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AUGUST 2024

1. HISTORY AND CULTURE

1.1 Classical Language Status

The Union Cabinet recently approved classical language status to Marathi, Bengali, Assamese, Pali, and Prakrit.

- Classical languages are ancient languages with independent traditions and a rich literary history that continue to influence various literary styles and philosophical texts.
- **Introduction** - In October 2004 by conferring this status to Tamil followed by Sanskrit (2005), Kannada (2008), Telugu (2008), Malayalam (2013), and Odia (2014).
- **Criteria** – The current framework, as revised in 2024 by the Linguistic Experts Committee (LEC) under Sahitya Akademi, emphasises 4 key factors.
- **Key Factors**
 - High antiquity of the language's early texts/recorded history over a period of 1500-2000 years.
 - A body of ancient literature/texts, which is considered a heritage by generations of speakers.
 - The language must have a distinct and original literary tradition, not derived from another speech community.
 - Knowledge texts, especially prose texts, in addition to poetry, epigraphical and inscriptional evidence.
- The classical languages and literature could be distinct from their current form or could be discontinuous with later forms of their offshoots.
- **Benefits** – The Education Ministry provides certain benefits to promote it.
- These include 3 Central Universities established in 2020 through an Act of Parliament to promote Sanskrit.
- The **Central Institute of Classical Tamil** was set up to facilitate the translation of ancient Tamil texts, promote research, and offer courses for university students and language scholars of Tamil.
- The Centres for Excellence for studies in classical Kannada, Telugu, Malayalam, and Odia were also established under the Central Institute of Indian Languages in Mysuru.
- **Significance** – It will promote these languages, their cultural preservation, academic research, and the overall recognition of linguistic heritage.
- It will enhance awareness of the language and strengthen the linguistic identity of speakers, fostering pride in their language's contribution to national and global culture.
- It will ensure that ancient literary texts, manuscripts, and works are conserved.
- Digitization of ancient manuscripts will make them accessible for future generations of scholars.

1.2 Shompen Tribes

Some members of the shompen tribes voted in the 2024 election amidst fears that their forests on the Great Nicobar Island will be destroyed by a proposed project.

- Shompens - They are **particularly vulnerable tribal groups (PVTGs)** in the Andaman and Nicobar Islands and also one of the most isolated tribes on Earth and the group is heterogeneous.
- **Language** - They have their own language, called Shompenese, which is part of the Austroasiatic language family and it has many dialects.
- **Cultural practices** - They are primarily hunter-gatherers and also practise a horticulture and pig rearing.
- Hunting of wild pigs, monkeys, monitor lizards and sometimes pythons are common among the tribe.
- **Diet** - Pandanus (a tropical plant found in the islands), whose fruits resemble the woody pineapple, is the staple food of the Shompens.
- **Classification** - Geographically, the tribe can be classified into 4 different groups depending on their location in the Great Nicobar Island namely north-eastern, western, southern and central groups.

- **Economy** - Different groups of Shompens have developed different levels of symbiotic relationship particularly a **barter system with the Great Nicobarese.**
- **Distinction** - They distinct from the 4 other PVTGs of Andaman and Nicobar Islands by **Mongoloid features.**
- **Religion** – Animism.
- **Social structure** – They have a **patriarchal** structure, with the eldest male member overseeing family affairs.
- **Population** - According to the 2011 Census, there are **only around 229 members** of the Shompen tribe.

1.3 International Abhidhamma Divas

Ministry of Culture in collaboration with the International Buddhist Confederation (IBC) celebrated the International Abhidhamma Divas (October 17) recently in New Delhi.

- **Abhidhamma Divas** – It commemorates Lord Buddha's descent from the celestial realm after delivering his teachings on the Abhidhamma, a core component of Buddhist philosophy.
- Lord Buddha descended from the celestial realm, *Tavatimsa-devaloka*, to *Sankassiya* (now Sankisa Basantapur) in Uttar Pradesh.
- The Asokan Elephant Pillar, a historical marker at the site, marks this significant event.
- According to **Theravada Buddhist texts**, Lord Buddha spent 3 months teaching the Abhidhamma to the deities in Tavatimsa, including his mother.
- **Abhidhamma Pinaka** – Later, he conveyed these teachings to his **disciple Sariputta**, who expanded upon them in the **6 core books of the Abhidhamma Pinaka.**
- It covers various topics, such as moral and mental states, aggregates, causal relationships, and the path to emancipation, understanding the mind and achieving spiritual growth.
- The 7 treatises of the Abhidhamma Pinaka, notably the Pannhana, delve into causal relations with unparalleled depth, showcasing the Buddha's profound insight.
- The celebration of Abhidhamma Divas coincides with the end of the first Rainy Retreat (Vassa) and the Pavaraṇa festival, a time when monks and nuns conclude their retreat period with a ceremony.
- **Abhidhamma or Higher Teaching** – It provides a profound and systematic analysis of mind and matter.
- It offers a detailed framework for understanding the nature of existence, addressing the processes of birth, death, and mental phenomena in a precise and abstract manner.
 - Unlike the more conventional teachings in the Sutta Piṭaka, which use everyday language, the Abhidhamma adopts a specialized and analytical approach to explore reality.
- It developed a specialized **vocabulary in Pali**, forming the basis of Buddhist philosophy and psychology.
- **Key terms** - "citta" (consciousness), "cetasika" (mental factors), "rupa" (materiality), and "nibbana" (final liberation).
- The meticulous analysis provided by these texts has made the Abhidhamma an essential tool for practitioners seeking to develop insight and grasp the essence of Buddha's teachings.

The Ashokan Elephant Pillar is a 3rd century BCE artifact in Sankissa, Uttar Pradesh built by Emperor Ashoka the Great. It has a unique capital with 4 elephants standing back-to-back, supporting a circular abacus.

Significance of Pali

- Pali was recently recognized as having a **classical language status.**
- The entire body of Buddhist canonical literature is written in Pali, with the Tipitaka or "Threefold Basket" being its most notable collection.
- This includes the
 - **Vinaya Pitaka** – It outlines ethical monastic rules,
 - **Sutta Pitaka** – It is a rich compilation of the Buddha's discourses, and
 - **Abhidhamma Pitaka** – It delves into ethics, psychology, and the intricate analysis of mind and reality.

- A rich commentarial tradition has developed around these texts, with works such as the ***Atthasalini and Sammohavinodani*** being crucial for understanding the nuanced teachings of the Abhidhamma.
- Moreover, Pali literature encompasses the ***Jataka Kathas***, which recount the stories of the Buddha's previous lives, reflecting shared moral values prevalent among the Indian populace.

1.4 Indian Council for Cultural Relations (ICCR)

The ICCR recently held a conference of Buddhist monks and scholars in Colombo on bequeathing Pali the status of a classical language by the Indian government.

- It is an **autonomous organization** under the Ministry of External Affairs.
- **Aim** - It is responsible to promote cultural exchanges with other countries and people.
- **Founded in** - 1950.
- **Head Quarters** - New Delhi.
- **Objectives** – To actively participate in the formulation and implementation of policies and programs pertaining to India's external cultural relations.
- To foster and strengthen cultural relations and mutual understanding between India and other countries.
- To promote cultural exchanges with other countries and people, and to develop relations with nations.
- **Programs** - It administers **various scholarship programs annually and awards** about 3000+ scholarships under 21 different schemes to foreign students from about 180 countries.
- Amongst these **21 schemes**, 6 are funded by ICCR from its grant and others are administered on behalf of MEA and Ministry of Ayush.
- The courses offered for studies are for Under-graduation, Post-graduation and Ph.D. levels.
- Each academic year, ICCR has about **6000+ of its foreign scholars** who are studying at various Central/State Universities, Institutes, NITs, and Agricultural Institutions etc.
- It administers various programmes under which it hosts eminent personalities from abroad for a certain period.
- ICCR developed the **"Admissions to Alumni (A2A) Portal"** to streamline the enrolment process.
- **Significance** – These programmes promote India's cultural relations with other countries through various instruments that involve people to people contact.

1.5 Raigad Fort

The fort of Raigad is part of the 12 forts recently nominated for UNESCO World Heritage under the title "Maratha Military Landscapes of India".

- **Raigad Fort**– A hill fort in the Raigad district, **Maharashtra**, an example **of Maratha architecture**.
- **History** - In 1653 CE, Raigad (then known as Rairi) was captured by the Maratha forces from the Mores'.
- **Construction** - Shivaji Maharaj assigned the work of reconstruction of the fort to **Hiroji Indulkar**.
- On 1674 CE a grand coronation ceremony of Shivaji Maharaj was held on Raigad post, during which he attained the title of "Chhatrapati".
- The fort served as the **2nd capital of Chhatrapati Shivaji Maharaj** and played an important role in the administration and expansion of the Maratha Kingdom.
- It is identified as Durgaraj (king of forts).
- **Chitta Darwaja** - The Chitta Darwaja or Jit Darwaja was used to access the fort from the foothills below.
- **Khoob Ladha Burj** – It is a strategically placed tower from which assailants on all sides could be spotted.
- **Maha Darwaja** - The Maha Darwaja, or the main gateway, was built almost 350 years ago. It consists of 2 massive bastions, each measuring about 20 metres in height.
- **Palkhi Darwaja** - Apart from the main gate, a special entrance called the Palkhi Darwaja was created for the royal ladies and queens.

- The fort also overlooks an artificial lake known as the ‘Ganga Sagar Lake’.
- Besides the lake, an important feature nestled within the fort complex is a Shiva temple called Jagadishwar Mandir.
- Raigad, surrounded by valleys shaped by the Kal and Gandhari rivers, stands as an isolated massif without connections to neighbouring hills.
- **Samadhi of Chhatrapati Shivaji Maharaj** - Adjacent to the Temple, the Samadhi of Chhatrapati Shivaji Maharaj is located almost opposite to the eastern entrance of Jagadishwar Mandir.

Grant Duff, a British historian of the Maratha period has drawn parallels between Raigad and the Rock of Gibraltar.

2. GEOGRAPHY

2.1 The Rann of Kutch

- It is reputed to be one of the largest salt deserts in the world.
- **Location** – It lies at the end of the Gulf of Kutch in Gujarat.
- **Size** – It is about 7500 km² in area.
- **Evolution** – It evolved when waters of the Arabian Sea made incursions into this region 150-200 million years ago.
- Geological upheavals led to the rise of a landmass that cut off the Kutch basin from the sea.
- **Types** – It is divided into the **Little Rann and the Big Rann**.
- **Landscape** – For most of the year, it consists of vast, barren desiccated, unbroken bare surface of dark silt, encrusted with salts.
- It is also known for ecologically important Banni grasslands
- **Landscape changes** - A striking alteration occurs when the monsoon sets in, and the Rann turns into a shallow wetland.
- **Bets** – About 75 elevated pieces of land turn into islands, called bets by the local Agariya and Maldhari communities.
- The largest plateau is called Pung.
- **Economic significance** – The salt marsh attracts human enterprise, 30% of India’s salt comes from the Little Rann.



The Rann of Kutch can be considered a large ecotone, a transitional area between marine and terrestrial ecosystems.

2.2 Antarctic Peninsula

Antarctic Peninsula showed 10-fold greening since 1986 according to the archive study of National Aeronautics and Space Administration’s (NASA) Landsat satellite mission between 1986 and 2021.

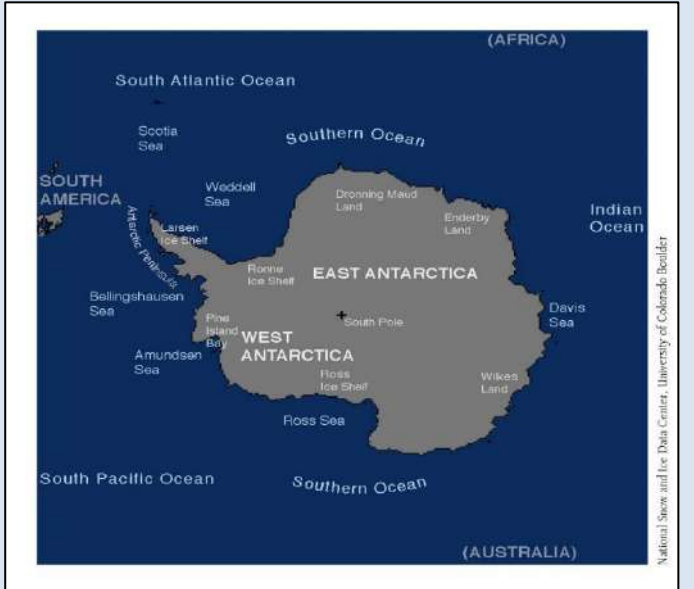
Recent Findings

- **Increased vegetation** – Its cover likely increased from less than one square km (km²) in 1986 to almost 12 km² in 2021.
- Vascular plants native to the Peninsula have extended their range.
- **Increase of Mosses** – They play a crucial role in changing the extent of vegetated ground cover, organic soil formation, and higher plant colonization.
- They are capable of colonizing bare rock surfaces and helping future soil development to enable moss-dominated ecosystems and higher plants to take over.

- This raises the **risk of non-native and invasive species arriving**, possibly carried by eco-tourists, scientists or other visitors to the continent.
- **Rising temperature** – It is heating up 5 times faster than the global average.
- Since 1950, the region has warmed almost 3°C.
- **Loss of glacier** - More than 90% of the glaciers have been losing mass since the 1940s.

Antarctic Peninsula

- It is the northernmost part of mainland Antarctica.
- **Different names** - It is known as
 - **O'Higgins Land** - In Chile
 - **Tierra de San Martín** - In Argentina,
 - **Graham Land** - In United Kingdom
 - **Palmer Peninsula** - In United States
- **Physiography** - The major feature of this peninsula is its mountain range.
- Mount Jackson is the highest peak at 3,184 metres but there are many other equally as impressive mountains.
- Marguerite Bay indents the west coast, and **Bransfield Strait** separates the peninsula from the South Shetland Islands to the north.
- Many other islands and floating ice shelves lie off the coast.
- This peninsula is notable for its unique ecosystems.



2.3 Roopkund Lake

Roopkund Lake is shrinking because of climate change.

- **Geographical location** - It is a high-altitude glacial lake located at the base of Mt Trishul in the Garhwal Himalayas in Uttarakhand.
- It is a part of Nanda Devi National Park.
- **Skeleton Lake** – It earned this name when in 1942, naturally preserved human skeletons were found here.
- There are 100's of skeletons preserved in the ice around the region and they become visible when the ice melts.
- Studies have found that the skeletons are genetically diverse and many are even aged to have a difference of 1,000 years.
- **Recent Findings** - Instead of snow flurries that the area usually witnesses, it has started getting more rain that is disrupting the natural balance of the region.
- Owing to the rain, loose moraine slides into the lake and causes it to shrink.
 - Moraine is soil, rocks and debris that a glacier carries with it and leaves behind.
- The lake is shrinking by 0.1 to 0.5% every year.

2.4 Korean Peninsula

North Korea has adopted a renewed aggressive stance in the face of tensions with its neighbour, South Korea.

- It is a peninsula in **East Asia** that is made up of the Korean mainland and more than 3,960 nearby islands.
- **Geographical location** - Between China and Japan.
- Japan is located just east of the Korean Peninsula across the Korean Strait.
- The Yalu and Tumen rivers form the border between North Korea and China.

- **Borders**

- **West** - Yellow Sea
- **South** - East China Sea and Korea Strait
- **East** - East Sea

- **Physiography** – Approximately 70% of the Korean Peninsula is mountainous.

- The highest peak in North Korea rises more than nine thousand feet.

- **Culture** – It is known for its **dolmens**, which are large rocks that were erected over thousands of years.

- Many dolmens can be found across the Korean Peninsula, and some have been designated as UNESCO World Heritage sites.

- **Political division** – It is divided into North Korea and South Korea

- **North Korea** - Also known as the Democratic People's Republic of Korea (DPRK) with its capital Pyongyang.
- **South Korea** - Also known as the Republic of Korea (ROK) with its capital Seoul.

- The two countries fought the Korean War from 1950 to 1953 and these countries have been separated by the **Korean demilitarized zone (DMZ)** since 1953.



2.5 Z-Morh tunnel

Seven workers from APCO Infratech were killed in the militant attack on the strategic Z-Morh tunnel on the Srinagar-Sonamarg highway in Jammu and Kashmir recently.

- It is an **all-weather connectivity tunnel**, has acquired its name for the Z-shaped road stretch at the place where the tunnel is being constructed.
- **Connectivity** – It connects Sonamarg resort with Kangan town in central **Kashmir's** Ganderbal district.
- It is situated an altitude of over 8,500 feet, and is prone to snow avalanches in the winter.
- **Construction** - It was originally conceived by the Border Roads Organisation in 2012 but was later taken over by the National Highways & Infrastructure Development Corporation Limited (NHIDCL).
- The tunnel project is almost complete, its inauguration was delayed by the Model Code of Conduct (MCC) in place because of the Jammu and Kashmir Assembly elections.
- **Significance** - It is **part of the Zojila tunnel project**, which will connect Sonamarg in Kashmir with Drass in Ladakh, is ongoing and expected to finish by December 2026.
- It is vital for ensuring year-round connectivity to Ladakh.
- It helps for the movement of military personnel to border areas.

2.6 Chug Valley

Chug valley, once blanketed by Cosmos flowers, has begun to shrink, and the meadows are no longer as dense as they used to be due to excessive human interference.

- The Chug Valley is in the Dirang region of **Arunachal Pradesh**, with sprawling green grasslands.

- **Vegetation** - It encompasses green hills, vast meadows, and towering pine trees amidst majestic Himalayan peaks.
- **Community** - Duhumbi Monpa community is a community in the Chug village.
- **River** - The Dihing River, flowing through the region.
- **Cosmos flowers** - The valley showcases an enchanting beauty with a sea of pink and white Cosmos flowers during September and October months.
- They repel the corn earworm (*Helicoverpa zea*), which is a threat to food crops.
- Cosmos is native to Southern and Central America with Asteraceae family.
- These flowers attract butterflies, bees and other pollinators that are essential for a healthy environment besides offering food to birds, freshwater fish and other wildlife.
- They are grown easily from seeds and will even survive in poor soil conditions.
- Cosmos are also tolerant of most soil pH levels but grow best in neutral to alkaline soils (pH of 7.0-7.5).
- **Awards** - In 2024, Chung Valley was awarded
 - The 2nd Best Tourism Village Award and
 - Dammu's Heritage Dine of Chug Village was awarded the Responsible Tourism Award by the Government of Arunachal Pradesh.

2.7 Lake Erie

Algae bloom in western Lake Erie was moderate compared to previous years, getting rid of problem algae starts with giving it less food.

- Lake Erie is one of the **5 Great Lakes of North America** and the 4th largest by surface area.
- It is located on the border between **Canada and the United States**.
- It is primarily bordered by the states of Ohio, Pennsylvania, and New York, as well as the Canadian province of Ontario.
- Lake Erie is the **shallowest of the Great Lakes**, which contributes to its warmer temperatures and greater susceptibility to pollution and algal blooms compared to the other lakes.
- **Tributaries** - The Detroit, Huron, and Raisin rivers are the main tributaries to Lake Erie.
- **Discharge** - The Niagara River carries the water from Lake Erie to the east.



- It is a key part of the St. Lawrence Seaway.
- **Pollution** - The Great Lakes have been affected by pollution, and in the late 20th century, the U.S. and Canada investigated ways to reverse the damage.
- **Ice levels** - The Great Lakes have experienced historically low ice levels for two years in a row.

2.8 Caspian Sea

The Caspian Sea, planet's largest lake has been shrinking since the mid-1990s, but the rate it's disappearing has sped up since 2005.

- The Caspian Sea is the **planet's largest inland sea** located between Europe and Asia.
- It is classified as a lake, despite being referred to as a "sea."
- **Topography** - It lies to the east of the Caucasus Mountains and to the west of the vast steppe of Central Asia.
- **Coastline** - Its looping coastline stretches more than 4,000 miles.
- **Bordered by** - 5 countries- Kazakhstan, Iran, Azerbaijan, Russia and Turkmenistan.

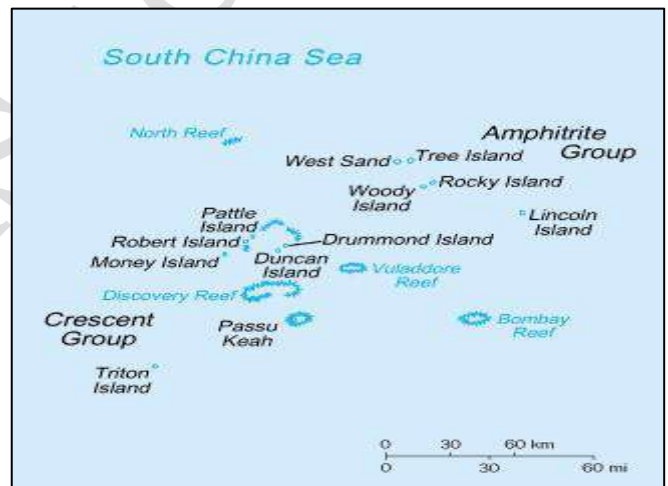
- **Rivers** - The Caspian is fed by 130 rivers, although around **80% of the water** comes from the **Volga, Europe's longest river**, which winds through central and southern Russia.
- The Caspian Sea is endorheic, meaning it has no natural outlets.
- **Significance** - Bordered countries rely on it for fishing, farming, tourism and drinking water, as well as its coveted oil and gas reserves.
- The Caspian also helps regulate this arid region's climate, providing rainfall and moisture to Central Asia.
- **Important Species** - It is home to Caspian seals, an endangered marine mammal and critically endangered Beluga sturgeon.
- **Threats** - Damming, over-extraction, pollution and, increasingly, the human-caused climate crisis are driving its decline.



2.9 Triton Island

Recent satellite imagery reveals a significant military buildup on Triton Island, the closest landmass in the disputed Paracels archipelago to Vietnam.

- **Location** – It is located on the southwest corner of Triton Reef in **South China Sea** and a part of Paracel Island group.
- **Contention** – It is claimed by multiple countries, including **China, Vietnam, and Taiwan**.
- The island is administered by the People's Republic of China.
- **Importance** - The surrounding waters are important fishing grounds and are believed to be rich in oil & natural gas reserves.
- Due to its strategic position in the South China Sea, it can serve as a military outpost, impacting regional security dynamics.



3. POLITY

3.1 Abetment of Suicide

The Supreme Court recently said that police and the courts should avoid unnecessary prosecutions in cases of abetment of suicide stemming from the workplace.

- **Abetment** - It can also be defined as the act of assisting, encouraging, or supporting someone with the intent to commit a crime.
 - **Abetment by instigation** - When someone is encouraged, intimidated, or motivated to commit a crime.
 - **Abetment by conspiracy** - When two or more people conspire to commit a crime.
 - **Abetment by aid** - When someone knowingly aids a crime or omits a legal act.
- **Legality** - It is defined under Section 107 of the Indian Penal Code, 1860, which is the same as Section 45 of the Bharatiya Nyaya Sanhita, 2023 (BNS).

National Crime Records Bureau's annual **Crime in India** report says that the conviction rate in abetment of suicide cases was 17.5% in 2022, 22.6%, 21.8%, 16.5%, and 15.6% in 2021, 2020, 2019, and 2018 respectively.

- **Punishment** – Section 306 IPC (Section 108 BNS) provides *imprisonment up to 10 years along with a fine*.
- **Judgement** - Supreme Court said ‘incitement’ to die by suicide could be caused by
 - Sentimental ties or physical relations between the deceased and the accused or
 - The deceased was linked to the accused in an official capacity.
- The accused had created a situation of unbearable harassment or torture, leading the deceased to see suicide as the only escape.
- The accused exploited any emotional vulnerability to make a person feel “worthless or undeserving of life”.
- It may be a case of threats to the deceased of harm to his or family or financial ruin.
- There were false allegations that may have damaged the reputation of the deceased and pushed him to die by suicide due to public humiliation and loss of dignity.

Related cases

M Mohan vs The State (2011)

- The SC set a high bar for proving abetment of suicide under Section 306 IPC, including specific intent.
- It requires an active or direct act which led the deceased to commit suicide seeing no option and this act must have been intended to push the deceased into such a position that he/ she committed suicide.

Karnataka Case

- In July 2023, the Karnataka HC refused to quash proceedings against 3 persons accused of abetting the suicide of an employee from the LGBT community.
- These persons the deceased’s reporting manager, co-worker, and another manager would allegedly harass and make fun of the employee on the basis of sexual orientation, which led to the suicide in June 2023.

Ude Singh vs State of Haryana (2019)

- Supreme Court said that proving abetment of suicide would depend on the facts of the individual case.
- There must be a proof of direct or indirect act(s) of incitement to the commission of suicide.

3.2 Lady Justice Statue

The Supreme Court has recently unveiled a new statue of “Lady Justice”, reimagining the image

- **Old version** - The lady justice statue *typically a blindfolded woman* holding a set of scales in one hand and a sword in the other is synonymous with legal practice around the world.
- The blindfold in the classic rendition has been to represent the impartiality of justice.
- **History** - The imagery of Lady Justice can be traced back to Greek and Roman mythology.
- Themis, one of the 12 Titans born to Gaea and Uranus according to works of the Greek poet Hesiod who lived circa 700 BCE, is known as the goddess of justice, wisdom, and good counsel.
- The first Roman emperor Augustus (27 BCE-14 CE) introduced the worship of Justice in the form of a goddess known as Justitia (or Iustitia). Justitia, like Themis, did not wear a blindfold.
- The blindfold was added during the Renaissance period (14th century) probably as a satire on the corrupt state of legal systems with judicial institutions turning a blind eye.
- **In India** - The British Raj also introduced the iconography of Lady Justice.
- At the Calcutta High Court first constructed in 1872 images of Lady Justice were carved into the pillars supporting the building.



- **New one** - It is a 6-foot-tall statue of a saree-clad woman with no blindfold, holding scales a copy of the Constitution of India.
- The new statue with unimpeded vision is meant to signify that Law is not blind, it sees everyone equally.
- **Designed by** - Vinod Goswami.

3.3 Autonomous District Councils (ADCs)

Climate activist Sonam Wangchuk and other activists from Ladakh have demanded that Schedule 6 be made applicable to the Union Territory.

- **Autonomous District Councils** – These are constituted for Social, Economic, Educational, Ethnic and Cultural advancement of the **Scheduled Tribe (ST)** communities.
- **Constitutional provision** - The **6th Schedule under Article 244** provides for the formation of Autonomous District Councils (ADCs), as well as Autonomous Regional Councils (ARCs).
- **Members** - ADCs have up to **30 members**, Governor nominates 4 members, and the rest are elected through adult franchise.
- **Term** - 5 years.
- **Powers** - It can make laws, rules and regulations on land, forest, water, agriculture, village councils, health, sanitation, village- and town-level policing, etc.
- The councils derive all their powers and functions directly from the Constitution.

- **Objectives of the council**

- Protect tribal land and resources
- Ensure tribal communities are not exploited or marginalized
- Preserve and promote tribal cultural and social identities

- **Administrative Authority** -

The **Governor of the state** has the authority to

- Determine which areas are administrative units of the autonomous districts and regions
- Create new autonomous districts or regions
- Alter the territorial jurisdiction or name of any autonomous district or region

- **Jurisdiction** - The jurisdiction of ADCs is subject to the jurisdiction of the concerned High Court.
- Currently, there are **10 ADCs** in the Northeast, with 3 each in Assam, Meghalaya and Mizoram, and 1 in Tripura.



ADC in Ladakh

- Ladakh activists demand greater autonomy in Ladakh's administration with the Central government.
- Specifically, they wanted **Schedule 6** of the Indian Constitution to be made applicable to Ladakh.
- A majority of the population in Ladakh belongs to Scheduled Tribes.

3.4 Industrial Alcohol

The Supreme Court in its recent Verdict cleared that State's power to make laws on industrial alcohol can't be taken away.

- It is primarily an **impure form of ethanol**.
- A high-purity alcohol that can be made from different raw materials such as sugarcane, grain, and wheat.
- **Role** – It is **important solvent** as it is involved in the synthesis of organic compounds, and can be used as a fuel source for lamps and engines.

- However, it is ***not suitable for human consumption*** due to its impurities.
- To avoid unauthorized consumption, industrial alcohol is also sold with a nauseous substance added to make it undrinkable. Such alcohol is also known as ***denatured alcohol***.
- **Regulation in India**– *Entry 8 in the State List* under the *7th Schedule* of Constitution gives the states the power to legislate on the manufacture, possession, transport, purchase and sale of "intoxicating liquors".
- *Entry 52 of the Union List* and *Entry 33 of the Concurrent List* mention industries whose control "declared by Parliament by law to be expedient in public interest".
- While both Parliament and state legislatures can legislate on topics within the Concurrent List, the Supreme Court reaffirmed that central laws precedence over state legislation.
- It is listed in ***Industries (Development and Regulation) Act, 1951 (IDRA)***.
- **Taxing in India** - Excise duty levied on alcohol is a key component of a state's revenue, with states often adding an additional excise duty on alcohol consumption to drive its income up.
- **Supreme Court** – It ruled that "industrial alcohol" falls within the definition of "intoxicating liquor" under Entry 8 of List II of the Constitution, thereby granting states the authority to regulate and tax its production.
- It set aside the 1990 judgment in Synthetics & Chemicals Ltd vs State of Uttar Pradesh which held that "intoxicating liquor" refers only to potable alcohol and states cannot tax industrial alcohol.
- The SC said Industrial alcohol means alcohol which is not fit for human consumption and that an artificial interpretation cannot be adopted to give a different meaning to the term 'intoxicating liquor'.

3.5 Right to Live in a Pollution-free Environment

The Supreme Court recently said cases of stubble-burning and "pick-and-choose" policy adopted by the Punjab and Haryana governments violated citizens' right to live in a pollution-free environment.

- **Constitution**– Right to live in a pollution free environment is a ***fundamental right under Article 21***.
- The right to a healthy environment includes the right to be ***safe from the effects of climate change***.
- It is the duty on the state to raise the standard of living and to ***improve public health under Article 47***
- **Article 48A** – It puts a duty on the State to protect and improve the environment and further to safeguard the forests and wildlife.
- To enable this duty, wildlife and forests have been inserted in the concurrent list so that both the Central Government and State Government can fulfil their duty of protecting wildlife.
- **Article 51A (g)** – It puts a fundamental duty on the citizens to protect and preserve the environment.
- **Environment (Protection) Act, 1986** - Section 15 of the Environment (Protection) Act, 1986 outlines the penalties for violating the provisions of the Act.
 - **Penalties** - ***5 years of imprisonment and ₹1 lakh*** as fine.
- **Indian Penal Code** - Section 277 of the IPC punishes anyone who pollutes a public reservoir with water, while Section 278 punishes anyone who pollutes the atmosphere.
- **Polluter pays principle** – It states that the undertakings have to pay financial costs for preventing or remedying the damages caused to the environment by the pollution created by those undertakings.
 - In India, the polluter pays was first recognized in ***M.C. Mehta vs Union of India, 1986*** which is also known as the oleum gas leak case.
- **Recent Verdict** – The court noted that Punjab had identified 1,084 instances of stubble burning, but recovered compensation only from 473 persons.
- Similarly, Haryana had recorded 490 occasions of stubble burning, but only 32 First Information Reports (FIRs) had been registered.
- The court said the authorities had failed in not only effectively implementing existing laws, but allowed blatant violation of fundamental rights guaranteed under Article 21.
- The ***"pick-and-choose" policy*** adopted by the Punjab and Haryana governments to penalise a few while letting many violators go "scot-free" after paying a nominal fine violated citizens' right.

- SC pointed out that a proper machinery for collection of fines under Section 15 of the Environment (Protection) Act, 1986 had not been formulated.
- It further directed the Union government to consider Punjab's request for more funds to fight stubble-burning.

3.6 Chief Justice of India

President Droupadi Murmu recently appointed Justice Sanjiv Khanna as the 51st Chief Justice of India.

- The Chief Justice of India (CJI) is the **head of the judiciary and the Supreme Court of India**, the custodian of the Constitution.
- The CJI is responsible for upholding the Constitution, ensuring justice for all citizens, and allocating cases.
- The CJI is also known as primus inter pares, which means "first amongst equals".
- **Qualification** - Apart from **being an Indian citizen**, the person must
 - Have been for at least five years a Judge of a High Court or of two or more such Courts in succession or
 - Have been for at least ten years an advocate of a High Court or of two or more such Courts in succession, or
 - Be, in the opinion of the President, a distinguished jurist.
- **Appointment** – According to **Article 124** of the Constitution of India, the President is pleased to appoint the Chief Justice of India usually from the senior-most judges in the Supreme Court.
- **System** - The system followed for recommending and appointing the Chief Justice of India is called the "Collegium System".
- The outgoing Chief Justice of India, in consultation with the 4 most senior judges of the Supreme Court, recommends the next Chief Justice to the President of India, who then appoints them.
- Essentially, the judiciary itself selects the next Chief Justice with the government having limited power to object to the recommendation.
- **Term** - They can hold office up to the **age of 65 years** or are removed through impeachment.
- **Responsibilities**
 - **Case allocation** - The CJI allocates cases to specific benches.
 - **Constitutional bench appointments** - The CJI appoints benches that deal with important legal matters.
 - **Administrative head** - The CJI is the administrative head of the court.

According to **Article 128**, a retired judge of the Supreme Court of India can be called upon by the Chief Justice of India, with the prior permission of the President of India, to sit and act as a judge of the Supreme Court.

4. GOVERNMENT POLICIES AND INTERVENTIONS

4.1 Dharti Aaba Janjatiya Gram Utkarsh Abhiyan (DAJGUA) Scheme

PM launches Dharti Aaba Janjatiya Gram Utkarsh Abhiyan from Hazaribagh, Jharkhand recently on 2nd October 2024, birth anniversary of Mahatma Gandhi.

- **Aim** - Dharti Aaba Janjatiya Gram Utkarsh Abhiyan envisions saturation of critical gaps in social infrastructure, health, education, and livelihood.
- The scheme focuses on the **Particularly Vulnerable Tribal Groups (PVTG) population**.
- **Ministry** - The Ministry of Tribal Affairs.
- **Fund** – It has a total outlay of Rs.79, 156 crores
- **Coverage** - Around 63,843 villages benefitting **more than 5 crore tribal people**.

Jharkhand, the birthplace of Adivasi icon Birsa Munda has chosen to launch the scheme as Birsa Munda is revered as Dharti Aaba, Father of the Land.

- It spread across all tribal majority villages and aspirational blocks in 30 States/UTs.
- **Implementation** - It will be by 17-line ministries of Govt of India by convergence and outreach and ensures holistic and sustainable development of tribal areas and communities.

4.2 Prime Minister's Internship Scheme

Union Finance Minister recently launched the Prime Minister's Internship Scheme.

- **Aim** – To enhance youth employability in India by offering them hands-on exposure to real-world business environments.
- It represents a transformative opportunity to bridge the skills gap and drive sustainable growth in India.
- It will be implemented through an online portal developed by the **Ministry of Corporate Affairs**.
- **Target** - The PM Internship Scheme aims to provide internship opportunities to one crore youth in the **top 500 companies over the next 5 years**.
- The ministry has partnered with government-owned BISAG-N to run the project.
- **Duration** - The internship will be for **12 months**.
- **Financial Assistance** - The interns will be provided financial assistance of Rs 5,000 per month and out of the total amount,
 - Rs 4,500 will be disbursed by the government and
 - Rs 500 will be paid by the company from its CSR funds.
- Also, a one-time grant of Rs 6,000 for incidentals will be disbursed by the ministry to each intern, upon joining the place of internship.
- The participation of companies in the scheme is voluntary and an internship will be offered for 12 months, with at least half of the period to be spent in the actual job environment and not in the classroom.
- Existing reservations will be applicable in selecting the candidates under the scheme, the sources said and emphasised that the scheme is only for providing internships and not for jobs.
- **Eligibility** - Candidates aged between 21 and 24 years who are not engaged in full-time employment are eligible for the one-year internship programme.
- Internships are available to those who have passed class 10 or higher.
- Individuals from families with government jobs are excluded.
- The scheme is not open to post-graduates.
- A candidate who graduated from premier institutes such as IIT, IIM, or IISER, and those who have CA, or CMA qualification would not be eligible to apply for this internship.
- Anyone from a household that includes a person who earned an income of Rs. 8 lakh or more in 2023-24, will not be eligible.

4.3 PM's Internship Scheme in Top Companies (TPISTPS)

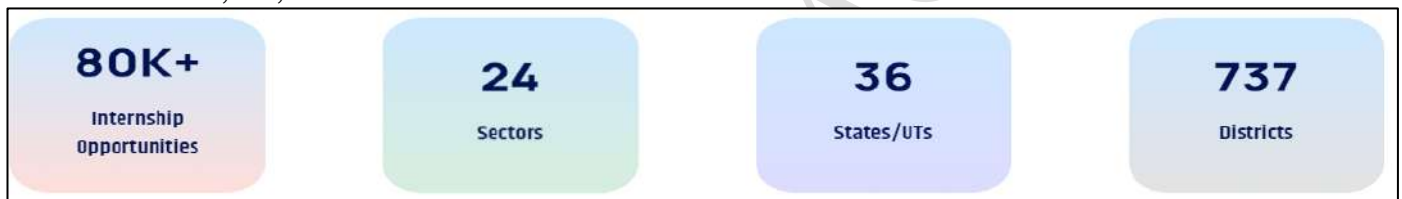
Recently, Indian government had opened up a portal for India's top 500 companies to participate in the one-year internship scheme.

- It is a **12 months real-life experience** in India's top companies.
- **Launched in** – October 2024, as announced in Union Budget 2023-24.
 - **Portal** - pminternship.mca.gov.in
- **Administered by** - Ministry of Corporate Affairs
 - **Partners**- FICCI and CII
- **Aim** – To **bridge the gap between skill sets** of unemployable youth and those needed by employers.
- **Target** – To train **1 crore youth in 5 years**

Recently, on the eve of the portal opening to applicants, the number of opportunities posted in the PM Internship Scheme surged to 90,849.

Eligibility for PM Internship Scheme	
Age	21-24 years
Education	Not enrolled full time
Job Status	Not employed full time
Family (Self/Spouse/Parents)	<ul style="list-style-type: none"> No member is earning more than Rs.8 Lakhs per annum No member has a government job

- The candidates will have to self-certify their educational qualifications data and would have to share their residential pin codes as well.
- Financial assistance** – *Monthly assistance* of
 - By Government of India - Rs. 4500
 - By Industry - Rs. 500
- One-time Grant of Rs.6000* for incidentals.
- Insurance coverage** – It is provided under PM Jeevan Jyoti Bima Yojana and Pradhan Mantri Suraksha Bima Yojana.
- Opportunities posted by** – 193 Companies, including private players like Maruti Suzuki India, Reliance Industries, etc.,



4.4 International Day of the Girl Child

Globally, the International Day of the Girl Child is celebrated on October 11th every year.

- Historical background** - The United Nations General Assembly passed **Resolution 66/170** in 2011, designating **October 11** as the International Day of the Girl Child.
- 2024 Theme** – Girls’ vision for the future.
- Significance** – It highlights the importance of gender equality, education, and opportunities for young girls.
- It acts as a reminder to create an environment where girls can thrive, ensuring they are equipped with the tools to lead and shape their futures.

*In 1995, the **World Conference on Women** in Beijing marked a turning point for advancing the rights of women and girls worldwide where the Beijing Declaration and Platform for Action was unanimously adopted.*

Girl Child Empowerment in India

- POCSO Act 2012** – It addresses child abuse, with updated rules in 2020 to enhance its implementation.
- Juvenile Justice Act 2015** – It ensures the care and protection of children in need.
- Mission Vatsalya** – It focuses on child development and protection, with services like the Child Helpline and the Track Child portal to assist missing children.
- Track Child portal** – It was launched in 2012 that facilitates the matching of ‘missing’ children being reported at Police stations with those ‘found’ children who are residing in the Child Care Institutions (CCIs).
- PM CARES for Children Scheme** – It supports children orphaned by COVID-19.

- **NSIGSE** - National Scheme of Incentive to Girls for Secondary Education was launched in 2008 to enhance educational opportunities for girls, particularly those from SC and ST communities.
- **E-SAMPARK** – It provides for mental health and medical care.

4.5 Nikshay Poshan Yojana (NPY)

Ministry of Health and Family Welfare recently said that it doubles the direct benefit transfer from Rs.500 to Rs.1,000 per month in the NPY for the entire duration of treatment, and initiating the disbursement of Rs. 3,000.

- It is a scheme that provides **financial support** to tuberculosis (TB) patients under the National Tuberculosis Elimination Program (NTEP).
- **Eligibility** - All TB patients who are registered or notified on the **NIKSHAY portal on or after April 1, 2018** are eligible.
- **Benefits** - Patients receive a monthly incentive of **INR 500** for anti-TB treatment till the completion of treatment.
- The first benefit of INR 1500 to be given upon diagnosis of a person with TB on Ni-kshay.
- Second benefit of Rs 1500 will be generated upon completion of 84 days (3 treatment months) from the date of treatment initiation followed by subsequent generation of benefit at Rs 500 for every month of the treatment extension period.
- All patients who are receiving treatment from **both public and private sectors** are eligible to receive the benefit.
- **Payment method** – It is paid in cash and deposited into the patient's Aadhaar-enabled bank account.
- For pediatric patients, the money is deposited into the account of the patient's parent or guardian. In some states, the incentive is provided in-kind, such as food baskets.
- **Follow-up** - To ensure treatment adherence, patients must undergo a follow-up examination after the first installment.
- If the patient dies, the person/valid relative is eligible to receive the amount.
- It is implemented across **all States and UTs** in India.

Nikshay is a web-based patient management system for tuberculosis (TB) control in India.

4.6 Bhu-Aadhar or ULPIN

Rural development ministry's portal data reveals that only 30% of the rural land parcels have Bhu-Aadhaar, Centre pushes for 100% completion by 2026.

- Bhu-Aadhaar is also known as **Unique Land Parcel Identification Number (ULPIN)**.
- **Launched in** – 2021.
- **ULPIN** - It is an initiative to give a **14-digit alpha-numeric identity** to each land parcel. The ULPIN contains
 - State code
 - District code
 - Sub-district code
 - Village code
 - Unique plot ID number
- It is generated using the longitude and latitude coordinates of the land parcel.
- It is part of the Centre's **Digital India Land Records Modernisation Programme (DILRMP)**.
- ULPIN is to streamline and bring uniformity to the process adopted by states in assigning unique identification numbers to land parcels.
- Once the ULPIN is generated, it is stamped on the physical land record document held by the owner.
- The same ULPIN will be permanently attached to the plot of land.

DILRMP is a Central Sector Scheme aims to modernize the management of land records, reduce land/property disputes, and enhance transparency in land transactions.

- Even if the land is transferred, sub-divided, or undergoes any change, the ULPIN will remain the same for that geographic boundary.
- **Objectives**
 - To assign a unique ID to each plot of land for easy identification and retrieval of records
 - To create accurate digital land records with details of land owners, plot boundaries, area, usage, etc.
 - To link land records and property registration processes
 - To facilitate online delivery of land record services
 - To assist in government planning by maintaining updated land data
- **Coverage** - **Andhra Pradesh** was the 1st State to complete 100% ULPIN coverage.
- The States of Karnataka, Odisha, Telangana, Madhya Pradesh and Chhattisgarh have achieved 60-90% ULPIN coverage.
- Uttar Pradesh, Bihar and Assam are lagging behind in ULPIN implementation due to administrative and operational challenges.

5. INTERNATIONAL RELATIONS

5.1 India-UAE Bilateral Investment Treaty 2024

Recently, India-UAE Bilateral Investment Treaty (BIT) came into effect.

- **Need** - The earlier Bilateral Investment Promotion and Protection Agreement (BIPPA) *between them expired* in September 2024.
- **Signed in** – February 2024 at Abu Dhabi
- **Entered into force** – With effect from August 2024.
- **Bilateral trade** – UAE is the 7th largest with a share of 3% in the total Foreign Direct Investment (FDI) received in India
 - Cumulative investment of approximately \$19 Billion from April 2000- June 2024.
- India also makes 5% of its total Overseas Direct Investments in UAE to the tune of \$15.26 Billion from April 2000 - August 2024.
- **Importance of BIT 2024** – It gives continuity of investment protection to investors of both the countries.

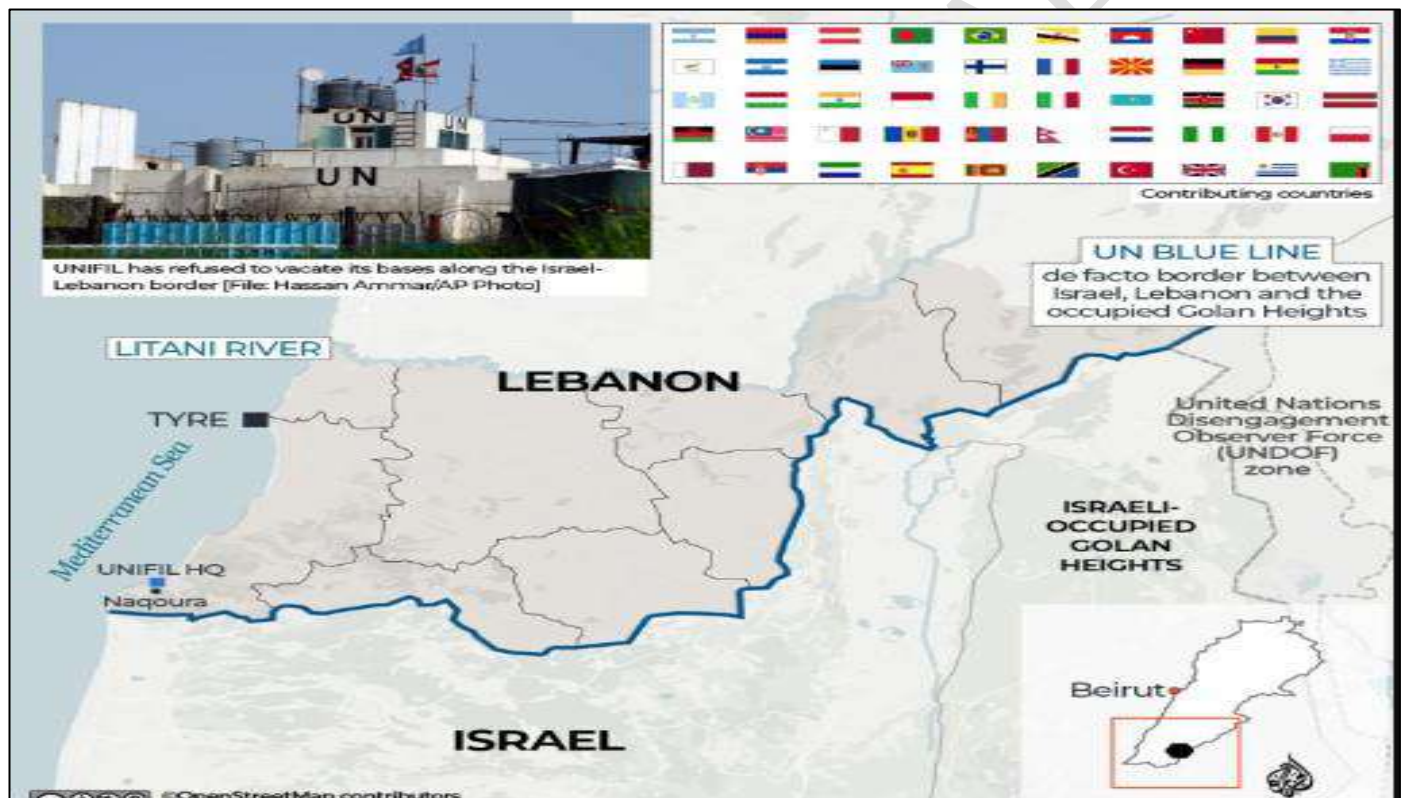
Key features of India-UAE BIT 2024

- Closed asset-based definition of Investment with coverage of Portfolio Investment.
- Treatment of Investment with obligation for no denial of justice, no fundamental breach of due process, no targeted discrimination and no manifestly abusive or arbitrary treatment.
- Investor-State Dispute Settlement (ISDS) through arbitration with mandatory exhaustion of Local remedies for 3 years
- General and Security Exceptions
- Right to Regulate for State
- No investor claim in case investments is involved with corruption, fraud, round tripping etc.
- Provision on National Treatment
- Treaty for protection to investments from Expropriation
- Treaty for Transparency, Transfers and Compensation for losses.
- Carve out for measures such as those related to taxation, local government, government procurement, subsidies or grants and Compulsory license.

5.2 United Nations Interim Peacekeeping Force in Lebanon (UNIFIL)

Recently two members of a UN peacekeeping mission, operating along Lebanon's border with Israel were injured.

- It is an international body assigned to prevent violations along the border between **Lebanon and Israel**.
- **Established by** - UN Security Council (UNSC) in March 1978, days after Israel invaded Lebanon.
- It is supposed to report breaches to the UN Security Council.
- It consists of more than 10,000 civilian and military personnel from 50 countries including India.
- The group is charged by the UN with keeping out of the area any weapons or fighters.
- Although they are armed, the peacekeepers are generally restricted to using force only when their safety or the safety of civilians is in immediate danger.
- **Location** - It is located in the South of Lebanon. UNIFIL's presence stretches from the **Litani River to the Blue Line**.
 - Blue Line is a 120km "border" drawn up by the UN between Lebanon and Israel.
- Its headquarters is Naqoura in the southwest.
- **Fund** - UNIFIL (United Nations Interim Force in Lebanon) receives its funding through a dedicated account which is approved annually by the United Nations General Assembly.



5.3 India-China LAC Agreement

India has announced a pact on patrolling along the LAC, which is expected to set in motion the process ultimately leading to normalization.

- India and China have made progress in resolving the military standoff along the Line of Actual Control (LAC) in **eastern Ladakh**, with both nations reportedly agreeing to restore patrolling rights.
- **Regions** - Depsang Plains and Demchok region, allowing their troops to resume patrolling up to their old patrolling points along the LAC.
- The frictions between the two sides these regions have long been regarded as "legacy issues" predating the Chinese incursions of 2020.
- The Depsang Plains are located in the north of Ladakh and Demchok in the south.
- At present, 7 friction points exist in eastern Ladakh.

- These include PP 14 (Galwan), PP 15 (Hot Springs), PP 17A (Gogra), the north and south banks of Pangong Tso, the Depsang Plains, and Charding Nullah in Demchok.
- The agreement allows Indian troops access to patrolling points (PP) 10 to 13 in the Depsang Plains, while in Demchok, patrolling will extend to Charding Nullah.
- Mutual agreements have reportedly been reached for the eastern theatre as well, particularly in sensitive areas of Arunachal Pradesh.
- Friction points like Galwan Valley and Pangong Tso remain unchanged.
- Further discussions on other sectors in the eastern region will also take place between the two sides at a later stage.
- Moreover, both sides will exchange their patrol schedules with each other.
- In case of conflicting dates or times, adjustments will reportedly be made by mutual consent.



6. AGRICULTURE

7.1 National Mission on Edible Oils - Oil seeds

Cabinet Approves National Mission on Edible Oils – Oilseeds (NMEO-Oilseeds) for 2024-25 to 2030-31.

- **Aim** - It is an initiative aimed at boosting domestic oilseed production and achieving self-reliance in edible oils.
- **Duration** - The Mission will be implemented over a 7-year period, from 2024-25 to 2030-31.
- **Ministry** – Ministry of Agriculture and Farmers Welfare.
- **Key crops** - It will focus on enhancing the production of key primary oilseed crops such as Rapeseed-Mustard, Groundnut, Soybean, Sunflower, and Sesamum.
- It also focuses on increasing collection and extraction efficiency from secondary sources like Cottonseed, Rice Bran, and Tree Borne Oils.
- **Targets** - The mission aims to increase primary oilseed production from 39 million tonnes (2022-23) to 69.7 million tonnes by 2030-31.
- Together with **NMEO-OP (Oil Palm)**, the Mission targets to increase domestic edible oil production to 25.45 million tonnes by 2030-31 meeting around 72% of our projected domestic requirement.
 - Around 9 MT of palm oil is imported every year to the tune of Rs. 40,000 crore which is around 56 % of the total imports of edible oil.
- This will be achieved by promoting adoption of high-yielding high oil content seed varieties, extending cultivation into rice fallow areas, and promoting intercropping.
- **Features** - The Mission will harness ongoing development of high-quality seeds by using cutting-edge global technologies such as genome editing.
- The Mission also seeks to expand oilseed cultivation by an additional 40 lakh hectares by targeting rice and potato fallow lands, promoting intercropping, and promoting crop diversification.
- **SATHI Portal** - To ensure the timely availability of quality seeds, it will introduce an Online 5-year rolling seed plan through the 'Seed Authentication, Traceability & Holistic Inventory (SATHI)' Portal.

National Mission on Edible Oils - Oil Palm (NMEO-OP)

- It is a Centrally Sponsored Scheme in India aimed at enhancing the production of edible oils and oilseeds.
- **Launched in** – 2021.
- **Target** - The mission plans to expand oil palm cultivation to 10 lakh hectares by the year 2025-26.

- **Funding** - The cost of the initiative is shared between the Central and State Governments at a ratio of 60:40 for general states and 90:10 for northeastern states.

7.2 National Agriculture Code

The Bureau of Indian Standards (BIS) has begun the process of formulating a National Agriculture Code (NAC), on the lines of the existing National Building Code and National Electrical Code.

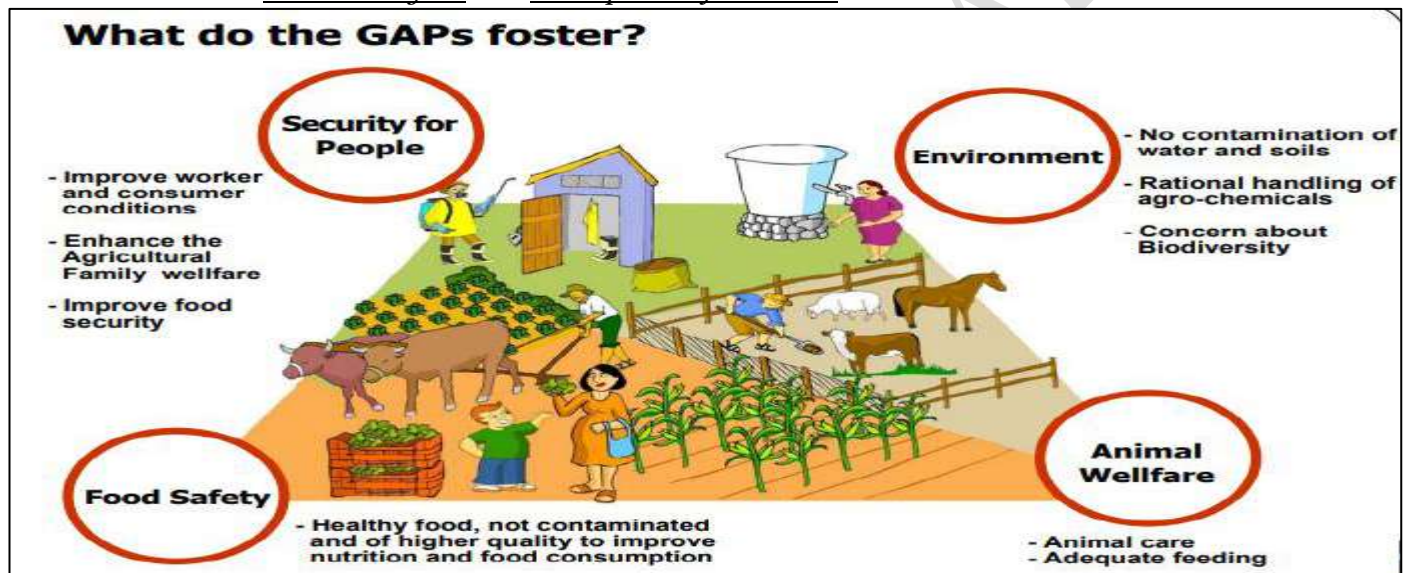
- It will cover the entire agriculture cycle, and will also contain a guidance note for future standardization.
- It will serve as a guide for farmers, agriculture universities, and officials involved in the field.
- The first part will contain general principles for all crops, and the second will deal with crop-specific standards for paddy, wheat, oilseeds, and pulses.
- It will also cover all agriculture processes and post-harvest operations, such as
 - Crop selection,
 - Land preparation,
 - Sowing/transplanting,
 - Irrigation/drainage,
 - Soil health management,
 - Plant health management,
 - Harvesting/threshing,
 - Primary processing,
 - Post-harvest, sustainability, and
 - Record maintenance.
- It will also include standards for input management, like use of chemical fertilisers, pesticides, and weedicides, as well as standards for crop storage and traceability.
- The NAC will cover all new and emerging areas like natural farming and organic farming, as well as the use of Internet-of-Things in the field of agriculture.
- **Objectives** - To create a code covering recommendations for agriculture practices taking agro-climatic zones, crop type, socio economic diversity of the country and all aspects of agrifood value chain into consideration.
- To act as an enabler of quality culture in agriculture by providing the required reference to policy makers, agriculture departments and regulators for incorporating the provisions of NAC.
- To create a comprehensive guide for the farming community to ensure effective decision making in agricultural practices;
- To integrate relevant Indian Standards with recommended agricultural practices.
- To address the horizontal aspects of agriculture such as SMART farming, sustainability, traceability and documentation; and
- To aid in the capacity building program organized by agriculture extension services and civil society organisations.
- **Deadline** - The panels will draft the code, with a tentative deadline for the NAC set as October 2025.

7.3 Good Agricultural Practices (GAP) & INDGAP

As a significant step to empower the farming community of Uttarakhand, APEDA has taken the key initiative for implementation and certification of Good Agricultural Practices (GAP) for over 350 farmers.

- **GAP** – They are some **codes, standards, regulation** followed in farm practices which were introduced in Europe, for the 1st time in the world, to ensure the food safety and quality.
- **Aim** – To deliver to the consumer healthy and safe high quality food and non-food products.

- **4 Pillars**
 - Economic viability
 - Environmental viability
 - Social acceptability
 - Food safety and quality
- **Stakeholders** – Governments, farmers, processors (food processing industries) and consumers.
- **Focus** – It focus at two levels
 - **Farm level focus** – From pre-harvest preparation, production and harvesting including transport to pack house.
 - **Pack level focus** – Post-harvest handling process like washing, grading, packing, storing, etc., including transport to consumers.
- **Potential benefits** – It helps improve the safety and quality of food and other agricultural products.
- It reduces the risk of non-compliance with national and international regulation, standards and guidelines.
- It also helps in promoting sustainable agriculture.
- It will ensure sustainable yield with development of livelihood.



Indian Good Agricultural Practices (INDGAP)

- **INDGAP** – It have been formulated to ensure the quality of our farm produce in the international market.
- These standards are voluntary and non-discriminatory to the growers.
- **Certification** - Quality Council of India (QCI) conduct voluntary certification scheme for these projects.
- **Institutional support** – It includes National Horticulture Board, APEDA, Spices Board, and National Medicinal Plants Board.
- These institutes encourage certified GAP and offer training on GAP procedures to equip farmers for globalized marketing.
- **Benefits for Uttarakhand** - This facilitates quality supply of agricultural products such as Mango & Vegetables from the state for exports to European Union (EU), UK, amongst other countries.



7.4 Hand-in-Hand (HIH) Initiative

Recently, the Food and Agricultural Organisation (FAO) Director-General opens the third Hand-in-Hand Investment Forum.

- It is a program by the Food and Agriculture Organization (FAO), United Nations.
- **Aim**
 - Eradicating poverty (SDG1),
 - Ending hunger and malnutrition (SDG2), and
 - Reducing inequalities (SDG10).
- It uses advanced geospatial modelling and analytics, as well as a robust partnership-building approach to accelerate the market-based transformation of agrifood systems.
- **Launched in** – 2019.
- **Focused areas** - It focuses on countries and territories where
 - Poverty and hunger are highest
 - National capacities are limited
 - Operational difficulties are greatest due to natural or man-made crises
- The HiH Initiative also has an open-access geospatial platform that provides Food security indicators, Agricultural statistics, and Access to millions of data layers from different domains and sources.
- **Members** - At present, **72 countries** that have joined.

Food and Agricultural Organization (FAO)

- **About-** It is a specialized agency of the United Nations that leads international efforts to defeat hunger.
- **Established year-** 1945.
- **Headquarters-** Rome, Italy
- **Goal-** To achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives.
- **Membership-** 195 members including the European Union
- **India-** It is one of the founding members of FAO.
- **Codex Alimentarius Commission-** It is created by WHO and FAO in 1961 to develop food standards, guidelines and texts such as codes of practice under the Joint FAO/WHO Food Standards Programme.
- **Publications-** The State of Food and Agriculture, The State of Food Security and Nutrition in the World, The State of World's Forests, The State of Fisheries and Aquaculture etc.,

7.5 Livestock census

The Union Minister of Fisheries, Animal Husbandry and Dairying recently launched the 21st Livestock Census in New Delhi.

- The census carries out a headcount of the number of domesticated **animals, poultry, and stray animals** in the country.
- **Duration** - Conducted **every 5 years.**
- Since 1919, a total of 20 livestock censuses have been carried out so far, with the last being conducted in 2019.
- The census takes into account information about the species, breed, age, sex, and ownership status of the animals.

Livestock Census, 2024

- **Animals counted in the 21st census** – 16 animal species will be collected.

- These include cattle, buffalo, mithun, yak, sheep, goat, pig, camel, horse, ponies, mule, donkey, dog, rabbit, and elephant.
- In total, the census will capture information on 219 indigenous breeds of these 16 species recognized by ICAR-National Bureau of Animal Genetic Resources (NBAGR).
- Besides these, the census will also carry out a headcount of poultry birds such as fowl, chicken, duck, turkey, geese, quail, ostrich, and emu.
- The census this time will be fully digitized, like the last one in 2019.
- The 21st census will capture several new data points. These include:
- **Data on pastoral animals, pastoralists** - The census will, for the first time, collect data on the contribution of pastoralists to the livestock sector, their socio-economic status, and livestock holding.
- **More details, granular information** - The census will find out the proportion of households whose major income comes from the livestock sector.
- It will also contain data on the gender of stray cattle.
- **Significance** - In terms of productivity, especially in the agriculture sector, poultry and animal husbandry contributes to roughly 30% of the Gross Value Added (GVA).
- In the economy overall, the livestock sector's GVA stands at roughly 4.7%. For comparison, the whole agriculture sector contributes to a GVA of roughly 15%.
- The Livestock Census will provide data pertaining to Goal 2 (Zero Hunger), and Target 2.5 (to maintain genetic diversity in food and nutrition), specifically Indicator 2.5.2 (The percentage of local livestock breeds that are at risk of extinction) of the SDGs.

GVA refers to the total output of a sector minus the cost of intermediate consumption.

7. ENVIRONMENT

8.1 World Animal Day

World Animal Day is celebrated worldwide recently.

- World Animal Day is observed **annually on October 4th**.
- **Theme, 2024** - "The world is their home too".
- It was first celebrated on 24th March 1925 by Heinrich Zimmermann, a German writer & animal welfare activist.
- The day is later celebrated yearly on October 4th to align with the feast day of Saint Francis of Assisi, the patron saint of ecology and animals.
- It is a global celebration that shines a light on animal rights, welfare, and conservation.
- This special day, dedicated to raising awareness about the protection and care of animals, encourages people to take action in safeguarding the creatures we share this planet with.
- It is a reminder of the vital role animals play in our world and our responsibility to ensure their safety and well-being.
- **Significance**- It draws attention to the plight of animals across the world, especially those affected by habitat destruction, poaching, and climate change.
- It encourages people to learn about the challenges animals face and take steps to protect them.
- **Promoting Animal Rights** - The day advocates for the fair treatment of animals, pushing for stronger laws and regulations to prevent cruelty and exploitation.
- It also emphasises the importance of recognising animals as sentient beings deserving of respect and compassion.
- **Encouraging Positive Action** - From grassroots campaigns to high-level initiatives, World Animal Day inspires everyone to take concrete steps in improving animal welfare.
- **Fostering Compassion**- World Animal Day promotes the message that humans have a responsibility to care for the creatures with whom we share the planet.

8.2 Amangarh Tiger Reserve

The body of an eight-year-old tiger was found on the border of Amangarh Tiger reserve of Bijnor and Jim Corbett National Park recently.

- Amangarh Tiger Reserve is a protected area in Bijnor district, Uttar Pradesh.
- The reserve encompasses a combination of grasslands, wetlands and dense forest.
- **Established in** – 2012.
- It is also known as New Jim Corbett Park.
- It has been declared as buffer area of Corbett Tiger Reserve to be known as the Amangarh Tiger Reserve, is now a corridor to Asiatic Elephant, Tiger and much other wild life.
- It is a part of **Project Tiger** and is recognized for its rich biodiversity and wilderness.
- The Reserve Was Said to Have 13 Tigers Which Jumped To A Total Of 20 In All India Tiger Estimation 2018.
- **Animals** - Tiger, Elephant, Swamp deer, Sambar, Cheetal, Hog deer, Kakar, Langur, Sloth bear, Porcupine, Otter, Monitor lizard, Turtles, Python, Gangetic Dolphin, Mugger, Gharial etc.
- **Birds** - Hornbill, Red Jungle Fowl, Pea fowl, Bengal Florican, Fishing eagle, Serpent eagle, Osprey, Woodpeckers, Shama, Indian Pitta, Paradise flycatcher, Orioles, Emerald dove etc.

8.3 Kaimur Wildlife Sanctuary (KWLS)

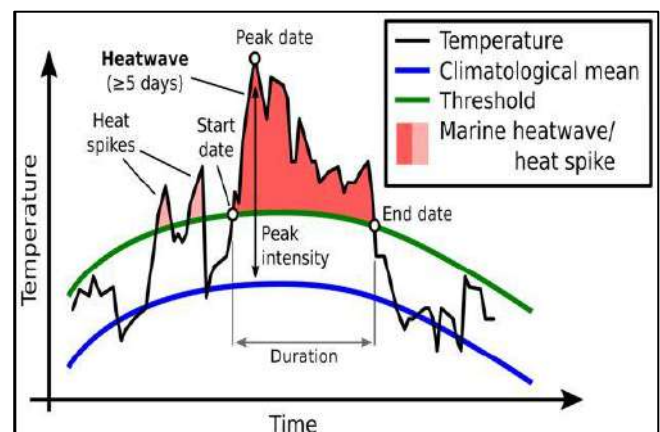
The central government has given its in-principle approval to develop the Kaimur Wildlife Sanctuary (KWLS) into Bihar's 2nd tiger reserve.

- It is the largest wildlife sanctuary in Bihar.
- It is located in the Kaimur hills range.
- **Established in** – 1982.
- The KWLS is bounded in the north and west by Uttar Pradesh, in the south by Jharkhand and in east by Bihar.
- **Waterfalls** - Karkat and Telhar.
- This sanctuary is a plateau situated between the Son River, bordering Jharkhand to the south, and the Karmanasa River, bordering Uttar Pradesh to the west.
 - The Oraon tribe is believed to have originated from this plateau.
- Kaimur Hills plateau is connected to the Bandhavgarh-Sanjay-Guru Ghasidas-Palamau tiger meta-population landscape
- **Species** - The sanctuary supports sizable populations of leopard, sloth bear, chital, sambar, wild pig, nilgai, and chowsingha, besides about 70 species of birds.

8.4 Marine Heat Waves (MHWs)

Researchers recently found that MHWs deep in oceans may be significantly under-reported and caused by ocean currents and also being impacted by global warming.

- MHWs can occur in any season they are defined based on differences with expected sea temperatures for the location and time of year.
- If the surface temperature of sea rises to **3 or 4 degree Celsius** above the average temperature for **at least 5 days**, it causes MHW.
- The phenomenon can manifest in any place in the ocean and at scales of up to thousands of kilometres.
- **Causes**



- **Surface heat flux** - When a high-pressure system sits over a body of water for a long time, the atmosphere heats the water's surface.
- **Advection** - Ocean currents move warmer water into a region.
- **Winds** - Winds can increase or decrease the warming that occurs during an MHW.
- **Climate modes** - Climate models like El Niño can change the likelihood of MHWs occurring in certain regions.
- **Human-caused climate change** - Human-caused climate change is a driver of MHWs.
 - 87 % of MHWs are attributable to human-induced warming.
- MHWs can last for weeks or even years.
- **Impacts**
 - Extreme weather events
 - Increased ocean stressors
 - Fisheries collapse
 - Coral deaths
 - Socioeconomic challenges for local communities
- **Trends** - The area and depth of all types of MHWs have been increasing significantly over the past two decades.
- **Predictions** - By the end of the 21st century, the annual MHW days are expected to increase to approximately 224.2 ± 26.9 days.
- The fraction of the global ocean experiencing MHWs is also expected to reach approximately 53.1 ± 6.3 %.

Recent Findings

- Researchers found that MHWs in deep oceans may be significantly under-reported.
- They found that in the deep ocean, atmospheric factors are not responsible for temperature changes (unlike MHWs). Instead, eddy currents play a major role.
- Eddies carry warm or cold water across long distances.

8.5 Ramgarh Vishdhari Tiger Reserve (RVTR)

A Tigress RVT-2 from the Ramgarh Vishdhari Tiger Reserve (RVTR) died recently, a massive setback for tiger conservation in Rajasthan.

- Ramgarh Vishdhari Tiger Reserve (RVTR) is located in Bundi district, **Rajasthan**.
- **Established in** – 2022.
- It is the **4th tiger reserve** in Rajasthan and the 52nd overall in India.
- The reserve includes the Ramgarh Wildlife Sanctuary as its core area.
- **Topography** - It represents a mix of **Vindhyan and Aravalli** geographical features.
- It is in continuation with the buffer area of **Ranthambore Tiger Reserve** on the north-eastern side and Mukundara Hills Tiger Reserve on the southern side.
- **Rivers** - Mez, a tributary of the Chambal River, passes through the tiger reserve.
- **Vegetation** - Dry Deciduous Forest.
- **Flora** – It comprises of fairly dense forest with **dhok** being the predominant species.
- The major tree species are Dhok (Anoggesius pendula) Khair (Acacia catechu), Amaltas (Cassia fistula), Tendu, Salar, Jamun, Kadamb, Ronjh, Ber, Arjun, etc.
- **Fauna** - Tigers, Panthers, Sloth Bears, Jungle Cats, Palm Civets, Ratels, Mongoose, Chital, Sambar, Wild Boar, Nilgai, Langur, and more than 150 species of birds.

8.6 Umbrella Conservation project

The wildlife wing of the Pune Forest department has recently proposed an umbrella conservation project.

- The project covers 5 wild animal species namely wolf, jackal, fox, civet and hyena. Together, these species are called '**Mizo-Carnivorous**'.
- It is a **species-specific conservation** approach.
- It has identified the five aforementioned wild animal species in Pune that are under threat and need urgent intervention for conservation.
- **Wolves** - The most endangered population of wolves in Pune.
- **Leopards** - The leopard population is expanding to new areas, causing significant crop and cattle damage.
- **Other animals** - Other wild animals in Pune are threatened by habitat destruction, conflict with stray dogs, and diseases.
- **Implementation** - This project will be implemented in 3 phases.
- The first phase will begin with data collection regarding the animal population and identifying the area they are living in. This also includes areas outside the protected forest.
- The later stage will include threat analysis and mitigation measures.
- The conservation plan has been submitted to the forest head office, and it is under consideration by the chief wildlife warden.
- **Threats** - Habitat destruction due to expansion of agriculture in grasslands, infrastructure projects.

8.7 Hasdeo Arand Forest

The Hasdeo forest in Chhattisgarh saw villagers clash with the police recently, after tree-felling for mining of coal resumed in the green belt.

- It is referred to as the "**lungs of Chhattisgarh**", with a wealth of biodiversity.
- According to the Indian Council of Forestry Research and Education (ICFRE), Hasdeo Arand is the **largest un-fragmented forests in Central India**.
- **Hasdeo-Arand Coalfield (HAC)** – It covers an area of 1,879.6 sqkm, spanning 3 districts of Sarguja, Korba and Surajpur, in the northern tribal belt of Chhattisgarh.
- **Biodiversity** – According to the ICFRE in 2021, there are 640 floral species, 128 medicinal plants and 40 timber-yielding species of plants.
- **Fauna** – There are 92 species of birds in Hasdeo and 25 different mammals, 16 types of snakes.
- It includes Elephant, Leopard, Sloth Bear, Indian Grey Wolf, Honey Badger, Four-Horned Antelope, Indian Pangolin, Giant squirrel, and Rusty spotted cat.
- **Flora** - It consists of pristine Sal (*Shorea robusta*) and teak forests.
- **Wildlife corridor** – It is a habitat as well as a corridor for elephants and a corridor for tigers.
- **Tribal habitat** – It is home to Adivasi communities such as **the Gonds**, who have been stewards of the environment for eons.
- **Watershed area** – It is the **catchment of the Hasdeo River**, the Mahanadi's largest tributary.
- It is also the **watershed for the Hasdeo Bango reservoir**, which irrigates 300,000 hectares of land in Chhattisgarh.



As per a 2021 report by the Wildlife Institute of India (WII), 9 species in HAC have special protection under **schedule I of the Wildlife Protection Act, 1972**.

8.8 Coral Triangle

A recent report highlighted at the 16th Conference of Parties (COP16) to the Convention on Biological Diversity (CBD) reveals the serious dangers brought by fossil fuel expansion to the Coral Triangle.

- It is one of the most biodiverse marine areas in the world.
- It is often referred to as the '**Amazon of the seas**', is a huge marine area spanning over 10 million square kilometres.
- **Spanning Countries** - It includes countries like Indonesia, Malaysia, Papua New Guinea, Singapore, the Philippines, Timor-Leste, and the Solomon Islands.
- This region is home to 76% of the world's coral species and supports more than 120 million people who rely on its resources for their livelihoods.



Findings of the report

- **Impact of offshore oil and gas blocks** – Operation blocks cover over 120,000 square kilometres, which is about 1% of the Triangle.
- Additionally, there are over 450 blocks being explored for future extraction, covering another 1.6 million square kilometres.
- If all these activities become fully operational, they could impact 16% of the Coral Triangle.
- The report also looks at the growing liquefied natural gas (LNG) infrastructure in Southeast Asia.
- **Threat to Biodiversity** – There are overlaps with oil and gas blocks, affecting 24% of coral reefs, 22% of seagrass areas, and 37% of mangroves.
- **Oil pollution** – Since 2020, 793 oil slicks have been detected in the Coral Triangle, mainly due to ships, with 98% caused by bilge dumping from traveling vessels.
- One of the most serious events mentioned in the report is the *Princess Empress oil spill*, which occurred in 2023 near the coast of the Philippines.
- This spill adversely affected more than 20 marine protected areas (MPA) and impacted 21,000 families, with economic damages reaching about 3.8 billion Philippine pesos (around \$68.3 million).
- The spill disrupted local fishing industries and endangered marine habitats.
- **Noise pollution** – It occurs from shipping and exploration activities harms marine life, especially species like whales and dolphins that rely on sound for communication, navigation, and finding food.
- Loud noises from seismic exploration and commercial shipping can disrupt these essential functions and lead to changes in behaviour and increased mortality rates in some marine species.

SPECIES IN NEWS

8.9 Khur

Khur have recently overcome a near-extinction event.

- It is an *Indian Wild Ass*, a species of ass that is native to the countries of southern Asia.
- It is one of the 4 remaining subspecies of the Asian Wild Ass.

- **Scientific name** - Equus hemionus khur
- **Other local terms** – Ghudkhur or Indian onager
- **Range** – Earlier it extended from Southern India towards southern Pakistan, Afghanistan and south-eastern Iran but now, it can only be found in India.
- **Features** – It is almost the *size of a zebra*, and lives for *21 years*.
- Stable groups consist of *females and their young* while Stallions tend to be loners, especially in the breeding season.
- On the flat terrain of the Rann, they are capable of bursts of up to *70 km per hour*.
- Their gestation periods are long, 11 to 12 months, and concurrent lactation and pregnancy is sometimes seen.
- **Feed** – It predominantly feeds on grasses.

Survival strategies of Khur

- Like donkeys and other members of the Asinus subgenus, possesses a remarkable ability to locate sustenance in desolate environments.
- During summer when grasses are scanty and dried they used to *feed on Prosopis pods and leaves*.
- Their *digestive systems are adept* at processing even the most arid vegetation.
- **Overcome a near-extinction event** – On account of diseases like
 - Viral African Horse sickness
 - Surra
- **Low level of genetic diversity** - It is due of a *genetic bottleneck* caused by disease outbreaks, which left only a small survivor.
- It has outlasted predators such as the cheetah and the lion, which were last spotted in this region in the 1850s.

- **Threat** – *Increased human presence* for salt farming, agriculture coupled with extensive *cattle grazing*, has led to their dispersal.
- *Irrigation canals* that bring water to the southern rim of the Little Rann can also add salinity to the soil.
- **Conservation status**
 - IUCN – Endangered
 - **Wildlife Protection Act 1972** – Schedule I
- **Conservation** – India has declared a **Wild Ass Sanctuary** in Little Rann of Kutch, the largest sanctuary in Gujarat.
- It was set up in 1973, only remaining habitat of the Indian wild ass.
- About 6,000 of these sandy and brown creatures live in this area.

Surra is an infection in Indian Wild Ass caused by the protozoan parasite *Trypanosoma evansi* and spread by biting insects.

8.10 Sus salvanius (Pygmy hogs)

Captive breeding and conservation efforts since 1996 in Assam have provided pygmy hogs back to the wildlife.

- **Scientific Name** - Porcula salvania.
- It is the **smallest wild pig species** and the only species in the genus Porcula.
- They are tiny, shy and considered extinct in the wild till its rediscovery in the Barnadi Wildlife sanctuary in Assam way back in 1971.
- The pygmy hog is one of the very few mammals that build its own home, or nest, complete with a 'roof'.
- It is an **indicator species** (Organism whose presence, absence or abundance reflects a specific environmental condition).
- **Appearance** - Males are slightly bigger than females. Their coats have blackish-brown bristles over gray-brown skin and they have no facial warts.

- Both sexes have a tail and females have 3 pairs of mammae.
- **Habitat**-Pygmy hogs live in tall, dense grasslands that have a mixture of shrubs and trees.
- **Distribution** – It is found only in the reserve forest belts of the Manas Wildlife Sanctuary and the Barnadi Wildlife Sanctuary in northwestern Assam, India.
- It remain hidden in tall dense grass and rarely emerge in the open.
- **Diet** - Pygmy hogs have well developed teeth, with upturned canines and molars with rounded cusps. This allows them to enjoy an omnivorous diet.
- **Threats** - Habitat loss and degradation, and illegal hunting.
- **Conservation status**
 - IUCN – Endangered
 - CITES - Appendix I
 - **Wildlife (Protection) Act, 1972** - Schedule I



8.11 Swallowtail butterflies

A new study found that the overexploitation of 25 species of host plants threatens the swallowtail butterflies in the forest habitats of a part of Assam often referred to as the “citrus belt of the world”.

- **Family** – Papilionidae.
- Swallowtail butterflies are named for the distinctive "tail-like" projections on their hindwings, even though many species within this group lack these tails.
- **Distribution** - It includes over 550 species found worldwide, except in the Arctic. India is home to 77 of the 573 recorded species.
- **Characteristics** - They are known for their large size and colorful appearance, specifically the characteristic tail-like extensions on their hindwings.
- **Diet** - Swallowtail butterflies primarily feed on nectar from a variety of flowering plants.
- These butterflies often mimic the patterns of distasteful species to avoid predation.
- They serve as valuable indicator species, reflecting the health of their ecosystems.
- There are many species but the most famous ones are Blue-striped mime (*Papilio slateri*), Bhutan glory (*Bhutanitis lidderdali*), and Kaiser-i-Hind (*Teinopalpus imperialis*).
- Swallowtail is the **state butterfly of Arunachal Pradesh.**
- **Conservation** - The International Union for Conservation of Nature designated the northeastern part of the country, where 69 species have been recorded, ‘swallowtail-rich zone’ under the Swallowtail Conservation Action Plan.
- **Threat** - Habitat destruction due to illegal farming, agriculture, deforestation, and pesticide use.

8.12 Indian Wolf

Indian wolves are sacred beings for Koppal’s Kuruba shepherds by removing diseased sheep, prevent spread of infection, saving most of the flock.

- **Scientific Name** - *Canis lupus pallipes*.
- It is a subspecies of Grey wolf.
- They are also relatively less vocal and have rarely been known to howl.
- Indian wolves are territorial and hunt during the night. One wolf usually is acting as a decoy while the other attacks from behind.
- **Habitat** - lives in semi-arid and arid areas.
- **Size** - The Indian wolf is intermediate in size between the Arabian and Himalayan wolves.
- It lacks the Himalayan wolf’s thick winter coat because it lives in warmer conditions.

- **Distribution** – Found in India, Pakistan, Afghanistan, Nepal, Bhutan, Israel, Turkey, Iran, and Syria.
- **Population** – There are approximately 400-1,100 wolves living in the Himalayan Region and 4,000-6,000 wolves in the Peninsular Region.
- **Diet** - Indian wolves are carnivores and prey mainly on antelopes, rodents, hares, and raccoons.
- Indian wolves are monogamous and mate for life.
- **Conservation status**
 - **Wildlife Protection Act of 1972** - Schedule I.
 - **IUCN** - Endangered.
 - **Threats** - Habitat loss, unregulated hunting, and loss of prey.



8.13 Caracal

Gujarat government allocates Rs 10 crore for Caracal conservation and breeding recently.

- **Scientific Name** - Caracal caracal.
- The caracal is a **medium-sized wildcat** primarily nocturnal animal.
- The caracal's name comes from the Turkish word karakulak, which means "black ear".
- In India, it is called siya gosh, which is Persian for "black ear".
- **Appearance** –The caracal has long legs, a short face, long canine teeth, and have Black markings around eyes and whiskers.
- It is known for its remarkable agility, capable of leaping over 3 meters (9.8 feet) to catch birds in midair.
- Among small cats, caracals are the largest in Africa, recognized for both their speed and weight.
- **Diet** - Caracals are strictly carnivorous and prey primarily on birds, rodents and small antelopes.
- **Habitat** - They live in woodlands, savannahs and in scrub forests, but avoid sandy deserts. In southern Africa, they usually live in upland areas.
- **Distribution** - Most regions of Africa, the Arabian Peninsula through northwest India and in Middle East.
- **In India** - It is now only found in a few areas of India, including:
 - Ranthambhore Tiger Reserve, Rajasthan.
 - Kutch region, Gujarat.
- **Conservation status**
 - **IUCN** - 'least concern'.
 - **Wildlife (Protection) Act, 1972** - Schedule-I.
 - Conservation Assessment and Management Plan (CAMP) listed as 'near threatened'.
- **Threats** - Hunting, Habitat loss and Competition with other predators.
- **Conservation areas**
 - Kachchh Wildlife Sanctuary (WLS) in Gujarat
 - The tiger reserves of Ranthambhore, Mukundra hills, and Sariska
 - The WLS of Kumbhalgarh, Mount Abu, and Todgarh-Raoli in Rajasthan
 - Gandhi Sagar WLS in Madhya Pradesh



8.14 Halari donkeys

The halari donkeys form close bonds with people, supporting for transport needs with the surviving population of fewer than 500.

- Halari donkey is a beautiful breed of donkey native to Halar region of Gujarat.
- They are considered to be intelligent animals which work closely with human beings.
- **Appearance** – They are white in colour, and is larger and more resilient than other donkey breeds.
- **Habitat** - It is an important domestic animal in the semi-arid landscape of Jamnagar and Dwarka districts in Gujarat's Saurashtra region.
- **Community Usage** - The Bharwad and Rabari pastoralists are the main communities to use this donkey as a pack animal for carrying luggage during migration.
- The Kumbhar (potter) community also uses this animal for pottery work in the Jamnagar region.
- **Uses** - Halari donkey milk is known for its sweetness. Milk powder made from it can fetch upwards of ₹7,000 a kg in the international market, and is used for cosmetic purposes.
- **Conservation status** – Endangered.
- The Sahjeevan Trust has worked to conserve this breed in collaboration with the Animal Husbandry Department of the Gujarat government.



8.15 Extinction of Bird Species

In a recent study, researchers have documented the extinction of 610 bird species over a period of 130,000 years.

- **3 main drivers** – **Habitat loss, hunting** and introduction of **non-native species** leads to extinction of avian species.
- Most of the documented extinctions occurred on islands.
- Capturing birds for the songbird trade is a big issue, particularly in Southeast Asia.
- Avian malaria, introduced by people, has triggered large numbers of extinctions in Hawaii, particularly among the endemic **Hawaiian honeycreepers**.
- **Anthropogenic causes** – Of the 610 species, **90% of them** went extinct at least partially due to humans.
- It coincides with the **spread of Homo sapiens** across the globe.
- The effect of this spread has only increased in the past few years
 - For instance, the **Kaua'i 'ō'ō, a Hawaiian songbird**, was declared extinct just last year.
- **Ecological impacts** - It includes **loss of seed dispersal**, pollination, the consumption of insects & the recycling of dead material.
- **Biodiversity impacts** – It can **precipitate secondary extinctions** of fruit bearing plants.
- Once one species goes extinct, there will likely be other extinctions or even an avalanche of them which is known as secondary extinction.
- **Health impacts** – There is **rise in disease outbreaks** due to fewer scavengers consuming carrion

A frugivore is an animal that thrives mostly on raw fruits or succulent fruit-like produce of plants such as roots, shoots, nuts and seeds. Approximately 20% of mammalian herbivores eat fruit.

Case study of Dodo Extinction

- **Dodo** – A **flightless bird** that inhabited the Indian Ocean island of **Mauritius**.
- It was finely adapted to the isolated ecosystem.
- **Discovery** – It was 1st encountered by Dutch sailors **in 1598**.
- **Threat** – **Hunting, habitat destruction** and the introduction of **non-native species** doomed it in under 80 years.
- **Extinction** – It became **extinct by 1681**.

8.16 Long-billed Vulture

The population of the long-billed vulture has seen a steady increase between 2015 and 2021, with the species exhibiting a 74% breeding success rate in the Mudumalai Tiger Reserve (MTR).

- It is a medium-sized bird of prey (any bird that pursues other animals for food) native to the Indian subcontinent.
 - **Scientific Name** - Gyps Indicus.
 - **Family** – Accipitridae.
- It is also known as the Indian vulture, Indian Griffon.
- **Appearance** - It features a light brown body with a dark head and neck, and it has a pale bill and collar that is more prominent behind the neck.
- It is similar to Slender-billed Vulture, but Indian Vultures are not as lanky and have a paler bill and very tiny ear holes.
- **Distribution** - Found in India and South East Pakistan.
- **Natural habitat** - Found in cities, towns and villages near cultivated area and open woody areas.
- **Diet** - Long-billed Vulture feeds exclusively on carrion, and mainly remains of cattle.
- **Breeding season** - November to March. Female lays one single whitish egg.
- **Nesting** - Nests in small colonies usually on cliffs. Nests are enormous and constructed with the help of sticks and lined with green leaves and rubbish. Both adults share the nesting duties.
- **Conservation status**
 - **IUCN** - Critically endangered.
 - **CITES** - Appendix II.
 - **WPA, 1972** – Schedule 1.
- **Threats**
 - Forest fires
 - The use of non-steroidal anti-inflammatory drugs, like diclofenac, in treating cattle, and
 - Farmers indulging in poisoning of tigers and leopards that occasionally prey on domestic cattle.



Mudumalai Tiger Reserve

- Mudumalai Tiger Reserve (MTR) is located in the Nilgiri District of Tamil Nadu.
- It is at the tri-junction of Karnataka, Kerala and Tamil Nadu.
- The Tiger Reserve comprises of the wildlife sanctuary and the national park of the same name.
- It forms a part of the Nilgiris Biosphere Reserve.
- It has a common boundary with Wayanad Wildlife Sanctuary (Kerala) on the West, Bandipur Tiger Reserve (Karnataka) on the North.
- The Moyar River flows downstream into the Mudumalai Tiger Reserve and is the natural line of division between Mudumalai and Bandipur Sanctuary.
- Other 2 vulture species observed in the reserve are the white rumped vulture and Asian king vulture.

8.17 Rufous-tailed rock thrush

The female Rufous-tailed rock thrush was recently spotted in Kanniyakumari Wildlife Sanctuary could be a passage migrant to Africa.

- It is a distinctive, small, short-tailed thrush-like bird.
- **Scientific Name** - Monticola saxatilis.

- **Family** - Muscicapidae.
- It is known as Common rock thrush.
- **Appearance**
 - Males are strikingly beautiful with bright blue-gray head, white back patch, and chestnut underparts.
 - Females are reddish-brown and have a scaly appearance, with a tail pattern similar to males.
- **Distribution** - Europe, northwestern Africa, and parts of Asia
- **Breeding** - Breeds on rocky mountain slopes and alpine meadows, usually above 1,500 m (5,000 ft).
- **Migration** - It migrates to Africa during the non-breeding season.
- **Diet** - It is omnivorous, eating a range of insects, berries and small reptiles.
- **Behavior** - Usually shy but may be obvious when delivering its melodic Eurasian Blackbird-like song in flight. The male common rock thrush has a clear and tuneful song.
- **Conservation status**
 - IUCN - Least Concern
- **Threats** - Habitat loss and degradation and indiscriminate shooting.



Kanyakumari Wildlife Sanctuary

- The sanctuary is widely known to be a tiger reserve and is known to be a wildlife corridor
- **Declared in** - 2008.
- **Rivers** - 7 rivers have their origin in this forest including the famous Pahrli and Thamirabarani rivers.
- **Vegetation** - Southern thorn forests, dry deciduous, moist deciduous, semi evergreen forests and ever green hill sholas with grassy downs.
- **Fauna** - Indian Bison, Elephant, Nilgiri Tahr, Sambar Deer, Lion-tailed Macaque and also reptiles such as Indian Rock Python.
- **Other spotted birds** - Persian shearwater (*Puffinus persicus*) and Willow warbler (*Phylloscopus trochilus*).

8.18 African penguin

A new study by an international team of researchers has found that Artificial nests can enhance the breeding success of African penguins by 16.5%.

- It is Endemic to **Southern Africa**.
- **Scientific Name** - Spheniscus demersus.
- It is also known as Cape penguin.
- It is flightless, with a streamlined body and wings stiffened and flattened into flippers for a marine habitat.
- **Distribution** - The African penguin breeds on the African mainland from Hollams Bird Island, Namibia to Bird Island, Algoa Bay, South Africa.
- **Appearance** – The plumage covering the chin and back is black, and most of the breast plumage is white, possess prominent C-shaped regions of white feathers on both sides of the head.
- **Size** – It can reach up to 60–68 cm in length and weigh up to 3.7–4 kg, the males being slightly larger than the females.
- **Diet** - African penguins primarily feed on pelagic schooling fish, especially sardines and anchovies.
- **Breeding** - The species breeds naturally in burrows dug into guano (a natural substance composed of the excrement of birds, bats, and seals), protects them from the extreme heat of their environment.



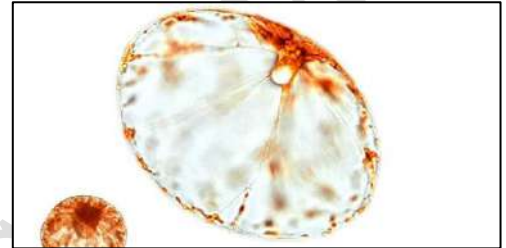
- These burrows also protect their broods from harsh winds and rain, which can be fatal to chicks.
- **Breeding season** - Breeding peaks between March and May in South Africa and during November and December in Namibia.
- **Conservation status**
 - IUCN – Endangered
- **Threats** - Competition for food, Climate change, Habitat loss, Oil spills.

The penguins prefer the artificial nests over burrows dug in guano.

8.19 Pyrocystis noctiluca

The phytoplankton *Pyrocystis noctiluca* is able to navigate vertically upward in the ocean by ballooning to 6 times its size.

- It is a **single-celled marine plankton** that produces bioluminescence, or blue light, in response to water movement.
- **Appearance** - A spherical dinoflagellate alga that's 250–400 µm in size.
- **Habitat** - Lives in tropical and subtropical seas and oceans.
- **Diet** - Eats sugars produced through photosynthesis.
- **Predators** - Crustaceans like copepods.
- **Defense** - Uses bioluminescence to startle predators or highlight their movements to make them vulnerable to secondary predators.
- **Bioluminescence** - When mechanically stimulated, the cells produce a blue flash of light through a luciferin-luciferase reaction.
- **Photosynthesis** - It makes once-in-a-lifetime trip from about 125 meters deep to about 50 meters, where there's more of the sunlight that they need to photosynthesize.
- **Density** - It is denser than seawater and should sink. But at the beginning of its life cycle, it swells, reducing its density and traveling up the water column.
- At the end of its 7-day life cycle, the cell then starts to divide into two daughter cells as it sinks.
- When the division is completed, the two newborn cells inflate by filling up with seawater ballooning to six times their original size in around 10 minutes. And so the cycle begins again.



8.20 Haliotis pirioma

Rare New Paua Species Discovered in Northern New Zealand recently.

- It is a new species of paua mollusk (also known as abalone).
 - Abalones (family Haliotidae) are herbivorous marine gastropods that occupy hard substrates in **shallow non-polar regions** worldwide.
 - Several haliotids are the basis of wild-caught and/or aquaculture fisheries.
 - Presently, almost 70 species and many subspecies and forms are scientifically recognized, all in the genus Haliotis.
- **Habitat** - Haliotis pirioma lives at 5-47 m depth under rocks and in rock crevices.
- **Distribution** - It has only been found at Manawatawhi 3 Kings Islands, off the northern North Island.
- **Appearance** - It resembles other small paua from the North Island but the shell has finer sculpture across its back & a subtly different shape.
- **Distinction** - Haliotis pirioma differs further from mainland populations of Haliotis virginea in average shell shape.



- Shell shape generally having a lower profile, especially abapically, a more angular abapical margin, and a flatter, broader, and more sharply delimited umbilical margin.
- **Uses** - Shells are often prized for art, cultural practices, jewellery, and by shell collectors.

8.21 Nilgiri tit butterfly

Butterfly enthusiasts from the Nilgiris have recorded for the first time in India, the Nilgiri tit (Hypolycaena nilgirica) utilising a large terrestrial orchid plant as a host.

- It is a rare, endemic butterfly an uncommon species of lycaenid or blue butterfly.
- **Scientific Name** - Hypolycaena nilgirica.
- **Appearance** - The male has a dark reddish purple-brown upper side with characteristic black spots capped in orange near its tails, while the female is pale brown.
- It has tapering patches of white dustings above the black spots and in the adjacent interspaces.
- **Behavior** - Males engage in mud sipping. Their flight is moderately fast and they visit flowers in hedges. They bask in the morning, but do not open their wings otherwise.
- **Habitat** - They inhabit forests and lush home gardens, especially those with orchids.
- **Distribution** – It is found in Western Ghats and Sri Lanka.
- **In India** –
 - **Tamil Nadu** - Geddai slopes of Nilgiris district,
 - Aiyannar Falls of Virudhunagar district,
 - Anamalais of Coimbatore district
 - Kalakkad Mundanthurai Tiger Reserve of Tirunelveli district
 - **Kerala**- Chinnar Wildlife Sanctuary of Idukki district, and
 - Silent Valley National Park of Palakkad district
- The Nilgiri tit was noted to lay its eggs on the inflorescence (complete flower head) of the larval host plant, *Eulophia epidendreae*, a terrestrial orchid species.
 - This terrestrial orchid was found on rocky slopes in humid areas.
 - Eulophia epidendreae was mainly associated with grasses such as Cymbopogon flexuosus, Chrysopogon nodulibarbis, Melinis repens, among other floral species.
- **Conservation status** - Schedule II of the Wildlife Protection Act. It is not listed on the IUCN Red List of Threatened Species.



8.22 Tenkana Genus & Tenkana Jayamangali

Recently, arachnologists discovered a new genus of jumping spiders, Tenkana, across southern India. This genus encompasses two previously known species and also includes a spider called Tenkana jayamangali in Karnataka.

- **Tenakana Genus** - Tenkana comes from the Kannada word for south, reflecting that all the known species are from southern India and northern Sri Lanka.
- This new group belongs to the *Plexippina subtribe of jumping spiders* and is different from related groups such as Hyllus and Telamonia.
- Two species that were previously in Colopsus - Tenkana manu (found in south India and Sri Lanka) and Tenkana arkavathi (from Karnataka) have now been moved to the new genus.

Tenkana jayamangali

- **Nomenclature** - Jayamangali comes after the Jayamangali River at Devarayanadurga reserve forest in Karnataka, where it was first seen.
- **Habitat** - Unlike related species that live in forests, Tenkana spiders prefer drier areas and ground habitats.

- **Distribution** - Tamil Nadu, Puducherry, Karnataka, Telangana and Andhra Pradesh.
- Tenkana jayamangali is a sister species to T arkavathi and T manu.
- Its movements are reminiscent of those of the unrelated ground-dwelling *Stenaelurillus* jumping spiders.
- **Appearance** - The males of T jayamangali, pale hairs occupy most of carapace surface area leaving small bald patch posteriorly while in
 - T arkavathi and T manu, pale hairs are gentler on carapace forming narrower bands on carapace laterally, tapering posteriorly.
- Ocular area of T jayamangali is covered with white hairs uniformly, while
 - T arkavathi has distinctive V-shaped bands and T manu has bald ocular area.
- The colour pattern of the male resembles the face of a panda and has a brownish abdomen. The female on the other hand is grey with some pattern.



8.23 Hornets

A species of hornet that often munches on foods containing alcohol can hold its liquor, without any side effects, at levels that no other known animal can tolerate.

- Hornets are social insects and the largest of the ***eusocial wasps***.
- **Family** – Vespidae.
- **Appearance** - They are known for their black or brown bodies with yellow or yellowish markings.
- It can resemble yellowjackets, which are their close relatives.
- **Size** -Some species of hornets can reach lengths of up to 5.5 cm.
- **Behavior** - They are known for living in colonies and can be quite aggressive when defending their nests.
- They construct nests from a paper-like material made from chewed wood fibers mixed with saliva.
- **Habitat** - Nests are typically found in trees, bushes, or sheltered areas.
- **Distribution** - Asia, Europe, and Africa, with one species introduced to North America.
- **Diet** - Oriental hornet (*Vespa orientalis*) consumes nectar and ripe fruits, including grapes. This fruit contains sugar that, when it naturally ferments over time, turns into ethanol.
- The oriental hornet shows no ill effects or behavioural changes when it spends a week drinking an 80% alcohol solution.
- The hornets produce NADP+, which helps break down alcohol.
- **Toxicity** - Hornets, particularly larger species like the Asian giant hornet, are known to inject a larger amount of venom per sting compared to most other stinging insects.

Fruit flies and tree shrews cannot stomach more than 4% ethanol in their meals.

8.24 Underground Animals near hydrothermal vents

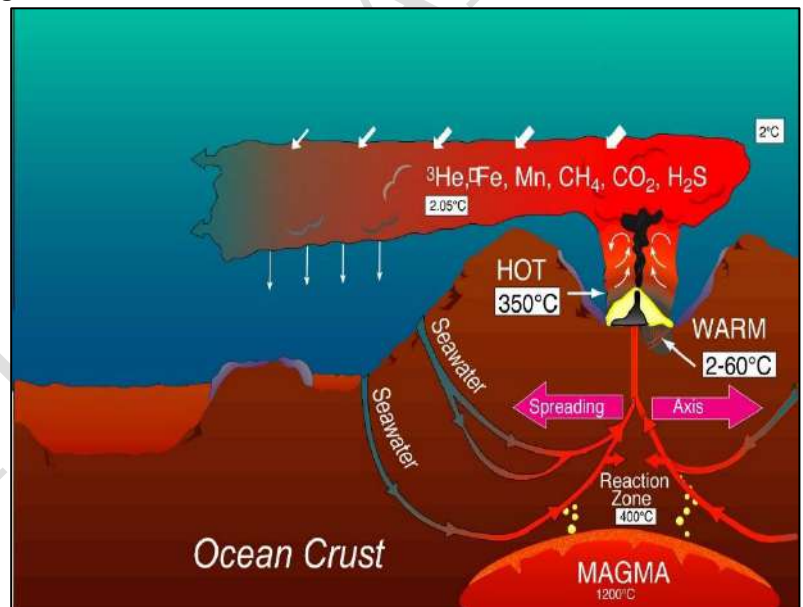
Recently, animals found living underground near deep-sea hydrothermal vents using the remotely operated underwater vehicle SuBastian.

- **Hydrothermal vents** – These are fissures on the seabed from which geothermally heated water discharges.
- They are commonly found near volcanically active places, areas where tectonic plates are moving apart at mid-ocean ridges, ocean basins, and hotspots.
- Seawater circulates deep in the ocean's crust and becomes superheated by hot magma.
- As pressure builds and the seawater warms, it begins to dissolve minerals and rise toward the surface of the crust.
- The hot, mineral-rich waters then exit the oceanic crust and mix with the cool seawater above.

- As the vent minerals cool and solidify into mineral deposits, they form different types of hydrothermal vent structures.
- The ability of vent organisms to survive and thrive in such extreme pressures and temperatures and in the presence of toxic mineral plumes is fascinating.
- The conversion of mineral-rich hydrothermal fluid into energy is a key aspect of these unique ecosystems.
- Through the **process of chemosynthesis**, bacteria provide energy and nutrients to vent species without the need for sunlight.
- **Recent Exploration** – It was conducted at the **East Pacific Rise**, a volcanically active ridge on the floor of the southeastern Pacific, running approximately parallel to South America's west coast.
- Earth's rigid outer part is divided into colossal plates that move gradually over time in a process called plate tectonics.
- The East Pacific Rise is located where two such plates are gradually spreading apart.
- This area contains many hydrothermal vents, fissures in the seafloor situated where seawater and magma beneath the Earth's crust come together.
- Magma refers to molten rock that is underground, while lava refers to molten rock that reaches the surface, including the seafloor.
- New seafloor forms in places where magma is forced upward toward the surface at a mid-ocean ridge and cools to form volcanic rock.
- The hydrothermal vents spew into the cold sea the super-heated and chemical-rich water that nourishes microorganisms.
- The warm venting fluids are rich in energy for example, **sulfide that can be used by microbes**, which form the basis of the food-chain.
- **Founded species** - Life flourishes around the vents including giant tubeworms reaching lengths of 10 feet, mussels, crabs, shrimp, fish and other organisms.
- The giant tubeworms do not eat as other animals do. Instead, bacteria residing in their body in a sack-like organ turn sulfur from the water into energy for the animal.
- Larvae from these animals may invade these sub seafloor habitats.
- They were living inside cavities within the Earth's crust at an ocean-floor site where the Pacific is 1.56 miles (2,515 meters) deep.
- All the species were previously known to have lived near such vents, but never underground.
- It is the **first time that animal life has been discovered in the ocean crust**.

The deepest vent located so far is in the **Cayman Trough**, which is the deepest point in the Caribbean Sea. The trough is located along the boundary between the North American Plate and the Caribbean Plate.

East Pacific Rise (EPR) is a mid-ocean rise at a divergent tectonic plate boundary, located along the floor of the Pacific Ocean.



8.25 Asiatic Golden Cat

Presence of 'Asiatic golden cat' reconfirmed in Assam's Manas National park recently.

- Asiatic golden cat is a **medium-sized wild** cat native to Asia.
- **Scientific Name** - Catopuma temminckii.
- **Appearance** - The Asian golden cat is polymorphic in color. It showcases a variety of coat colors, including golden, red brown, dark brown, and grey.

- **Habitats** - It thrives in dry deciduous forests, subtropical evergreen forests, tropical rainforests, and even temperate and sub-alpine forests.
- It can be found at elevations ranging from sea level to 3,738 meters.
- **Distribution** – It is found across Northeast India, Southeast Asia, and southern China.
- It is also found in protected areas such as
 - Khangchendzonga Biosphere Reserve (Sikkim),
 - Buxa Tiger Reserve (West Bengal),
 - Nongkhyllam Wildlife Sanctuary (Meghalaya),
 - Dampha Tiger Reserve (Mizoram),
 - Namdapha Tiger Reserve, Kamlang Tiger Reserve,
 - Debang valley,
 - Pakke Tiger Reserve,
 - Eaglenest Wildlife Sanctuary,
 - Singchung-BugunVCR and
 - Talle-Valley Wildlife Sanctuary (Arunachal Pradesh), and
 - Intanki National Park (Nagaland).
- **Behavior**- Asian golden cats are solitary and territorial. Once considered nocturnal, a radio-tracking study showed them to be diurnal and crepuscular.
- **Diet** – Asian golden cats are carnivores, often eating small prey like Indochinese ground squirrels, small snakes, and other reptiles, muntjacs, rodents, birds, and young hares.
- **Mating** - Asian golden cats are polygynous (mating with multiple females) with ***no breeding season***.
- **Conservation status**
 - IUCN - Near Threatened.
 - **Wildlife (Protection) Act, 1972** - Scheduled-I.
 - CITES - Appendix I.
- **Threats** - Habitat destruction, deforestation, decreasing numbers of ungulate prey, illegal wildlife trade, hunting by tribal people for meat and skin to use in tribal rituals.



8.26 Anguiculus dicaprioii

A team of scientists named a new species of snake, *Anguiculus dicaprioii* recently.

- It is a ***colubrid snake***, refers to any member of the family Colubridae, which is the largest family of snakes.
 - This family comprises 304 genera and approximately 1,938 species. They account for almost two-thirds of all living snakes in the world.
- The new species was discovered in ***Western Himalayas*** by the team of researchers from India, Germany and United Kingdom in 2020.
- **Nomenclature** - Anguiculus is Latin for small snake. The proposed nomen highlights the small size (SVL) of members of the new genus in relation to members of the family Colubridae.
- It has been named after Hollywood star Leonardo DiCaprio for his efforts to create awareness about biodiversity loss.
- Suggested common English name is ***'Himalayan snake'***.
- **Appearance** - The species is small, growing up to 22 inches, with distinct features such as a steeply domed snout and a faint grey collar around its neck.
- The snake resembled ***Liopeltis rappi***, a species known to be found in the eastern Himalayas.



- **Habitat** - They live at heights of around 6,000 feet above sea level.
- **Distribution** - The snake is found in Chamba, Kullu and Shimla in Himachal Pradesh, Nainital in Uttarakhand and Chitwan National Park in Nepal.

8.27 Great Eared Nightjar

The Great Eared Nightjar is one of the most mesmerizing creatures, due to its striking resemblance with a mythical dragon, especially when perched.

- The Great Eared Nightjar is a dragon-like appearance bird ***native to Southeast Asia.***
 - **Scientific Name** - Lyncornis macrotis.
 - **Family** - Caprimulgidae.
- **Nomenclature** - The name 'nightjar' comes from the bird's ***nocturnal*** habits and its calls are often called as jarring.
- **Appearance** - They have large, forward-facing eyes, big head, and intricate patterning of brown, black, and gray on its feathers.
- It has a white throat band but has no white on its wings or on its tail.
- **Habitat** - These birds prefer to dwell in thick forests, woodlands and mangroves. Instead of making nests really high up on trees, they typically roost on the ground or low branches.
- **Distribution** - It can be found roaming the skies from parts of India and Sri Lanka to the Malay Peninsula, the Philippines, and Indonesia.
- **Diet** – Insectivores include moths, beetles, and other nocturnal insects.
- **Breeding** - They blend into surroundings easily and lay eggs on the ground.
- **Flight** - Nightjars are well known for their ***silent flight***, which is due to the structure of their feathers.
- Hence they can easily sneak up on their prey and also move away without anyone noticing, if faced with a potential threat.
- **Threat** - Habitat loss.
- **Conservation status**
 - **IUCN** - Least Concern.



8.28 Western Hoolock Gibbon

As the world marks International Gibbon Day on October 24, the Western Hoolock gibbon, faces an unprecedented threat to its survival.

- Western Hoolock Gibbon is one of the 20 gibbon species in the world and ***India's only ape*** species.
- **Scientific Name** - Hoolock hoolock.
- **Family** - Hylobatidae.
- It is also known as the white-browed gibbon.
- Currently there are less than 3,000 gibbons in India.
- **Size** - 1.5 feet tall and weighing 6 to 8 kilograms.
- **Habitat** – They are built for an ***arboreal life*** in forests from moist deciduous to evergreen, sub-tropical to lowland.
- **Brachiation** - A special form of arboreal locomotion, enables them to swing up to 6 metres in a single leap, reaching speeds of over 50 km/h as they move effortlessly between trees.

International Gibbon Day aims to raise awareness about gibbons and the challenges they face, as well as to promote efforts to protect these



- It can jump between 10 to 12 metres.
- **Distribution** - They are usually seen in the forests of Nagaland, Meghalaya, Manipur, Arunachal Pradesh, Mizoram and Assam.
- **Appearance** – It is **tailless** like other apes. Males have jet-black coats, while females are a rich brown.
- **Mating** - Gibbons do not mate within family lines, and once paired, they formed lasting monogamous bonds.
- **Calls** - They are known for their distinct 'hook-o, hook-o, hook-o' calls, which can be heard from up to a kilometre away.
- Males and females often sing in unison, a series of duet calls that helps the pair to mark their territory.
- **Diet** - They are **omnivorous**, consuming over 100 species of plants and some invertebrates and birds' eggs.
- **Threats** - Hunting for food and Medicine and Habitat loss, existential risk from a proposed oil exploration project near the Hollangapar Gibbon Sanctuary.
- **Conservation status**
 - It is **Asia's most endangered primates**.
 - **IUCN** – Endangered.
 - **CITES** - Appendix I.
 - **Wildlife Protection Act of 1972** - Schedule 1.

The western hoolock gibbon's population has declined by almost 90% in the last 30 years.

Hollangapar Gibbon Sanctuary

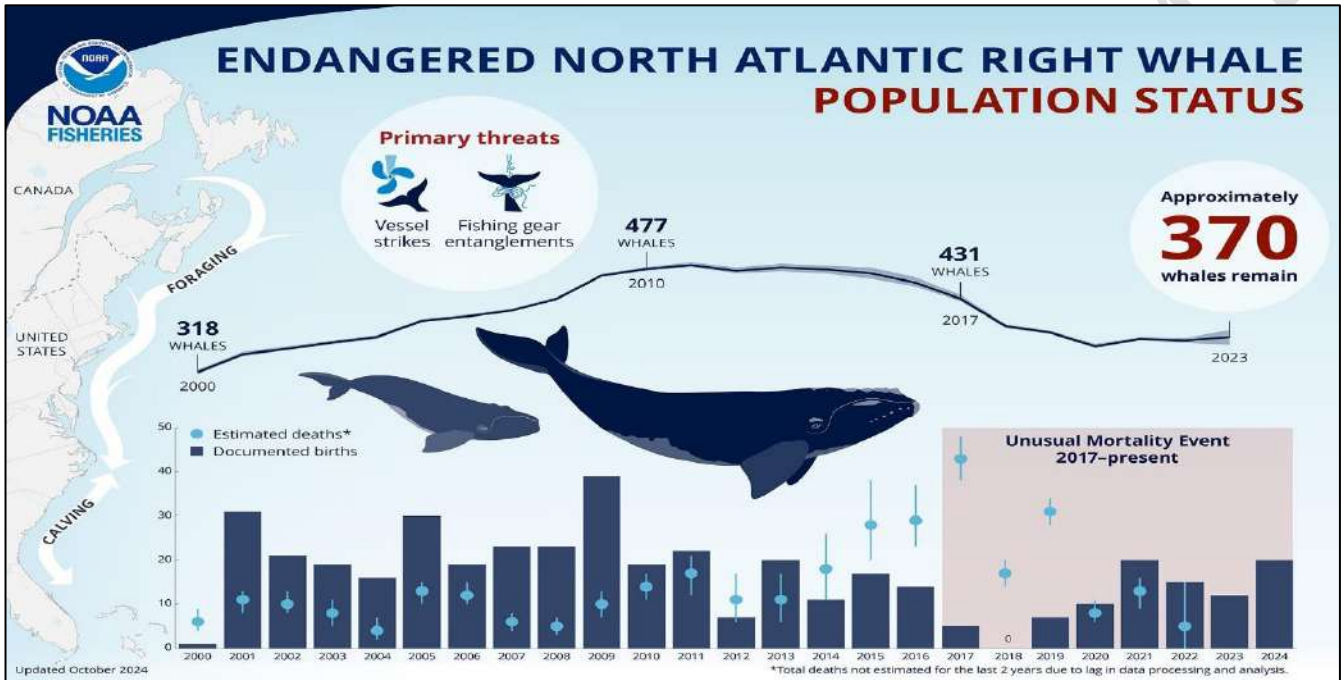
- It is the **last remaining home of Hoolock Gibbon** in Assam.
- It is formerly known as the Gibbon Wildlife Sanctuary or Hollongapar Reserve Forest.
- The sanctuary was officially constituted and renamed in 1997.
- **Bhogdoi River**, a tributary of the Brahmaputra, flows along the sanctuary's border.
 - It causes a waterlogged area characterized by plants that can thrive in partially submerged conditions, known as semi-hydrophytic plants.
- **Flora** - The upper canopy of the forest is dominated by the Hollong tree, while the Nahar dominates the middle canopy. The lower canopy consists of evergreen shrubs and herbs.
- **Fauna** - The sanctuary is home to the Bengal slow loris (Northeastern India's only nocturnal primate), 219 bird species, over 200 butterfly species and rare reptiles.
- Indian elephants, tigers, leopards, jungle cats, wild boar, three types of civet, four types of squirrel, and several other types of mammal.
- Other primates include the stump-tailed macaque, northern pig-tailed macaque, eastern Assamese macaque, rhesus macaque, and capped langur.

8.29 North Atlantic Right Whale (NARW)

According to the most recent estimate from the North Atlantic Right Whale Consortium, NARW has continued its slow increase from a low of 358 individuals in 2020.

- Right whales are baleen whales that feeds on copepods (tiny crustaceans) by straining huge volumes of ocean water through their baleen plates, which act like a sieve.
- The population of NARW is one of the **world's most endangered** large whale specie that remains significantly smaller than it was a decade ago.
- **Features** – They have stocky black bodies with no dorsal fins, and their blow spouts are shaped like a “V.”
- Their heads have knobby white patches of rough skin, called callosities, which appear white because of whale lice (cyamids) covering their otherwise black skin.
- Right whales can probably live for at least 70 years, but data on their average lifespan is limited since scientific monitoring of the species is fairly recent.

- **Range** – North Atlantic right whales primarily occur in ***Atlantic coastal waters on the continental shelf***, although they also are known to travel far offshore, over deep water.
- **Two other species of right whales** – The North Pacific right whale, which is found in the North Pacific Ocean, and the Southern right whale, which is found in the southern hemisphere.
- **Threats** – They have experienced an ongoing Unusual Mortality Event since 2017, which includes sub-lethally injured or ill, seriously injured, and dead right whales.
- Additionally, research demonstrates that only about ***1/3*** of right whale deaths are documented.
- Other threats include entanglement in fishing gear, vessel strikes, climate change, which may alter their migratory patterns and feeding area.
- The impacts of ocean noise also affect their ability to communicate, find food and navigate.



- **Conservation**
 - IUCN - Critically endangered.
 - They have been listed as endangered under the Endangered Species Act since 1970.
- **North Atlantic Right Whale Consortium** – Is a longstanding collaboration between scientists, conservationists, marine industry members and others.

8. SCIENCE & TECHNOLOGY

SPACE

8.1 Earth's Future after Red Giant Phase of Sun

The recent discovery of earth like planet orbiting a white dwarf is getting a sneak peek at the future of the Solar System, and the fate of Earth.

- **Rocky planet** – It comes in at ***around 1.9 times the mass of Earth***, orbiting its star at around twice Earth's distance from the Sun.
- The star is a white dwarf which means any life that might have been on the exoplanet was probably obliterated before or during the star's red giant death throes.
- **White dwarf** – It began as an ordinary star ***1 or 2 times the mass of the sun*** and its current mass is about half the sun.
- **Distance of Orbiting** – Before its host star's death, it orbited at a distance, possibly placing it in the habitable zone.

- Following its star's demise, it is at 2.1 times that distance.
- **Current state of the planet** - It's currently a freezing world because the white dwarf, which is in fact smaller than the planet, is extremely faint compared to when it was a normal star.
- **Significance of the finding** – It offers insight into Earth's potential survival after sun's death.

Red Giant Phase of Sun

- The sun, roughly four and a half billion years old, is destined to become a white dwarf.
 - **Red Giant phase** – It is the end of our sun's life when it will puff up to enormous size.
 - It is estimated to occur 7 billion years from now and will become a white dwarf a billion years after that.
 - It gently blows off its outer layers in a wind.
 - As our sun loses mass, the planets' orbits will expand to larger sizes.
 - Eventually, the star will eject its outer material completely, and the core will collapse under gravity to form a dense object whose bright light not generated by fusion, but the residual heat of its collapse process.
 - That hot core is the white dwarf, and it will take trillions of years to cool to complete darkness.
- Research modelling shows that this planet very likely had a similar orbit to Earth before its host star became a red giant.
 - It implies that Earth's chances for survival may be higher than currently thought.

8.2 White Dwarf

A recent study using Hawaii-based telescopes, found the 1st rocky planet that is orbiting the white dwarf about 4,200 light years away from our solar system near the bulge at the center of the Milky Way galaxy.

- **White Dwarf** – It is the stellar core left behind after a dying star has exhausted its nuclear fuel and expelled its outer layers to form a planetary nebula.
- It is the last observable stage of evolution for low- and medium-mass stars.
- **Conditions for formation** – Stars with a mass less than 8 times the sun.
- **Formation** – It is formed when a low-mass star like our sun exhausts most of its nuclear fuel.
- **Composition** - Compared to our sun, it has a similar carbon and oxygen mass though it is much smaller in size.
- **Features** - It is about as massive as the Sun, yet only slightly bigger than the Earth.
- It is one of the densest forms of matter, surpassed only by neutron stars and black holes.
- **Temperatures** - It can exceed 100,000 Kelvin according to NASA.
- They no longer support nuclear fusion reactions that generate energy, but they are still extremely hot.
- **Luminosity** - Despite having too high a temperature, they have a low luminosity as they're so small in size.
- It luminosity can be used by astronomers to measure how long ago star formation began in a particular region.

Stars having a larger mass may end their lives as black holes or neutron stars. A light year is the distance light travels in a year, about 5.9 trillion miles.

White Dwarfs cool over time, and it is predicted that they would ultimately form '**black dwarfs**', although the Universe is likely not old enough for any black dwarfs to exist yet.

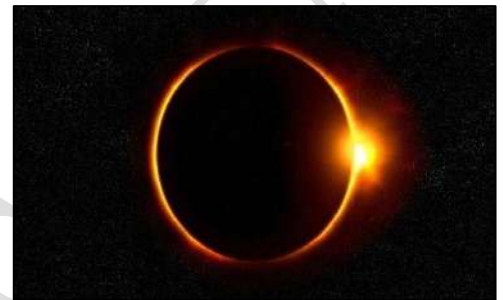
Hubble was the 1st telescope to directly observe white dwarfs in globular star clusters in 2003, which astronomers reported as the dimmest stars ever seen in a globular star cluster.

8.3 Solar Eclipse

The recent annual solar eclipse created a rare ring of fire phenomenon visible in parts of South America because the Moon is farther from the Earth than usual.

A "ring of fire" occurs when the Moon lines up between the Sun and the Earth to create a solar eclipse but does not block out the Sun's light entirely.

- A solar eclipse occurs when the **moon is positioned between Earth and the sun** and casts a shadow over Earth.
- A solar eclipse is witnessed only during the new moon when the Moon and Sun are aligned on the same side of Earth.
- A new moon occurs about 29.5 days because that is how long it takes the Moon to orbit Earth.
- This, however, does not mean that a solar eclipse happens every month. It takes place only between two to five times annually.
- It is because the Moon does not orbit Earth in the same plane as the Earth orbits the Sun.
- In fact, the Moon is tilted by about five degrees with respect to Earth.
- As a result, most of the time when the Moon is in between the Sun and Earth, its shadow is either too high or too low to fall on the Earth.
- **Types of solar eclipse**
- There are 4 different types of solar eclipses depending on how the sun, moon and Earth are aligned at the time of the event
- **Total solar eclipse** - The sun is fully obscured by the moon.
- **Partial solar eclipse** - The moon doesn't fully block the sun so only a portion of the sun is obscured. Here the moon appears to take a "bite" out of the sun.
 - Partial solar eclipse is the most common type of solar eclipse.
- **Annular solar eclipse** - The moon is centered in front of the sun but doesn't cover the entirety of the surface (as seen in a total solar eclipse). A "ring of fire" shines around the moon.
- **Hybrid solar eclipse** - The rarest solar eclipse is a combination of a total and annular eclipse (sometimes known as an A-T eclipse) and is produced when the moon's shadow moves across Earth.
- These begin as one type of eclipse and transition to another.



8.4 C/2023 A3 (Tsuchinshan–Atlas)

C/2023 A3 (Tsuchinshan–Atlas) reached its closest approach to the Sun (perihelion) becoming increasingly visible to observers on Earth recently.

- Comet C/2023 A3 (Tsuchinshan–Atlas) is thought to orbit the sun about every 80,000 years on a highly elongated path.
- The comet is currently between the orbits of Jupiter and Saturn.
- It is approximately 129.6 million kilometres away from Earth and is currently located in the Sextans constellation.
- **Discovered by** - Purple Mountain Observatory; ATLAS South Africa.
- **Discovered** - 9 January 2023.
- It is a non-periodic comet. Unlike more familiar comets, such as Halley's Comet, this one is unpredictable in its appearance.

Asteroid Terrestrial-impact Last Alert System (ATLAS)

- ATLAS is a NASA-funded early warning system.
- **Developed by** - The University of Hawaii.
- It consists of 4 telescopes located in Hawaii and Chile.
- It is designed to detect smaller near-Earth objects days to weeks before they potentially impact Earth.
- ATLAS can survey the entire dark sky every 24 hours, making it a crucial tool for monitoring and tracking potential asteroid threats.

8.5 Charon

Researchers recently discovered that Carbon dioxide, hydrogen peroxide detected on Pluto's largest moon 'Charon'.

- Charon is the ***largest of the 5 known moons of Pluto.***
- **Discovered by** - Charon was discovered in June 1978 by James Christy and Robert Harrington at the U.S. Naval Observatory in Flagstaff, Arizona.
- This moon is remarkably similar to Pluto, earning it the nickname ***"Pluto's smaller twin."***
- **Size** - Half the size of Pluto, Charon is the largest known satellite relative to its parent body.
- The same surfaces of Charon and Pluto always face each other, a phenomenon called ***mutual tidal locking.***
- **Orbit** - It's orbit around Pluto takes 6.4 Earth days, and one Pluto rotation (a Pluto day) takes 6.4 Earth days.
- Charon neither rises nor sets, but hovers over the same spot on Pluto's surface, and the same side of Charon always faces Pluto.
- Compared with most of the planets and moons, the Pluto-Charon system is tipped on its side, like Uranus.
- **Rotation** - Pluto's rotation is retrograde - it rotates backward, from east to west (Uranus and Venus also have retrograde rotations).
- **Possibility of life** - Being extremely cold, there's practically no chance for life to exist on Pluto and water, essential for life, is present as ice.

Recent Findings

- The study explains that hydrogen peroxide forms when ice is broken down by charged particles, releasing hydrogen and oxygen atoms that combine.
- The presence of the chemical suggests Charon's icy surface is altered by ultra-violet light and solar wind from the distant Sun.
- The discovery sheds new light on Charon's composition and chemical processes, offering valuable insights into the Pluto system's mysterious and icy landscape.

Pluto

- It is the largest known dwarf planet in the solar system.
- Pluto was discovered in 1930 by astronomer Clyde Tombaugh.
- Pluto, once hailed as the ninth and final planet in our Solar System, underwent a reclassification in 2006.
- The International Astronomical Union (IAU) convened to establish a formal definition of a planet, resulting in Pluto's demotion to dwarf planet status.

8.6 Asteroids as Foods

A study published in *The International Journal of Astrobiology* suggests that astronauts could use asteroids to meet their nutritional needs.

- **Concept** - The idea is to extract and convert the carbon from space rocks into something edible.
- **Principle** – Asteroids share similarities with plastics regarding how microbes interact with them.
- **Conversion of plastic into food** - Plastic wastes are broken down into solid, gas and oil through the process of *pyrolysis*.
- The oil is then fed to bacteria in a bioreactor, producing a nutritious biomass.
- **Microbes in meteorite** – It was observed that microbes thrived on the meteorite material.
- **Significance** – It addresses the limitations of the amount of dried food astronauts can carry.

Asteroids are remnants of planetary formation and they circle the Sun in a zone lying between Mars and Jupiter. The circular chain of asteroids is called the asteroid belt.

Pyrolysis uses heat to break down combustible materials in the absence of oxygen, producing a mixture of combustible gases, liquids and solid residues.

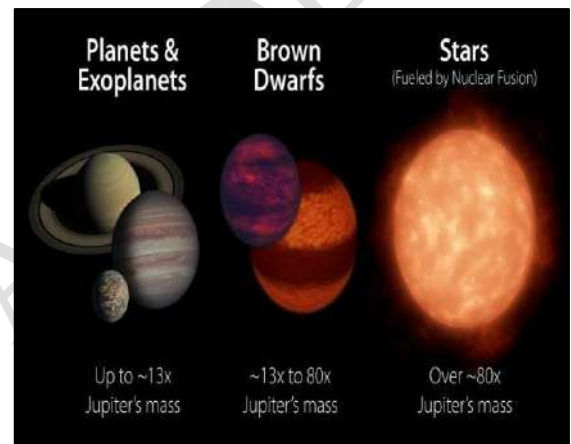
- Some astronauts have grown food in space, such as chillies and lettuce.
- It can also help in space farming that hasn't evolved yet.
- It is reported that [asteroid Bennu](#) when broken down by microbes, even inefficiently could sustain astronauts for up to 600 years.
- **Challenges** – Extensive toxicity testing is needed.

8.7 Brown Dwarfs

A new study confirms that brown dwarf twins, Gliese 229Ba and Gliese 229Bb discovered decades ago is actually twins orbiting each other at a much closer range, completing a full orbit every 12 days.

- A brown dwarf is an astronomical object that is intermediate between a planet and a star, typically having a mass less than 0.075 times that of the Sun.
- **Fusion capacity** - They are larger than giant planets like Jupiter but **do not have enough mass** to sustain hydrogen fusion reactions in cores.
- Thus, scientists have dubbed brown dwarfs as "failed stars".
- Rather, the small amount of energy emitted by these objects comes almost exclusively from the heat stored in them during the collapse of the parent gas cloud from which they formed.
- Brown dwarfs therefore gradually cool and fade with cosmological time.
- Brown dwarfs accumulate material **like a star**, not like a planet.
- **Gravity** - They condense from a gaseous cloud and are higher in mass than planets and so **have stronger gravity**.
- Thus, they hold onto their **lighter elements (hydrogen and helium)** more effectively than planets and have a relatively low metal content.

The mass required to sustain nuclear fusion is about 1/12th of a solar mass (or about 90 times the mass of Jupiter).



- **Orbit** - Brown dwarfs have been found orbiting other suns at distances of 1,000 astronomical units (AU) or more.
- However, not all brown dwarfs orbit far from their stars; some have been found orbiting at closer distances, and a few rogue brown dwarfs have been spotted not orbiting any star.
- **Luminosity** - Because of their low temperatures and small sizes, brown dwarfs have extremely low luminosities (about 1/100,000th of the solar luminosity).
- **Observation** – It is extremely difficult to observe even with modern telescopes because the brown dwarfs is more distant than two or three hundred light years.
- Consequently, it was only in 1995 that the first confirmed brown dwarf was observed.
- Due to their extremely low luminosities, brown dwarfs were one of the proposed candidates for **baryonic dark matter**.

One AU = one Earth-sun distance.

8.8 Comet C/2023 A3 (Tsuchinshan-ATLAS)

Thiruvananthapuram Astronomical Observatory has successfully captured images of the bright comet C/2023 A3 (Tsuchinshan-ATLAS) recently.

- Comet C/2023 A3 (Tsuchinshan-ATLAS) is in the **constellation of Serpens**.
- It is currently traversing the Orion constellation.
- **Discovered by** - The Purple Mountain Observatory in China on January, 2023.
- The comet is currently between the **orbits of Jupiter and Saturn**, a billion kilometers from Earth.
- **Orbit** – It is a long-period comet from the oort cloud, with an 80,000-year orbit around the sun.

- Its retrograde orbit, meaning it moves in the opposite direction to most major solar system objects.
- **Distance** - It is parabolic-like with a perihelion distance of 0.39 astronomical units (AU).
- **Brightness** - Though it has been described as the brightest comet in over a decade, it is not expected to reach the iconic brilliance of Comet Hale-Bopp, the 'Great Comet' which dazzled observers in 1997.

Oort Cloud is a vast region of space thought to contain billions or trillions of icy objects, including comets, ranging in size from mountains to larger.

8.9 Moonlight program

The European Space Agency (ESA) at the International Astronautical Congress, launched its Moonlight Lunar Communications and Navigation Services (LCNS) program recently.

- Moonlight program is the **Europe's first-ever dedicated satellite constellation** for telecommunication and navigation services for the Moon.
- **Aim** - To offer coverage at the Moon's South Pole, an area suitable for future operations.
- **Agency** – Moonlight Lunar Communications and Navigation Services (LCNS) program is a partnership project between
 - ESA and an industry consortium led by space systems developer Telespazio, with support from the UK and Italian Space Agencies.
- **Features** - The program will have a constellation of about 5 lunar satellites (1 for high data rate communications and 4 for navigation) that allow accurate autonomous landings, high-speed communication, and surface mobility.
- These satellites will reportedly enable data transfer over 2,50,000 miles or 4,00,000 kilometres between the Earth and the Moon.
- **Duration** - The first step will be the launch of Lunar Pathfinder, a communications relay satellite built by Surrey Satellite Technology LTD, in 2026.
- The initial services of the programme will reportedly begin by the end of 2028, and the system is said to be fully operational by 2030.
- Moonlight will comply with LunaNet's standards and undergo the first-ever lunar navigation interoperability tests, scheduled for 2029.

The ESA is working with NASA and the Japanese space Agency JAXA on LunaNet, which is essentially a framework to standardise communication and navigation for the Moon.

8.10 Recent Study on Space Rocks

New research shows most space rocks crashing into earth come from a single source, while some of these meteorites come from the Moon and Mars, the majority come from asteroid.

- **Meteorite** - When a fireball reaches Earth's surface is it called a meteorite. They are commonly designated as 3 types - stony meteorites, iron meteorites, and stony-iron meteorites.
- **Stony meteorites** – It comes in 2 types. The most common are the chondrites.
- **Chondrites** – It have round objects inside that appear to have formed as melt droplets. These comprise **85% of all meteorites** found on Earth. Most are known as "ordinary chondrites".
- They are then divided into 3 broad classes – **H, L and LL** based on the iron content of the meteorites and the distribution of iron and magnesium in the major minerals olivine and pyroxene.
- These silicate minerals are the **mineral building blocks of our Solar System** and are common on Earth, being present in basalt.
- Carbonaceous chondrites are a distinct group. They contain high amounts of water in clay minerals, and organic materials such as amino acids. Chondrites have never been melted and are direct samples of the dust that originally formed the solar system.
- **Achondrites** - The less common of the two types of stony meteorites are "achondrites". These do not have the distinctive round particles of chondrites, because they experienced melting on planetary bodies.

- **The asteroid belt** - Asteroids are the primary sources of meteorites.
- Most asteroids reside in a dense belt between ***Mars and Jupiter***.
- The interactions with Jupiter can perturb asteroid orbits and cause collisions. This results in debris, which can aggregate into rubble pile asteroids. These then take on lives of their own.
 - S-class asteroids (akin to stony meteorites) are found on the inner regions of the belt, while
 - C-class carbonaceous asteroids (akin to carbonaceous chondrites) are more commonly found in the outer regions of the belt.

One family of asteroids

- The two new studies place the sources of ordinary chondrite types into specific asteroid families and most likely specific asteroids.
- The study reports that ordinary chondrites originate from collisions between asteroids larger than 30 kilometres in diameter that occurred less than 30 million years ago.
- The Koronis and Massalia asteroid families provide appropriate body sizes and are in a position that leads to material falling to Earth.
- Of these families, asteroids Koronis and Karin are likely the dominant sources of H chondrites.
- Massalia (L) and Flora (LL) families are by far the main sources of L- and LL-like meteorites.
- Another study showed that the composition of L chondrite meteorites on Earth is very similar to that of the Massalia family of asteroids.
- In determining the source asteroid body, these reports provide the foundations for missions to visit the asteroids responsible for the most common outer space visitors to Earth.

DEFENCE

8.11 Very Short-Range Air Defence System (VSHORAD)

The Defence Research and Development Organisation (DRDO) recently announced the completion of the development trials of the ingeniously developed 4th Generation miniaturised VSHORAD.

- The VSHORAD is a ***Man Portable Air Defence System (MANPADS)*** aims to provide effective protection against aerial threats at short ranges.
- **Developed by** - DRDO's Research Centre Imarat (RCI) in collaboration with other DRDO laboratories and DcPPs.
- **Range** - 1 to 15 kilometers.
- **Altitude** - It can engage targets at altitudes up to around 3,000 meters.
- **Novel Technologies** - The VSHORADS missile is equipped with advanced features including a miniaturized Reaction Control System (RCS) and integrated avionics.
- **Propulsion system** - It is powered by a dual-thrust solid motor, making it capable of effectively neutralizing low-altitude aerial threats at short ranges.
- **Features** - It can engage multiple targets simultaneously.
- It is designed to protect ground forces and critical assets from low-flying aerial threats such as drones, helicopters, and fast-moving aircraft.
- These systems fill a vital gap between short-range and close-in air defense solutions, providing quick response capabilities to counter immediate threats.
- The system has been subjected to successful flight tests, indicating its operational readiness.
- VSHORAD systems are often mounted on mobile platforms, such as vehicles or trailers, enabling them to be repositioned quickly in response to changing battlefield conditions.

8.12 INS Nirdeshak

Recently, a survey vessel Nirdeshak (Yard 3026) was delivered to the Indian Navy.

- It is **2nd of 4 Survey Vessel (Large) ships**, steered by the Indian Navy's Warship Design Bureau.
- **Built at** – Garden Reach Shipbuilders & Engineers (GRSE), Kolkata
- **Aim** – It aims for full scale **coastal and deep-water hydrographic survey** of port/ harbour approaches and determination of navigational channels/ routes.
- **Features** – It displaces about 3400 tons and overall length is 110 meters and is powered by 2 **diesel engines**.
- It can achieve **speeds in excess of 18 knots**.
- It is fitted with state-of-the art hydrographic equipment such as
 - Data acquisition and processing system
 - Autonomous underwater vehicle
 - Remotely operated vehicle
 - DGPS long range positioning systems
 - Digital side scan sonar, etc.
- **Role** – It will collect **oceanographic and geophysical data** for **defence and civil applications**.
- **Importance** – It has an **indigenous content of over 80% by cost**.
- It is a reassurance on impetus towards '**Aatmanirbhar Bharat**'.
- It is a tribute to the collaborative efforts of a large number of stakeholders, MSMEs and the Indian industry in enhancing the maritime prowess of India in the Indian Ocean Region.

The 1st ship of the class, INS Sandhayak was commissioned early in 2024.

8.13 Dragon drones

Dragon drones have been used in the recent Russia-Ukraine War.

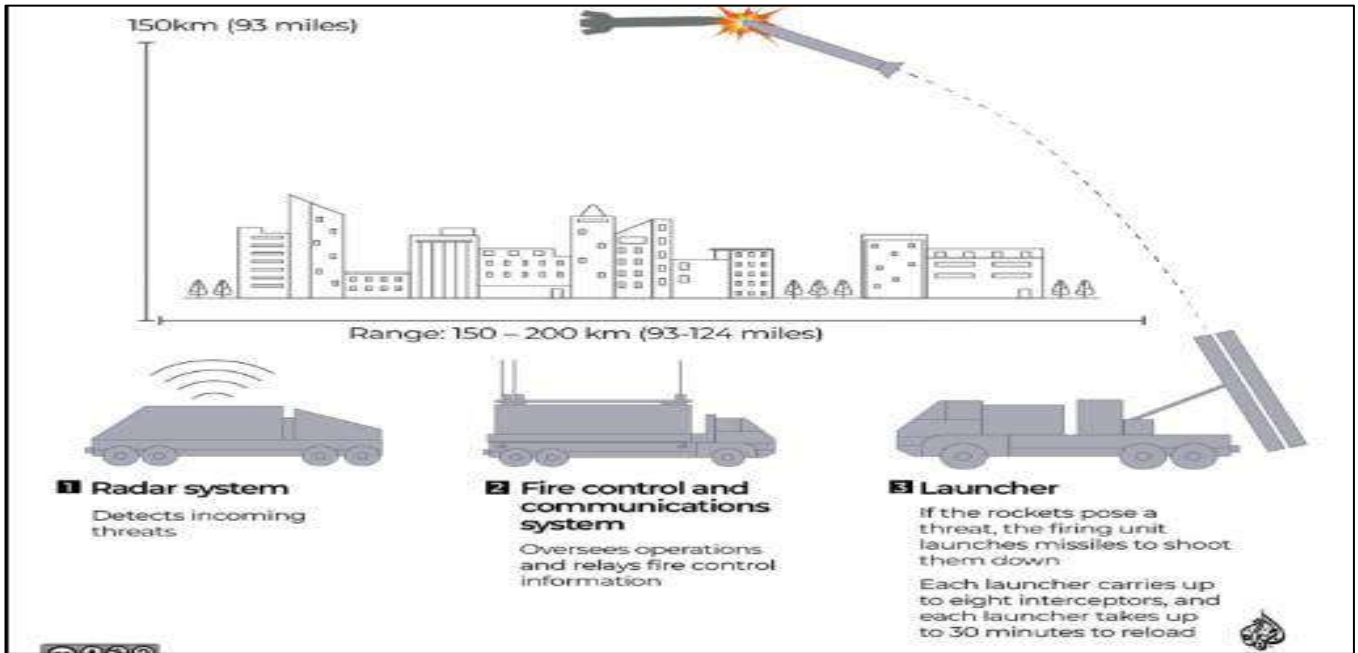
- Dragon drones essentially release a substance called **thermite**, a mixture of aluminium and iron oxide.
 - Thermite is just one type of 'incendiary weapon,' with others including napalm and white phosphorous.
- When ignited (usually with the help of an electrical fuse), thermite triggers a self-sustaining reaction that is quite difficult to extinguish.
- These are known to emit a molten metal that burns at 2,427 degree Celsius (4,000 degrees Fahrenheit) and can even burn underwater.
- As it comes down, the mixture resembles the fire spewed by the mythical dragon.
- **Discovered in** – 1890s by a German Chemist and **originally used to weld railway tracks**.
- On humans, it causes severe, **possibly fatal**, burns and bone damage.
- There is little protection against thermite as it can burn through almost everything, including even metals.
- Dragon drones tend to be **low-flying** because thermite is more effective when it's in close contact with the target.
- Under international law, thermite is not banned for military combat, but its use on civilian targets is prohibited.

8.14 THAAD Antimissile System

A recent press release by the US department of defence said that they are going to send THAAD battery system to Israel.

- **THAAD** - Terminal High-Altitude Area Defense.
- It is a defense battery system used to intercept and destroy enemy missiles.
- **Developed by** - Lockheed Martin Corporation.

- **Components** - It consists of 95 soldiers, 6 truck-mounted launchers, 48 interceptors (eight per launcher), radar surveillance and radar, and a tactical fire component.



- **Features** - THAAD provides a rapidly deployable capability against
 - Short-range (up to 1,000 km),
 - Medium-range (1,000–3,000 km), and
 - Limited intermediate-range (3,000–5,000 km) ballistic missile threats inside or outside the atmosphere during their final (terminal) phase of flight.
- **Technology** - It employs **“hit-to-kill” technology** to destroy threat missiles, can defend a larger area than the older Patriot Air and Missile Defense System.
- **Accuracy** - THAAD is so accurate because the radar system that supplies its targeting information, the Army Navy/Transportable Radar Surveillance radar, or AN/TPY-2.
- **Detecting missiles** - It can detect missiles in two ways. In its forward-based mode it is configured to acquire and track targets at ranges of up to 3,000 kilometers (1,865 miles), and in its terminal mode it is aimed upward to acquire targets during their descent,
- Its interceptors use kinetic energy (energy generated through its mass being in motion) to set off the missile.

8.15 C295 aircraft

Prime Minister Narendra Modi recently inaugurated a plant in Vadodara, where Tata Advanced Systems Ltd (TASL) will manufacture the C-295 aircraft for the Indian Air Force (IAF).

- It is a tactical transport aircraft originally produced by a Spanish aircraft manufacturer named Construcciones Aeronauticas SA.
- **Manufactured by** - Airbus Defence and Space.
- **Capacity** - 5 to 10-tonnes.
- **Maximum speed** - 480 kmph.
- **Features**
 - **Range and Endurance** - 5,000 km range and 11 hours of endurance.
 - **Payload Capacity** - Up to 9,250 kg.
 - **Short Takeoff and Landing (STOL)** - Enabling operations from short, unpaved runways.
 - **Advanced Avionics** - State-of-the-art cockpit and navigation systems.
 - **Multi-Mission Capability** - Easily configurable for various roles.
- It has a rear ramp door for quick reaction and para-dropping of troops and cargo.

- The aircraft has the longest unobstructed cabin in its class and can accommodate 71 seats.
- The C295 operates in the Brazilian jungles and Columbian mountains in South America, the deserts of Algeria and Jordan in the Middle East and the cold climates of Poland and Finland in Europe.
- The aircraft has also flown in military operations in Chad, Iraq and Afghanistan.
- C295 can carry troops and logistical supplies from main airfields to forward operating airfields of the country.
- The aircraft can additionally be used for casualty or medical evacuation, performing special missions, disaster response and maritime patrol duties.

HEALTH

8.16 Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) Scheme

The National Disability Network (NDN) has approached the Central government seeking inclusion of persons with disabilities without any income as well as age criteria in AB PM-JAY scheme

- It is the **world's largest health assurance scheme**.
- **Aim** – To provide a health cover of **Rs. 5 lakhs per family per year for secondary and tertiary care** hospitalization to all the poor and vulnerable families.
- It is to achieve the vision of Universal Health Coverage (UHC) which encompasses promotive, preventive, curative, palliative and rehabilitative care.
- **Launched in** – 2018.
- **Recommended by** - The National Health Policy, 2017.
- **Ministry** - Ministry of Health and Family Welfare (MoHFW)
- **Funding** – **Centrally Sponsored Scheme** (expenditure incurred in premium payment will be shared between Central and State governments).
- **Coverage** - Targets over 10 crore families (approximately 50 crore beneficiaries) based on SECC (Socio-Economic Caste Census)
- **Implementing Agency** – National Health Authority (NHA).
- **Components** - It has 2 components covering all 3 types of care to the people.
- **Health and wellness Centres (HWC)** – It covers primary care hospitalisation by providing comprehensive health care, including for non-communicable diseases and maternal and child health services.
- It covers up to **3 days** of pre-hospitalization and **15 days** post-hospitalization expenses such as diagnostics and medicines.
- There is **no restriction** on the family size, age or gender.
- **Benefits** – It is portable across the country i.e. a beneficiary can visit any empaneled public or private hospital in India to avail cashless treatment.
- **Ayushman Bharat Digital Mission (ABDM)** – It was launched in 2021 to provide Unique Digital Health IDs (UHID) for all Indian citizens to help hospitals, insurance firms, and citizens access health records electronically when required.
- **Recent expansion of the scheme**-The Union Cabinet recently expanded the scheme further to all senior citizens, regardless of income, who are 70 years of age or older.
- Senior citizens who are already benefiting from other public health insurance schemes like the
 - Central Government Health Scheme (CGHS),
 - Ex-Servicemen Contributory Health Scheme (ECHS), or
 - Ayushman Central Armed Police Force (CAPF) have the option to either continue with their current scheme or opt for AB PM-JAY
- **Eligibility with Private Insurance** - Senior citizens who are covered by private health insurance policies or the Employees' State Insurance scheme are also eligible to benefit under the scheme.

8.17 Respiratory Syncytial Virus Infection (RSV)

The World Health Organization recently recommended vaccinating pregnant women and administering infants with an antibody to prevent severe respiratory syncytial virus (RSV) infection in newborns.

- Respiratory Syncytial Virus, which typically causes **cold-like symptoms**, is a leading cause of severe infection and death in babies and older adults.
- The virus enters the body through the eyes, nose or mouth.
- It spreads easily through the air on infected respiratory droplets.
- It causes infections of the lungs and respiratory tract.
- **Symptoms** – Cough, Runny nose, Congestion, Sneezing, Sore throat, Mild headache, Lack of energy, Fever, Decreased appetite, Lack of interest in playing (in babies and young children).
- A severe infection leads to **pneumonia and bronchiolitis**.
- **Spreading** - It can spread in close contact with someone with the infection or by touching a contaminated object and then touching your eyes, nose or mouth.
- People with RSV are usually contagious for **3 to 8 days** and may become contagious a day or two before they start showing signs of illness.
- However, some infants and people with weakened immune systems can continue to spread the virus for **4 weeks or longer**, even after they stop showing symptoms.
- RSV symptoms make it difficult to distinguish it from the common cold or other respiratory viruses (like the flu or COVID-19).
- In most regions of the United States and other areas with similar climates, RSV season generally starts during fall and peaks in the winter.
- **Vulnerables** - Premature babies, young infants and older adults, with heart or lung disease or a weakened immune system are at higher risk of severe infection.
- **Vaccines**
 - **For infants** – Nirsevimab (Beyfortus).
 - **For Adults** - Two vaccines are available - Abrysvo and Arexvy.

According to the WHO, majority of RSV-related deaths occur in low- and middle-income countries, with about 101,400 annual deaths in children under the age of five.

8.18 Nutrition Support for TB Patients and their Families

Union Health Minister Unveils Key Initiatives to boost Nutrition Support for TB Patients and their Families

- **Ni-Kshay Poshan Yojana (NPY)** – Nutrition support under this has been increased from existing Rs. 500 per month/patient to Rs. **1,000/month/patient** for entire duration of the treatment.
- All TB patients will now receive a nutritional support of **Rs. 3,000 to Rs.6,000** under Ni-Kshay Poshan Yojana (NPY).
- It will benefit all **25 lakh TB patients in a year**.
- Till date, Rs.3,202 crores have been disbursed to 1.13 crore beneficiaries through Direct Benefit Transfer.
- **Energy Dense Nutritional Supplementation (EDNS)** – It would be provided to all eligible patients **for the first 2 months of their treatment**.
- Patients having **BMI less than 18.5 kg/m²** at the time of diagnosis are eligible for this scheme.
- It would cover **approximately 12 lakh underweight patients**.
- It will cost the Government of India approximately an additional Rs.1,040 crores to be shared between the center and states on 60:40 basis.
- **Ni-Kshay Mitras** – It provides for nutritional support to Tb patients under Pradhan Mantri TB Mukta Bharat Abhiyaan (PMTBMBA).
- Its scope has been expanded to provide nutritional support **to the family members (household contacts)** of TB patients and provides for distribution of food baskets with a view to improve the immunity.

- **Significance** – These measures are expected to aid nutritional recovery, improve response to treatment and outcomes and reduce mortality due to TB in India.
- It would lead to a significant reduction in out-of-pocket expenses (OOPE) incurred by TB patients.

8.19 Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU)

India Participates in 44th Session of Codex Committee on Nutrition and Foods for Special Dietary Uses.

- **Codex Alimentarius** - It is the international food standards, guidelines and codes of practice for the safety, quality and fairness in international food trade.
- **Established in** - 1963
- **Functions of CCNFSDU** - To study specific nutritional problems assigned to it by the Commission and advise the Commission on general nutrition issues.
- To draft general provisions, as appropriate, concerning the nutritional aspects of all foods.
- To develop standards, guidelines or related texts for foods for special dietary uses, in cooperation with other committees where necessary.
- Endorse provisions on nutritional aspects proposed for inclusion Codex standards, guidelines and related text.
- **India's Representatives** - Food Safety and Standards Authority of India, the Ministry of Health and Family Welfare, and the Ministry of Women and Child Development
- **Matters Discussed** - Various food safety, consumer health, and trade-related issues.
- **India's Contribution** – It provided valuable insights on nutrient reference values for persons aged 6 to 36 months.
- India disagreed with the EU's proposal for sensory testing on assessing the relative sweetness of carbohydrate sources.
- **India's Demand** - Update Probiotic Guidelines for foods and food supplements and Nutrient Standards.
- During the adoption of the final report, India's suggestions were officially incorporated, marking a significant contribution to shaping global food safety and nutrition standards.
- **Joint Statement on Healthy Diet Principles** - During the session, FAO/WHO announced plans for a Joint Statement on Healthy Diet Principles.
- **Food and Diet domain** – This new domain was introduced by FAO on its FAOSTAT database.

8.20 Trachoma Free India

WHO declares that India has eliminated Trachoma as a public health problem in 2024.

- **Trachoma** – It is a bacterial infection that affects the eyes.
- World Health Organisation has termed it as a *neglected tropical disease*.
- **Caused by** – Bacterium *Chlamydia Trachomatis*.
- **Transmission** – It is *contagious*, spreading through contact with the eyes, eyelids, nose or throat secretions of infected people.
- **Infection** – Repeated infections in childhood lead to *scarring of the inner side* of the upper eyelids, resulting in *inward turning of the eyelid margin*, with the eyelashes touching the eyeball.
- If left untreated it causes *irreversible blindness*.
- **Spread** – Globally, 150 million people are affected and 6 million of them are blind or at risk of visually disabling complications.

The National Trachomatous Trichiasis (TT only) Survey was carried out in 200 endemic districts of the country under NPCBVI from 2021-24, which was a mandate set by WHO in order to declare that India has eliminated Trachoma as a public health problem.

- **Susceptible population** – It is found in underprivileged communities living in poor environmental conditions.

Trachoma:



is the world's leading infectious cause of blindness.



is known to be a public health problem in 40 countries affecting 115.7 million people.



elimination contributes to Sustainable Development Goal target 3.3 calling for an end to neglected tropical diseases.



is being reduced through coordinated actions from partners in the global health and development communities.

Elimination in India

- **India** – It was amongst the leading cause of blindness in the country during 1950-60.
- **Measures by India**
 - **NTCP** – National Trachoma Control Program in 1963
 - **NPCB** – National Program for Control of Blindness
 - **NPCBVI** – National Programme for Control of Blindness & Visual Impairment in 1976
 - **WASH** - water, sanitation and hygiene
- In 1971, blindness due to Trachoma was 5% and today, owing to the efforts under the NPCBVI, it has come down to less than 1%.
- **WHO SAFE strategy** – SAFE stands for adoption of surgery, antibiotics, facial hygiene, environmental cleanliness etc.
 - Swachh Bharat Mission and Jal Jeevan Mission
- **Elimination** –
 - In 2017, India was declared free from infective Trachoma
 - In 2024, India has eliminated Trachoma as a public health problem.
- India becomes the 3rd country in the South-East Asia Region.
- **Recognition** – An official Certification was handed over to Ministry of Health and Family Welfare by the WHO.

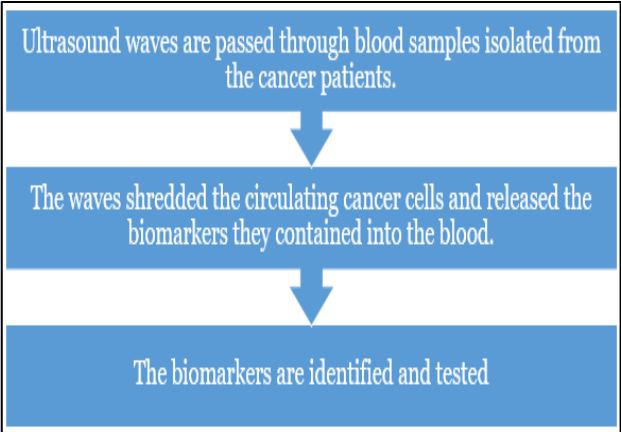
India joins Nepal and Myanmar in the WHO South-East Asia Region and 19 other countries globally that have previously achieved this feat.

8.21 Cancer Detection using Ultrasound

Scientists are working on a way to detect cancer with sound waves.

- **Traditional method** - The gold standard is a biopsy, where doctors extract a small piece of tissue or cells using a large needle from the part of the body where cancer is suspected to be present.
- In vitro tests can confirm if the tissue/cells are cancerous and, if so, what kind of cancer it is.
- **Ultrasound method** – Ultrasound waves are used in the blood sample of patients in detecting the presence of cancers in the body.
- **Principle** – High-energy ultrasound (at frequencies greater than those used in ultrasound scans) can break off a small piece of cancerous tissue into droplets.
- It release their contents into the bloodstream.
- The blood can be tested for biomarkers, biomolecules like DNA, RNA or proteins that are specific to cancer.
- **Advantages** - Ultrasound can enhance the levels of genetic and vesicle biomarkers in blood samples by over a 100-times.

Ultrasound machines are used to take pictures of internal organs. The technology converts the sound waves reflected by surfaces inside the body to an image, just the way bats use ultrasound to sense their surroundings.



- The blood samples can be used to *detect specific cancer types* and even the *mutations* they contain, which is currently undetectable in blood.
- **Significance** – The main advantage is its *non-invasiveness*, which will prevent patient discomfort.
- It could help clinicians *avoid nearly half of all biopsies*.
- It could be extended to monitoring cancer progression and treatment response.

Normally, when cancer progresses and spreads, cancer cells move to parts of the body other than their original site via the blood. But it is difficult to spot these cells in blood because they're very small in number.

Biomarker

- A biological characteristic that can be measured to indicate a normal or abnormal biological process, or a response to a treatment.
- **Present in** – Blood, urine, tissues, or other body fluids.
- **Usage** – It can be used to diagnose diseases, identify potential treatments and also to track disease progression.

8.22 Marburg virus

Rwanda recently reported that the Marburg disease infected at least 46 individuals and 12 Marburg deaths.

- Marburg virus disease (Marburg) is a rare but severe hemorrhagic fever that can cause serious illness and death.
- Marburg is among the **deadliest pathogens** known to humans.
- Marburg belongs to the **filovirus family**, like Ebola. Both pathogens are clinically similar, and rare.
- **Discovered in** - The first outbreak occurred in Marburg, Germany, in 1967. Since then, subsequent outbreaks have been mostly reported across Africa.
- **Caused by** - Prolonged exposure to mines or caves inhabited by colonies of **Rousettus bats**, most notably the **Egyptian fruit bat**.
- Marburg also spreads through human-to-human transition both
 - Directly (through contact with blood and other bodily fluids of infected people) and
 - Indirectly (through surfaces and materials like bedding, clothing, etc. Contaminated with these fluids).
- **Symptoms** - High fever, severe headache, muscle ache, severe watery diarrhoea, abdominal pain and cramping, and vomiting.
- Many patients develop haemorrhagic symptoms (bleeding), often in many places including the digestive system (faeces and vomit often come with fresh blood), the nose, gums, and vagina.
- Haemorrhage leads to most MVD fatalities, with death in fatal cases occurring 8 to 9 days after the onset of symptoms, usually of severe blood loss and shock.
- **Treatment** - Currently, there are no approved vaccines or specific treatments for MVD.
- **Fatality** - Marburg virus disease (MVD) case fatality rates ranging from 24% to 88% in past outbreaks, depending on virus strain and case management.

8.23 Murine Typhus

A 75-year-old man from Kerala who recently travelled to Vietnam and Cambodia diagnosed with the bacterial disease murine typhus.

- Murine typhus is an infectious bacterial disease caused by the **flea-borne bacteria Rickettsia typhi**.
- It is transmitted to humans through the bites of infected fleas.
- The disease is also known as endemic typhus, flea-borne typhus or flea-borne spotted fever.
- **Host** - Rodents like rats, mice and mongoose, are known to be reservoirs of the disease. The fleas can also live on other small mammals, including pets such as cats and dogs.

- Once a flea is infected, it can spread the disease ***for the rest of its life.***
- **Transmission** - The disease is spread when infected flea faeces come into contact with cuts or scrapes in the skin.
- Transmission can also happen through exposure of mucous membranes to infected flea faeces.
- Murine typhus is ***not spread*** from one person to another, or from person to fleas.
- **Prevalent areas** - The disease has been reported in coastal ***tropical and subtropical regions***, where rats are prevalent.
- In India, cases of murine typhus have been reported in the Northeast, Madhya Pradesh and Kashmir.
- **Symptoms** - Usually appear 7 to 14 days after the exposure and include fever, headaches, body aches, joint pains, nausea, vomiting, and stomach aches.
- Some people may later develop rashes on the skin, days after the initial symptoms.
- The illness seldom lasts longer than two weeks, but may last for months with complications if not treated.
- **Treatment** - There is ***no vaccine currently*** available against the disease.
- The antibiotic doxycycline is considered effective in therapy, but early diagnosis is vital for treatment.
- **Fatality** - Without timely treatment, the disease could turn severe in one or two weeks, and become fatal in rare cases.

Both Murine and Scrub Typhus share overlapping symptoms, while Scrub Typhus caused by Orientia tsutsugamushi is generally more severe and widespread in the Asia-Pacific region.

8.24 Central Drugs Standard Control Organisation (CDSCO)

The Central Drugs Standard Control Organisation (CDSCO) has met safety, efficacy, and quality indicators for a functional vaccine regulatory system by the World Health Organization (WHO).

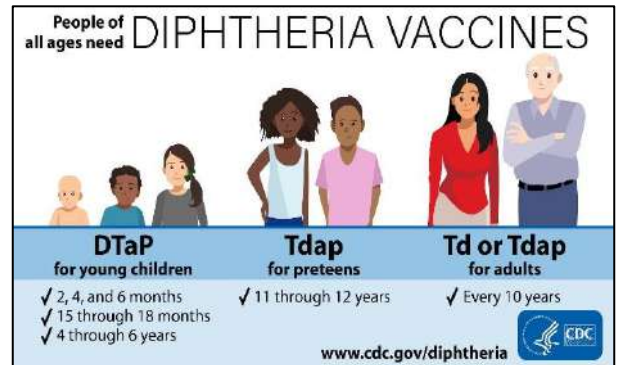
- The Central Drugs Standard Control Organization (CDSCO) is the Central Drug Authority for discharging functions under ***the Drugs and Cosmetics Act.***
- **Functions**
 - Regulatory control over the import of drugs,
 - Approval of new drugs and clinical trials,
 - Meetings of drugs consultative committee (DCC) and drugs technical advisory board (DTAB),
 - Approval of certain licenses as central license approving authority
- It will also coordinate the activities of ***state drug control organizations.***
- CDSCO also plays a key role in drug surveillance and monitoring adverse drug reactions.
- **Ministry** - Ministry of Health & Family Welfare.
- **Head Quarters** – New Delhi.
- It has 6 zonal offices, 4 sub zonal office, 13 Port offices and 7 laboratories.
- The ***Drugs Controller General of India (DCGI)*** is the head of the Central Drugs Standard Control Organization (CDSCO).
- **Vision** - To Protect and Promote public health in India.
- **Mission** - To safeguard and enhance the public health by assuring the safety, efficacy and quality of drugs, cosmetics and medical devices.

8.25 Diphtheria

A 3-year-old girl died of suspected diphtheria in Punjab's Faridkot recently.

- Diphtheria is a ***highly contagious*** but preventable bacterial disease.
- A toxin produced by some strains of the ***Corynebacterium diphtheria*** bacteria results in diphtheria.

- **Types** - There are 2 types of diphtheria - respiratory and cutaneous.
 - Respiratory diphtheria affects the nose, throat, and tonsils, while cutaneous diphtheria affects the skin.
- **Transmission** - It is spread through the air or by contact with an infected person.
- It affects the respiratory tract and spreads throughout the body.
- **Symptoms** - Fever, chills, swelling in lymph nodes, fatigue, shortness of breath, etc.
- **Prevention** - Immunisation is the best prevention against it, with the full schedule requiring seven doses between 0-16 years.
- Three doses are given before the child turns one, a booster Diphtheria, Pertussis and Tetanus (DPT) shot when the child is two, a fifth dose when the child turns six, and one each in years 10 and 16.
- **Treatment**
 - **Respiratory diphtheria** - Treatment usually involves diphtheria antitoxin and antibiotics.
 - **Skin infections** - Generally, only antibiotics are used.
- **Prevalence** - Data from 2023-24 states that almost 84% of diphtheria cases in India were reported from 10 states
 - Kerala, Assam, Delhi, Gujarat, Haryana, Karnataka, Nagaland, Maharashtra, Rajasthan and West Bengal.



According to the Ministry of Health and Family Welfare, 93.5% of Indian children in the one-year age bracket were immunised in 2023-24 while Punjab's numbers stood at 93.96%.

8.26 Vitiligo

A new Kannada film, 'Bili Chukki, Halli Hakki' is attempting to take the veil of stigma off from Vitiligo, disease that is usually the subject of stereotypes and ignorance in India.

- Vitiligo is a **chronic auto-immune skin disorder** that results in the loss of pigment in patches, causing white areas to appear on the skin.
- This condition arises due to the **malfunction or destruction of melanocytes**, the cells responsible for producing melanin, the pigment that gives skin its colour.
- **Symptoms** - Those affected develop depigmented patches that may occur anywhere on the body, including the skin, hair, and even the lining of the mouth.
- **Causes** - The **cause of vitiligo is unknown**, but it may be related to immune system changes, genetic factors, stress, or sun exposure.
- **Triggering factors** - Potential triggers could include oxidative stress, physical trauma, severe sunburn, or chemical exposure.
- **Frequency** - Vitiligo is a common disorder that affects between 0.5% and 2% of the population worldwide.
- It occurs with similar frequency in all ethnic groups, but may be more noticeable in dark-skinned people.
- **Risk factors** - People with a family history of certain autoimmune diseases have a higher risk of getting this disease.
- The pale areas of skin caused by vitiligo are more vulnerable to sunburn, so it's important to take extra care when in the sun and use a sunscreen with a high sun protection factor (SPF).
- **Treatment** - There is **no cure** for vitiligo, but treatments can help stop the progression and reverse its effects.
- Options include topical corticosteroids, calcineurin inhibitors, and phototherapy, which work to slow depigmentation and encourage the regeneration of melanocytes.
- In advanced cases surgical interventions like skin grafting or depigmentation therapy may be considered to even out skin tone.



8.27 Escherichia coli (E.coli)

1 person has died and 10 have been hospitalized in the US due to an E.coli infection after eating McDonald's burgers.

- E. coli, or Escherichia coli, is a rod-shaped, gram-negative bacterium typically resides in the intestines of humans and most mammals.
- While most strains are harmless and play a beneficial role in gut health, some can cause serious foodborne illnesses.
- **Types of E. coli**
 - Enterotoxigenic Escherichia coli (ETEC)
 - Enteropathogenic Escherichia coli (EPEC)
 - Enteroaggregative Escherichia coli (EAEC)
 - Enteroinvasive Escherichia coli (EIEC)
 - Diffusely adherent Escherichia coli (DAEC)
 - Enterohemorrhagic Escherichia coli (EHEC)
- **Causes** - It spreads through contaminated food and water.
- **Transmission** - Most diarrheagenic E. coli strains spread through fecal-oral transmission.
- Some forms, like Shiga toxin-producing E. coli (STEC), can also transmit through undercooked meat and unpasteurized beverages.
- E. coli can be **contagious (spread from person to person)**.
- **Symptoms**
 - Fever of more than 102 degree F, persistent diarrhoea, bloody diarrhoea, and vomiting.
 - The main problem, however, is dehydration due to the inability of the patient to retain water and fluids.
 - In very few cases, people may get acute kidney injury.
- **EHEC** – It produces a poison called Shiga toxin.
- EHEC strains cause bloody diarrhea and can sometimes damage the kidneys and progress to the potentially fatal hemolytic uremic syndrome (HUS).
- EHEC has caused many large food-borne outbreaks worldwide, O157:H7 is the best known strain.
- This group is also known as **STEC (Shigatoxin producing E. coli)** and is the **only group that is passed in animal feces.**
- **Treatment** - E.coli is a bacterial infection for which antibiotics are prescribed.
- Indiscriminate use of antibiotics leads to antimicrobial resistance and further difficulty in treating common infections.
- For example, E.coli's susceptibility to even strong antibiotics, such as carbapenem, has been on the decline, reducing from 81.4% in 2017 to 62.7% in 2023 to one type of medicine in this category.
- **Severity** - E. coli sometimes causes life-threatening complications
- **Prevalence in India** - E.coli is **common in India.**
- According to the National Centre for Disease Control, more than 500 outbreaks of diarrhoeal diseases were reported across India in 2023.
- According to the latest report of ICMR's Antimicrobial Surveillance Network, E.coli is the most common bacteria isolated from patient samples.
- The pathogen was found in **23.19%** of all types of patient samples from tertiary care hospitals across India.

8.28 World Polio Day

World polio day was organized recently by Rotary International in collaboration with global health organisations like the World Health Organization (WHO) and UNICEF.

- World Polio Day is observed annually on **October 24**.
- The Day was established by Rotary International to commemorate the birth of **Jonas Salk**, who led the first team to develop the vaccine against the disease in the 1950s.
- **Aim** - To raise awareness about the importance of polio vaccination and to recognize progress made toward a polio-free world.
- **Theme, 2024** - A Global Mission to Reach Every Child.

Polio

- Polio (Poliomyelitis) is a **highly viral infectious disease**, mainly affecting children **under 5**.
- **Transmission** - The virus is spread from person to person, mainly through the faecal-oral pathway or, less frequently, by a shared object (such as contaminated food or water).
- It multiplies in the intestine, from where it can enter the nervous system and cause paralysis.
- **Severity** - There are cases of paralytic poliomyelitis due to a loss of viral attenuation in the oral polio vaccine (OPV), known as vaccine-associated paralytic poliovirus (VAPP).
- Vaccine-associated paralytic poliovirus (VAPP) is very rare, occurring approximately 3.8 times per lakhs of cases in countries using the oral poliovirus vaccine. It can cause sometimes death.
- **Prevention** - Along with vaccination, it is required to wash hands, boil drinking water, and give only breastmilk to babies under 6 months of age.
- There is **no cure** for polio, it can only be prevented through a vaccine.
- **Vaccination**
- **Inactivated Polio Vaccine (IPV)**
 - **Developed by** - Jonas Salk in 1955.
 - **Administration** - Given via injection.
 - **Characteristics** - IPV contains a killed virus, making it safe but less effective at inducing immunity in the intestines compared to oral vaccines.
- **Oral Polio Vaccine (OPV)**
 - **Developed by** - Albert Sabin in the early 1960s.
 - **Administration** - Administered orally, often in a sugar cube form.
 - **Characteristics** - OPV contains a weakened live virus, which not only protects the vaccinated individual but can also help immunise others in the community through "herd immunity."
- **In India** - In 2009, India had reported 741 polio cases, the highest in the world. In January 2011, India reported its last polio case.
- India was declared polio-free in 2014 by the World Health Organization (WHO).

Over the past 35 years, cases of wild poliovirus have decreased by more than 99%.

Global Polio Eradication Initiative

- The Global Polio Eradication Initiative (GPEI) is a public-private partnership that aims to eradicate polio worldwide.
- **Goal** - To ensure that no child will ever be paralyzed by polio.
- **Partners**
 - Led by national governments, the GPEI's partners include:
 - World Health Organization (WHO)
 - Rotary International
 - US Centers for Disease Control and Prevention (CDC)
 - United Nations Children's Fund (UNICEF)
 - Bill & Melinda Gates Foundation
 - Gavi, the Vaccine Alliance

- The GPEI uses a monitoring and evaluation (M&E) matrix to track progress and adjust to risks. The matrix includes milestones, outcomes, and key performance indicators (KPIs).

8.29 Scurvy

A disease once common among sailors and maritime communities, scurvy cases are now being reported in 2024 from Western Australia and Canada.

- It is a non-contagious ***severe vitamin C deficiency***.
- Unlike most animals, humans cannot produce vitamin C naturally and depends on the fruits and vegetables.
- **Causes** - Prolonged lack of vitamin C in the diet.
- **Early symptoms** - Weakness, fatigue, and sore limbs and as the disease progresses it can include
 - Gum disease
 - Poor wound healing
 - Skin hemorrhages
 - Corkscrew hairs
 - Personality changes
 - Bleeding from the skin
- **Treatment** - The disease requires immediate treatment, as without it, scurvy can lead to serious complications and may even become life-threatening.
- Mild scurvy cases are often managed simply by increasing vitamin C intake through fresh fruits and vegetables. In some instances, taking vitamin C supplements is also recommended until symptoms improve.
- **Prevalence** - Scurvy was once widespread, particularly among 18th-century sailors who spent long periods at sea without access to fresh food.
- **Significance of Vitamin C in Humans** - Vitamin C plays a huge role in maintaining collagen, a protein important for tissues like skin.
- Vitamin C is also essential for healthy blood vessels, teeth, and gums, and it aids in iron absorption, necessary for red blood cell production.
- It also supports wound healing, including burns and cuts, by promoting tissue repair and immune response.
- Vitamin C is an antioxidant, meaning it protects your cells against damage from free radicals.

BIO-TECHNOLOGY & NANO-TECHNOLOGY

8.30 Combination Therapeutic Implant

Scientists at Institute of Nano Science and Technology (INST) have developed & tested an indigenous intra-operative combination treatment consisting of drug and metal-based nanomedicine.

- **Need** – Surgery and chemotherapy are inevitable in managing solid tumours but ***localised tumour reappears***.
- While Nano technological tools can reduce toxicity, there is an issue of the adsorption of host serum proteins over the surface of nanoparticles.
- **Combination therapeutic implant** – It consists of ***metal-based nanomedicine*** reinforced with patient derived blood clotting components.
- **Working principle** – The components are ***stabilized by patient derived serum protein corona*** termed as ***Nano-Micro-Sera (NMS)***.
- They are reinforced into autologous fibrin to aid in the post-surgical management of locally recurrent tumors.
- **Usage** – The autologous hybrid fibrin glue exhibited superior synergy and outcomes in ***suppressing recurrent breast tumors***.
- Thus, it ***reduces localised tumour*** recurrence post-surgery.

Institute of Nano Science and Technology (INST) is an autonomous institute of Department of Science and Technology.

- **Applications** – It can be used to *fabricate a therapeutic kit* that can generate this autologous hybrid implant which might be beneficial to marginalised cancer patients.

Protein Corona

- It is a dynamic *multilayer protein structure* on the surface of Nanoparticle, formed by the rapid adsorption and accumulation of various proteins (such as albumin, apolipoprotein, and fibrinogen) after entering the intercellular environment.
- **Importance** – It has been recently established as a *molecular fingerprint of a patient*.
- It can be integrated into the basic design of nanoparticles for a futuristic *personalized treatment strategy*.
- They can be channelized towards generation of *precision nanomedicines and diagnostic tools*.
- **Significance** – It is an affordable methodology for localized post-surgical management.

8.31 Clostridioides difficile bacteria

Researchers are developing the 1st successful vaccine against Clostridioides difficile bacteria, using the technology behind the revolutionary mRNA vaccines that tackled COVID-19.

- It is a bacterium highly contagious and difficult-to-treat and can cause severe diarrhea and even deadly colon damage.
- **Symptoms**
 - **Common** - Watery diarrhea, fever, nausea, abdominal pain
 - **Severe** - Severe cramping, loss of appetite, weight loss, dehydration, rapid heart rate
 - **Life-threatening** - Pseudomembranous colitis, toxic megacolon with septic shock
- **Vulnerables** - It can affect anyone, but most cases occur after taking antibiotics or shortly after finishing them.
- **Transmission** - C. diff can also spread from patient to patient, or through contaminated hands or the environment.
- C. diff can live in the intestines of humans and animals, and in the environment, especially where infected people and animals live.
- It can enter the body through the mouth, and reproduce in the small intestine.
- In the colon, the bacteria can release toxins that damage tissues and cause diarrhea.
- Roughly one-third of infected individuals will have recurrent infections.
- **Treatment** - C. diff can usually be treated with another course of antibiotics.
- **Recent advancement in treatment** - Like the COVID vaccines, the *C. difficile mRNA vaccine* uses genetic material from the bacteria to train the immune system to recognize and respond in the event of future infections.
- Immune cell responses increased with vaccine dose and were significantly higher than with more traditional vaccines.
- Mice vaccinated with traditional-style vaccines all died within a day after being infected with the bacteria.
- Adding a booster to the old-style vaccines improved survival by 20%, but immunization with the mRNA vaccine improved survival to 100%.

Clostridioides difficile bacteria is the leading cause of antibiotic-associated diarrhea worldwide.

8.32 A Study on Hypsibius henanensis

A team of researchers has recently identified that the genetic mechanisms help a newly discovered species of tardigrades (*Hypsibius henanensis*) withstand high levels of radiation.

- **Recent Findings** - The team of scientists sequenced the genome of this new species and revealed that it had **14,701 genes**, 30% of which were unique to tardigrades.

- The scientists discovered 2,801 of the genes in *Hypsibius henanensis* that were involved in DNA repair.
- They protect the microscopic animals' DNA from damage and repair breaks.
- They then exposed this species to radiation doses of gamma rays that were far beyond what would be survivable for humans.
- More specifically, they found 3 factors that help this species survive radiation.
- **Factors** - The first was its ability to quickly repair double-strand breaks in DNA due to radiation exposure, by using a protein called ***TRID1***.
- The second factor involved a gene that was switched on during exposure to radiation, resulting in the generation of two proteins that are known to be important for mitochondrial synthesis.
- The researchers also estimate that **0.5–3.1%** of the tardigrade's genes were acquired from other organisms through a process known as ***horizontal gene transfer***.
- A gene called ***DODA1***, which seems to have been acquired from bacteria, enables tardigrades to produce four types of antioxidant pigments called betalains.
- These pigments can mop up some of the harmful reactive chemicals that radiation causes to form inside cells, which account for 60–70% of radiation's damaging effects.
- **Applications** - The findings could one day be harnessed to help
 - Protect astronauts from radiation during space missions,
 - Clean up nuclear pollution or improve cancer treatment,
 - Tolerate other harsh conditions, such as extreme temperatures, air deprivation, dehydration and starvation.
 - Improve the shelf life of fragile substances such as vaccines.

Tardigrades

- Tardigrades are short, plump, and covered in a tough cuticle (similar to that of grasshoppers and other insects) that they must shed to grow.
- They have four pairs of legs, with 4-6 claws on each foot.
- They are also known as water bears or moss piglets.
- They live in liquid water, including oceans, freshwater lakes and rivers
- Their specialised mouthpart called a ***bucco pharyngeal apparatus*** allows them to suck the nutrients out of plants and other microorganisms.
- Their tiny bodies contain no bones and are instead supported by a hydrostatic skeleton a fluid-filled compartment known as a ***hemolymph***.
- They have no spinal cord but do have a similar system in place a ventral nervous system that sends signals between the brain and body.
- They often found lurking in mosses and lichens.
- Tardigrades don't live in or on humans, and they are not dangerous.
- Tardigrades have been known to survive:
 - Low temperatures of 0.05 kelvins (-272.95 degrees Celsius or functional absolute zero)
 - High temperatures of 150 degrees Celsius
 - Pressures of 40,000 kilopascals
 - The burning ultraviolet radiation of space
 - Being shot from a high-speed gun (traveling at nearly 3,000 feet per second and the impact of 1.14 gigapascals of pressure)
 - Being stored in a freezer for 30 years



INFORMATION TECHNOLOGY

8.33 Digital arrest scam

A recent scam has emerged, resulting in significant financial losses for individuals and businesses, amounting to crores of rupees, under the guise of digital arrest.

- It is an online scam that defrauds victims of their hard-earned money.
- **Process** - In digital arrest scam, fraudsters impersonate law enforcement officials to deceive their victims.
- They initiate contact with victims via phone calls and request that the victims switch to video communication through platforms like WhatsApp and Skype.
- The scammers then threaten the victims with a digital arrest warrant, citing various reasons such as financial misconduct, tax evasion, or other legal violations.
- They also create a police station-like set-up to further convince victims that the call is legitimate.
- Under the guise of “clearing their name”, “assisting with the investigation”, or “refundable security deposit/escrow account”, individuals are coerced into transferring large sums of money to specified bank accounts or UPI IDs.
- Once the victims comply and make the payment, the scammers vanish, leaving the victims to face financial loss and potential identity theft.

As per the National Crime Records Bureau (NCRB) data, a significant rise in cybercrimes have been reported in the last few years.

9. INDICES AND REPORTS

9.1 Business-Ready Index (B-Ready)

Govt looking to align some indicators of India’s BRAP 2024 index with the World Bank’s B-READY index recently.

- It collects new data and analysis project of the World Bank Group to assess the business and investment climate.
- It is a successor to the Ease of Doing Business rankings, which were discontinued in 2021 due to irregularities.
- It is a key instrument of the World Bank Group’s new strategy to facilitate private investment, generate employment, and improve productivity to help economies accelerate development.
- **Pillars** - It focuses on 3 main pillars.
- The pillars will benchmark and provide comprehensive data and analysis, which can guide policy reforms and support private sector development.
- **Parameters** - It tracks 10 parameters throughout a firm's lifecycle, including starting, operating, closing, and reorganizing.



- **Scoring** - For each economy, B-READY produces 2 sets of scores

- One consisting of 10 topic scores and another comprising 3 pillar scores. Topic and pillar scores can range from a ***minimum of 0 to a maximum of 100.***
- For topic scores, every score is generated by averaging the scores assigned to each of the three pillars (Regulatory Framework, Public Services, Operational Efficiency) for that topic.
- Although the B-READY rankings will commence in 2024, India will only participate in the exercise in 2026.
- The first set of rankings will feature **54 countries**, with the 2025 report covering 120 economies and the 2026 version having rankings on 180 economies.

The government had recently announced the BRAP 2022 rankings, which were topped by Andhra Pradesh and Kerala.

9.2 Living Planet Report (LPR), 2024

The recently released LPR, 2024 report said that significant 'collective effort' will be required over the next five years to tackle the dual climate and nature crises.

- It is a ***biennial compilation*** of the threats faced to wildlife.
- **Released by** - World Wide Fund (WWF) in collaboration with Zoological Society of London (ZSL).
- It is provided by includes almost 35,000 population trends of 5,495 species from 1970-2020.
- **Findings** – There has been a **73%** decline in the average size of monitored wildlife populations from 1970-2020.
- The sharpest decline is reported in
 - Freshwater ecosystems at 85%, followed by
 - Terrestrial ecosystems at 69% and
 - Marine ecosystems at 56%.
- At a regional level, the fastest declines have been seen in ***Latin America and the Caribbean*** a concerning 95% decline followed by Africa (76%) and the Asia and the Pacific (60%).
- Declines have been less in Europe and Central Asia (35%) and North America (39%).
- **In India** - The report noted the decline in 3 vulture species in India.
 - Bombay Natural History Society (BNHS) highlighted white-rumped vulture population has dropped by 67%, Indian vulture by 48%, and slender-billed vulture by 89% compared to their populations in 2002.
- India is home to the largest population of wild tigers globally.
- The All-India Tiger Estimation 2022 recorded a minimum of 3,682 tigers, a significant increase from the 2,967 estimated in 2018.
- **Tipping point** - When cumulative impacts reach a threshold, the change becomes self-perpetuating, resulting in substantial, often abrupt and potentially irreversible change.
- Early warning signs indicate that several global tipping points are fast approaching:
- In the biosphere, the mass die-off of coral reefs would destroy fisheries and storm protection for hundreds of millions of people living on the coasts.
- The Amazon rainforest tipping point would release tonnes of carbon into the atmosphere and disrupt weather patterns around the globe.
- In ocean circulation, the collapse of the subpolar gyre, a circular current south of Greenland, would dramatically change weather patterns in Europe and North America.
- In the cryosphere (the frozen parts of the planet), the melting of the Greenland and West Antarctic ice sheets would unleash many metres of sea level rise.
 - Large-scale thawing of permafrost would trigger vast emissions of carbon dioxide and methane.
- **Reasons** - Habitat loss and degradation, driven primarily by farming and consumes food followed by over-exploitation, invasive species, and diseases.
- Pollution is an additional threat for wildlife populations in Asia and the Pacific, which have recorded a 60% average decline.

- There are no India specific projections.
- **Shortfall in achieving goals** - Countries have agreed on ambitious global goals
 - To halt and reverse nature loss (the Global Biodiversity Framework),
 - Cap global temperature rise to 1.5C (the Paris Agreement), and
 - Eradicate poverty (the UN Sustainable Development Goals).
- But despite these global ambitions, national commitments and actions on the ground fall far short of what's needed to meet the targets for 2030.
- Over half the SDG targets for 2030 will be missed, with 30% of them stalled or getting worse from the 2015 baseline.
- National climate commitments would lead to an average global temperature increase of almost 3°C by the end of the century, inevitably triggering multiple catastrophic tipping points.
- National biodiversity strategies and action plans are inadequate and lack financial and institutional support.

10. OTHERS

10.1 Sports Authority of India (SAI)

Sports Authority of India (SAI) signs MoU with Government of Maharashtra to develop National Centre of Sports Excellence in Mumbai.

- **SAI** – It was set up as a Society registered under Societies Act, 1860 in pursuance of the Resolution of the Department of Sports, Govt. of India.
- **Established in** – 1984.
- **Objective** - Promoting sports and achieving sporting excellence at the national and international level.
- SAI Sports complex is located in Kandivali.
- **Role** - Training and preparation of National teams.
- Support Training with Scientific & Sports Equipment and scientific personnel.
- Monitor and enhance Performance with a scientific evaluation system.
- Implement various schemes like Khelo India, Assistance to NSF, TOPS, FIT India.
- Offering academic programmes in physical education and sports.
- Sports Infrastructure Development & Maintenance.
- Maintaining and utilizing Stadium in Delhi
 - Jawaharlal Nehru Sports Stadium
 - Indira Gandhi Sports Complex
 - Major Dhyan Chand National
 - Dr. Syama Prasad Mookherjee Swimming Pool Complex
 - Dr. Karni Singh Shooting Ranges
- **Strategies** - International collaboration for sports development and sporting excellence.
- Evolving a structured system for spotting and increasing the talent pool in all Olympic disciplines and selected indigenous and other sports.
- Focused attention on areas and regions having potential of excellence in the specific sports disciplines.
- Encouraging active involvement of the corporate sector in developing academies and Centres of Excellence for different disciplines
- Ensuring the availability of quality sports goods and the development of indigenous sports goods industry.

10.2 Nobel Prize, 2024

The Nobel Prize, 2024 has been announced recently.

- A Nobel Prize is a prestigious **international award** given to individuals or organizations annually.
- **Founder** - Alfred Nobel.
- **Fields awarded** - Physics, Chemistry, Physiology or Medicine, Literature, Peace, and Economic Sciences.
- **Rationale** - To honor individuals who have made significant contributions that benefit humanity.
- The first set of awards were handed out in 1901, 5 years after Nobel's death.
- A Nobel Prize **cannot be awarded posthumously**.
- **Award ceremony** - Takes place annually on December 10, the anniversary of Alfred Nobel's death.
- The award winners are also given a sum of \$1.1 million per prize.

Chemistry, 2024	David Baker	For computational design
	Demis Hassabis and John M. Jumper	For protein structure prediction
Physics, 2024	John J. Hopfield and Geoffrey E. Hinton	Use of statistical physics concepts in the development of artificial neural networks
Physiology/Medicine, 2024	Victor Ambros and Gary Ruvkun	Discovery of microRNAs

10.3 Contribution of Nanaji Deshmukh

Prime Minister pays tribute to Bharat Ratna Nanaji Deshmukh on his birth anniversary.

- **Social movement** – He played a key role in the Jaya Prakash (JP) movement against Emergency in 1974.
- **Rural development** – He set up **alternative rural development models** based on traditional knowledge in Uttar Pradesh and Madhya Pradesh.
- **Reformist** – He actively participated in the **Bhoodan Movement** started by Vinoba Bhave.
- He played a vital role in carrying out a **social restructuring programme** in over 500 villages of UP and MP.
- He also carried out reformation of agriculture and cottage industry, rural health and rural education.
- **Educationist** – He started the country's **1st Saraswati Shishu Mandir (SSM)** at Gorakhpur in 1950.
- He founded Deendayal Research Institute (DRI) in Chitrakoot.
- He was also responsible for starting **India's 1st rural university**, Chitarkoot Gramodya Vishwavidyalaya.

Recognition by Indian Government

- **Nanaji Deshmukh Scheme of construction of hostels** – It is a centrally sponsored scheme was launched in 2014-15.
- It aims to provide hostel facilities to those De-Notified Tribes (DNT) students who are not covered under SC, ST or OBC to enable them to pursue higher education.
- The income ceiling for eligibility is Rs 2 lakh per annum.
- Centre provides a maximum of 500 seats per annum throughout the country.
- **Bharat Ratna** – He was **awarded posthumously** with Bharat Ratna in **2019**.

10.4 Sveriges Riksbank Prize

The Royal Swedish Academy of Sciences recently awarded the Sveriges Riksbank Prize in Economic Sciences to 3 US-based economists.

- **Sveriges Riksbank Prize, 2024** - The award was given to Daron Acemoglu, Simon Johnson, and James A Robinson for studies of how institutions are formed and affect prosperity.
- It helps to understand differences in prosperity between nations.
- The 3 laureates have distinguished between inclusive and extractive institutions.
- An inclusive institutional framework refers to the existence of democracy, law and order, protection of property rights, etc.
- An extractive institutional framework typically refers to a lack of rule of law, of power being concentrated in the hands of a few (autocracy or dictatorship), and the associated risks of expropriation.

Sveriges Riksbank Prize

- It is also known as Nobel Prize in Economics.
- **Established by** - Sveriges Riksbank (Sweden's central bank) established the Prize in Economic Sciences in 1968 in Memory of Alfred Nobel.
- The Prize is based on a donation received by the Nobel Foundation from Sveriges Riksbank.
- **Awarded by** - The Royal Swedish Academy of Sciences.
- **Announcement** - Announced in October every year.
 - Presented at award ceremonies on 10 December, marks the anniversary of Alfred Nobel's death (Nobel Day).
- **Medal** - Each laureate shall be presented with a gold medal depicting Alfred Nobel.
- **Award money** - The current amount is at **SEK 11 million** (\$1.058 million) per full Nobel Prize, shared among the 3 members.
- The first Prize in Economic Sciences was awarded to Ragnar Frisch and Jan Tinbergen in 1969.

A Nobel Prize cannot be awarded posthumously.
