial drugs and no longer be inactivated or killed by the drug.

Causes of spread:

- Overuse and misuse of drugs in humans, animals and the food production sectors. The

environment also accelerates the emergence and spread of AMR.

Consequences:

- In **2019,** about **five million deaths worldwide** were estimated to be associated with antibiotic resistance. **About 1.3 million deaths were directly attributed to it.**

WASH strategy to prevent AMR:

- **Water, sanitation and hygiene (WASH)** in healthcare facilities, households and communities, and food-animal production systems play a fundamental role in **AMR prevention** and containment.
- Universal access to clean drinking water, better sanitation and hygiene can control the development and spread of infections and subsequent antibiotic use. A recent report by the **World Health Organization** and **UNICEF** has reaffirmed this.
- **Water, Sanitation, Hygiene, Waste and Electricity Services in Health Care Facilities: 2023 Global Progress Report** assessed global and national efforts and progress towards improving WASH, cleanliness and waste management, particularly in health care facilities.
- **Healthcare-associated infections** that occur while receiving care for another condition are a major threat; they call for the use of antibiotics.
- **Waste (mostly sewage and effluents)** can be a major source of AMR. Improper disposal of healthcare-associated waste such as gloves, syringes and vials.

The status of least developed countries (LDC) —low-income countries:

- **Only 21 per cent of healthcare facilities** have basic sanitation services, whereas basic hygiene services are available in just **a third (32 per cent)** of healthcare facilities in these countries.

Only 14 per cent of countries **monitored WASH in health systems in 2022.**

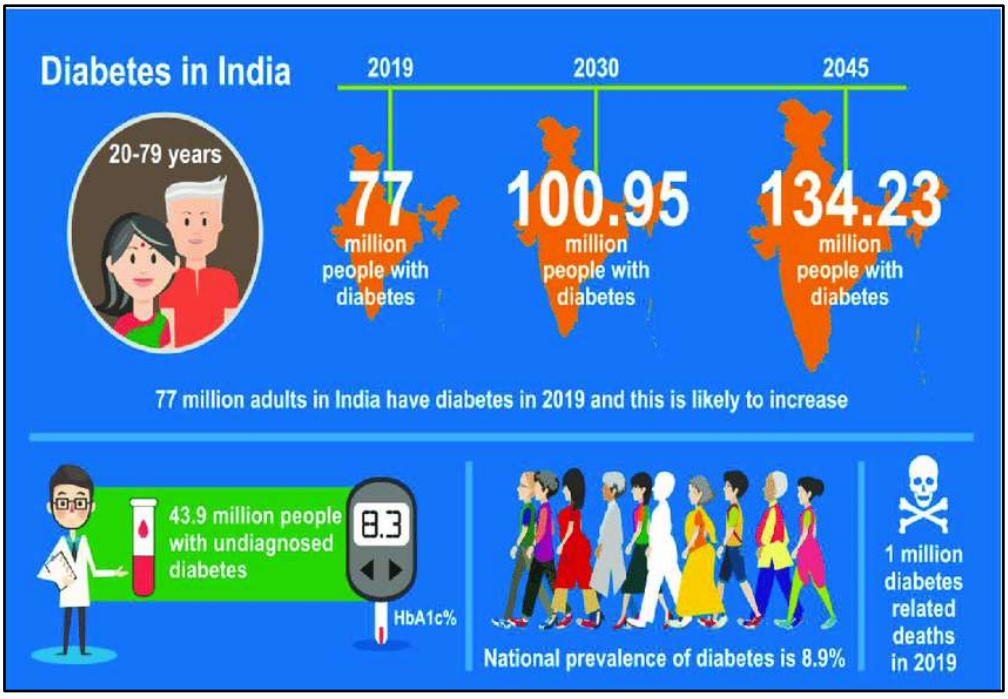
- In terms of **health budgets**, **only 12 per cent** of countries have **more than 75 per cent** of the funds needed to reach WASH targets.
- **Universal access to WASH in healthcare facilities** will cost **$0.60 per person per year for LDCs** — equivalent to **6 per cent** of their current annual health spending.

Steps to prevent AMR:

- Safely managed sanitation systems, even simple ones using well-maintained septic tanks, will reduce pathogen loads and help prevent the spread of antimicrobial-resistant pathogens (and other pathogens) in wastewater. Improving investments, integration into health planning, building the right set of the health workforce and strengthening the review and monitoring process to deliver and maintain better WASH, waste and electricity services.

Topic 14. HOW CAN INDIA TACKLE ITS DIABETES BURDEN?

Important for the subject: Science and technology



A study was published in The Lancet regarding a long term study on metabolic factors in the Indian subcontinent. Launched in 2008, It was the largest long term study to estimate the country's Chronic Non-Communicable Diseases (NCD). Conducted over five phases between 2008 and 2020 across the whole country (except for some of the islands and Union Territories), 1.24 lakh individuals were part of this survey.

Key findings of the report:

- According to the report, about 11% (101.3 million) of the country's population is diabetic and 15.3 % (136 million) is in the prediabetic stage.

- The researchers found that the conversion from prediabetes to diabetes is faster in India. Urban India accounts for 16.4% of the cases of diabetes, while in the rural population the prevalence is 8.9%.
- The study also shows that diabetes has become as common in 2-3 tier cities as it is in the metro cities. Cases are surprisingly high even in the states like Kerala, Sikkim an Tripura where socio-economic conditions are relatively better.

What does this study mean?

- The results of the study should be taken as a warning and the first thing that needs to be done is to save the people from diabetes who are already in the prediabetic stage.
- About 422 million people worldwide have diabetes, and 1.5 million deaths are directly attributed to it each year.
- It is said that prevention is better than cure, so awareness campaigns should be run to focus on using lifestyle modifications, maintaining a healthy diet and getting sufficient exercise. Periodic check-ups should be promoted.
- In rural areas, where the prevalence is still low, the aim should be to keep it in control.

About Diabetes

- Diabetes is a chronic issue that can lead to complications like cardiovascular diseases, kidney disease, neuropathy, blindness etc. Hence it becomes crucial to keep it away.
- Diabetes mellitus is a metabolic disease of high blood sugar (glucose) levels that result from problems with insulin secretion, its action, or both. Normally, blood glucose levels are tightly controlled by a hormone produced by the pancreas known as insulin. When blood glucose levels rise (for example, after eating food), insulin is released from the pancreas to normalize the glucose level.

Type 1 diabetes:

- An absolute lack of insulin, usually due to destruction of the insulin-producing beta cells of the pancreas, is the main problem in type 1 diabetes.
- It is to be due to an autoimmune process, in which the body's immune system mistakenly targets its own tissues (islet cells in the pancreas. This tendency for the immune system to destroy the beta cells of the pancreas is likely to be, at least in part, genetically inherited,

although the exact reasons that this process happens are not fully understood.

Type 2 diabetes:

- People who have type 2 diabetes can still produce insulin, but do so relatively inadequately for their body's needs.
- Genetics plays a role in the development of type 2 diabetes, and having a family history and close relatives with the condition increases your risk; however, there are other risk factors, with obesity being the most significant.

Topic 15. MONKEY POX OUTBREAKS IN ASIA PACIFIC REGION

Important for the subject: Science and technology

Recently, there has been an increase in reported cases of Monkey pox from some countries, particularly in Southeast Asia and the Western Pacific Region.

About Monkey pox:

- It is a **viral disease** that primarily spread to the human population through zoonotic spillovers, with rodents and primates serving as potential reservoirs. The first case in humans was reported in 1970 in the Democratic Republic of Congo.
- **Transmission: It** can be transmitted between humans through close contact and exposure to infected bodily fluids or lesions.
- **Incubation period**: The incubation period (the period between exposure to an infection and the appearance of the first symptoms) of monkey pox is usually from 6 to 13 days but can range from 5 to 21 days.
- **Symptoms**: Common symptoms of mpox are a skin rash or mucosal lesions, Fever, rash and swollen lymph nodes which may lead to a range of medical complications. There is **no effective vaccine available** for Monkeypox infection.

Topic 16. MULTIPLE SPACEFLIGHT WITH SHORTER RECOVERY TIME AFFECTS BRAIN

Important for the subject: Science and technology

A recent research published in Scientific Reports reveals that spaceflight experiences, **especially longer missions and shorter breaks between missions, can cause changes in**

the fluid levels in the brain. These changes might not go back to normal before the next spaceflight.

- The study found that the **ventricles, which are spaces in the brain filled with cerebrospinal fluid**, **expand more as the length of space missions increases**, especially up to six months.
- Additionally, if there is less than a three-year gap between missions, it may not be enough time for the ventricles to fully recover. It is unclear if these changes differ with varying mission duration or number of previous spaceflight missions.

Ventricles of the Brain

The ventricular system is a **set of communicating cavities within the brain.**

- These structures are responsible for the production, transport and removal of cerebrospinal fluid, which bathes the central nervous system.
- The ventricles are structures that produce cerebrospinal fluid, and transport it around the cranial cavity. They are lined by ependymal cells, which form a structure called the choroid plexus. It is within the choroid plexus that CSF is produced.
- Embryo logically, the ventricular system is derived from the lumen of the neural tube. In total, there are four ventricles; right and left lateral ventricles, third ventricle and fourth ventricle.

Topic 17. AN EXTRA SOLAR RADIATION BELT, A LA VAN ALLEN, SEEN FOR THE FIRST TIME

Important for the subject: Science and technology

Astronomers describe the first radiation belt observed outside the solar system, using a coordinated array of 39 radio dishes from Hawaii to Germany.

- The images are persistent, intense radio emissions from an ultracool dwarf star revealed the **presence of a cloud of high-energy electrons** trapped in the object's powerful magnetic field, forming a double-lobed structure.

The Radiation belts:

- Strong magnetic fields form a **"magnetic bubble"** around a planet called a

magnetosphere, which can trap and accelerate particles to near the speed of light. All the planets in the solar system that have such magnetic fields, including the **earth** and **Jupiter,** have radiation belts.

- The **earth's radiation belt**, known as the **Van Allen belts**, are large doughnut shaped zones of high-energy particles captured from solar winds by the magnetic fields. This extra solar radiation belt would be 10 million times brighter than Jupiter's.

Notable features of Van Allen Radiation Belts are:

- Most of the particles that form the belts are thought to come from solar wind and other particles by cosmic rays.
- By trapping the solar wind, the magnetic field deflects those energetic particles and protects the atmosphere from destruction. The belts are located in the inner region of Earth's magnetosphere.
- The belts trap energetic electrons and protons. Other nuclei, such as alpha particles, are less prevalent. The belts endanger satellites, which must have their sensitive components protected with adequate shielding if they spend significant time near that zone.

Magnetosphere:

- It is the region around a planet dominated by the planet's magnetic field. Other planets in our solar system have magnetospheres, but Earth has the strongest one of all the rocky planets.
- The magnetosphere shields earth from solar and cosmic particle radiation, as well as erosion of the atmosphere by the solar wind – the constant flow of charged particles streaming off the sun.

Regions of the Earth's Magnetosphere:

- **Bow shock –** It occurs when the magnetosphere of an Earth interacts with the nearby flowing ambient plasma such as the solar wind.
- **Magneto sheath –** It is the region of space between the magnetopause and the bow shock of a planet's magnetosphere.
- **Magnetopause –** It is the boundary between the planet's magnetic field and the solar wind.
- **Magnetotail –** The sun-facing side, or dayside, extends a distance of about six to 10

times the radius of the Earth. The side of the magnetosphere facing away from the sun, the night side stretches out into an immense magneto tail, which fluctuates in length and its exact length is not known, this extension of the magnetosphere.

- **Northern tail lobe –** The magnetosphere of the earth contains two lobes, referred to as the northern and southern tail lobes. Magnetic field lines in the northern tail lobe point towards the earth.
- **Southern tail lobe –** The magnetic field lines in the southern tail lobes point away from the earth. Usually, the tail lobes are almost empty, with few charged particles opposing the flow of the solar wind.
- **Plasma sphere –** The plasma sphere, or inner magnetosphere, is a region of the Earth's magnetosphere consisting of low energy (cool) plasma.
- **Solar winds –** It is a stream of charged particles released from the upper atmosphere of the Sun, called the corona.

Topic 18. TITANIC TOURIST SUBMERSIBLE MISSING: DIFFERENCE BETWEEN A SUBMERSIBLE AND A SUBMARINE

Important for the subject: Science and technology

A vessel known as the Titan went missing in the area of the Titanic wreck in the North Atlantic on 19 June 2023. The **Titan** is classified as a **submersible,** not a **submarine**, because it does not function as an autonomous craft, instead relying on a support platform to

deploy and return.

About the Titan:

- The Titan began deep-sea ventures related to the Titanic in 2021. Titan, the missing vessel is a **submersible capable of taking five people** — one pilot and four crew members — to depths of **4,000 meters**, or more than **13,100 feet** — for **site survey and inspection, research and data collection, film and media production, and deep sea testing of hardware and software**.
- The titan was made of **titanium** and **carbon fibre,** it weighs about **21,000 pounds** and is listed as measuring **22 feet by 9.2 feet by 8.3 feet**, with **96 hours of "life support" for five people.**
- The Titan, one of three types of crewed submersibles operated by **Ocean Gate**, is **equipped with a platform similar to the dry dock of a ship** that launches and recovers the vessel.
- The **platform** is used to launch and recover manned submersibles by flooding its flotation tanks with water for a controlled descent to a depth of 9.1 meters (30 feet) to avoid any surface turbulence.
- Once submerged, the platform uses a patented motion-dampening flotation system to remain coupled to the surface yet still provide a stable underwater platform from which our manned submersibles lift off of and return to after each dive.
- At the conclusion of each dive, the sub lands on the submerged platform and the entire system is brought to the surface in approximately two minutes by filling the ballast tanks with air.
- As per the website of company, titan employs a system that can analyze how **pressure changes affect the vessel as it dives deeper,** providing **early warning detection** for the pilot with enough time to arrest the descent and safely return to the surface.

Topic 19. THE REMARKABLE ENDURANCE OF THE Y CHROMOSOME, 'MASTER OF MALENESS'

Important for the subject: Science and technology

The Y chromosome, often referred to as the "master of maleness", has long captivated scientists and historians alike.

Y chromosome

- In humans, in **addition to the 22 pairs of chromosomes in each, we have a pair of sex chromosomes called X and Y.**
- Sex as a specification is determined by these sex chromosomes. They carry sex determining genes. **All biological males have X and Y chromosomes and all biological females have two X chromosomes.**
- The 'sex-determining region Y' on the Y chromosome determines the biological male sex.

'Juvenile delinquent'

- Estimated to have emerged around 200-300 million years ago in a common ancestor of all mammals, the Y chromosome has had a unique genetic journey, and embedded within its DNA lies a remarkable tale of evolution. Scientists published the complete genetic sequence of the Y chromosome in 2003.
- This sequence provided an outline of 23 million bases of the 60 million or so bases that together make up the Y chromosome. In total, the chromosome encoded for only 55 genes and accounted for around 2% of the genetic material inside a cell.
- Many researchers jokingly refer to the Y chromosome as the "juvenile delinquent" among chromosomes pertaining to its abundance of repetitive sequences, poor functional utility (with a small number of genes), reluctance to socialize (i.e. recombine with other chromosomes), and a high proclivity to degenerate over the course of evolution.
- Indeed, because it has little potential to recombine, the diminutive Y chromosome has been passed from father to son, carrying the legacy of generations.

Vital genes

- In a landmark genetic study, published in March 2003 in the American Journal of Human Genetics, researchers reported that around 0.5% of all the men in the world have inherited a Y chromosome from the Mongol emperor Genghis Khan or one of his descendants.
- Y chromosome possesses genes that are vital to biological functions, including those linked to ageing and lifespan regulation. In the animal kingdom (including mammals), scientists have noticed substantial differences in lifespan between the sexes: the females tend to live longer than the males.
- This phenomenon has been attributed largely to the absence of a second Y chromosome

in males, exposing the deleterious mutations in the X chromosome.

- It is also well known that men lose the Y chromosome with age and that this is associated with a higher frequency of cancers, Alzheimer's disease, and a shorter lifespan.

Losing the Y

- Studies have shown that LOY in humans occurs with age and is associated with several debilitating medical conditions – a finding that has been validated in mice with LOY, resulting in weak heart muscles (cardiomyopathy), stretched or thickened heart tissue (fibrosis), and heart failure. Researchers have also found that the pathological effects observed on account of LOY in mice's hearts could be negated by transforming growth factor beta 1- neutralizing antibodies, suggesting a potential treatment for this medical condition in future.
- The human Y chromosome is about one-third as big as the X chromosome. So, many animal species, including humans, have a genuine fear of losing the Y chromosome in the distant future.

Topic 20. HIGH ROAD TO DUBAI COP28: 6TH TECHNICAL EXPERT DIALOGUE ON NEW COLLECTIVE QUANTIFIED GOAL HELD AT BONN

Important for the subject: Environment

Climate finance is a key issue in climate negotiations this year.

- The **$100 billion climate finance goal,** which developed countries committed to in 2009, will be succeeded by the **New Collective Quantified Goal (NCQG)** in 2025.
- The current deliberations on the **NCQG** are promising and indicate that the new climate finance goal will be based on a more concrete rationale and well-defined criteria.

Progress on NCQG:

- The **Sixth Technical Expert Dialogue (TED 6)** of the ad hoc Work Program on the **New Collective Quantified Goal** was held at the **58th Subsidiary Body Meetings in Bonn,** where details on ways to determine the quantum of as well as options of framing the mobilization and provision of financial sources were discussed.

Key discussions are:

To determine the quantum (amount) of the NCQG

- Determining the quantum through increasing provisions of climate finance from a baseline of existing provisions by either doubling or tripling previous goals.
- Whether the new quantum should be based on the needs of developing countries; Whether it should be tied to specific outcomes and outputs to be achieved in the context of Article 2 of the Paris Agreement
- Whether the new quantum should be based on a scope and structure of the NCQG; or If it should be based on the breadth of contributions including the private sector and philanthropies, among other options.
- In their submissions leading up to **TED 6**, **Zambia,** on behalf of the **African Group of Negotiators**, the **Least Developed Countries group, India** on behalf of the **Like-Minded Developing Country group (LMDC)**, and **Costa Rica** on behalf of the **Independent Alliance of Latin America and the Caribbean group** have also said that the needs of developing countries should be a primary criterion in deciding the new quantum.

Article 9 of Paris Agreement:

- States that "developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention".

Article 2.1c of Paris Agreement:

- Relates to "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".

Topic 21. WORLD DESERTIFICATION DAY 2023: GRANTING EQUAL LAND RIGHTS TO WOMEN CAN REDUCE WORLD HUNGER SIGNIFICANTLY, SAYS UN

Important for the subject: Environment

Ensuring women can own and inherit land is imperative for reducing desertification and achieving the land degradation neutrality (LDN) 2030 agenda, world leaders highlighted at the global observance event ahead of **World Day to Combat Desertification and Drought**

on **17 June**.

- Desertification threatens the world with food insecurity and impedes climate change mitigation. Unsustainable agriculture is a primary cause and erodes soil 100 times faster than it can be restored naturally.
- As much as 40 per cent of the world's land is degraded. This year's **desertification day observance events planned across the world will take forward the "Her Land. Her Rights: Advancing Gender Equality and Land Restoration Goals" campaign** launched by **UNCCD** International Women's Day in March 2023.

Inequality in land rights:

- Women suffer the most because of the consequences of this **human-made crisis** such as scarcity of food and water as well as forced displacement, although **only a fifth of the world's landowners are women.**
- This is because women have **lower access to natural resources, financial services and technology**, among other things, compared to men.
- This **inequality** is despite the fact that **women comprise "nearly half the world's agricultural workforce and produce up to 80 per cent of food in developing countries**.
- Inequality is also rampant — women in over 100 countries are stopped from inheriting their husband's property.

The global soil health protection body also released an analysis of the benefits of land rights equality. It showed:

- If women had equal rights to land, agricultural production in the poorest regions would **increase by up to 4 per cent and malnourishment would decline by 12-17 per cent,** resulting in 150 million fewer hungry people globally.

Women's role in land conservation:

- The fact that women play an important role in soil conservation is not new to the global consciousness. Past reports highlighted that **when women decide how to manage land, both soil health and agriculture yield improved.**

Efforts to reduce gender inequality in land degradation neutrality (LDN):

- Despite this, as of 2019, **only around 20 of more than 80 countries had included discussions on the role of gender and women in their LDN targets**.
- It was only during **COP13** held in **China** in **2017** that **UNCCD**, which came into force in **1996,** drew up a **'Gender Action Plan'** mandating gender mainstreaming in efforts of countries to achieve their LDN targets.
- In the two years till the following **COP14, UNCCD** observed that gender still had not found a prominent mention in the measures of most countries.
- Some like **Bosnia, Guyana, Senegal, Peru, Ethiopia, and Indonesia** adopted the Gender Action Plan.

Topic 22. ALL THAT HAPPENED AT UNCCD COP14

Important for the subject: Environment

UNCCD COP14 throws up innovative methods to fund drought mitigation The commercialization of basic livelihood and services such as water supply and sanitation would generate sufficient funds to mitigate drought.

- The experts batted for the engagement of the private sector to get funds for drought. A successful insurance model from Africa for innovative financing to tackle drought is the **Africa Risk Capacity (ARC).** Established in **2012** as a body of the Africa Union, its aim is to improve member countries' prepared- redness for tackling extreme weather events

and natural disasters. An interactive 'drought toolbox' was launched to monitor early drought warnings and methods of mitigation.

Public-private partnerships can help restore degraded lands

- Business leaders were keen to collaborate with the public sector and the civil society to on land degradation projects. They called for encouraging public-private partnerships to restore degraded lands at the **14th Conference of Parties (COP 14) of the United Nations Convention to Combat Desertification (UNCCD).**

Experts stress restoring Sahel region by 2030

- Partners of the **African-led Great Green Wall Initiative** have agreed to bold targets to **restore 100 million hectares of land** and create **10 million green jobs by 2030** across the Sahel.
- The **Great Green Wall Initiative,** launch in **2007** by **African Union**, is a flagship program that aims to combat climate change and desertification. It has made major progress in restoring Sahara-Sahel landscapes. They also called to focus on land degradation. Nearly 65 per cent of land in the African continent is under degradation and requires immediate attentions, they said.

The initiative aims to achieve:

- Large-scale landscape restoration Creation of 10 million green jobs Promotion of clean energy by 2030

Land utility as solar park:

- Generating Solar power needs the most amount of land among green energy sources, claimed Global Land Outlook, a report released by the United Nations Convention to Combat Desertification (UNCCD).
- India showcased the biggest solar power plant as a model to deal with land degradation while meeting energy requirements. The **Pavagada power plant** of Karnataka is billed as the world's largest solar park spread over 13,000 acres of land.
- The **2000 MW solar park** is spread across **five villages** — Thirumani, Rayacherlu, Vallur, Balasamudra and Kyataganacherlu in Nagalamadike Hobli of Pavagada Taluk in Karnataka's Tumakuru district.

- The arid region with fallow land was not irrigated and a drought-like situation prevailed continuously

Topic 23. OVERFISHING IS DRIVING CORAL REEF SHARKS TOWARD EXTINCTION

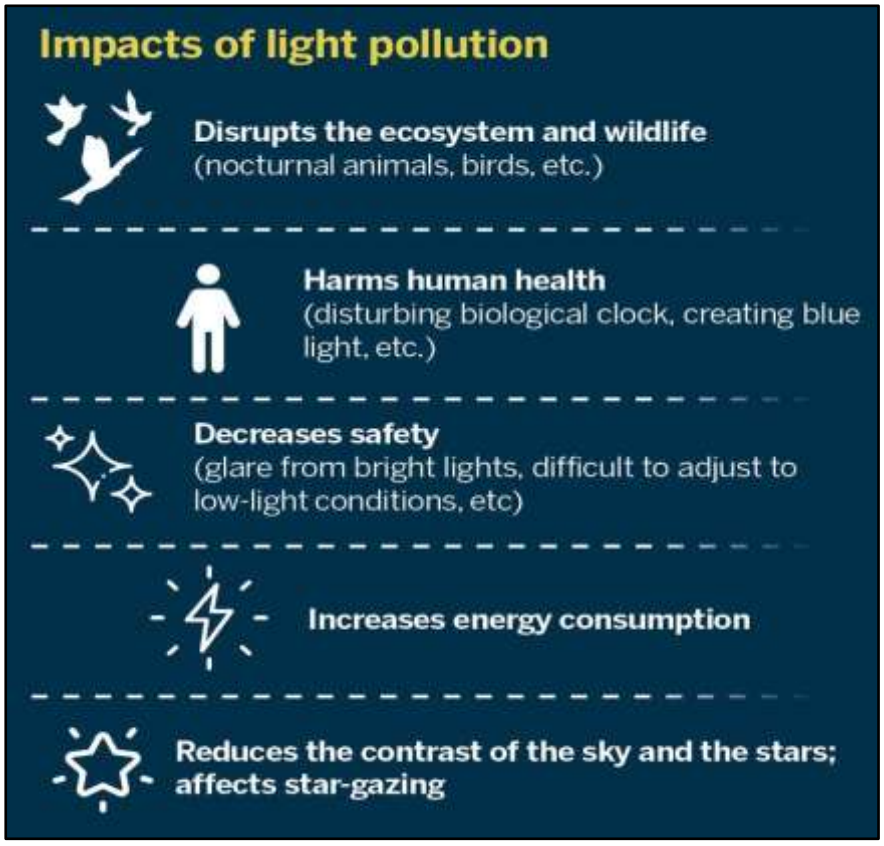
Important for the subject: Environment

Five of the most common shark species living in coral reefs have declined 60% to 73%, according to a massive global study by Colin Simpfendorfer and colleagues. The research is a result of a worldwide collaboration called the Global Fin Print project and was funded by the family foundation of Microsoft co-founder and ocean enthusiast Paul G. Allen.

- Some individual shark species were not found at 34% to 47% of the reefs in the survey.
- The likely cause is **overfishing,** which has removed both the sharks themselves and the prey they depend on. **As shark numbers decline**, **ray species** are increasing on the reefs, suggesting a shift in the top elasmobranch species in the communities.
- **391 coral reefs** in **67 nations** and territories using **22,756** remote underwater video stations. They show that **shark-dominated reefs** persist in **wealthy, well-governed nations and in protected marine sanctuaries.**
- In areas of **poverty and limited governance,** rays dominate the reef communities. The estimated declines of these resident reef shark species meet the **IUCN Red List criteria for End angered status.**
- As the top predators of the reef and indicator species for marine ecosystems, they help maintain the delicate balance of marine life in reef environments. Reef sharks are highly valued for their meat, leather, liver oil, and fishmeal, which make them prone to overfishing and targeting. Yet, their importance for the tourism industry makes them more valuable alive than dead. In 2011, Honduras declared its waters to be a permanent sanctuary for sharks, making fishing for these species completely forbidden.
- It focused on five key species of reef sharks — the Caribbean reef shark, nurse shark, grey reef shark, blacktip reef shark and whitetip reef shark — by collecting and analysing 22,000 hours of video footage. The study showed that the **five species would qualify as endangered on The International Union for Conservation of Nature Red List of Threatened Species**. The IUCN is the global authority on nature conservation.

Topic 24. LIGHT POLLUTION AND IMPACT OF LIGHT POLLUTION

Important for the subject: Environment



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 neighbour'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.
- **Sky glow:** 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.

Recommendations

- Light only where needed Don't over light Don't waste light Shine light downwards, using shields and reflectors Light only when needed – use sensors where possible Light with

energy efficient sources such as LED's and compact fluorescents.

Much more research is needed on the effects of light pollution

- Public and government awareness shall be intensified in view of the value of protection, avoidance and decrease of light pollution. Public opinion would need to be shifted regarding light trespass and "second hand" light, the wastefulness of excessive night lighting and the importance of using the right lighting for the right situation.
- Legislation needs to be developed to support and require dark sky-friendly lighting through by-laws, modified engineering standards and building codes.

Topic 25. RESPONSIBILITY AND THE COMPLEXITIES OF CLIMATE LEADERSHIP

Important for the subject: Environment

Over the last few weeks, there has been an **increasingly vocal campaign to unseat the President-Designate of COP28, Minister Sultan Al Jaber of the host nation**, the **United Arab Emirates (UAE).**

Background

- This includes a recent letter from United States and European parliamentarians calling for his removal on the **grounds that he is CEO of the Abu Dhabi National Oil Company.**
- As representatives of developing countries in the climate change front line, and as leaders of the **Climate Vulnerable Forum, a group of 58 of the world's most climate vulnerable countries hosting 1.5 billion of the world's poorest people**, we know only too well the urgency of the climate challenge.
- We have endured climate-related economic losses of $500 billion in the last two decades alone.

This is a journey of unity

- However, recognizing that this journey, towards a clean energy future, is one we must embark on together. Fossil fuel-dependent economies are critical to these efforts, and they clearly have a more difficult task defining their energy transition strategy.
- It is important to avoid division and continue to engage the fellow parties at COP28 and

elsewhere on the best way forward for their economies and for the planet. Finance will be crucial for COP28.

Debt is a barrier

- Many of the nations are crippled by unsustainable debts, including debts which are becoming unpayable due to climate damages largely caused by emissions elsewhere.
- Rather than going one by one over the financial cliff, we **urgently need a collective approach which recognizes the debt problem and the barrier** it now poses to clean energy investment and climate adaptation.
- Sovereign wealth funds and multilateral development banks (MDBs) could assist in de-risking restructured debts and insuring re-issued climate bonds,
- The UAE leadership for a clean energy target starting in 2025, transforming the Abu Dhabi National Oil Company into the Abu Dhabi Clean Energy and Grid Company by 2030, and towards global financial reform including of the International Monetary Fund.
- **The Loss and Damage fund** that was secured last year in Sharm El-Sheikh must not be just be another empty bank account, and **fossil fuels-dependent economies can demonstrate their commitment to a shared future by making subscriptions** to support funding for climate damages in the most vulnerable countries, well in advance of the COP.
- Holding COP28 in the UAE, and with Sultan Al-Jaber as COP President-Designate, may well be an opportunity to engage the fossil fuels industry to make some significant and quantifiable commitments to emissions cuts and climate action in general.

Climate Vulnerable Forum

- The Climate Vulnerable Forum is an **international cooperation group** of **developing countries tackling global climate change.**
- The CVF was **founded by the Maldives government before the 2009** United Nations Climate Change Conference in Copenhagen, which sought to increase awareness of countries considered vulnerable.
- United Nations agencies collaborate in implementing activities linked to the CVF with the UNDP, the lead organization supporting the forum's work.
- The CVF was formed to increase the accountability of industrialized nations for the consequences of global climate change. **Afghanistan, Nepal and Bhutan are its**

members, whereas India is one of the observer states.

Topic 26. BONN CLIMATE MEET TAKEAWAYS: OLD CONFLICTS, SOME FORWARD MOVEMENT

Important for the subject: Environment

Developed and developing countries bickered on issues old and new, and could not even agree on the agenda.

Global stock take (GST):

- Mandated by the **2015 Paris Agreement, GST** is an exercise aimed at **assessing the progress in the fight against climate change,** and deciding ways and means to enhance global action to bridge the adequacy gap.
- The Paris Agreement says GST must be conducted **every five years,** starting in 2023.

Conflict over historical emissions:

- Australia seeks to downplay the **'historical responsibility'** of the developed countries in causing global warming.
- A bulk of the accumulated greenhouse gas emissions, the reason for global warming, have come from a group of about **40 rich and industrialised countries**, usually referred to as **Annex I countries** because they were mentioned in

Annexure I of the 1992 UN Framework Convention on Climate Change, or UNFCCC.

- This historical responsibility has been the basis for the differentiated burden-sharing between developed and developing countries in the climate change framework.
- Australia argued that the **historical emissions happened at a time when there was no alternative to fossil fuel-based energy sources,** and when there was little understanding or consensus on the harm caused by greenhouse gases.
- It pointed out that since 1992, **about 57% of the carbon dioxide emissions had come from non-Annex I countries.** It said that **70% of the incremental warming since 1992 due to emissions from carbon dioxide, methane and sulphur dioxide had come from non-Annex I countries**.

Mitigation Work Program (MWP):

- Set up at **COP26 Glasgow in 2021** for climate action. This is a **temporary emergency exercise** focused **only on increasing emission cuts.** The **Intergovernmental Panel on Climate Change** says global emissions have to come down by **43% from 2019 levels by 2030** to keep alive hopes of meeting the **1.5-degree target.**
- As of now, emissions are still growing and, in 2021, were higher than 2019 levels. **Developed countries** are under an obligation to support the **implementation of climate action plans of developing countries** through money and tech transfers.
- According to one assessment, **developing countries need as much as US$ 6 trillion between now and 2030** just to implement their climate action plans. The **loss and damage** needs of developing countries are assessed to be about **US$ 400 billion every year**. More funds are needed for all kinds of other purposes, the total estimated to be running in several trillions of dollars every year. Against this, even a minuscule looking **US$ 100 billion per year that the developed countries had committed to raise from 2020 is not fully available.**

Topic 27. CIL VS CCI ISSUE

Important for the subject: Polity

Supreme Court ruled that Competition Act, 2022 applies to statutory monopolies like Coal India Limited (CIL)

- CIL had approached the Apex Court arguing against applicability of the Competition Act 2002 to its operations citing that the PSU operates under the Coal Nationalization Act, 1973.
- It is an appeal against a 2014 decision of the Competition Appellate Tribunal (**COMPAT**), where CIL was directed to stop its **abuse of dominant position**.
- The government could have decided to exempt Coal India's conduct from the ambit of the CCI review, under **Section 54** of the Act (as has been done for mergers among oil and gas PSUs) The government had **chosen not to exempt CIL** despite having the power to do so.

Verdict and its implications:

- SC rejected CIL's argument of exemption and affirmed that the Competition Act applies

to CIL.

- The mandate of public interest given to PSU's does not mean that their commercial conduct is beyond review by the CCI if they are abusing their position of dominance.
- The judgment is landmark in an India that has embraced free market economy after 1991.

CIL reasoned on two points to seek exemption:

- Firstly, the mines operated by CIL had been nationalized pursuant to the Coal Nationalization Act, 1973 and thus **as a PSU it should be exempt** from CCI Secondly, the Nationalization Act envisaged that the mines would be operated as a monopoly in the **national interest**.

CCI argument was:

- It is not dominance that is prohibited under the Competition Act but only abuse of such dominant position. How is not abusing dominance power impeding CII in objectives of national interest.
- CCI has jurisdiction to examine a dominant company notwithstanding if such dominant position was acquired as a result of statute or by virtue of being a Government company. Delhi High Court had previously held that the Indian Railways too will not be exempt from the applicability of the Competition Act.

Topic 28. RAWS SINHA WHO HEADED OPERATIONS IS NOW AGENCY'S NEW CHIEF

Important for the subject: Polity

Senior IPS officer Ravi Sinha has been appointed as the chief of the country's external spy agency RAW. Sinha will succeed Samant Kumar Goel who will complete his four-year tenure.

About Research and Analysis Wing

- Established in 1968, to handle the **nation's international intelligence affairs, RAW** came into force after the China-India War in 1962. At present, the intelligence arm operates **under the aegis of the Prime Minister's Office.**
- RAW provides intelligence support to various significant operations on foreign soil.

RAW works in cooperation with the Intelligence Bureau or other Indian intelligence agencies.

Genesis

- After the 1962 China-India war and Indo-Pakistani war in 1965, India established a separate and distinct external intelligence organization – the Research and Analysis Wing.
- In 1968, R. N. Kao was appointed as the first director of RAW. Under his leadership, RAW provided intelligence support, which resulted in India's successful operations including creation of Bangladesh in 1971, the defeat of Pakistan during the Kargil conflict of 1971, the accession of Sikkim in 1975, and the increase of India's support to Afghanistan.

Working mechanism of RAW

- RAW collects military, economic, scientific, and political intelligence through covert and overt operations. It also monitors terrorist elements and smuggling rings that transport weapons and ammunition into India.
- It primarily focuses on India's neighbours. The collected inputs by RAW also help Indian officials, which are further used in national security policy and revise the foreign policy.

Attached Bodies

- The Aerial Reconnaissance Centre (ARC) collects high-quality overhead imagery of activities and installations in neighbouring countries.

Special Frontier Force:

- The inspector general of a paramilitary force of India, the Special Frontier Force reports to the director-general of security for RAW. While the force has functions independent of RAW, it is often fielded to support covert and overt RAW missions.

Topic 29. ADR SEEKS ACTION AGAINST PARTIES FOR CONTEMPT OF SC ORDER

Important for the subject: Polity

Flagging what it called was a "**deliberate act of contempt" by political parties**, the

Association for Democratic Reforms (ADR) wrote to the Election Commission seeking action against parties that fail to publish details of criminal antecedents of candidates as per orders of the Supreme Court and the poll panel.

- The apex court had on September 25, 2018 directed all political parties to publish the details of criminal antecedents of their candidates, including the reason for selecting them.
- Hearing a contempt petition on its order not being implemented, the Supreme Court on February 13, 2020 directed the parties to list out the reasons for nominating such candidates within 72 hours of their selection.
- The EC issued directions to the parties on October 10, 2018 and March 6, 2020 in compliance with the SC's orders, making it mandatory for all parties to publish the details on their websites.

About 'Contempt of Court':

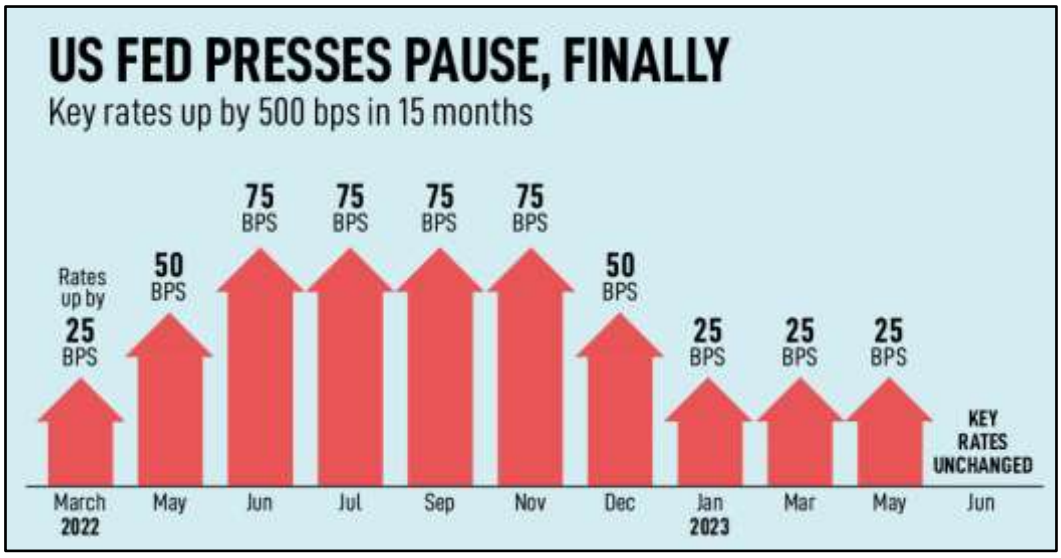
- Contempt of court is the power of the court to protect its own majesty and respect. The power is regulated but not restricted in the Contempt of Courts Act, 1971. The expression '**contempt of court' has not been defined by the Constitution**.
- However, **Article 129 of the Constitution** conferred on the Supreme Court the power to punish contempt of itself.
- **Article 215** conferred a corresponding power on the High Courts. The **Contempt of Courts Act, 1971 defines both civil and criminal contempt. Civil contempt** refers to wilful disobedience to any judgment of the court.

Criminal contempt can be invoked if an act:

- Tends to scandalize or lower the authority of the court. Tends to interfere with the due course of any judicial proceeding. Obstruct the administration of justice.

Topic 30. US FED RATE HIKE PAUSE: IMPACT ON INDIA

Important for the subject: Economy



Federal Reserve has maintained the policy rate, after continuously raising for 15 months

- Federal Open Market Committee (FOMC) has decided to pause the cycle of interest rate hikes despite inflation being at 4% The **benchmark rate** (Fed Rate) continues to be **1%**
- Fed has signalled that it could increase rates again by the end of 2023 as the **inflation target** of **2%** is yet to be achieved. The pause along with a signal of future increase is seen as a hawkish (monetary tightening) stance.
- The decision is supported by the US Inflation at 4% is being below its interest rates of 5.1% (i.e. real interest rates being positive) if inflation is higher than interest rate in an economy, it means the real interest rate is negative
- Negative interest rates while encouraging investment by increasing the cost of parking funds in banks, also have the effect of discouraging savings.

Likely impact on Indian economy/market:

- Is likely to have a negative effect on the Indian equity markets for two reasons: Reduced inflow: a rise in interest rates in the US reduces inflow of funds into markets

Outflow: outflow from emerging markets to US treasury bonds.

- The pause (and not reduction) in the Fed rate is indicative of inflationary pressures still

being present in global markets.

- India too may see continuation of the inflationary cycle. RBI too may thus not reduce interest rates in near term.
- In the short term WPI will reduce through a reduction in prices of commodities, especially oil.

Impossible Trinity: Why international monetary policy matters

- The Impossible Trinity or **Mundell-Fleming Trilemma** is a restriction on the economic policy that a government may pursue.

It argues that the government may not have all three of:

Monetary autonomy Free capital flows and Fixed rate of exchange.

- It may choose two of these, but in doing so it sacrifices the third. So for instance, if a country chooses a fixed exchange rate and monetary autonomy, then it cannot allow free capital flows. Similarly for the other combinations.

Topic 31. GROWTH IN GOVERNMENT DEBT OF INDIA

Important for the subject: Economy

From 2014 to 2022 the government's debt has increased from ₹55-lakh crore to **₹155-lakh crore**. India's government debt as a proportion of GDP has remained relatively stable at around **82%** in 2023 up from 81% in 2005. (the FRBM Act 2003 mandates Debt Ceilings of 60% for general government and 40% for the Central government)

It is expected to follow a declining trend if India's GDP continues to expand ata rapid pace. (nominal rate of 11% and above).

Arguments in favor of India's public debt management:

- The rise in public debt has been conservative. Government debt increase is necessary in a period when the private sector is recovering its balance sheet after a phase of over-borrowing. Government expenditure when in infrastructure and other capital asset building helps '**crowd in**' private investment.

Factors against high level of public debt:

- Debt affordability: The general government **interest payments as a percentage of revenues** indicate debt affordability. For India at 26%, it indicates a low level of debt affordability. (It is around 8.4% for countries with Moody's Baa rating) High level of debt: India's general government debt is considered to be relatively high at around **8%** of GDP (It is around 56% for countries with Moody's Baa rating)
- Reduced Fiscal capacity: The high proportion of revenue going towards interest payments reduces the funds for developmental activities. In addition it reduces the capacity of the government to respond to the next economic shock/crisis.
- Sustainability of debt: Rise in primary deficit and deterioration in interest rate growth differential, since 2019 cast doubts on debt sustainability of India.

Way ahead:

- High growth can support and help reduce a high public debt. Generally this capacity to support public debt is seen in how high the **interest rate-growth differential**
- To increase debt affordability, tax buoyancy needs to be improved along with expansion of the tax base.

India's Debt profile

- The total general (Centre + States) government debt stands at ₹155-lakh crore. About 29.6 % of the outstanding dated securities have a residual maturity of less than 5 years, this has increased in recent years.
- The implication of short-term debt (less than one-five years) is the immediate refinancing risks.

External debt:

- $613.1 billion
- The share of short-term debt, with maturity of up to one year, in total external debt is around 21%

Topic 32. STATES LOOK FOR ALTERNATIVES AS CENTRE RESTRICTS FCI PURCHASE

Important for the subject: Schemes

The Union Government has recently **discontinued the sale of wheat and rice under the Open Market Sale Scheme (OMSS) to state governments**, except for some northeastern, hilly, and calamity-hit states.

This decision will affect some states, such as Karnataka, that offer free grains to the poor under their schemes.

- The Karnataka government had requested 13,819 tonnes of rice for July from the Food Corporation of India (FCI) under the OMSS without e-auction. But the FCI has rejected the request and informed the state that the sale of wheat and rice under the OMSS for state governments is discontinued.
- The FCI has said that it will continue to sell rice under the OMSS to private parties from the central pool stock as per the requirement to moderate the market prices.
- The discontinuation of the OMSS for state governments may have implications for food security and price stability in some regions. The states that depend on the OMSS for their welfare schemes may have to procure grains from other sources or reduce their coverage. The FCI may also face challenges in managing its surplus stocks and preventing wastage.

Open Market Sale Scheme (OMSS)

- The Open Market Sale Scheme (OMSS) is a government initiative in India aimed at **reducing the excess stock of food grains held** by the Food Corporation of India (FCI) and state agencies.
- The scheme allows the Food Corporation of India (FCI) to **sell wheat and rice to bulk consumers, state governments, and private parties through e-auctions** at predetermined prices.

Features of OMSS

- The FCI conducts weekly auctions through e-auctions in the open market to sell surplus stocks of wheat and rice.
- The reserve price of wheat and rice for sale under OMSS is fixed by the Department of

Food and Public Distribution (DFPD) every year.

- The reserve price is kept uniform throughout the country without adding any further freight to facilitate buyers to lift stocks from any place at ease.
- The sale of wheat and rice under OMSS is undertaken throughout the year in the non-procuring states and during the non-procurement period in the procuring states. The quantum of wheat and rice for sale under OMSS is decided by the DFPD based on the availability and demand of food grains.
- The surplus procuring states (paddy/rice) are not allowed to participate in e-auction for the purchase of rice for their state schemes and they are advised to retain stocks under the state pool for their schemes.