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Monthly Current Magazine

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AUGUST MONTH UPDATES

TOPICS COVERED

- World Hepatitis Day
- Global Tiger Day
- India International Bullion Exchange
- Kangaroo Court
- Light-mantled Albatross
- Project BM-SEAL 11
- American Bull Frog and Brown Snake Tree
- Linking Textile with Tourism
- Orunodoi scheme
- Hybrid Electric Vehicles (HEVs)
- AlphaFold
- AL NAJAHH-IV
- Hellfire R9X missile
- Paryushan Parv
- Indian Virtual Herbarium
- Polycyclic aromatic hydrocarbons (PAHs)
- State University Research Excellence (SERB-SURE)
- Central Universities Amendment Bill
- Composite Financial Inclusion Index (FI-Index)
- LIBOR
- Laser Guided Anti-Tank Guided Missiles
- Lumpy Skin Disease

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AUGUST MONTH UPDATES

- Project of Shrimaad Rajchandra Mission
- India's Updated Nationally Determined Contribution (NDC)
- Chief Minister Equal Education Relief, Assistance and Grant (Cheerag) Scheme
- USA-Led Mineral Security Partnership (MSP)
- AzaadiSAT
- Rock Agama
- AGM-88 HARM
- Vasculitis
- Live Fire Exercise
- Porcupine Strategy
- Ex VINBAX 2022
- Lachit Borphukan
- 10 more Ramsar Sites added
- Audio-Visual CO-Production Treaty
- KV Subramanian Committee
- Korea Pathfinder Lunar Orbiter (KPLO)
- Blue Bonds
- Portulaca Oleracea
- Soil Mapping Project
- Langya Henipavirus
- Type Ibn Supernova (SNe)
- Butterfly Mines
- West Seti Power Project
- Popular Slogans raised during Indian Independence
- MPMH-17

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AUGUST MONTH UPDATES

- Rem/ Rapid Eye Movement sleep
- Arpakkam
- United Nations Military Observer Group (UNMOGIP)
- ATAGS
- NIPAM
- Low Altitude Escape Motor (LEM)
- Boundary Commission
- 75 Ramsar sites in 75th Year of Independence
- Women Heroes of India's Freedom struggle
- Bioengineered Cornea implants made of collagen derived from pig skin
- Compostable Plastic
- F-INAS System
- Inflation Reduction Act (IRA) 2022
- Paalan 1000 National Campaign
- Smile-75 initiative
- Pre-Summit meeting of Tiger Range countries
- Dhara Smart Flow Meter
- Mudhol Hounds
- Tilapia
- Megalodon
- Ocean Marine Biodiversity
- Urban forests
- Rhinoceros Poaching Rates
- Cloudbrusts

AUGUST MONTH UPDATES

- Postage stamp released by Egypt celebrating 75th Anniversary of diplomatic ties
- New species of bent-toed gecko
- Garba Dance included in UNESCO Heritage list
- India's First Geothermal Field development project in Leh
- India to become next global Saas Capital
- New identified Gene CSA6
- Anang Tal Lake
- Blue Pacific Tuna
- India's first Commercial Space situational awareness observatory
- Department of Commerce Restructuring Dossier
- PEN-PLUS Strategy
- Snailfish
- Traditional Knowledge Digital Library (TKDL)

World Hepatitis Day is celebrated on 28 July every year.

Key Points

- In year **2022, the World Hepatitis Day is being celebrated under** the theme- "**Bringing hepatitis care closer to you**".
- This theme is **aimed at highlighting the usefulness of bringing hepatitis care closer to primary health care facilities and communities.**
- It also **seeks to ensure better access to treatment and care.**

Hepatitis

- Hepatitis is an **inflammation of the liver that is caused by a variety** of **infectious viruses and noninfectious agents** leading to a range of health problems, some of which can be fatal.
- It **can be acute** (inflammation of the liver that presents with sickness — jaundice, fever, vomiting) **or chronic** (inflammation of the liver that lasts more than six months, but essentially showing no symptoms).
- **Common symptoms** include **fatigue, flu-like symptoms, dark urine, abdominal pain, loss of appetite, unexplained weight loss.**

Causes

- Usually **caused by a group of viruses known as the "hepatotropic**" (liver directed) viruses, **including A, B, C, D and E.**

- **Other causes** include **drugs and alcohol abuse, fat buildup in the liver** (fatty liver hepatitis) or an **autoimmune process in which a person's body makes antibodies that attack the liver** (autoimmune hepatitis).
- **Other viruses may also cause it**, such as the varicella virus that causes chicken pox

Treatment

- **Hepatitis A and E are self-limiting diseases** (i.e. go away on their own) and require no **specific antiviral medications**.
- **Safe and effective vaccines are available to prevent hepatitis B virus (**HBV). This **vaccine also prevents the development of hepatitis D virus** (HDV). **Chronic hepatitis B infection can be treated with antiviral agents**.
- There is **no vaccine for hepatitis C.** Antiviral medicines can cure more than 95% of persons with hepatitis C infection, thereby reducing the risk of death from cirrhosis and liver cancer, but access to diagnosis and treatment remains low.
- An **integrated Regional Action Plan for viral hepatitis, HIV and STIs 2022–2026 is being developed by WHO.**
- This **will ensure effective and efficient utilisation of limited resources** available **for the region and will guide countries to adopt a person-centred approach rather than a disease-specific one.**

Scenario worldwide

- Approximately **354 million people are suffering from hepatitis B and C.**
- **Southeast Asia has 20% of the global morbidity burden of hepatitis.**
- About **95% of all hepatitis-related deaths are due to cirrhosis** and **liver cancers caused by the hepatitis B and C virus.**
- **India has "intermediate to high endemicity" for Hepatitis B** surface antigen and an **estimated 40 million chronic HBV infected people, constituting approximately 11% of the estimated global burden.**
- Population prevalence of chronic HBV infection in India is around 3-4 %.

The world celebrates International Tiger Day or Global Tiger Day every year on July 29.

Key Points

- **Year 2022 is marking the 12th International Tiger Day**.
- The **day is aimed at promoting a global system to protect natural habitats** of tigers, **raising public awareness on risks and challenges faced by tigers** worldwide.

History

- The **World Tiger Day was founded in 2010, during Saint Petersburg Tiger Summit 2010.**
- During the summit, **representatives from 13 countries declared that**; ***tiger-populated countries will start initiatives to double the population of tiger by 2022.***

Key facts related to tiger population

- **As per World Wildlife Fund (WWF), number of wild tigers** have **decreased by over 95% and only 3900 wild tigers are left in the world.**
- **India is home to nearly 70 per cent of the world's tiger population**.
- **Madhya Pradesh has the highest number of tigers** at 526, closely followed by **Karnataka (524) and Uttarakhand (442).**

- There is a **decline in the population of tiger in Chhattisgarh and Mizoram** while **tiger numbers in Odisha remained constant**.
- Kanha Tiger Reserve in Madhya Pradesh is the first tiger reserve in India to officially introduce a mascot, Bhoorsingh the Barasingha.

Reasons behind the declining population of Tigers

- With the **increasing population forest are becoming less in number**. **Clearing of forests** for several reasons like agriculture, industries, etc. **made a loss of around 93% of the natural habitats of tigers.**
- **Climate change, poaching, Illicit commerce, and killing** are other factors leading to decrease in population.
- The **study of Wildlife Institute of India (WII) in the Ranthambore Tiger** Reserve (RTR) **says that the tiger population in the park shown a loss** of **genetic diversity** over the years.
- **Man-animal conflict** also affects the population of big cats.

Conservation efforts

- Tigers are a **part of our planets' natural heritage; they also have great cultural and historical significance.**
- Tigers not only **protect the forest by maintaining ecological integrity** but also they **bring the highest levels of protection and investment to an area**.

Globally

- At the **Petersburg Tiger Summit in 2010, leaders of 13 tiger range countries resolved** to **do more for the tiger and embarked on efforts** to **double its number in the wild, with a popular slogan 'T X 2'.**
- There are **currently 13 tiger range countries** - ***India, Bangladesh, Bhutan, Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam.***

- The **Global Tiger Initiative (GTI) program of the World Bank**, using its **presence and convening ability, brought global partners** together to **strengthen the tiger agenda**.
- **CA|TS has been agreed upon as an accreditation tool by the global coalition** of **Tiger Range Countries (TRCs)** and has been developed by tiger and protected area experts.
- The **Global Tiger Forum (GTF), an international NGO working** on tiger conservation, and **World Wildlife Fund India are the two implementing partners of the National Tiger Conservation Authority for CATS assessment** in India.

India

- India is **home to 51 tiger reserves spread across 18 states** and the last tiger census of 2018 showed a rise in the tiger population.
- **National Tiger Conservation Authority (NTCA) was constituted** under the **Wildlife (Protection) Act, 1972 for strengthening tiger conservation**. It has **launched the M-STrIPES** (Monitoring System for Tigers – Intensive Protection and Ecological Status), a mobile monitoring system for forest guards.
- **Project Tiger is a Centrally Sponsored Scheme** of the Ministry of Environment, Forests and Climate Change (MoEFCC) launched in 1973. It **provides havens for tigers in the country's national parks.**

Protection Status:

- ***Indian Wildlife (Protection) Act, 1972: Schedule I.***
- ***International Union for Conservation of Nature (IUCN) Red List: Endangered.***
- ***Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): Appendix I.***

The Prime Minister launched the India International Bullion Exchange(IIBX) at GIFT city in Gandhinagar, Gujarat.

Key Points

- He **also launched the India International Bullion Exchange (IIBX), India's first International Bullion Exchange in GIFT-IFSC the NSE IFSC-SGX Connect**.

About GIFT city, IFSCA, IIBX and NSE IFSC-SGX Connect

GIFT city

- GIFT city (Gujarat International Finance Tec-City) was e**nvisaged as an integrated hub for financial and technology services** not just for India but for the world.
- GIFT-city is **not just for business but the aspirations of the common man** of the **country are part of the vision of GIFT City**. The **vision of India's future** is **connected in GIFT-City, and dreams of India's golden past are** also **connected with this.**
- GIFT-city is an **important gateway to get connected with India** as well as **global opportunities.**

IFSCA

- IFSCA is the **unified regulator for the development and regulation** of **financial products, financial services and financial institutions** in **International Financial Services Centres (IFSCs) in India.**
- The **building has been conceptualised as an iconic structure, reflective** of the **growing prominence and stature of GIFT-IFSC as a leading International Financial Centre**.

India International Bullion Exchange – IIBX- Background

- During her **2020 budget speech, Finance Minister announced the setting** up of **India International Bullion Exchange (IIBX) at International Financial Services Center (IFSC) at GIFT City in Gandhinagar.**
- The **International Financial Services Centres Authority (Bullion Exchange) Regulations, 2020,** was **notified in December 2020 for trading of precious metals, including gold and silver**.
- These **regulations also cover bullion exchange, clearing corporation,** depository and **vaults**.

What is it?

- IIBX **will facilitate efficient price discovery with the assurance of responsible sourcing and quality**, apart from **giving impetus** to the **financialisation of gold in India.**
- It **will empower India to gain its rightful place in the global bullion market** and **serve the global value chain with integrity and quality**.
- IIBX **also re-enforces the commitment of the Government of India** towards **enabling India to be able to influence global bullion prices** as a **principal consumer**

Who can trade on IIBX?

- **Qualified jewellers will be permitted to import gold through the IIBX.**

- To **become qualified jewellers, entities require a minimum net worth of Rs 25 crore and 90% of the average annual turnover** in the **last three financial years through deals in goods categorized as precious metals.**
- Apart from qualified jewellers, **non-resident Indians and institutions** will **also be able to participate in the exchange after registering with the IFSCA.**
- Further, **jewellers will be able to transact on IIBX as trading members** or as **clients of a trading member**.
- For **becoming a trading member, a qualified jeweller may establish** a **branch or a subsidiary in IFSC and apply to the IFSCA.**

NSE IFSC-SGX Connect

- NSE IFSC-SGX Connect is a **framework between NSE's subsidiary in the GIFT International Financial Services Centre (IFSC) and Singapore Exchange Limited (SGX).**
- Under Connect, all **orders on NIFTY derivatives placed by members** of **Singapore Exchange will be routed to and matched on the NSE-IFSC order** matching and **trading platform.**
- **Broker-Dealers from India and across international jurisdictions** are **expected to participate in large numbers** for **trading derivatives** through Connect.
- It **will deepen liquidity in derivative markets at GIFT-IFSC**, bringing in more international participants and **creating a positive impact** on the **financial ecosystem in the GIFT-IFSC.**

What is a Bullion?

- Bullion **refers to physical gold and silver of high purity often kept** in the **form of bars, ingots, or coins.**
- It can **sometimes be considered as a legal tender.**
- It is **often held as reserves by central banks or held by institutional investors.**

Chief Justice of India said that the media is running "kangaroo courts" in India.

What is a kangaroo court?

- **Oxford Dictionary defines** it as "***an unofficial court held by a group of people in order to try someone regarded, especially without good evidence, as guilty of a crime or misdemeanour".***
- In a less **literal sense, it is used to refer to proceedings or activities** where a **judgement is made in a manner that is unfair, biased**, and **lacks legitimacy.**
- Moreover, the **system does not work on the standards of law or justice.**
- Kangaroo Courts **are known for working against the phrase** "***innocent until proven guilty".***

Origin

- The **origin of the phrase is not clearly known,** but it is **believed to have** been **used from the 19th Century onwards. Why the word 'kangaroo'** is **used is also not clear**, but **there are several theories**.
- This **expression may have originated in Australia** but it **was first recorded** in the **US during the California Gold Rush of 1849.**
- The **Kangaroo Courts were common during the Stalin era in the Soviet Union, famous** as the "***Moscow Trails" of the Soviet Great Purge.***

Researchers have recorded the sighting of a light-mantled albatross in Tamil Nadu's Rameswaram.

Key Points

- The **location where the Albatross was spotted is part of the Palk Bay and near the Gulf of Mannar,** an '**Important Bird Area'** on India's southeast coast.
- As the **nearest recorded site of the bird is around 5,000 km away from Rameswaram**, the **researchers feel a change in atmospheric pressure could have been among the reasons** for the Albatross to **land on an Indian shore.**
- This is the **first time that the bird – a native of Antarctica** — was **being spotted on the Asian continent**.
- This **record from the Palk Bay side of Rameswaram island** is **significant**, and it **throws up new challenges to researchers** once these **Antarctic birds migrate to Asia**.

Light-mantled Albatross

- With **Scientific Name "Phoebetria palpebrate**", it is **also, known** as the **grey-mantled albatross or the light-mantled sooty albatross.**

- It is **native to Antarctic seas**
- A **worldwide population of 21,600 breeding pairs**, according to an estimate in 1998
- **IUCN Status: Near Threatened**

Breeding Sites-

- It **breeds on several sub-Antarctic islands**, such as ***Macquarie Islands, Heard Island and McDonald Islands (Australia), South Georgia Island (British Overseas Territory), Prince Edward Islands (South Africa), Iles Kerguelen and Iles Crozet (France), and Auckland, Campbell, and Antipodes Islands (New Zealand).***

Characteristics

- **Ash coloured with darker areas** around **the head and lighter areas across the back and wingtips.**
- **Distinctive white stripe immediately above the eye**
- The **Light-mantled Albatross, with broad pelagic habits, maintains** a **circumpolar distribution in the Southern Ocean.**

The start of production from the BM-SEAL-11 project is expected from 2026-27

Key Points

- The **Cabinet Committee on Economic Affairs** (CCEA) **approved** an **additional investment of $1.6 billion** (about Rs 12,000 crore) by **Bharat PetroResources (BPRL), a subsidiary of state-run Bharat Petroleum Corporation** (BPCL), for **development of BM-SEAL-11 Concession Project in Brazil.**
- The **start of production from BM-SEAL-11 project is expected** from **2026-27.**
- **BPRL has 40% Participating Interest** (PI) in this Concession along **with Petrobras, National oil company of Brazil,** as the **Operator with 60% Participating Interest.**

Background

- In **April this year**, **India and Brazil in a joint statement recognised** the **importance of robust investment in the Brazilian oil** and **gas sector by Indian companies** and **reaffirmed their commitment** to **safeguard existing investments**, while **encouraging further bilateral investments.**

- **India also expressed interest in sourcing crude oil** under long term special contracts.

Significance

- **accessing to equity oil to strengthen India's energy security**.
- **diversifying India's crude oil supply** and **Indian oil companies** have **expressed interest in sourcing more crude oil from Brazil**.
- **Strengthening India's foothold in Brazil,** which **will further open business avenues in neighbouring Latin American countries**
- Further **strengthening the bilateral ties between the countries**

Two invasive species, American bullfrog and brown tree snake, cost the world an estimated $16 billion

Key Point

- **According to a study**, **two invasive species** namely the American bullfrog and the brown tree snake **cost the world economy an estimated $16 billion between 1986 and 2020 by causing problems** such as **crop failure and triggered costly power failures.**

Impacting the world economy, How?

- The **brown-and-green frog weighs over two pounds (0.9 kg)**, had the **greatest impact in Europe**.
- The **brown tree snake has multiplied uncontrollably on Pacific islands including Guam and the Mariana Islands**, where the **species was introduced by the U.S. troops in World War II.**
- The **snakes have, at times, been so abundant that they caused power outages by crawling on electrical equipment.**
- This **signals the need for investment controlling global transport** of invasive species to **avoid paying for mitigation after the invasions occur.**

American bullfrog

- The **American bullfrog (Lithobates catesbeianus), often simply known** as the **bullfrog in Canada and the United States**, is a **large true frog native** to **eastern North America**
- The bullfrog **gets its name from the sound the male makes** during the **breeding season, which sounds similar to a bull bellowing.**
- It **typically inhabits large permanent water bodies such as swamps, ponds**, and **lakes**. Bullfrogs **can also be found in man made habitats such as pools**, **koi ponds, canals, ditches and culverts.**
- Bullfrogs **have been introduced into the Western United States, South America, Western Europe, China, Japan, and southeast Asia**. In these places **they are invasive species due to their voracious appetite** and the **large number of eggs they produce**, having a negative effect on native amphibians and other fauna
- **Other than for food, bullfrogs are also used for dissection in science classes.** Albino bullfrogs are sometimes kept as pets, and bullfrog tadpoles are often sold at pond or fish stores.

The brown tree snake

- The **brown tree snake (Boiga irregularis), also known as the brown catsnake,** is an **arboreal rear-fanged colubrid snake native to eastern** and **northern coastal Australia, eastern Indonesia (Sulawesi to Papua), Papua New Guinea**, and **many islands in northwestern Melanesia.**
- This **snake is infamous for being an invasive species responsible** for **extirpating the majority of the native bird population in Guam**.
- The brown tree **snake preys upon birds, lizards, bats, and rats and other small rodents in its native range**
- The brown tree snake is **not restricted to forested habitats,** as it **can also occur in grasslands and sparsely forested areas, as well.**

Eight Craft Villages Including One In Odisha Taken Up Under 'Linking Textile With Tourism'

Key Points

- **Major tourist places are being linked with handicrafts cluster** and **Infrastructure supports combined with soft interventions** are being **proposed under the "Linking Textile with tourism".**
- With respect to this, **8 craft villages have already been set** up for **overall development of villages**. In these villages craft promotion and tourism are being taken forward.

Craft villages have been set up in;

- ***Raghurajpur (Odisha)***
- ***Tirupati (Andhra Pradesh)***
- ***Vadaj (Gujarat)***
- ***Naini (Uttar Pradesh)***
- ***Anegundi (Karnataka)***
- ***Mahabalipuram (Tamil Nadu)***
- ***Taj Ganj (Uttar Pradesh), and***
- ***Amer (Rajasthan)***

Significance

- **Craft Village will develop handicrafts as a sustainable** and **remunerative livelihood option for artisans in the clusters** and thus **protecting the rich artisanal heritage of the country.**
- Through this programme, **around 1000 artisans will be benefitted directly across the country.**
- This programme **has also increased the inflow of tourist** across these Craft Villages.

Linking Textiles with Tourisms

- Linking Textile with Tourism through Crafts Tourism Village is a **modern-day concept wherein craft promotion and tourism** are being **taken up simultaneously**.
- Under these villages, **the artisans live and work at the same place** and are **provided the opportunity to sell their products** thereby **ensuring livelihood to the artisans**.
- The **basic objective is to select areas that are surrounded** and **connected by major tourist destinations/circuit** and have a **traditional art and craft heritage, which attract maximum tourist footfalls.**
- It **helps to increase the income of the artisans through the-design innovations** and **sales of their handcrafted products** at **work place and in connecting and disseminating the heritage**, **culture, food and other aspects of the area**, which **also ensures livelihood to the other sectors as well.**

Some 22 lakh beneficiaries of the Orunodoi scheme in Assam will get ₹18 extra for August to buy a National Flag or two.

Orunudoi Scheme

- **'Orunodoi' or Arunodoi Scheme** is a **scheme of the Government of Assam** is **launched on 2nd October 2020**.
- Under 'Orunodoi', **monetary benefits has been envisaged for more than 24 lac poor household in the state**
- Its **aim is to empower women and provide financial assistance** to **economically vulnerable families.**

Features

- Under the scheme, a **monthly assistance of Rs 1000 earlier 830** is **transferred to women members of marginalised families of Assam.**
- On **account of being a DBT, or a Direct Benefit Transfer scheme**, the **money is credited directly to the bank account of the woman** head of a family because they are primary caretakers of the household.
- The **scheme gives a choice to the poor and needy households** on **how they want to spend their money.**

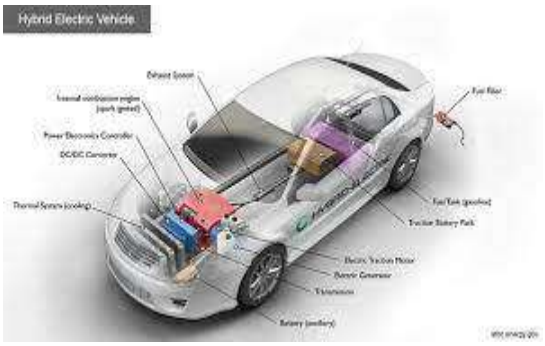
Eligibility

- The **applicant, a woman, has to be a permanent resident of Assam**, whose **composite household income should be less than Rs 2 lakh per annum.**

- **Families with specially-abled members and divorced/widowed/separated /unmarried women are prioritised**.
- **Poorer families, those without National Food Security Act (NFSA) or ration cards, are also given priority.**
- **Families without any women members, MPs, MLAs** (former and current), **members of Panchayati Raj institutions and urban local bodies, government officials** and **employees of cooperative societies are excluded** from the scheme.

Scope of the Scheme:

- G**overnment of Assam will provide monthly financial assistance** to the **eligible beneficiaries for procuring medicines, pulses, and sugar** wherein Rs **400 per family per month is to be given to each beneficiary family** for **procuring medicines** for taking care of their health need
- **Rs 200 per family per month to provide for 50% subsidy for the 4 Kgs** of **pulses a family consumes in a month** and **Rs 80 per month per family** which will **effectively subsidize 50% of the monthly expenditure** they will **spend on the 4 Kgs of sugar** that they will purchase for the house every month.
- **Separately, Rs 150 per family per month would be provided** for the **purchase of essential fruits and vegetables over** and **beyond what they grow in their homestead farms.**
- The **medical and nutritional support will have a consolidated inflow of Rs 830 per month to a family.**



Automakers Maruti Suzuki, Toyota and Honda have launched Hybrid Electric Vehicles (HEVs) in India offering car buyers more choices in the nascent electric vehicle market.

Hybrid electric vehicle

- A **hybrid electric vehicle (HEV) uses an ICE (a petrol/diesel engine)** and one or more **electric motors to run**.
- It is **powered by the electric motor alone**, which **uses energy stored** in **batteries, by the ICE, or both.**

Components:-

- The **powertrain of the HEV is more complex than a regular ICE-powered car** as it **has EV components and a conventional ICE**
- A typical HEV **will have**

➢ ***low-voltage auxiliary battery,***
➢ ***traction battery pack to store electricity for the electric motor,***
➢ ***electric generator,***
➢ ***AC/DC converter,***
➢ ***power electronics controller,***
➢ ***thermal system to maintain working temperature,***
➢ ***conventional ICE,***

- *fuel tank, a fuel filler,*
- *transmission and an exhaust system.*

How do HEV powertrains work?

- HEV **powertrains are designed to power cars in a series, parallel or series-parallel (power split) methods.**
- A **series HEV uses only the electric motor to drive the wheels**, while the **ICE powers the generator, which in turn recharges the battery.**
- A **parallel HEV, based on the driving condition, uses the best power source** to **power the vehicle**. It **will alternate between the electric motor** and the **ICE to keep the car moving.**
- A **series-parallel HEV offers a combination of both models** and **allows splitting power,** wherein **power is routed from the ICE alone** or **from the battery to the electric motor to drive the vehicle.**
- Moreover, in **all three designs, the battery is charged through regenerative braking technology.**

Regenerative braking

- The **efficiency of HEVs and EVs will in large part be determined by** their **ability to recover as much energy as possible while braking,** with a **higher degree of energy recovery lowering fuel consumption.**
- The **amount of recoverable energy depends upon factors** like **vehicle speed and stopping pattern.**
- The **adoption of regenerative braking technology in the auto industry** is **increasing on account of the operating efficiency of vehicles** through **reduced fuel consumption and the extended range of batteries**.

Based on the type of RBS, the energy recovery happens in multiple ways.

- A **kinetic system can recover the energy lost during braking** and **then use this energy to recharge the high-voltage battery of the vehicle.**

- An **electric system generates electricity through a motor during sudden braking.**
- Lastly, a **hydraulic system uses pressurised tanks to store the vehicle's kinetic energy** and **can offer a high energy recovery rate** which is **ideal for heavy vehicles.**

Its advantages

- A **regenerative braking system (RBS) used in automotive applications** has **several advantages like better braking efficiency in stop-and-go traffic** which **enhances fuel economy and also helps in reducing carbon emissions.**
- Besides, **RBS also helps in energy optimisation resulting in minimum energy wastage**.

Different types of HEVs

The HEVs **can be categorised into micro, mild and full hybrid vehicles**, based on the **degree of hybridisation**.

Full HEV

- They have **larger batteries and more powerful electric motors** which can **power the vehicle for short distances and at low speeds.**
- These **vehicles cost more than mild hybrids but provide better fuel economy benefits.**

Mild HEV

- It **cannot drive using only the electric motor and uses the battery at traffic** lights or in **stop-and-go traffic to support the ICE.**

Micro HEV

- They **do not offer electric torque assistance as they lack an electric motor,** but they **have an idle stop-start system and energy management functions.**

Plug-in-HEVs

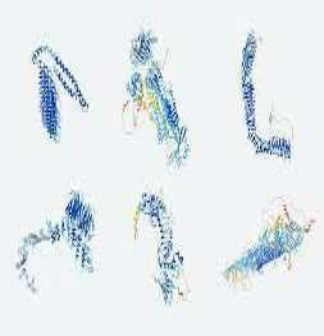
- They are **just like full HEVs, but they can be charged using a wall outlet**, as they **have an onboard charger and a charging port.**
- PHEVs **generally use the electric motor until the battery is almost drained and then automatically switch to the ICE.**

Advantages of using hybrid technology

- **Fuel efficiency is a major factor** for most people considering buying a car.
- **Most vehicles with hybrid technology offer better fuel efficiency**, more power, and **minimum emissions**.
- The **design of hybrid vehicles for reduced engine size and car weight** as **compared to ICE vehicles**, translates into **increased mileage to favour** the **demand for these vehicles**.
- Moreover, with the **increase in total power and torque, HEVs can deliver instant torque** and **provide high torque even at low speeds**.

Challenges of hybrid technology

- In a **price-sensitive market like India, one of the major challenges** for HEVs is the **high vehicle cost**.
- **Battery, a vital component of an HEV, increases the cost of the vehicle,** making it **pricier than vehicles powered only by an ICE**.
- The RBS **also adds to the higher cost of an HEV.**



DeepMind, a company based in London, announced that it had predicted the three-dimensional structures of more than 200 million proteins using AlphaFold.

AlphaFold

- AlphaFold is an AI-**based protein structure prediction tool.**
- It is **based on a computer system called deep neural network.**
- **Inspired by the human brain**, **neural networks use** a **large amount of input data** and **provide the desired output exactly like how a human brain would.**
- The **real work is done by the black box between the input and the output** layers, **called the hidden networks.**
- AlphaFold is **fed with protein sequences as input**.
- When **protein sequences enter through one end,** the **predicted three-dimensional structures come out through the other.**

Working Mechanism:

- It **uses processes based on "training, learning, retraining and relearning."**
- The **first step uses the available structures of 1,70,000 proteins** in the **Protein Data Bank (PDB) to train the computer model**.
- Then, it **uses the results of that training to learn the structural predictions** of **proteins not in the PDB.**

- Once **that is done, it uses the high-accuracy predictions from the first step** to **retrain and relearn to gain higher accuracy of the earlier predictions.**
- By **using this method, AlphaFold has now predicted the structures** of the **entire 214 million unique protein sequences deposited** in the **Universal Protein Resource (UniProt) database.**

Implication

- **Proteins are the business ends of biology**, meaning **proteins carry out all the functions inside a living cell.**
- Therefore, **knowing protein structure and function is essential** to **understanding human diseases.**
- **Scientists predict protein structures** using x**-ray crystallography**, nuclear **magnetic resonance spectroscopy, or cryogenic electron microscopy**.
- These **techniques are not just time-consuming, they often take years** and are **based mainly on trial-and-error methods**.
- The **development of AlphaFold changes all of that**.
- It is **a watershed movement in science and structural biology in particular.**

Substitutes

- ***AlphaFold is neither flawless nor the only AI-based protein structure prediction tool.***
- **RoseTTaFold, developed by University of Washington in Seattle**, U.S., is **another tool.**
- Although **less accurate than AlphaFold, it can predict the structure** of **protein complexes.**

Significance for India

- The **Indian community of structural biology is strong and skilled.**
- It **needs to quickly take advantage of the AlphaFold database** and **learn how to use the structures to design better vaccines and drugs.**

- **Understanding the accurate structures of COVID-19 virus proteins** in days rather than years **will accelerate vaccine and drug development against the virus.**
- It **should facilitate joint collaborations with the prevalent hardware muscle** and **data science talent in the private sector and specialists** in **academic institutions to pave the way for data science innovations.**

Indian Army and Royal Army of Oman will conduct their joint Military Exercise AL NAJAH-IV from 1st to 13th of August 2022.

Key Points

- This is the **fourth edition of India-Oman joint military exercise 'AL NAJAH-IV'.**
- It is **held between contingents of Indian Army and the Royal Army** of **Oman** is **scheduled to take place at the Foreign Training Node of Mahajan Field Firing Ranges**.
- The **Indian Army is represented by troops from the 18 MECHANISED INFANTRY Battalion.**
- The **joint military exercise aims** to **enhance the level of defence co-operation between Indian Army and Royal Army of Oman** and **will further manifest in enhancing the bilateral relations** between the two nations.

Previous Edition - The **previous edition of Ex AL NAJAH IV** was **organised at Muscat** from 12 to 25 **March 2019**.

The scope of the exercise includes:

- *Professional interaction*
- *Mutual understanding of drills and procedures*
- *Establishment of joint command and control structures*
- *Elimination of terrorist threats*

- The **joint exercise would focus on Counter Terrorism Operations, Regional Security Operations, and Peace Keeping Operations** under **United Nations charter** apart from **organising joint physical training schedules, tactical drills, techniques** and **procedures**.

Other exercises with Oman

- *Naseem-Al-Bahr*
- *Eastern Bridge*

The US military used its 'secret weapon' — the Hellfire R9X missile – to detain Al Qaeda chief Ayman al-Zawahiri.

Hellfire R9X Missile

- **Better known in military circles as the AGM-114 R9X**, the Hellfire R9X is a **US-origin missile.**
- **Known to cause minimum collateral damage** while **engaging individual targets**
- The Hellfire 9RX **missile is known to have been in active service since 2017**. However, its **existence became public knowledge two years later in 2019**.

Features

- It is a **variant of the original Hellfire missile family** which is **used** in **conventional form with warheads and is traditionally used from helicopters**, **ground-based vehicles**, and **sometimes small ships** and **fast moving vessels.**
- This **weapon does not carry a warhead** and **instead deploys razor-sharp blades at the terminal stage of its attack trajectory.**

Working:

- **Blades help it to break through even thick steel sheets** and **cut down** the **target using the kinetic energy of its propulsion without causing** any

damage to the persons in the general vicinity or to the structure of the building.

- The **blades pop out of the missile and cut down the intended target without causing the massive damage to the surroundings** which **would be the case with a missile carrying an explosive warhead.**

Hellfire missile Family

- Hellfire is **actually an acronym for Heliborne, Laser, Fire and Forget Missile**
- It was **developed in the US initially to target tanks from the Apache AH-64 attack helicopters.**
- **Later**, the **usage of these missiles spread to several other variants** of **helicopters** and **also ground and sea-based systems and drones**.
- **Developed by Lockheed Martin and Northrop Grumman,** the Hellfire missile has **other variants such as 'Longbow' and 'Romeo' apart from the 'Ninja'.**
- The **Hellfire family of missiles, including the 'Ninja Missile',are armed** on **Combat Unmanned Aerial Vehicles or drones that the US Military uses** in **offensive military operations** around the world.

PARAMETERS CONSIDERED

Learning outcomes, Effective classroom transaction, infrastructure facilities and student's entitlements, school safety and child protection, digital learning and governance process

OVERALL SCORE

Percentage	Districts
Over 90%	0
*81-90%	3
71-80%	86
61-70%	276
51-60%	238
41-50%	87
31-40%	39
*21-30%	3
*11-20%	2

DIGITAL LEARNING SCORE

Percentage	Districts
71-80%	8
61-70%	41
51-60%	71
41-50%	79
31-40%	83
21-30%	125
11-20%	146
Below 10%	180

DISTRICT SCORES

11-20%
Shi Yomi (Arunachal Pradesh), Lawngtlai (Mizoram)

21-30%
Kra Daadi and Longding (Arunachal Pradesh), Mamit (Mizoram)

81-90%
Sikar, Jhunjhunu, Jaipur (all in Rajasthan)

The Department of School Education and Literacy (DoSE and L), Ministry of Education (MoE) has released the Performance Grading Index for Districts (PGI-D) for 2018-19 and 2019-20.

Key findings of the index

- **Rajasthan's Sikar is the top performer**, followed by **Jhunjhunu and Jaipur**.
- The **other States** whose districts have performed best are **Punjab with 14 districts in 'Ati-uttam' grade** (scoring 71-80% on a scale of 100).
- It is **followed by Gujarat and Kerala.**
- The **districts with the lowest scores** are So***uth Salmara-Mankachar (Assam), Alirajpur (Madhya Pradesh), North Garo Hills and South Garo Hills in Meghalaya, and Khowai*** (Tripura) in 2019-20.
- The **12 states/ UTs which don't have a single district in the Ati-Uttam** and **Uttam** are **Bihar, Goa, Jammu and Kashmir, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Uttarakhand.**

Other observations

- Schools across India performed poorly under the category of digital learning.
- Around **61% of districts of the country had very little exposure** to **digital learning** due to **limited availability of computers, Internet facilities** and **teachers trained to handle technological tools in schools.**

- **33 districts improved their score in outcomes**, but there is n**o grade-level improvement.** The outcomes category includes learning outcomes of students, teachers' availability and professional outcomes.
- A **clear rural-urban divide in the area of digital learning**. For instance, while districts in cities like Chandigarh and Delhi scored between 25 and 35 out of 50, places like Bihar's Araria and Kishanganj scored as low as 2.

Performance Grading Index for Districts(PGI-D)

- An **index designed to grade the performance of all districts in school education.**
- ***Conducted by Department of School Education and Literacy (DoSEL under the ministry of education)***
- Aim is **to assess the performance of the school education system at** the **District level by creating an index for comprehensive analysis**.
- The indicator-wise PGI score shows the areas where a district needs to improve.

Structure-

- The PGI-D structure **comprises a total weightage of 600 points** across ***83 indicators, which are grouped under six categories***
- ***Outcomes, Effective Classroom Transaction, Infrastructure Facilities & Students' Entitlements, School Safety & Child Protection, Digital Learning, and Governance Process***

Working

- The **PGI-D grades the districts into 10 grades with the highest achievable grade being 'Daksh'**, which is **for districts scoring more than 90% of** the **total points in that category or overall.**
- '**Utkarsh' category is for districts with score between 81-90%,** followed by '**Ati-Uttam**' (71-80%), '**Uttam'** (61-70%), '**Prachesta-I'** (51-60%), '**Prachesta-II'** (41-50%) and '**Pracheshta III'** (31-40%).

- The **lowest grade in PGI-D is called 'Akanshi-3'** which is for scores up to 10% of the total points.

Significance

- The index is **expected to help the state education departments** to **identify gaps at the district level** and **improve their performance in a decentralized manner.**
- The PGI-D **will reflect the relative performance of all the districts** on a **uniform scale which encourages them to perform better.**

Union Environment Minister inaugurated the country's largest online herbarium database, the 'Indian Virtual Herbarium' web portal.

Key Points

- **More than one lakh Specimens and Scientific Information related** to them are **available in this Virtual Herbarium**
- In the **Virtual Herbarium, a rich picture of the Botanical Diversity of India** is **also visible**. It **will become an important resource for research** on **Indian flora.**
- In the **future, the Ministry of Environment, Forest and Climate Change may also extend** and **include herbarium specimens from other Institutes** and **University herbaria to bring the herbarium database of entire India** on a **single platform.**

Indian Virtual Herbarium Portal

- It is **developed by the Botanical Survey of India under 'Azadi Ka Amrit Mahotsav' and 'Digital India'.**
- The portal **aims to provide complete information on herbarium specimens about the floral diversity of India** and **other countries stored in the cabinet of the herbarium** building through online access.

- The portal **includes about one lakh images of herbarium specimens** with **metadata comprising all digitized images of type specimens**, Wallich specimens, Orchid specimens, and other specimens.

Categories

At present, portal has four categories:

1. ***Cryptogam type specimens***
2. ***Cryptogams general specimens***
3. ***Phanerogam type specimens***
4. ***Phanerogams general specimens***

Significance of the Portal

- The **database created is the largest storage of information about plant diversity in India.**
- The **information can be used by taxonomists, naturalists, ecologists**, **molecular biologists, amateur botanists**, etc.
- It **will also aid the research studies** and **provide valuable insight** for **global plant research.**

Herbarium specimens

- A **herbarium (Latin: hortus siccus) is a collection of plant samples** with **associated data for long-term study.**
- These **materials may include pressed and mounted plants, seeds, dry fruits, wood sections, pollen, microscope slides, silica-stored materials, frozen DNA extractions, and fluid-preserved flowers or fruits**; all are **generally referred to as herbarium specimens**.
- Herbaria are **usually affiliated with universities, museums, or botanical** gardens.
- **Herbarium specimens help in research work and studies related** to the **subject**.

- It is **also essential in plant identification, systematics studies**, and ecological studies.

Major Herbaria in India

- The **Botanical Survey of India (BSI) has more than 30,00,000 herbarium** specimens **persevered in different herbaria located in different parts** of the **country.**
- The **Central National Herbarium (CAL) located at Howrah**, was established in 1795 and **comprised about 2,000,000 (2 million) specimens.**
- The **first herbarium in the country is one of the most important Asian Herbaria.**
- **Forest Research Institute, Dehradun contains 350,000 specimens.**
- The **National Botanic Gardens, Lucknow** contains **260,000 specimens.**
- **Blatter Herbarium, St. Xavier's College**, Fort Bombay contains **200,000 specimens.**

Researchers at the Council of Scientific & Industrial Research-Indian Institute of Petroleum (CSIR-IIP), Dehradun, have identified a fungus capable of removing toxic, recalcitrant, and carcinogenic polycyclic aromatic hydrocarbons (PAHs) from the environment.

About the research

- The **researchers at IIP identified a white-rot fungus Trametes maxima IIPLC-32** which **has the potential to cause microbial degradation of pyrene.**
- According to researchers, **growing on dead plants, this fungus causes pyrene degradation using special enzymes**.
- The **researchers used gas chromatographic-mass spectrometer** and **serotome analysis for their study**.
- **Gas chromatographic-mass spectrometric identification of prominent** metabolites **helped determine the pyrene degradation pathway**.

Findings

- As **found by researchers, the pyrene concentration decreased by 79.8 percent, 65.37 percent and 56.37 percent within 16 days** from the initial levels of 10 mg per litre, 25 mg per litre and 50 mg per litre, respectively.
- The **serotome analysis revealed the presence of 81 extracellular proteins**.
- ***Knowledge of serotome analysis in pyrene degradation helped understand the degradation mechanism of pyrene.***

Significance

- The **fungus identified by the researchers can cause microbial degradation**, thereby **improving the soil quality**.
- This **fungus acts to decrease the pollution level of the soil**
- As revealed by the study, the **fungus T.maxima may prove to be helpful** in the **remediation of especially pyrene.**
- The **recommendation from the study is that T.maxima IIPLC-32** can be **tried in the future for the bioremediation of PAH-contaminated aquatic environments.**

About PAHs

- The **rapid pace of economic development and industrialisation** has **resulted in an increased level of pollution in the environment**. Among the **pollutants found in the soil, many PAHs are also present**.
- The **PAHs are ubiquitous environmental pollutants originating** from **multiple sources, including combustion of petrogenic fossil fuels**, and **incomplete incineration of municipal wastes and biomass**.
- **Pyrene, possessing four benzene rings**, belongs to the **highly toxic class** of **PAHs, with carcinogenic and mutagenic properties**.
- It **gets lodged into the environmental matrices like soil, water** and **atmosphere, resulting in widespread environmental pollution**, **necessitating adequate remediation of contaminated environmental matrices.**

The Science and Engineering Research Board (SERB) has launched a new scheme titled "State University Research Excellence(SERB-SURE)".

State University Research Excellence(SERB-SURE) Scheme

- State University Research Excellence (SERB-SURE) is a **new innovative scheme of the Science and Engineering Research Board** (SERB), a **statutory body of the Department of Science and Technology** (DST), that **can foster collaboration for high-end research at state and private universities** and **colleges**.
- Launched to **augment the research capabilities in a structured way** to **create a robust R&D ecosystem in state and private universities** and **colleges, including self-financed institutions working** within these universities
- In this scheme, the **state universities will have level competition** to **secure research funding, and present significant opportunities for strengthening** of **research ecosystem in state universities to upgrade their research capabilities to national and international levels**
- The scheme **provides research support to active researchers belonging** to **state and private universities and colleges.**
- This **includes self-financed institutions working within universities**, across India to **undertake research and development in frontier areas of science**, **engineering, and quantitative social science**.

Significance

- The **new scheme will help bring the university system,** which was **so far mostly limited to teaching, into mainstream research** and **enable the young faculty there to participate in cutting-edge research**
- The new programme, which **would also support data-driven social science** research, **would be a great stimulus to the latent potential** that **lies in our universities.**
- The scheme **will also provide much-needed research opportunities** to the **faculties of state universities, 45% of which are located in rural areas.**
- **Universities with local background** would be **able to take ground-level research,** that in **turn would benefit the local industry and local farmers.**

Science and Engineering Research Board (SERB)

- SERB is a **statutory body, working under Department of Science** and **Technology.**
- It was **set up in 2009, through SERB ACT, 2008**.
- Set up to **promote basic research in science and engineering** as well as to **give financial assistance to scientists, academic institutions, industrial concerns and R&D laboratories.**

The education minister introduced the Central Universities (Amendment) Bill.

About the bill

- The **Bill amends the Central Universities Act, 2009**, which **provides for establishing central universities in various states**
- It **aim to address the need for talent in the expanding transportation sector** and **meet the demand for trained talent** to **fuel the growth and expansion of the sector.**

Features of the Bill

- The Bill **seeks to convert the National Rail and Transportation Institute, Vadodara (a deemed university) to the Gati Shakti Vishwavidyalaya**, which **will be a central university**.
- The **National Rail and Transportation Institute** was **declared** a **deemed university under the University Grants Commission Act, 1956.**
- The **Vishwavidyalaya will be sponsored and funded by the central government** through the **Ministry of Railways**.

- It **will reverse the brain drain and create capability and capacity** by **developing masters and doctoral degrees in transportation.**

Functions

- The Bill **provides that Gati Shakti Vishwavidyalaya** will take **measures to provide quality teaching, research**, and **skill development** in **disciplines related to transportation, technology,** and **management**.
- If **required, the University may also establish centres in India** and **abroad.**
- The **establishment of the Vishwavidyalaya will address the need** of **trained talent in the transportation sector.**
- It **will carry out critically-needed research and development** by **creating innovative technologies** to **encourage local manufacturing and substitute imports of expensive technology,** equipment and **products**.

The Reserve Bank of India has released the Composite Financial Inclusion Index (FI-Index) for the year ended 31st March 2022.

Key Points

- The **extent of financial inclusion across the country has increased to 56.4** in **March 2022 showing growth across parameters.**
- The **improvement has been seen across all its sub-indices** (**Access, Usage and Equality).**
- The **index stood at 53.9 in March 2021**.
- It **was at 43.4 for the period ending March 2017**. This sh**ows rapid improvement in the reach of financial services over the past five years.**

Financial Inclusion Index

- It is a **comprehensive index released by RBI to capture the extent** of **financial inclusion across the country** by **including details of banking, investments, insurance, postal as well as the pension sector**.
- The index is **published annually in July.**
- The **index has been constructed without any "base year"**. It **reflects the cumulative efforts of all stakeholders.**
- The **FI-Index is responsive to ease of access, availability and usage** of **services and quality of services, consisting of 97 indicators.**

Parameters

- It **comprises three broad parameters** (weights indicated in brackets) viz., **Access (35%), Usage (45%), and Quality (20%)** with **each of these consisting** of **various dimensions, which are computed based on a number of indicators.**
- The **index is responsive to ease of access, availability and usage of services**, and **quality of services for all 97 indicators**.
- It **captures information on various aspects of financial inclusion** in a single **value ranging between 0 and 100**, where **0 represents complete financial exclusion and 100 indicates full financial inclusion.**

Financial inclusion

- **According to the World bank**, financial inclusion **means that individuals** and **businesses have access to affordable financial products and services** that **meet their needs.**
- **Accessibility, affordability and availability of financial services** are **3 pillars of financial inclusion.**
- It is a **method of offering banking and financial solutions** and **services** to **every individual in the society without any form of discrimination.**
- In a **diverse country like India, financial inclusion is a critical part** of the **development process.**
- Since independence, the combined efforts of successive governments, regulatory institutions, and civil society have helped in increasing the financial-inclusion net in the country.

Initiatives to Increase Financial Inclusion in India

- **Jan Dhan-Aadhar-Mobile (JAM) Trinity**
- The **government has also launched many flagship schemes** to **promote financial inclusion** and **provide financial security to empower the poor** and **unbanked in the country.**

- These **include the Pradhan Mantri Mudra Yojana, Stand-Up India Scheme, Pradhan Mantri Jeevan Jyoti Bima Yojana, Pradhan Mantri Suraksha Bima** Yojana, and **Atal Pension Yojana**.
- The **Reserve Bank of India has undertaken a project titled "Project Financial Literacy"**
- **Digital Identity "Aadhar**"

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Prelims 2023

(LIBOR) rose for the fourth straight session, rising roughly 2.5 basis points to 2.83229%, the highest since November 2008.

London Interbank Offered Rate (LIBOR)

- LIBOR, which **stands for London Interbank Offered Rate** is a **benchmark interest rate** at which **major global lend to one another in the international interbank market** for **short-term loans.**
- LIBOR **serves as a globally accepted key benchmark interest rate** that **indicates borrowing costs between banks.**

Working

- LIBOR is **administered by the Intercontinental Exchange**, which **asks major global banks how much they would charge other banks** for **short-term loans**.
- The **rate is calculated using the Waterfall Methodology**, a **standardized, transaction-based, data-driven, layered method**.
- It is **based on five currencies including the US dollar, the euro**, the **British pound, the Japanese yen, and the Swiss franc.**

- It **serves seven different maturities**—***overnight/spot next, one week, and one, two, three, six, and 12 months.***
- The **combination of five currencies and seven maturities** leads to a **total of 35 different LIBOR rates calculated and reported** each **business day.**

Replacement

- It has **been subject to manipulation, scandal, and methodological critique, making it less credible today as a benchmark rate.**
- It is **being replaced by the Secured Overnight Financing Rate (SOFR) on June 30, 2023,** with **phase-out of its use beginning after 2021.**

Defence Research and Development Organisation (DRDO) has successfully test fired indigenously developed Laser-Guided Anti-Tank Guided Missiles (ATGM).

Key Points

- The **indigenously developed Laser-Guided Anti-Tank Guided Missiles ATGM** were **successfully test-fired from Main Battle Tank MBT Arjun** by **Defence Research and Development Organisation** (DRDO) and **Indian Army at KK Ranges** with **support of Armoured Corps Centre** and **School Ahmednagar in Maharashtra**
- The **missiles hit with precision and successfully destroyed the targets** at **two different ranges**.
- Telemetry systems have recorded the satisfactory flight performance of the missiles.

About the missile

- The **missile has been developed with multi-platform launch capability** by **Pune-based Armament Research and Development Establishment** (ARDE) in **association with High Energy Materials Research Laboratory** (HEMRL) and **Instruments Research and Development Establishment** (IRDE), Dehradun.

- The **all-indigenous laser guided ATGMs employ a tandem high explosive anti-tank (HEAT) warhead to defeat explosive reactive armour** (ERA) **protected armoured vehicles in ranges from 1.5 km to 5 km.**
- The ATGM has been **developed with multi-platform launch capability** and is **currently undergoing technical evaluation trials from 120 mm rifled gun** of MBT Arjun.
- The **missile locks and tracks the targets with the help of laser designation to ensure precision hit accuracy**.

Anti-Tank Guided Missiles

- ATGMs are **primarily designed to hit and destroy heavily armored military** vehicles.
- The **missiles can be transported by a single soldier, to larger tripod-mounted weapons, which require a squad or team to transport and fire**, to **vehicle and aircraft mounted missile systems.**
- This **type of guided missiles rely on an electro-optical imager (IIR) seeker**, a **laser or a W-band radar seeker in the nose of the missile**.
- These are '**fire-and-forget' missiles where the operator can retreat right** after **firing as there is no more guidance required.**

Some other Anti-tank Missiles

- ***HELINA***
- ***The Nag***
- ***MPATGM***
- ***SANT***
- ***ATGM for MBT Arjun***

Over the last few weeks, nearly 3,000 cattle have died in Rajasthan and Gujarat due to Lumpy Skin Disease.

Lumpy Skin Disease (LSD)

- Lumpy Skin Disease is a **viral illness that causes prolonged morbidity** in **cattle and buffaloes**.
- **According to a report by GAVI, the Global Alliance for Vaccines** and **Immunisation**, the Lumpy Skin Disease (LSD) **disease is caused by a virus called the Capripoxvirus** and is "**an emerging threat to livestock worldwide".**
- It is **genetically related to the goatpox and sheeppox virus family.**
- LSD **infects cattle and water buffalo mainly through vectors** such as **blood-feeding insects**

Symptoms

- Signs of infection **include the appearance of circular, firm nodes** on the **animal's hide or skin that look similar to lumps.**
- Infected **animals immediately start losing weight and may have fever** and **lesions in the mouth, along with a reduced milk yield**.
- Other symptoms include **excessive nasal and salivary secretion**.
- **Pregnant cows and buffaloes often suffer miscarriage** and in some cases, **diseased animals can die due to it as well**.

Earlier outbreaks

- This is **not the first time LSD has been detected in India.**
- The **disease has been endemic in most African countries, and since 2012** it has **spread rapidly through the Middle East, Southeast Europe** and **West and Central Asia.**
- Since **2019, several outbreaks of LSD have been reported in Asia**.
- In May this year, Pakistan's Punjab also reported the deaths of over 300 cows due to LSD.

Transmission

- **According to the World Organisation for Animal Health (WOAH),** of which **India is a member, mortality rates of 1 to 5 per cent are considered usual**.
- The **disease is not zoonotic, meaning it does not spread from animals** to **humans, and humans cannot get infected with it.**
- While the **virus does not spread to humans,** "***milk produced by an infected animal will be fit for human consumption after boiling or pasteurisation as these processes will kill the viruses, if any, in the milk***"

Prevention and Treatment

- **Successful control and eradication of LSD relies** on "***early detection…followed by a rapid and widespread vaccination campaign***", as per the WOAH.
- **Vaccination against these diseases is covered under the Livestock Health and Disease Control Programme of India.**
- Once an **animal has recovered, it is well protected** and **cannot be the source of infection for other animals.**
- There are **no specific antiviral drugs available for the treatment** of lumpy skin disease. The **only treatment available is supportive care of cattle**.
- The **first thing is they should sanitize cattle-sheds by eliminating vectors through application of insecticides** and **spraying disinfectant chemicals**.

- They **should isolate the infected cattle immediately from the healthy stock** and **contact the nearest veterinarian for treatment** of the infected animal. This is **necessary as otherwise the virus may prove fatal.**
- Secondly, they **should report the outbreak to the state government** so that the **rest of the healthy herd can be vaccinated using goat pox vaccine**
- **Another challenge** is the **disposal of the dead animals** as **improper handling of the carcasses can cause health and sanitation issues**.
- **Proper disposal of the carcasses can include incineration or burning** of the **bodies at high temperatures, along with disinfection of premises**, as per the WOAH.

The Prime Minister of India inaugurated and laid the foundation stone of various projects of the Shrimad Rajchandra Mission at Dharampur in Gujarat.

About the project

Shrimad Rajchandra Hospital–

- Shrimad Rajchandra **Hospital will be inaugurated at Dharampur in Valsad district.**
- It is a **250-bed multispecialty hospital**, constructed at the cost of 200 crore rupees. Hospital is **equipped with cutting edge medical infrastructure.**
- It will **provide world class tertiary medical facilities, to the people Gujarat.**

Shrimad Rajchandra Animal Hospital

- Shrimad Rajchandra Animal Hospital is **going to be a 150-bed hospital** and will be built at a cost of around Rs. 70 crores.
- It **will be equipped with top-class facilities and a dedicated team of veterinarians and ancillary staff**.
- The Hospital **will provide holistic medical care alongside conventional medicine for the care and upkeep of animals.**

Shrimad Rajchandra Center of Excellence for Women

- Shrimad Rajchandra Center of Excellence for Women will be built at an estimated cost of Rs. 40 crores.
- It **will have facilities for recreation, classrooms** for **self-development sessions, and rest areas.**
- It will **employ over 700 tribal women and subsequently provide a livelihood** to **thousands of others.**

About Shrimad Rajchandra Mission

- Shrimad Rajchandra Mission Dharampur is a **spiritual movement for inner transformation through wisdom, meditation and selfless service.**
- **Founded by Pujya Gurudevshri Rakeshji**, the organization **works through 196 centers on five continents**

Shrimad Rajchandra

- He was a **Jain poet, philosopher, mystic, scholar and reformer.**
- He was **born in in Vavaniya village near Morbi** (present day Gujarat).
- He **wrote many philosophical poetries, one being Atma Siddhi**.
- He is **well known to provide spiritual guidance to Mahatma Gandhi**
- He **gave the world a rich heritage that guides generations of seekers**.
- He was a **visionary who laid the foundations of spirituality for a new era.**
- **Honoured as Yugpurush**, he **gave the world a rich heritage that continues** to **guide generations of seekers, in a short span of 34 years.**

India updated its Nationally Determined Contribution (NDC) on emissions

Key Points

- The **Union Cabinet recently gave approval to India's updated Nationally Determined Contribution (NDC).**
- The **updated NDC will be transferred to the United Nations Framework Convention on Climate Change** (UNFCCC).

Background

- **Last time** India had **submitted its Intended NDC to UNFCCC on October 2, 2015.** It **had eight goals, of which 3 goals have quantitative targets** up to **2030;**
- ***To take cumulative electric power installed capacity from non-fossil sources to 40%.***
- ***To reduce emissions intensity of GDP by 33-35 %, as compared to 2005 levels.***
- ***To create additional carbon sink of 2.5-3 billion tonnes of CO2 equivalent***

India had communicated at the COP26 to the United Nations Framework Convention on Climate Change (UNFCCC), to **escalate its climate action**, by **presenting five nectar elements of India's climate actions** (Panchamrit), to the world. **COP 26 was held in Glasgow, United Kingdom**.

About the updated NDC

- The **updated NDC seeks to enhance India's contributions towards achievement of the strengthening of global response** to the **threat** of **climate change,** as **agreed under the Paris Agreement**. Such action will also help India usher in low emissions growth pathways.
- It **would protect the interests of the country and safeguard its future development needs based on the principles and provisions of the UNFCCC.**

As per the updated NDC, India now stands committed to

- ***Reduce its emission intensity by at least 45%, instead of just 33 to 35% from 2005 levels by 2030.***
- ***Ensure at least 50% of its total electricity generation, not just 40% would come from renewable sources by 2030.***
- However, the ***forestry target has not been touched***.
- India would **ensure** that at ***least 500 GW of India's installed electricity generation capacity in 2030 would be based on non-fossil fuel sources***.
- India **would ensure avoided** ***emissions of at least one billion tonnes of carbon dioxide equivalent between now and 2030.***
- It ***also announced a net zero target for the year 2070***.

Electricity coming from non-fossil fuels

- The **target having at least 40% of electricity coming from non-fossil fuels**, has **officially been reached.**
- **41.5% of India's current installed electricity capacity of 403 GW** is now powered **by non-fossil fuels**.
- Renewables (wind, solar and others) alone account for more than 28% of this capacity while hydropower contributes over 11%.

Features

- It also **take forward the Hon'ble Prime Minister's vision** of **sustainable lifestyles** and **climate justice to protect the poor and vulnerable** from **adverse impacts of climate change.**
- The **updated NDC reads** "***To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change".***
- The **decision on enhanced NDCs demonstrates India's commitment** at the **highest level for decoupling of economic growth from greenhouse gas** emissions.
- India's **updated NDC will be implemented over the period 2021-2030 through programs and schemes of relevant Ministries /departments** and with **due support from States and Union Territories**.
- Recognizing that lifestyle has a big role in climate change, the Hon'ble ***Prime Minister of India, at COP 26, proposed a 'One-Word Movement', to the global community.***
- This ***one word is LIFE…L, I, F, E, i.e. Lifestyle For Environment.***
- The **vision of LIFE is to live a lifestyle that is in tune with our planet** and **does not harm** it. India's updated NDC also captures this citizen centric approach to combat climate change.

Role of Government

- The **Government has launched many schemes and programs** to scale up **India's actions on both adaptation and mitigation.**
- For **instance the Net Zero target by 2030 by Indian Railways alone** will lead to a **reduction of emissions by 60 million tonnes annually.**
- Similarly, **India's massive LED bulb campaign is reducing emissions by 40 million tonnes annually.**
- India's NDC does not bind it to any sector specific mitigation obligation or action.

The chief minister of Haryana has launched the "Chief Minister Equal Education Relief, Assistance and Grant (Cheerag)" scheme.

Cheerag Scheme

- Under the scheme, **government will provide free education to Economically Weaker section** (EWS) **students of Government schools in private school.**
- It has **replaced a similar scheme launched in 2007**, by Bhupinder Singh Hooda's government. **Scheme was launched in accordance with Rule 134 A** of **Haryana School Education Rules, 2003.**

Features

- Under Cheerag scheme, **students of government school can enrol in private school in class 2nd to 12th.**
- However, **for this, annual verified income of parents shall be less than Rs 1.8 lakh.**

The **government will provide monthly Support** of;

- ***Rs 700 per student from Classes II to V.***
- ***Rs 900 per student from Classes VI to VIII.***
- ***Rs 1,100 per student from Classes IX to XII***

India, in partnership with the United Kingdom, announced the Green Grids Initiative — One Sun, One World, One Grid (GGI-OSOWOG)

GGI-OSOWOG- Background

- The **26th Conference of Parties to the United Nations Framework Convention on Climate Change** (COP26) in **Glasgow promoted discussions** on **climate change issues and solutions that resulted in the Glasgow Climate Pact**, including **commitments to strengthen efforts** to **build climate resilience and curb the emission of greenhouse gases.**
- The **conference called for participating nations to accelerate** their **transition from fossil fuels to clean power**.
- Based on **such deliberations of CoP26, India's Prime Minister** announced **India's Panchamrit to accelerate the energy transition in India.**
- Furthermore, **under the International Solar Alliance**, **India announced** the ***launch of the Green Grids Initiative — One Sun, One World, One Grid (GGI-OSOWOG) in partnership with the United Kingdom.***

GGI-OSOWOG

- GGI-OSOWOG was **conceived in 2018 to develop global interconnected solar energy systems.**
- The **vision behind the OSOWOG is 'The Sun Never Sets'** and is a constant at some geographical location, globally, at any given point of time.

- The **initiative aims to build a framework for global cooperation** on the **effective utilisation of renewable resources** and to **help ensure** that **clean** and **efficient energy is a reliable option for all nations** to **meet their energy requirements by 2030**.
- This **project aspires to harness the sun's energy** and **build a global interconnected electricity grid to accelerate** the **transition to renewable energy.**
- The **initiative is expected to connect more than 80 countries** across a large **geographical area**, with varying levels of sunlight.
- A **transitional system will enable countries with low levels of sunlight** to **obtain energy from areas with an excess of it**.

Implementation

The **development of the grids will take place in three stages-**

1. ***The interconnection of the Indian grids with the Middle East, South Asia and Southeast Asian (MESASEA) grids***
2. ***MESASEA grids' interconnection with the African power grid***
3. ***Finally, global interconnectivity***

Opportunities

- Being a **thermal energy-dependent country, India faces severe electricity shortages** in many areas **due to heatwaves** (when demand increases) and **coal shortages**
- **GGI** can **transform the traditional energy system by replacing thermal power plants with solar energy**, making **India more resilient** against **extreme weather conditions and less dependent on fossil fuels.**
- **Solar energy** has been **improving the lives of millions of people** in **rural India, enabling them to carry out activities** and **improving their standard** of living **in an environmentally friendly manner**.

- An **example of this is the implementation of solar-powered agriculture pumps** to **extract groundwater**, which are **more environmentally friendly** than traditional diesel ones.
- The **implementation of GGI can enhance the quality of life of rural communities** in many other areas **like access to electronic gadgets, clean drinking water, among others.**

Challenges

- **Certain obstacles need to be considered** during the implementation of the initiative. Its **documentation does not comment on improving the efficiency** of the **existing solar energy infrastructure in the country.**
- A **majority of the solar energy infrastructure is located in desert regions**, which **brings dust deposits on panels**. A layer of dust decreases solar power conversion efficiency by 40 per cent.
- There are **also hidden environmental costs of setting up solar energy** infrastructure. **Solar energy technologies such as batteries** and panels use **energy-intensive raw materials** and **several chemicals** and **heavy metals** that **need to be handled and disposed of correctly.**
- In **India**, the **problem of e-waste and industrial discharge in rivers** is at an **all-time high**. This **makes proper waste management mechanisms necessary** to **reduce the environmental stress,** primarily caused by an increase in solar energy infrastructure.
- The **initiative also does not define strategies to recycle** and **repurpose existing infrastructure**, which **can be an exciting avenue** to view through the circular economy lens.
- **Solar panels generally have a lifespan of 25 years**, after which **they have to be retired since they lose their efficiency.**

What can be done?

- **Environmental costs of solar power, efficiency issues, energy losses** due to conversion and **transfer, and the problem of waste management** are **barriers that need to be addressed urgently** by the implementing bodies.
- In **India**, the **implementation** of GGI **comes at an increased environmental cost due to waste disposal issues**. These obstacles need to be worked around by **developing specific systems to reuse and recycle existing infrastructure**.
- To **make the initiative a success in India**, there **needs to be a careful consideration of the initiative's costs and the benefits**. Its modifications need to be planned in ways that suit the country's requirements and resource capabilities.
- The **GGI serves as a good starting point for the same**, provided the nation overcomes the aforementioned challenges and considers the environmental costs of implementing the initiative.

Indian Space Research Organisation (ISRO) is set to launch its smallest commercial rocket 'Small Satellite Launch Vehicle (SSLV)' carrying 'AzaadiSAT'

Key Points

- It **will be launched to unfurl the Tricolour in space**, from **Satish Dhawan Space Centre in Sriharikota.**
- It **was specifically conceptualised for celebration of 75th Independence Day.**
- It **will encourage scientific temper and create opportunities for young girls** to **opt for 'space research' as their career.**
- The **vehicle will carry an Earth Observation Satellite named EOS-02** and a **co-passenger satellite, 'Azaadi SAT' into low earth orbit.**

What is Azaadi SAT?

- The 'Azaadi Satellite' is **designed by 750 girl students of government schools** in **rural areas from Kashmir to Kanyakumari.**
- AzadiSAT is the **result of ISRO pushing for girls to take up Science, Technology, Engineering, and Mathematics (STEM).**
- It is an 8-**kilogram CubeSat**. Each of the **75 payloads are weighing about 50 grams**

- The **mission will conduct femto-experiments** (selfie cameras to click pictures of its own solar panels and long-range communication transponders).
- AzadiSAT **also comprise of a solid-state PIN diode-based radiation counter,** that will **measure the ionising radiation in its orbit**, as well as a long-range transponder.
- The **satellite will also carry a recorded version of the national anthem sung** by Rabindranath Tagore, **which will be played in space as a tribute to the country.**
- **ISRO will use ground system developed by Space Kidz India,** to **establish telemetry and communication with AzadiSAT in orbit.**

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Prelims 2023

A study carried out by researchers from Indian Institute of Science (IISc) undertook to understand where the rock agamaresidese in and around Bengaluru specifically.

About the research

- The **study, published in Frontiers in Conservation Science, examined** several **environmental factors that could affect the presence of the lizard**
- **Habitat loss and other such features of urbanisation** have **affected** the presence of the animal in urban centres.
- The **inference is that conservation efforts must point towards retaining rocky patches** even **while reviving landscapes by planting trees.**
- The **study has revealed that Rock Agama lizards are found mainly** in **rocky places and warm spots**.

Significance of this study

- **Organisms like lizards** other than large animals like tigers or elephants or even birds **also play an equally important role in the ecosystem**.
- So, **while rock agamas are interesting in themselves**, they ar**e also a good model system to understand other aspects of the ecosystem**.
- For instance, in **cities such as Bengaluru, there is a lot of flora and fauna** that is **rapidly disappearing.**

- The rock **agama is one such species which is dependent on rocky scrub** habitats which are **being converted into buildings and plantations.**
- Hence, the **study of this lizard could be a key indicator of the health** of the **ecosystem and need to be preserved too.**

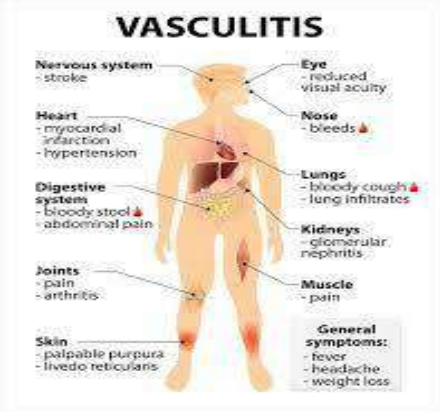
Peninsular Rock Agama

- The **Peninsular Rock Agama (Psammophilus dorsalis)** is a **type of garden lizard has a strong presence in southern India.**
- This lizard is a **large animal, strikingly coloured in orange and black**.
- They **do not generate their own body heat**, so they **need to seek warmth** from **external sources like a warm rock or a sunny spot on the wall.**
- They are **important in ecology from different aspects** — they **can indicate which parts of the city are warming**, and **their numbers show how the food web is changing**.
- **Habitat loss and other such features of urbanisation** have **affected** the **presence o**f the animal in urban centres.

United States Under Secretary of Defence for Policy Colin Kahl confirmed that Washington has supplied some "anti-radiation missiles" to Ukraine, which could be fired from some Ukrainian Air Force aircraft.

AGM-88 HARM

- The **acronym 'HARM' in the AGM-88 HARM air-to-surface missile** stands for High-**Speed Anti-Radiation Missile**.
- It is a **tactical weapon fired from fighter aircraft**, and has the **capability to detect** and **home into radiation emitted by hostile radar stations** that **have surface-to-air detection capabilities**.
- The **missile was originally developed by the Dallas-headquartered Texas Instruments**, but is **now produced by** the **major American defence contractor Raytheon Corporation.**
- The **AGM-88 HARM is 14 metres in length, but only 10 inches** in **diameter**.
- It **weighs around 360 kg and carries a fragmentation type warhead that is optimised for radar targets**.
- It **also has an anti-radar homing seeker broadband RF antenna** and **receiver, and a solid state digital processor**.
- The missile has a **range of more than 100 km.**



Ashton Kutcher had a "weird, super rare form of vasculitis" two years ago that "knocked out" his vision, hearing, and "all his equilibrium". Now he is "fully recovered".

Vasculitis

- Vasculitis is **inflammation of blood vessel walls**.
- **Inflammation is the natural response of the body's immune system** to any **injury or infection**, which **in normal course can help the body fight invading germs**.
- **However, in vasculitis**, the **body's immune system turns on healthy blood vessels, causing them to swell up and narrow down**. The **trigger** for vasculitis **may be an infection or a drug, although the precise reason** is **often uncertain or unknown**.
- **Fever, night sweats, malaise, myalgia, and arthralgia are common** in all types of vasculitis.
- **Active vasculitis is usually associated with an acute phase response** with an **increase in C reactive protein concentration, erythrocyte sedimentation** rate, or **plasma viscosity.**
- Vasculitis **can be only a minor problem affecting the skin**, or it can be a **serious condition that impacts the heart, kidneys or other vital organs**.
- There are **around 20 different disorders that are classified as vasculitis**. **Angiitis and Arteritis are used as synonyms for vasculitis**.

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Prelims 2023

China began its live-fire exercise, launching at least 11 ballistic missiles into the country's coast, a day after US House speaker Nancy Pelosi visited Taiwan.

What are live-fire exercises?

- They are **exercises primarily used by military personnel**, in which **live ammunition is used to create training conditions** that are as **close to real combat scenarios as possible.**
- Live-fire **exercises are also used by law enforcement** and **firefighters as a form of field training**, to **train them to act calmly** in **real-life emergency situations in the future**.
- During live-fire training, **soldiers are placed in simulated combat situations and are given the opportunity to use their weapons** and **equipment** (like ships, aircraft, tanks and drones).
- Such **exercises are invaluable in maintaining combat readiness** of **troops, the cohesiveness of units, and instilling confidence** in their **ability to use their weapons and equipment correctly**.
- It **also involves testing the effectiveness of vehicles**, **weapon platforms and weapons systems** (such as intercontinental ballistic missiles, cruise missiles, anti-aircraft weapons), so **that any design flaws can be resolved before the weapons are fully operational**.

- In the **recent case in the Taiwan Strait,** live-fire **exercises allow countries to brandish their military prowess** and **capacity** for **destruction**

Previously

- **China** had **previously undertaken a similar show of force during** the **Third Taiwan Strait Crisis in 1995-1996,** when it **fired missiles into the waters near Taiwan,** after **former President Lee Teng-hui visited the US, despite China's strong objections**.
- **US army resumed its live-fire drills in South Korea** after a **hiatus of three years**, in **response to the series of weapons tests undertaken by North Korea this year.**

Taiwan is planning to use this strategy to fight back in case China attempts to occupy it by force

Key Points

- **China has launched aggressive and unprecedented military exercises** near **Taiwan in response to the US House Speaker's visit to the island** that **China claims as part of its territory**.
- As the **long-range, live-fire drills began with China's Eastern Theatre Command firing several ballistic missiles**, **Taiwan** said that it was **"preparing for war without seeking war".**

About porcupine strategy

- The "**porcupine doctrine" was proposed in 2008 by US Naval War College research professor William S Murray**.
- It is a ***strategy of asymmetric warfare focused on fortifying a weak state's defences to exploit the enemy's weaknesses rather than taking on its strengths.***
- It is **about building defences that would ensure that Taiwan** could be **attacked and damaged but not defeated**, at **least without unacceptably high costs and risks.**

Working

It **identifies three defensive layers in the porcupine approach.**

- The **outer layer is about intelligence and reconnaissance to ensure defence forces are fully prepared**. Behind this **come plans for guerrilla warfare at sea with aerial support from sophisticated aircraft** provided by the US.
- The **innermost layer relies on the geography and demography of the island**.
- While the **outer surveillance layer would work to prevent a surprise attack,** the **second one would make it difficult for China to land its troops** on the **island in the face of a guerrilla campaign at sea** using "agile, missile-armed small ships, supported by helicopters and missile launchers".

Why need such a strategy?

- ***China enjoys overwhelming military superiority over Taiwan.***
- Over the **past decade, China has developed far more accurate** and precise **weapon systems to target Taiwan** and **has been vocal about its intention** to "**reunite" the island with the mainland, by force or coercion if needed.**

Asymmetric systems of defence

- Asymmetric systems **are ones that are small, numerous, smart, stealthy, mobile and hard to be detected and countered** and **associated** with **innovative tactics and employments.**
- Among **Taiwan's current and yet-to-be-delivered military systems**, "the ***minelayer ship, the Harpoon coastal defence cruise missile, the Stinger man-portable air defence missile, and possibly the missile corvettes*** can be **considered 'small things' that can be fielded in large numbers".**
- These **asymmetric capabilities will be aimed at striking** the "**operational centre of gravity and key nodes of the enemy".**
- **Taiwan underlined its shift to an asymmetric approach by adopting** the **Overall Defence Concept (ODC) in 2018.** The **ODC was developed** and **introduced during the tenure of Admiral Lee, who served from 2017 to 2019.**

The 3rd Edition of Vietnam India Bilateral Army Exercise "Ex VINBAX 2022" is scheduled to be conducted at Chandimandir,Haryana.

Key Points

- The **exercise is a sequel to previously conducted bilateral exercise** in **Vietnam in 2019** and a **major milestone in strengthening** the **bilateral relations between India and Vietnam.**
- **India and Vietnam share a Comprehensive Strategic Partnership** and **defence cooperation is a key pillar of this partnership.**
- **Vietnam is an important partner in India's Act East policy** and the **Indo-Pacific vision.**

Ex VINBAX – 2022

- The **conduct of Ex VINBAX – 2022 as a field training exercise** with **enhanced scope from previous editions of bilateral exercise**
- A **48 hours Validation Exercise is part of the schedule** to **assess** the **standards achieved by both contingents while executing technical military operations under similar scenarios in UN missions**.
- A **Humanitarian Assistance & Disaster Relief demonstration** and **equipment display will showcase India's capacity to undertake rescue** and **relief operations during natural and manmade disasters utilising indigenous solutions.**

Theme

- The **theme of Ex VINBAX – 2022 is employment and deployment** of an **Engineer Company and a Medical Team as part of United Nations Contingent for Peace Keeping Operations.**
- **India has a rich legacy of deployment of troops in United Nations missions** and has **some of the best capacities to impart United Nations peace operations training incorporating best practices** and **hands on training** to **prospective United Nations peacekeepers at tactical, operational** & **strategic levels.**

Significance

- It **will strengthen mutual confidence, inter-operability and enable sharing** of **best practices between the Indian Army and Vietnam People's Army.**
- The **joint exercise will also provide an opportunity to the troops of both** the **Contingents to learn about the social and cultural heritage** of each other.
- **Indian Army is being represented by troops from the 105 Engineer Regiment.**

The Assam government made a request to include Lachit Borphukan's valour in textbooks

Lachit Borphukan

- Lachit Borphukan was a **commander in the erstwhile Ahom kingdom**.
- Born on **24th November, 1622, Borphukan was known for his leadership** in the **Battle of Saraighat, 1671** in which an **attempt by Mughal forces** to **capture Assam was thwarted**.
- On **one side was Mughal Emperor Aurangzeb's army headed by Ram Singh** of **Amer (Jaipur**) and on the **other was the Ahom General Lachit Borphukan.**
- **Ram Singh failed to make any advance against the Assamese** army during the **first phase of the war.**
- Lachit is **known to have defeated the Mughal Army by brilliant uses** of the **terrain, guerrilla tactics, clever diplomatic negotiations to buy time**, **military intelligence** and by **exploiting the sole weakness of the Mughal forces—its navy.**
- Lachit Borphukan **emerged victorious in the war and the Mughals** were **forced to retreat from Guwahati**.
- It is **considered as one of the greatest naval battles** on a river which resulted in the victory of Ahoms over the Mughals.

Battle of Alaboi

- The Battle of Alaboi was **fought on August 5, 1669, between the Ahoms** and **Mughals in which the Ahoms suffered severe reverses** and thousands of its soldiers were killed.
- **Aurangzeb had ordered the invasion in 1669** under **his ally Rajput Raja Ram Singh I** who **led a combined Mughal and Rajput army.**
- **Borphukan engaged in guerrilla warfare, assaulting the invaders** and then **falling back until Ram Singh I unleashed his entire forces on the Ahoms**, **defeating them in the Battle of Alaboi**.

Honor

- On **24 November each year, Lachit Divas is celebrated statewide** in **Assam to commemorate the heroism of Lachit Borphukan.**
- The **best passing out cadet of National Defence Academy has conferred** the **Lachit gold medal every year since 1999 commemorating his valour**.
- The **government is also trying to turn the burial sites (maidams) of Ahom royalty scattered across Charaideo hillocks** into a **UNESCO world heritage site.**
- The **year-long celebration of the 17th-century Ahom general's 400th birth anniversary is going on.**

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Prelims 2023

India has added 10 more Ramsar sites, or wetlands of international importance

Key Points

- **India adds 10 more wetlands designated as Ramsar sites** to make **total 64** sites **covering an area of 12,50,361 ha in the country.**
- The **10 new sites include** Six **(6) sites in Tamil Nadu and One (1) each** in **Goa, Karnataka, Madhya Pradesh and Odisha**.
- Being **designated one, however, doesn't necessarily invite extra international funds but that States —and the Centre** — must **ensure** that these **tracts of land are conserved and spared from man-made encroachment**.
- **Acquiring this label** also **helps with a locale's tourism potential** and its international visibility.

Note

- **Earlier**, India **designated five new wetlands of international importance** – the ***Karikili Bird Sanctuary, Pallikaranai Marsh Reserve Forest and Pichavaram Mangrove in Tamil Nadu, Pala wetland in Mizoram and Sakhya Sagar in Madhya Pradesh.***
- **India is one of the Contracting Parties to Ramsar Convention**, signed in **Ramsar, Iran, in 1971.** ***India signed it on 1st Feb 1982***.

Ten sites are

Koonthankulam Bird Sanctuary (Tamilnadu)

- It is a **man-made wetland**. It is the **largest reserve for breeding resident** and **migratory water birds in South India**.
- It is **also an Important Bird and Biodiversity Area forming** part of the **Central Asian Flyway.**

Satkosia Gorge (Odisha)

- Satkosia **spreads along the magnificent gorge over the mighty river Mahanadi in Odisha**. It was **established in 1976 as a wildlife sanctuary**.
- Satkosia is also the **meeting point of two biogeographic regions of India**; the **Deccan Peninsula and the Eastern Ghats**, contributing to immense biodiversity.

Nanda Lake (Goa)

- The **majority of the lake is intermittent freshwater marshes** that lie **adjacent to one of the major rivulets of the Zuari River.**
- This **enables the locals to store the water during the off-monsoon season.**

Gulf of Mannar Marine Biosphere Reserve (Tamil Nadu)

- It is **located on the southeastern coastline of India** and is a **unique marine environment rich in biodiversity.**
- This is the **first Marine Biosphere Reserve in South & South -East Asia.**

Ranganathittu Bird Sanctuary (Karnataka)

- It has **been enlisted as one of the Important Bird Areas (IBA) in Karnataka** and **India by the Bombay Natural History Society**.

Vembannur Wetland Complex (Tamil Nadu)

- It is a **human-made inland tank**. The **tank is believed to have been constructed in the regime of Pandyan king Veeranarayana**.

- The **wetland forms the southernmost tip of peninsular India**. This wetland is also an **Important Bird and Biodiversity Area(IBA).**

Vellode Bird Sanctuary (Tamil Nadu)

- It is **provincially known as Periyakulam Yeri**. It **forms part of the Central Asian Flyway.**

Sirpur Wetland (Madhya Pradesh)

- It is a **historical wetland situated in Indore, Madhya Pradesh**. It is not only **important for its aesthetic value, but it provides immense ecological services such as being an important source of water.**
- Presently, the **wetland is being developed as a bird sanctuary** and **ecological learning center**.

Vedanthangal Bird Sanctuary (Tamil Nadu)

- It is **comprised of freshwater water and is also one of the oldest bird-protected areas**. It **belongs to the Coromandel Coast biotic province.**
- This site is also **recognized as an Important Bird and Biodiversity Area(IBA).**

Udhayamarthandapuram Bird Sanctuary (Tamil Nadu

- It is **one of the important bird sanctuaries in Tamil Nadu**. The site is an **important staging and breeding ground for several species of waterbirds**.
- The **notable species observed at the site are oriental darter, glossy ibis, grey Heron & Eurasian spoonbill**.
- This **site stores floodwaters during monsoon overflow** and **maintains surface water flow during drier periods.**

Ramsar convention

- It is an international treaty for the conservation and wise use of wetlands.

- It is **named after the Iranian city of Ramsar, on the Caspian Sea**, where the **treaty was signed on 2 February 1971**.
- ***Known officially as 'the Convention on Wetlands of International Importance especially as Waterfowl Habitat'*** (or, more recently, just 'the Convention on Wetlands'), it **came into force in 1975.**

Montreux Record

- Montreux Record **under the Convention is a register of wetland sites** on the **List of Wetlands of International Importance** where **changes in ecological character have occurred, are occurring, or are likely to occu**r as a **result of technological developments, pollution** or **other human interference.**
- It is **maintained as part of the Ramsar List.**

Union Cabinet has approved the signing of an Audio Visual C0-Production Treaty, between India and Australia with a view to promote co-production of films.

Key Points

- **India has so far signed 15 Audio Visual Co-production Treaties** with **foreign countries.**
- **Australia has emerged as a preferred destination for shooting** of **Indian films**.
- **India** is **fast emerging as a major content hub for film makers** looking **for new projects.**
- **India has abundance of exotic locations**, **talent pool,** relatively **cheaper cost of production and post production**, making **India** a **favoured destination of foreign film makers.**

Audio Visual Co-production Treaty

- Audio visual co-production **treaties are enabling documents which facilitate the co-production of films between both countries.**

- Under **such umbrella agreements, private, quasi-government** or **governmental agencies enter into contracts to produce films** together.

Significance

- The **proposed agreement will boost ties with Australia**, lead to **exchange of art and culture, showcase the soft power** of our **country**.
- This **will also generate employment among artistic, technical** as well as **non-technical personnel engaged in audio-visual co-production, including production and post-production work.**
- Moreover, the **use of Indian locations would increase** the **prospects of the country becoming a preferred film-shooting destination** and also **lead to an inflow of foreign exchange**

The Securities and Exchange Board of India (SEBI) has constituted an expert group of Foreign Portfolio Investors (FPIs) to boost overseas flows into the country.

KV Subramanian Committee

- The **FPI Advisory Committee (FAC) will be chaired** by **former Chief Economic Adviser KV Subramanian.**
- It **will consist of 14 other members representing foreign banks**, **stock exchanges depositories and RBI**.

Mandate of the committee

- To **advise on issues related to investments and operations of FPIs** in the **financial markets, including measures to facilitate ease** of **doing business by FPIs in India**
- To **review investment avenues available for FPIs** and **to advise on the feasibility of new investment avenues**
- To **suggest measures required to encourage FPI participation** in the **bond market.**

South Korea launched its first exploratory space mission outside of Earth's orbit known as Korea Pathfinder Lunar Orbiter (KPLO), officially named 'Danuri'

Key Points

- **South Korea became the seventh country in the world** to **launch** a **mission to the Moon as its orbiter hitched a ride on SpaceX Falcon-9.**
- This is the **first lunar mission by South Korea**, which **recently developed a space rocket launch capability**

Korea Pathfinder Lunar Orbiter (KPLO), DANURI

- This is the **first lunar mission by South Korea**.
- It was **lifted off from launch complex 40 at the Cape Canaveral Space Force Station in Cape Canaveral.**
- The lunar mission has been jointly developed by Nasa and the **Korea Aerospace Research Institute (KARI)**
- **Danuri features a boxy, solar-powered satellite designed** to **skim just 62 miles (100 kilometers) above the lunar surface**, during which it **will collect geologic and other data for at least a year from this low polar orbit.**

- **Danuri**, which **translates to enjoying the moon in Korean**, has an expected **lifetime of one year around the Moon** and **will orbit in a circular orbit at an altitude of 100 km** and a **90-degree inclination angle.**
- **Objective** is **developing and verifying space technologies** suitable for **deep-space exploration on future missions.**

Significance

- The **spacecraft is taking a long, roundabout path to the Moon** in **order to conserve fuel** and **will arrive at its destination** in mid-December.
- If successful, the **spacecraft will join India's Chandrayaan-2** and **Nasa's Lunar Reconnaissance Orbiter** (LRO) **around Earth's natural satellite** as **new missions make a beeline for the Moon**.

Also

- **India, Russia and Japan will also launch new moon missions** in **2022-2023.**
- NASA is **also scheduled to launch its mega moon rocket**, under **Artemis program, in August 2022**.
- As a **part of the mission, an empty crew capsule** will be **sent across the moon**, in a **bid to test the systems before a crew climbs aboard in two years.**

Markets regulator Securities and Exchange Board of India (SEBI) has proposed the concept of blue bonds as a mode of sustainable finance.

Key Points

- Securities and Exchange Board of India **(SEBI) has proposed** the **concept of blue bonds** as a **mode of sustainable finance**, saying such **securities can be utilized for various blue economy-related activities**, including **oceanic resource mining and sustainable fishing.**
- The **watchdog has suggested strengthening the framework** for **green bonds by amplifying the definition of green debt securities** and **enhancing disclosures**
- **Sebi framework defines Green Debt Securities** (GDS) as **debt securities issued for raising funds** that are **to be utilised** for **projects or assets falling under certain categories**.
- The **proposals are aimed at aligning with the updated Green Bond Principles** (GBP) published by the International Capital Market Association (ICMA).

What is a Blue Bond?

- It is a **debt instrument issued by governments, development banks or others to raise capital from impact investors** to **finance marin**e and **ocean-based projects** that **have positive environmental, economic and climate benefits.**
- They **are a subset of the green bonds**.
- The **Republic of Seychelles launched the world's first sovereign blue bond in 2018** raising a total of $15 million to **advance the small island state's blue economy.**

Significance

- **India has tremendous scope for deployment of blue bonds** in **various aspects of the blue economy** like ***oceanic resource mining, sustainable fishing, national offshore wind energy policy and in the area of blue flag beach eco-tourism model*** that **provide the tourists clean and hygienic bathing water facilities**
- It **helps in raising awareness about important marine issues** while providing much-needed funding to projects.

Blue Economy

- **According to the World Bank**, the **blue economy** is the ***"sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem".***
- **India has a 7,500 kilometre-long coastline** and **14,500 kilometres** of **navigable inland waterways**
- At present, the blue economy comprises 4.1 per cent of India's economy

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Prelims 2023

A common weed named Portulaca oleracea, also commonly known as purslane, offers important clues about creating drought-tolerant crops in a world beset by climate change.

Key Points

- **Scientists integrated two metabolic pathways** to **produce a novel type of photosynthesis** that **enables the weed to withstand drought while remaining highly productive**.
- Purslane **has the evolutionary adaptations** that **help it to be both highly productive** and **drought tolerant**, an **unlikely combination for a plant.**
- Plants have **independently evolved various mechanisms** to **improve photosynthesis**, the process by which green plants use sunlight to synthesise nutrients from carbon dioxide and water.

Portulaca oleracea

- Portulaca oleracea is an **annual succulent in the family Portulacaceae.**
- P. oleracea is **mostly an annual, but it may be perennial** in the **tropics.**

- **Stems are glabrous, fleshy, purplish-red to green**, arising from a taproot, often prostrate, forming mats.
- The **leaves (also fleshy) are alternate, subalternate or opposite, obovate to spatulate** with an **obtuse or truncate-emarginate apex**
- P. oleracea **grows from sea level to 2600 m** and is **most common** in the **temperate and subtropical regions**, although it **extends into the tropics and higher latitudes**
- P. oleracea is **common in fields, gardens, vineyards, lawns**, **driveways, dunes, beaches, salt marshes, waste areas**, eroded slopes, **bluffs and riverbanks.**
- P. oleracea **competes for resources with many field crops**, **particularly herbaceous species** that are **germinating or growing** in competition.
- **Affected crops include**: ***asparagus, red beets, celery, crucifers, cotton, maize, onions, potatoes, rice, soyabeans, sugarcane, tomatoes and wheat.***

Uses

- Purslane has **been used in folk medicine since ancient times** and is **included in the World Health Organization's list of most widely used medicinal plants.**
- The **leaves of the plant are a rich source of omega-3 fatty acids,** which is **important in preventing heart attacks** and **strengthening the immune system.**

The Food and Agriculture Organization (FAO) has started the Soil Mapping project in sub-Saharan Africa for better use of fertilisers, improving food security.

Soil Mapping Project

- A **United Nations project is digitally mapping soil nutrients** in **sub-Saharan Africa (SSA) and Central America** to **increase efficiency in using fertilizers.**
- The **project is being carried out by Food and Agriculture Organization (FAO).**
- The **project has been fast-tracked and will organise** and **improve existing soil maps in Guatemala and Honduras**, as well as other **countries in central America and SSA.**
- FAO is **already supporting the scale-up of a soil-mapping project** in **Ethiopia**.
- Further, the **private sector, and especially farmers can generate long-term benefits from it.**

Need

- **Unsustainable agricultural practices, lack of resources** and **capacity development and nutrient underuse in SSA** have

resulted in significant soil nutrient depletion, low crop yields, and **poverty, leaving many farm families** in a **scenario** of **vulnerability and food insecurity**.

- The **largest increase in moderate or severe food insecurity** between **2020 and 2021 was seen in Africa.**
- Within **sub-Saharan Africa, Middle Africa is the sub-region facing** the **highest levels of food insecurity**.
- **One in five people in Africa** (20.2 % of the population) was **facing hunger in 2021**
- Many **African countries lack policies regulating soil** as well as the **capacity, knowledge and experience to plan** and **implement sustainable soil management programmes.**
- **Africa's Total Factor Productivity growth**, especially in the **sub-Sahara region**, does **not match up to the growth** of **other developing regions.**

Soil Mapping

- It is the **process of delineating natural bodies of soils**, classifying and **grouping the delineated soils into map units**, and **capturing soil property information for interpreting and depicting soil spatial distribution on a map.**
- It **uses the most advanced technology to obtain the most accurate information** about the **condition of the soil, the weather and the crops.**
- It will **enhance the understanding of what types of nutrients** our **soils and crops need**.

- It **can improve short-term flexibility to adapt to trends in fertiliser** markets and **climate dynamics without compromising output**.
- It **will reduce waste when applying fertilizers** and **increase their effectiveness.**
- It **helps in creation of national soil databases** and **soil information systems** that **can be used by policymakers**, the **private sector and especially farmers for their long-term benefits.**

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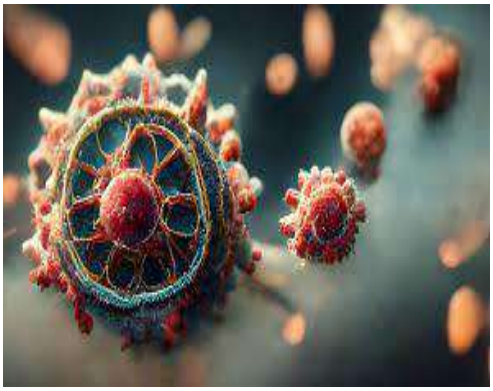
Prelims 2023



A new zoonotic virus named Langya Henipavirus or the LayV has been discovered in China with 35 infections identified so far.

Key Point

- **Cases of a novel Langya henipavirus (LayV)** have been **reported** in **Shandong and Henan provinces of China.**
- The **first case of the Langya virus was reported in 2019**.

What is Langya Virus?

- The Langya virus is a **zoonotic virus which means** it can be **transmitted from animals to humans.**
- Langya is a **part of a genus of viruses called henipaviruses.**
- The **newly discovered Langya virus is a 'phylogenetically distinct Henipavirus'.**
- However, it **has a genome organisation identical to that of other henipaviruses.**
- It is **phylogenetically related to Mojiang henipavirus**, which was **discovered in southern China.**

Origin

- The **authors also investigated whether domestic or wild animals** may **have been the source of the virus.**
- **Although they found a small number of goats and dogs** that may have been **infected with the virus in the past,** there **was more direct evidence a significant proportion of wild shrews** were **harbouring the virus**.
- This **suggests humans may have caught the virus** from **wild shrews.**

Symptoms of the Langya virus

- ***Fatigue, cough, anorexia, myalgia (pain in the muscles), nausea, headache, vomiting, Thrombocytopenia, leukopenia, impaired liver function***
- **More than half of the patients also had leukopenia defined** as an **insufficient number of pathogen-fighting white blood cells.**
- **More than a third had thrombocytopenia**, a low number of blood-clotting cells called platelets.
- An **impaired liver or kidney function was also detected** in a few patients.

Treatment

- There are **no licensed drugs or vaccines meant for humans**.
- It is **not known yet whether this virus is capable of human-to-human transmission.**

Henipavirus

- Henipaviruses are **classified as biosafety level 4 (BSL4) pathogens.**
- They can **cause severe illness in animals and humans.**
- **6 henipavirus species have been identified** so far: ***Hendra virus, Nipah virus, Cedar virus, Ghanaian bat virus, Mojiang virus, and Langya henipavirus.***
- **Cedar, Ghanaian bat, and Mojiang virus are not known to cause human disease**.
- But **Hendra and Nipah infect humans and can cause fatal illness**.
- **Nipah and Hendra virus also belong to the same genus,** henipavirus, from the **Paramyxoviridae family**.
- **Paramyxoviridae** is a **family of single-stranded Ribonucleic acid** (RNA) viruses that **cause different types of viral infections.**

A study by a team of scientists at the Goa-based National Centre for Polar and Ocean Research (NCPOR) has brought new insights into the critical processes involved in the movement of the earth's tectonic plates.

About the study

- The **team of scientists studied samples of igneous rocks collected** from **near the Ninety East Ridge in the Indian Ocean** during an expedition **under the International Ocean Discovery Program(IODP).**
- The **Ninety East Ridge is an aseismic ridge located almost parallel to 90 degrees east longitude in the Indian Ocean**.
- It is **approximately 5,000 km in length and has an average width of 200 km.**

Key Findings of the study

- **Investigation revealed** that **some basaltic samples were highly alkaline** and **had very similar composition to those released by the Kerguelen hotspot** (volcanic hotspot at the Kerguelen Plateau in the Southern Indian Ocean).
- In **addition, the minimum age of alkaline samples was about 58 million** years, **much younger than the adjacent oceanic crust surrounding Ninety East Ridge (around 82-78 million years old)**

- This **study proposes that the Indian Tectonic Plate**, which was **contemporaneously moving northward at a very high speed**, had **dragged a considerable amount of Kerguelen plume material for more than 2,000 km underneath the Indian lithosphere.**
- **Subsequent reactivation of deep fractures** may have **triggered decompression melting of the underlying plume material** and **emplaced as magmatic sills** and **lava flows near the Nighty East Region around 58 million years ago.**

Background

- The **buoyant rising of hot and low-density magma or plumes** from the **Earth's interior towards the surface leads to extensive volcanism** and the **creation of seamounts and volcanic chains above the ocean floor**.
- However, a **rising plume has to cut through the thick overlying lithosphere**, the **most rigid part of the earth before it can reach the earth's surface.**
- Many times, the **magma's buoyant force is not sufficient to pierce** through the **lithosphere**. In **such cases, plumes tend to dump the material at sub-lithospheric depths.**
- When the **tectonic plates that lie over the lithosphere move**, they **tend** to **drag the ponded materials along with them.**
- A fund**amental question that remains outstanding in understanding earth's processes** is **how far a tectonic plate can drag the plume material at its base after its initial impact with the plume**. This **study has thrown some light on it.**

NCPOR is an autonomous Research and Development Institution of the Ministry of Earth Sciences (formerly Department of Ocean Development) for the co-ordination and implementation of the Indian Antarctic Programme, including the maintenance of India's permanent station in Antarctica.

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Prelims 2023

UK Ministry of Defence sounded an alarm on the possible use of PFM-1 series 'Butterfly Mines' by the Russian military in Donetsk and Kramatorsk region

Key Points

- As per the bulletin, **these mines have the potential to inflict widespread casualties amongst both the military** and the **local civilian population.**
- In **Donetsk and Kramatorsk, Russia has highly likely attempted employment of PFM-1 and PFM-1S** scatterable anti-personnel mines
- **PFM-1s were used to devastating effect in the Soviet-Afghan War** where they **allegedly maimed high numbers of children** who **"mistook them for toys".**
- This **poses a threat to both the local population** and **humanitarian mine clearance operations**, the bulletin says

Butterfly Mine

- The **PFM-1 and PFM-1S are two kinds of anti-personnel landmines** that are **commonly referred to as 'Butterfly mines' or 'Green Parrots'.**

- These **names are derived from the shape and colour of the mines.**
- The **main difference between the PFM-1 and PFM-1S mine** is that the **latter comes with a self-destruction mechanism** which gets **activated within one to 40 hours**.
- These mines are **difficult to detect because** they **are made of plastic and can evade metal detectors.**

Specifications

- It is a **very sensitive anti-personnel landmine**.
- They **can be dropped from helicopters or through ballistic dispersion using artillery and mortar shells**.
- They **glide to the ground without exploding** and **later explode** on **coming in contact.**
- They are **moulded in polyethene plastic and have two wings,** one of which is **heavier than the other**.
- The **thicker wing is the pressure activation for the main fuse** which is **contained in the central body.**
- The **thinner wing acts as a stabiliser for the mine** when it **is air-dropped, thus giving it the name 'butterfly'.**

Conventions on Anti-Personal Mines

- The **anti-personal mines are banned by international convention** on **land lines but Russia and Ukraine are not signatories to it.**
- However, **there is a 1996 Amended Protocol II to the Convention** on **Certain Conventional Weapons-the Landlines Protocol** to **which Russia and Ukraine are signatories**.

Nepal approved India's National Hydro Electric Power Corporation Pvt Ltd to study and develop 1,200MW hydropower projects in western Nepal.

West Seti Power Project

- The West Seti Dam is **a proposed 750-megawatt (MW) hydroelectric dam on the Seti River** in the **Far-Western Development Region of Nepal.**
- **India's National Hydro Power Corporation** (NHPC) has already **begun preliminary engagement of the site** in far-western Nepal following the Indian Prime Minister's visit to Lumbini in May 2022.
- Particularly, it is a **storage scheme designed to generate** and **export large quantities of electrical energy to India.**
- The **project is envisaged to provide Nepal 31.9% electricity free.**

India -Nepal Power Relations

- **Nepal** is **rich in power sources with around 6,000 rivers** and an **estimated potential for 83,000 MW.**
- **Nepal's Constitution** has a **provision under which any treaty** or **agreement with another country on natural resources** will **require Parliament's ratification by at least a two-thirds**

majority. That will also mean homework will be required before any hydro project is signed and given for execution.

- **Nepal** has a **massive power shortfall as it generates only around 900 MW against an installed capacity of nearly 2,000 MW.** Although it is **currently selling 364 MW power to India**, it has over the years importing from India
- **India has formally approached Nepal on many occasions**, seeking **preferential rights over Nepali waters s**hould it match offers coming from elsewhere.
- **India is viewed as a feasible power market for Nepal.**
- India has undertaken to harness or expressed intent to harness major rivers in the north.

Earlier projects:

- An **ambitious Mahakali treaty was signed back in 1996**, to **produce 6,480 MW, but India has still not been able to come out** with the **Detailed project Report.**
- The **Upper Karnali project, for which the multinational GMR signed the contract**, has not **made any headway for years.**
- **Three cross-border transmission lines** were **completed recently** with GoI assistance: ***400 kV Muzaffarpur-Dhalkebar line (2016); 132 kV Kataiya-Kusaha and Raxaul-Parwanipur lines (2017).***

Significance

- This **storage or reservoir will fill up during the monsoon season** and the **water will be drawn to generate power during peak hours** each day in the dry season.

- Its **success is expected to restore India's image in Nepal** and give it **weightage in future considerations for hydropower projects,** when competition is bound to be tough.
- Also **once the projects are made multi-purpose**, with **flood control, navigation, fisheries, irrigation contributing to agricultural growth** etc, the **cost of power will be much lower compared to existing rates**

Seti river

- The Seti River is an **important tributary of the Karnali system** that **drains western Nepal**. It **originates from the snow fields** and **glaciers around the twin peaks of Api and Nampa** in the south facing slopes of the main Himalayas.
- The **area is near the trijunction of the borders of Nepal**, India (**Kumaon, Uttarakhand), and China (Tibet).**
- The **river first flows in a south-easterly direction**, **then turns** and **flows in a south-westerly and finally south-easterly again** before joining the Karnali or Ghagra River.
- It has **cut a spectacular gorge across the Mahabharat Range** and appears to be lost amongst caves and tunnels for a short distance

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Prelims 2023

The history of popular slogans raised during Indian independence movement

'Jai Hind' by Netaji Subhash Chandra Bose

- **Netaji Subhas Chandra Bose popularised 'Jai Hind'** as a **salutation for soldiers of his Indian National Army** (INA), which fought alongside Netaji's ally Japan in the Second World War.
- But **according to some accounts, Netaji did not actually coin** the slogan.
- A **book says the term was coined by Zain-ul Abideen Hasan,** the **son of a collector from Hyderabad**, who **had gone to Germany to study.**
- There, he **met Bose and eventually left his studies to join** the **INA.**
- Khan **was tasked by Bose to look for a military greeting** or **salutation for the INA's soldiers**, a slogan which w**as not caste or community-specific**, given the all-India basis of the INA.
- The **idea for 'Jai Hind' came to Hasan when he was** at the **Konigsbruck camp in Germany**.
- He **overheard two Rajput soldiers greet each other with** the slogan '**Jai Ramji ki'.**

- That **led to the idea of 'Jai Hindustan ki' in his mind** and it was **then shortened to 'Jai Hind'**, with the t**erm meaning 'Long live India'** or a call to lead a fight for India.

'Tum mujhe khoon do, main tumhe aazadi doonga' by Netaji Subhash Chandra Bose

- This **slogan had origins in a speech Netaji made in Myanmar,** then **called Burma, on July 4, 1944.**
- "The **British have been struggling in a worldwide war** for many years, and as **a result they have suffered many defeats**. However, **their enemies have been weakened significantly**, which **makes the fight for freedom much easier than** it was five years ago.", **said Subhash Chandra Bose.**
- **Underlining his core philosophy of violence** being necessary to achieve independence, **he said, "Tum mujhe khoon do, main tumhe aazadi doonga".**

'Vande Mataram' by Bankim Chandra Chatterji

- The **term refers to a sense of respect expressed to the motherland.**
- In **1870, Bengali novelist Bankim Chandra Chattopadhyay wrote a song** which **would go on to assume a national stature,** but **would also be seen as communally divisive by some**.
- **Written in Bengali**, the **song titled 'Vande Mataram'** was **not introduced into the public sphere** until the **publishing** of the **novel Anandamath in 1882**, of which the song is a part.
- Vande Mataram **soon became the forefront of sentiments expressed during the freedom movement.**

- The **novel, set in the early 1770s came against the backdrop** of the **Fakir-Sannyasi Rebellion against the British in Bengal.**

'Inquilab Zindabad' by Maulana Hasrat Mohani

- 'Inquilab Zindabad' (Long live the revolution) **was first used by Maulana Hasrat Mohani in 1921.**
- **Hasrat was his pen name (takhallus) as a revolutionary Urdu** poet, which **also became his identity as a political leader.**
- Hasrat Mohani **was a labour leader, scholar, poet and also one** of the **founders of the Communist Party of India in 1925.**
- Along **with Swami Kumaranand — also involved in the Indian Communist movement** — Mohani **first raised the demand** for **complete independence or 'Poorna Swaraj'**, at the **Ahmedabad session of the Congress in 1921.**
- His **stress on Inquilab was inspired by his urge to fight against social and economic inequality**, along with colonialism.
- **Before Mohani coined this slogan**, the **Bolshevik Revolution** in Russia **made the idea of revolution symbolic of the struggle** for **oppressed nationalities globally**.
- It **was from the mid-1920s that this slogan became a war cry** of **Bhagat Singh and his Naujawan Bharat Sabha**, as well as his **Hindustan Socialist Republican Association (HSRA).**

'Sarfaroshi ki Tamanna' by Bismil Azimabadi

- ***"Sarfaroshi ki tamanna ab hamare dil men hai, dekhna hai zor kitna bazu-e-qatil men hai"*** (Our hearts are now longing to die for a good cause, that we shall see what strength the arms of killers possess), are **the first two lines of a poem written by**

Bismil Azimabadi, a freedom fighter and poet from Bihar, after the Jallianwalah Bagh Massacre of 1921 in Amritsar, Punjab.

- The **lines were popularised by Ram Prasad Bismil**, another revolutionary.
- He was a **part of the Kakori train robbery**, a successful and ambitious operation in which a train filled with British goods and money was robbed for Indian fighters to purchase arms.

'Do or Die' by Mohandas Karamchand Gandhi

- In **1942, as World War II was starting and the British government's efforts to win support from Indian leaders** by **promising them a "dominion status" fell short**, it was **decided that the struggle for freedom needed to be stepped up.**
- On **August 8, 1942, the All-India Congress Committee met** in **Gowalia Tank Maidan (August Kranti Maidan) in Bombay.**
- **Gandhiji gave the mantra: 'Do or Die'.** We shall either free India or die trying; we shall not live to see the perpetuation of our slavery.
- In Bihar **and UP, a full-fledged rebellion began, with slogans** of
- **'Thana jalao', 'Station phoonk do' that demanded burning** of **police stations and train stations,** and
- **'Angrez bhaag gaya hai'** (the Englishman ran away).
- Trains were stopped, taken over, and national flags were put on them.

'Quit India' by Yusuf Meherally

- While **Gandhi gave the clarion call of 'Quit India'**, the slogan was **coined by Yusuf Meherally, a socialist and trade unionist** who also served as Mayor of Mumbai.

- A few **years ago, in 1928, Meherally had also coined the slogan "Simon Go Back" to protest the Simon Commission** – that although was meant to work on Indian constitutional reform, but lacked any Indians.
- Meherally was a Congress Socialist Party member who was actively involved in anti-government protests.

In Rajasthan, a new variety of hybrid millets MPMH-17 developed at Mandore Agricultural University is becoming very popular among farmers.

Key Points

- The **hybrid variety MPMH-17 was first sown on a large scale** in the **Daikda village of Jodhpur district by more than 300 farmers**
- Presently it **has been sown in more than 70 percent area** in the **Jodhpur district.**

MPMH-17

- It is a **dual-purpose hybrid of pearl millet with high grain** and **stover yield.**
- It is a **cross between ICMA 04999 (female) and a Restore MIR 525-2 (male).**
- It **matures in 79 days and flowers in 48 days**.
- The **new variety is found to be rich in iron and zinc elements,** which **will also prove to be effective in ending malnutrition.**
- This **variety is capable of giving high yields, especially in drought-prone areas of western Rajasthan**.

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Prelims 2023

Scientists have found evidence to suggest that spiders exhibit characteristics that are similar to human sleep cycles.

About the research

- **Scientists have found evidence to suggest that spiders** might be **more like humans than previously imagined**. While **they snooze**, they **might not just be resting, but perhaps even dreaming**
- They **recorded baby jumping spiders** (Evarcha arcuata) with **infrared cameras overnight, and found that they exhibited characteristics that were similar to human sleep cycles**, such as **leg curling, twitching and eye movement.**
- This **could suggest that jumping spiders experience an "REM sleep-like state" that humans and other vertebrae undergo**

REM or Rapid Eye Movement sleep

- Rapid eye movement (REM) sleep **involves a state of partial** or **near-total muscle paralysis paired with an active, awakelike brain** state, which is **why it is sometimes called "paradoxical** sleep."In **humans, this state has been strongly linked** with

dreaming. It is **characterized by shifting of eyes** and increased brain activity.

- The **body's muscles begin to paralyze, suppressing most body movements but allowing for slight fluttering of limbs.**
- This is the **phase in which most people dream,** and is considered to play an integral role in learning and memory retention.

Signs

- The **most noticeable sign of REM sleep is the movement** of the **eyes, but it is difficult for researchers to determine** how **widespread it is amongst the animal kingdom, as insects** and **most terrestrial arthropods lack movable eyes**.
- While the **eight eyes of jumping spiders are fixed to their heads**, they **have long tubes that allow their retinas to move around** at the **back of their principal eyes.**
- **Baby spiders also temporarily lack pigment in their exoskeletons**, which **allows scientists to peer inside and observe the retinal tubes**.

Evidences

- There is **abundant evidence for REM sleep or an analogous state** in **many mammals and birds**.
- Scientists have also **found something similar in two reptile species** and **hints of a state like it in zebra fish.**
- **Both octopuses and cuttlefish appear to have an REM phase,** complete **with eye movements, arm twitches, and rapid skin**

color and **texture changes that resemble displays** they **perform when awake.**

- Beyond those animals, **there are glimmers but not much evidence** of **REM sleep in invertebrates, including insects** and **arachnids.**

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Prelims 2023

A Chola-era seated Buddha idol that was reportedly stolen from Arpakkam near Kancheepuram is now stuck in the U.S

Key Points

- A **Chola-era Buddha idol is now stuck with the Department** of **Homeland Security in the U.S., without any claim having** been **made by the Indian authorities**.
- It was **stolen from a temple in Arpakkam on the outskirts** of **Kancheepuram about 20 years ago**

Arpakkam

- Arpakkam, a **small village on the outskirts of Kancheepuram**, is a **virtual treasure trove of heritage.**
- It **has a Jain temple, a Shiva temple and an Adikesava Perumal** temple - all **over 1,000 years old.**
- It **has a Buddhist vestige as well**. **Three granite idols of Buddha** were **located in the confines of the Perumal temple.**
- While **one of them was inside the temple**, a **large Chola-era seated Buddha and a headless seated Buddha lined the outer walls.**

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Prelims 2023

The United Nations (UN) has appointed Rear Admiral Guillermo Pablo Rios of Argentina as the Head of Mission and Chief Military Observer for the United Nations Military Observer Group in India and Pakistan (UNMOGIP).

About UNMOGIP

- It was **established in January 1949**. Its **headquarter** is at **Islamabad (November to April) and Srinagar (May to October)**
- After the **first war in Kashmir (1947-1948), India approached** the **United Nations Security Council (UNSC) to bring the conflict** in **Kashmir to the notice of Security Council members**.
- It **emerged from the U.N. Security Council Resolution 39** of **January 1948 that set up the U.N. Commission for India** and **Pakistan (UNCIP).**
- The **first group of UN military observers arrived in the mission** area on **24 January of 1949 to supervise the ceasefire between India and Pakistan in the Indian state of Jammu and Kashmir.**
- These **observers, under the command of the Military Adviser** appointed by the UN Secretary-General, **formed the nucleus** of

the **United Nations Military Observer Group in India and Pakistan (UNMOGIP).**

Functions

- Following **renewed hostilities of 1971, UNMOGIP has remained** in the **area to observe developments pertaining to the strict observance of the ceasefire of 17 December 1971** and **report thereon to the UN Secretary-General.**
- The **Karachi Agreement of July 1949 firmed up the role of UN-level military observers** and **permitted supervision** of the **Ceasefire Line established in Jammu and Kashmir.**
- After the **1st Indo-Pak armed conflict in 1948 under** the **supervision of the UNCIP, military representatives** of **both Pakistan and India met in Karachi** and **signed the Karachi Agreement on 27th July 1949.**
- It **established a Cease-Fire Line (CFL) in Kashmir.**
- UNMOGIP has six **field stations in Pakistan-administered Kashmir** (PAK) and **four field stations in Indian-administered Kashmir** (IAK) to **monitor ceasefire**.

Note

- **India has not officially gone to the UNMOGIP since 1972** with complaints **against Pakistan.**
- India **officially maintains that the UNMOGIP's role** was "**overtaken" by the Simla Agreement of 1972** that **established the Line of Control or the LoC.**

- **Pakistan, however, did not accept the Indian argument** and **continued to seek cooperation from the UNMOGIP.**
- As a **result of these divergent policies, Pakistan continues to lodge complaints with the UNMOGIP against alleged Indian ceasefire violations.**

An indigenously developed howitzer gun, Advanced Towed Artillery Gun System (ATAG) became part of the 21-gun salute during the Independence Day ceremony at the Red Fort

Key Points

- When the **National Anthem is played by the Military Band after** the **unfurling of the Tricolour at the Red Fort by the Prime Minister, a 21-volley gun salute is fired by a ceremonial battery** from an **artillery regiment.**
- The **tradition originates from the Western navies** where **guns from the ports** and **those from incoming ships used to be fired** in a **particular manner to convey that there was no belligerent intention.**
- I**ndia inherited the tradition from the British rulers** who had gun salutes comprising 101 volleys, 31 volleys and 21 volleys.

ATAGS

- The ATAGS is an **indigenous 155 mm x 52 calibre howitzer gun.**
- Howitzers is an umbrella term for a category of long-range artillery guns.

- It is de**veloped by the Defence Research and Development Organisation** (DRDO) **with its Pune-based facility Armament Research and Development Establishment** (ARDE) being the nodal agency.
- The **ATAGS project was started in 2013 by DRDO to repla**ce **older guns in service in the Indian Army with a modern 155 mm artillery gun**.

Features

- The **armament system of ATAGS mainly comprises barrel, breech mechanism, muzzle brake and recoil mechanism to fire 155 mm calibre ammunition held by Army** with a **longer range, accuracy** and **precision and provides greater firepower.**
- The ATAGS is **configured with all electric drive** to **ensure maintenance free and reliable operation** over **a longer period of time.**
- It **has advanced features in terms of high mobility, quick deployability, auxiliary power mode, advanced communication** system, **automatic command and control system** with **night firing capability in the direct fire mode.**
- The **specialised gun system is compatible with C4I** (**command, control, communications, computers, and intelligence**) systems like the **Artillery Combat Command and Control System** (ACCCS) called **Shakti for technical fire control, fire planning, deployment** management, and **operational logistics management of the Army**.

Future Role

- The **development process of ATAGS by the DRDO coincides** with **development of Howitzer Dhanush for Advanced Weapons** and **Equipment India of the erstwhile Ordnance Factory Board.**
- In **2019, the Army and the Ministry of Defence** gave **bulk production clearance to produce 114 Dhanush.**
- In the **coming days, ATAGS and Dhanush will successfully replace older artillery systems.**

National Intellectual Property Awareness Mission (NIPAM) has achieved target of imparting Intellectual Property (IP) awareness and basic training to 1 million students on 31st July 2022, ahead of the deadline which was 15 August 2022.

National Intellectual Property Awareness Mission

- A **National Intellectual Property Awareness Mission** (NIPAM) was **launched under the initiative of the Government's "Azadi ka Amrit Mahotsav".**
- It is **being implemented by Intellectual Property Office,** the **Office of Controller General of Patents, Designs and Trade Marks** (CGPDTM), **Ministry of Commerce and Industry**.

Aim

- to **provide awareness on intellectual property** and **its rights to 1 million students.**
- to **inculcate the spirit of creativity and innovation to students** of **higher education (classes 8 to 12) and ignite** and
- **inspire the students of college/Universities to innovate** and **protect their creations.**

Targets

- This **Mission target students at two levels** as

1. ***Level A - Schools (Class 9th to 12th)***
2. ***Level B - Universities / Colleges***

- During the **period 08 December 2021 to 31st July 2022**, the **following milestones were achieved**:

1. ***No. of participants (students/faculty) trained on IP: 10,05,272***
2. ***Educational institutes covered: 3,662***
3. ***Geographical coverage: 28 states and 7 Union Territories***

Way forward

- to **nurture and encourage innovation and creativity,** thereby **contributing towards cultural and**
- **economic development of the society** through a **revamped manner utilizing the existing resources of the IP Office** in **collaboration with Atal Innovation Mission (AIM), AICTE, UGC etc**

Intellectual Property Rights

- Intellectual Property Rights **are legal rights governing the use** of **creations of the human mind**.
- The **recognition and protection of these rights is of recent origin.**
- Intellectual property rights **include** ***patents, copyright, industrial design rights, trademarks, plant variety rights, trade dress, geographical indications,*** and in ***some jurisdictions trade secrets***

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Prelims 2023

ISRO successfully carried out the test-firing of the Low Altitude Escape Motor (LEM) of the Crew Escape System, from Sriharikota, Andhra Pradesh for the Gaganyaan Project.

About it

- The **Crew Escape System (CES) takes away the Crew module** of the **Gaganyaan mission in case of any eventuality and rescues the astronauts.**
- In **case of mission-abort during the initial phase of flight**, **LEM provides the required thrust to CES,** to **take away Crew Module from the launch vehicle.**

About LEM

- LEM is a **distinctive special purpose solid rocket motor with four reverse flow nozzles and generates maximum sea level thrust** of **842 kN (nominal) with burn time of 5.98 s (nominal).**
- The **nozzle end of LEM is mounted at the fore end of the launch vehicle unlike at aft end in conventional rocket motors** to **avoid exhaust plume impingement on the crew module.**
- This **necessitates the use of a reverse flow multiple nozzle** in this **solid rocket motor**. The **reverse flow nozzle implies the reversal of the exhaust gas flow direction in the nozzle region.**

On August 17, 1947, two days after Independence, the award of the Boundary Commissions for the partition of Punjab and Bengal was announced.

Key Points

- It was on **August 17, 1947, two days after Independence**, that the **award of the Boundary Commissions for the partition of Punjab** and **Bengal was announced.**
- The **award caused much anguish to the people of the two** provinces and also to the governments of India and Pakistan.
- **Documents accessed from National Archives of India reveal** that the **then Law minister of India, B R Ambedkar**, and **Minister** of **Industry and Supply, Syama Prasad Mukherjee, proposed** to **take the matter of the Chittagong Hill Tracts to the UN (the UNO).**

Award discussed by the top political leaders of India and Pakistan

- The **documents in national archives include minutes of a meeting** held at **Government house, New Delhi at 5 pm on August 16, 1947**, a **day before the public announcement of award**
- Here the ***Governor General of India Lord Mountbatten*****,** Prime Minister of India ***Pandit Jawaharlal Nehru, Prime Minister of Pakistan Liaquat Ali Khan, Home Minister of India Sardar Vallabhbhai Patel, Interior Minister of Pakistan Fazal-ur-Rahman, Defence Minister of India Sardar Baldev Singh, Secretary of the States Department of India, VP Menon and Cabinet Secretary of Pakistan Mohammad Ali were present.*** Copies of the award had been distributed to them earlier that day.

What were the two Boundary Commissions?

- In **June 1947, Sir Cyril John Radcliffe, a British lawyer,** was made the **Chairman of two boundary commissions of Punjab and Bengal** and **given the task to draw up the new borders of India** and **Pakistan**. He was **given a period of five weeks** to complete this task and **arrived in India in July 1947.**
- The **boundary commissions of Punjab and Bengal** also **included two nominees each of the Indian National Congres**s and **Muslim League respectively.**
- The **Punjab commission had Justice Mehr Chand Mahajan, Justice Teja Singh, Justice Din Mohammad and Justice Muhammad Munir as members.**
- The **Bengal commission comprised Justice CC Biswas, Justice BK Mukherjee, Justice Abu Saleh Akram and Justice SA Rehman.**

- The **Boundary Commissions award was made public on August 17, 1947.**

What discussion took place with regard to the awards?

- The **minutes of the meeting show that Pandit Jawaharlal Nehru protested against the award of Chittagong hill Tracts to Pakistan** (East Pakistan, now Bangladesh).
- He **said that he had never considered that the allocation of Chittagong Hill Tracts to East Bengal was possible** under the **terms of reference of the boundary commission**.
- He **said he and his Congress colleagues had given assurances** to the **petty chiefs from the hill tracts that there was no question** of the **territory being included in Pakistan** and that the area has 97 per cent population of Buddhists and Hindus.
- **"Sir Cyril Radcliffe had no business touching them**," Nehru is quoted as saying.
- **Lord Mountbatten defended the award s**aying that the **Chittagong district had close economic ties with the hill tracts** and that the **port required proper supervision of the Karnaphuli river which runs through the hill tracts.**
- He **made a suggestion of compromise by re-adjustment** of **territory which was rejected by Nehru and the Liaquat Ali Khan.**
- **Fazl-ur-Rahman** said that **the hill tracts could not exist** if they **separated the district and that the 'contiguity' clause** of the **terms of reference of boundary commissions permitted** their **allocation to East Bengal**. He also **objected to the inclusion** of **Darjeeling and Jalpaiguri districts in India**

Punjab

- **Nehru** said that he **considered that the award of boundary commission in the Punjab was likely to have a bad effect** among the **Sikhs, who presented a particularly difficult problem.**
- **Sardar Baldev Singh** said that the **reaction to the award** would be very **unfavourable on the Sikh mind.**
- **Liaquat Ali Khan** said it would **have a similar unfavourable reaction among the Muslims**. "He **emphasised that he, as Prime Minister of Pakistan, considered it his duty to stand up** for the **rights of the Sikhs in West Punjab as much as the Indian leaders stood up for their rights in East Punjab**.
- He **emphasised that complete religious freedom will be allowed," the minutes note.**
- **Sardar Patel's view** was that **the only solution to the Punjab award was a transfer of population on a large scale.**
- **Mountbatten** said that **he had spoken to Jinnah about Nankana Sahib.**

On Bengal award, what was BR Ambedkar and SP Mukherjee's note?

- The **joint note of the two ministers pointed out that the decision** of the **award in some vital respects is "unjust and unfair"** and **against the fundamental policy of the partition** and **also the terms of reference.**
- The **note also pointed out that Radcliffe had not given any reasons** to **support the award which he gave**.

- “Nowhere has he set out the principles on which he has based his decisions.
- It **can therefore be urged that the decision by Sir Cyril Radcliffe without reference to principles by which he was guided can be treated as a nullity.**
- We propose to take up the matter with the Pakistan Dominion immediately.
- We shall make an attempt to open negotiations with that government and see if any amicable re-settlement is possible. If not, we reserve to ourselves the right to treat this as an inter dominion dispute and refer it to the UNO , claiming the inclusion of the areas outlined above into West Bengal,” the note concludes.

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Prelims 2023

75 Ramsar Sites in 75th Year of Independence

Key Points

- **India adds 11 more wetlands to the list of Ramsar sites** to make **total 75 Ramsar sites covering an area of 13,26,677 ha** in the country in the **75th year of Independence**.
- The ***11 new sites include: Four (4) sites in Tamil Nadu, Three (3) in Odisha, Two (2) in Jammu & Kashmir and One (1) each in Madhya Pradesh and Maharashtra.***
- Designation of these sites would help in conservation and management of wetlands and wise use of their resources.
- ***During this year itself (2022) a total of 28 sites have been declared as Ramsar sites.*** Based on the date of designation mentioned on Ramsar Certificate, the number is 19 for this year (2022) and 14 for previous year (2021).
- ***Tamil Nadu has maximum no. of Ramsar sites (14 nos), followed by UP which has 10 nos. of Ramsar sites.***

Tampara Lake (Odisha)

- Tampara Lake is **among the most prominent freshwater lakes** in the **State of Odisha**. It is **called 'Tampara' as the depression** on the **ground gradually filled with rainwater from catchment flow** and **was called "Tamp" by the British** and **subsequently termed "Tampra" by the locals.**
- The **wetland is an important habitat for vulnerable species** such as **Cyprinus carpio, common pochard (Aythya ferina), and river tern (Sterna aurantia).**

Hirakud Reservoir (Odisha)

- Hirakud Reservoir, the **largest earthen dam in Odisha** started **operating in 1957**. The **reservoir is important for livelihoods** of **fishermen, tourism, irrigation and production of hydro-energy.**
- The **wetland also provides important hydrological services** by **moderating floods in the Mahanadi delta, the ecological** and socio-economic hub of the east coast of India.

Ansupa Lake (Odisha, Cuttack district)

- Ansupa Lake is the **largest freshwater lake of Odisha situated** in **Banki sub-division of Cuttack district** and **has its fame from time immemorial for its scenic beauty, biodiversity**, and natural resources.
- The **wetland is an oxbow lake formed by River Mahanadi** and is **spread over an area of 231 ha**.
- The wetland is home to at least 194 species of birds, 61 species of fishes and 26 species of mammals in addition to 244 species of macrophytes.

- The **wetland provides a safe habitat to at least three threatened** bird species- ***Rynchops albicollis (EN), Sterna acuticauda (EN) and Sterna aurantia (VU) and three threatened fish species- Clarias magur (Clariidae) (EN), Cyprinus carpio (Cyprinidae) (VU) and Wallago attu (VU).***

Yashwant Sagar (Indore, Madhya Pradesh)

- Yashwant Sagar is **one of the two Important Bird Areas (IBA)** in the **Indore region as well as one of the most important birding** sites in **Malwa region of Madhya Pradesh**
- Presently it is **mainly used for water supply to the city of Indore** and is **also being used for fish culture on a commercial scale**.
- Yashwant Sagar is **considered to be a stronghold of the vulnerable Sarus Crane in central India**. The lake backwaters have plenty of shallow areas, conducive for waders and other waterfowl.

Chitrangudi Bird Sanctuary (Ramanathapuram, Tamil Nadu)

- The **wetland is a protected area since 1989 and declared a Bird Sanctuary.**
- It is an **ideal habitat for winter migratory birds.**
- Around **50 birds belonging to 30 families have been reported** from the site. Out of these 47 are water birds and 3 terrestrial birds. **Notable waterbirds spotted from the site area spot-billed pelican, little egret, grey heron, large egret, open billed stork, purple, and pond herons.**

- The **wetland also supports a number of fishes, amphibians, molluscs, aquatic insects**, and their larvae forming good food **sources for arriving waterbirds**. Groundwater is extracted for irrigation around and within the wetland for agricultural purposes.

Suchindram Theroor Wetland Complex

- **Suchindrum Theroor Wetland complex is part of the Suchindrum-Theroor Manakudi Conservation Reserve.**
- It is **declared an Important Bird Area and lies at the southern tip of the Central Asian flyway of migratory birds**. It was **formed for birds' nesting purposes** and **it attracts thousands of birds every** year.
- This is a **man-made, inland Tank and is perennial**. Copper plate inscriptions from the 9th century mention Pasumkulam, Venchikulam, Nedumarthukulam, Perumkulam, Elemchikulam and Konadunkulam.
- Around 250 species of birds have been recorded in the area, of which 53 are migratory, 12 endemic, and 4 threatened.

Vaduvur Bird Sanctuary

- Vaduvur bird sanctuary spreads over an area of 112.638 ha, is a **large human-made irrigation tank and shelter for migratory birds** as it **provides a suitable environment for food, shelter, and breeding ground.**

- Large concentrations of wintering waterfowl such as Eurasian **Wigeon Anas penelope, Northern Pintail Anas acuta, Garganey Anas querquedula were recorded in tanks.**
- Vaduvur Bird Sanctuary **has a diverse habitat including a number of inlets and surrounding irrigated agricultural fields** which **provides good nesting and foraging habitats for birds**. Thus, the site provides support to the species listed above during critical stages of their life-cycle.

Kanjirankulam Bird Sanctuary

- Kanjirankulam Bird Sanctuary **is a Protected area near Mudukulathur Ramanathapuram District, Tamil Nadu. India**, declared in 1989. It is **notable as a nesting site for several migratory heron species that roost in the prominent growth** of babul trees there.
- The **site qualifies as an IBA as the threatened Spot-billed Pelican Pelecanus philippensis breeds he**re.
- The **wetland exhibits rich biodiversity including many globally near-threatened species like Spot-billed Pelican, Oriental Darter, Oriental white Ibis and Painted Stork** and also commonly occurring shore and **water birds like greenshank, plovers, stilts and forest birds like bee-eaters, bulbuls, cuckoos, starlings, barbets, etc.**
- The **wetland supports IUCN RedList vulnerable avian species like Sterna aurantia (River Tern).**

Thane Creek (Maharastra)

- **Ulhas River is the largest source of water for the creek**, followed by **many drainage channels from various suburban areas** of **Mumbai, Navi Mumbai & Thane.**
- Creek is a **narrow, sheltered waterway, especially an inlet in a shoreline or channel in a marsh.** It has **been declared as Thane Creek Flamingo Sanctuary**.
- Thane creek is **fringed by mangroves on both banks & comprises** around **20% of the total Indian mangrove species.**
- The **area is an important part of the wetland complex of the Central Asian Flyway of the birds** and has been categorized as an Important Bird Area (IBA).

Hygam Wetland Conservation Reserve (Baramulla district, J&K)

- Hygam Wetland **falls within the River Jhelum basin** and plays a **significant role as a flood absorption basin, biodiversity conservation site, eco-tourism site, and livelihood security** for the local communities.
- It is **also recognized as an Important Bird Area (IBA).**
- Consequent to the high rate of siltation, Hygam Wetland has lost its wetland characteristics to a large extent and in many places changed its profile into a landmass.

Shallbugh Wetland Conservation Reserve (Sri Nagar, J&K)

- The area **has extensive reedbeds of Phragmites communis and Typha angustata, and rich growth of Nymphaea candida and N. stellata on open water.**
- It **serves as an abode to more than four lakh resident** and **migratory birds of at least 21 species.**
- Shallabugh Wetland plays a major role in the natural control, amelioration or prevention of flooding, It is also important for seasonal water retention for wetlands or other areas of conservation importance downstream

Women heroes of India's freedom struggle, mentioned by PM in his Independence Day speech

Key Points

- During **75th Independence Day anniversary speech**, the **Prime Minister hailed "nari shakti"**, and **urged people to pledge** to **not do anything that lowers the dignity of women.**
- He also **paid tribute to women freedom fighters for showing** the **world the true meaning of India's "nari shakti".**

Rani Laxmibai

- Rani Laxmibai is **known for her role in the First War of India's Independence in 1857**. She was born in 1835.
- **Refusing to cede her territory**, the **queen decided to rule** on **behalf of the heir,** and **later joined the uprising against the British** in 1857.
- Cornered by the British, she escaped from Jhansi fort.
- She was wounded **in combat near Gwalior's Phool Bagh**, where she **later died.**

Jhalkari Bai

- A **soldier in Rani Laxmibai's women's army, Durga Dal**, she **rose** to **become one of the queen's most trusted advisers.**
- She is **known for putting her own life at risk to keep the queen** out **of harm's way.**
- Many **Dalit communities of the Bundelkhand region look up to her** as an **incarnation of God and also celebrate Jhalkaribai Jayanti** every year in her honour.

Durga Bhabhi

- **Durgawati Devi was popularly known as Durga Bhabhi**. She was a **revolutionary who joined the armed struggle against colonial rule**.
- She was born **in Allahabad in 1907 and married to Hindustan Socialist Republican Association (HSRA) member Bhagwati Charan Vohra.**
- She was a **member of the Naujawan Bharat Sabha**. She **helped Bhagat Singh escape in disguise from Lahore** after the **1928 killing of British police officer John P Saunders.**
- During the **train journey that followed, Durgawati and Bhagat Singh posed as a couple and Rajguru as their servant.**
- Later, as **revenge for the hanging of Bhagat Singh, Rajguru**, and **Sukhdev, she made an unsuccessful attempt to kill the former Punjab Governor, Lord Hailey.**

Rani Gaidinliu

- She was **born in 1915 in present-day Manipur.** She **was a Naga spiritual and political leade**r who fought the British.

- She **joined the Heraka religious movement which later became** a **movement to drive out the British.**
- The **British launched a manhunt, but she evaded arrest**, moving from village to village.
- She was **finally arrested in 1932 when she was just 16,** and later sentenced for life. She was released in 1947.

Rani Chennamma

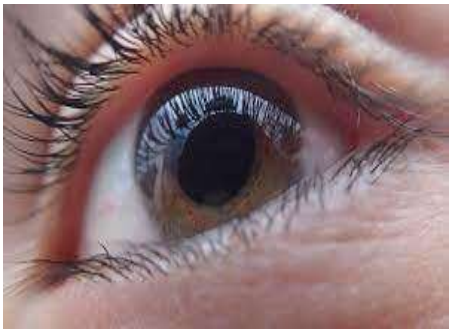
- Rani Chennamma was **among the first rulers to lead an armed rebellion against British rule.**
- Rani Chennamma **defeated the British in her first revolt but** was **captured and imprisoned during the second assault** by the East India Company.

Begum Hazrat Mahal

- After **Nawab of Awadh Wajid Ali Shah, was exiled after the 1857** revolt, **Begum Hazrat Mahal, along with her supporters** took on the British and **wrested control of Lucknow.**

Velu Nachiyar

- Velu Nachiyar **waged a war against the British and emerged victorious.**
- After her **husband was killed in battle with the East India Company**, she **entered the conflict, and won with support of neighbouring kings.**
- She went on to produce the first human bomb as well as establish the first army of trained women soldiers in the late 1700s.



Researchers in Sweden have developed a successful alternative — bioengineered cornea implants made of collagen derived from pig skin.

Key Points

- The **implant was used to successfully restore the vision of 20 people in India and Iran, most of whom were blind due** to **keratoconus, a disease that leads to thinning of the cornea.**
- The **cornea is the clear outer layer at the front of the e**ye. The cornea helps the eye to focus light so that one can see clearly.
- **Damage to the cornea is one of the leading causes of blindness** across the world leaving approximately 12.7 million people blind.
- **Researchers claim that there is a severe shortage of donated human corneas with only one available for 70 patients**.
- **Logistical and storage difficulties**, along **with expensive surgical equipment, further burden those living in low- and middle-income countries**.

Substitute for human corneas

- As a **substitute for human corneas, the researchers utilised medical-grade collagen derived from pig skin,** a **byproduct** of the

food industry that is already used in medical devices for **glaucoma surgery.**

- This is **not only cheaper and easier to access than donated** corneas, but **requires a less invasive procedure and can be stored** for a **significantly longer period — up to two years.**
- The **researchers developed a minimally invasive method without** the **use of stitches,** where a small incision is made in the patient's eye, and the implant is inserted over the existing cornea.
- This **can be done with high-precision lasers or by using readily available surgical instruments.**
- The **results show that it is possible to develop a biomaterial** that **meets all the criteria for being used as human implants**, which can be **mass-produced and stored up to two years** and thereby **reach even more people with vision problems**.
- This **new method was used by surgeons in India and Iran**, where there is a **lack of donated corneas.**

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Prelims 2023

The Ministry of Science & Technology has approved Start-up loan for manufacturing and commercialising "compostable" plastic.

Key Points

- The **loan has been approved for Satara Based start-up TGP Bioplastics Private Limited**, which **will be manufacturing** it.
- The St***artup firm has developed a prototype of Compostable Plastic through seed funding offered under NIDHI Prayas(DST), Niti Aayog and UNIDO***.
- Backed by the funding received, the **company plans to expand** its **production capacity for Compostable Plastics to 880 Metric Tonne/year.**

Need

- **Currently**, very **few degradable materials/composites** are **available in the market.**
- **Most of them cost more than Rs. 280/kg for the raw materials**. The **cheapest degradable polymer today is Polybutylene adipate terephthalate** (PBAT) which is **available at Rs. 280-300/kg,**

whereas **conventional plastic raw materials cost around Rs. 90/kg.**

- Hence, the **market willingness for the degradable plastic is less.**
- To **solve this problem, the StartUp has developed** a new **composite material which is cheaper than the available compostable plastic (~Rs 180/kg), having comparable strength.**

What is Compostable Plastic?

- The composite is a **unique blend of Thermoplastic-Starch (TPS)-glycerin with some chemical modifications** that **provides higher strength with low manufacturing cost.**
- The **granules prepared from this composite can be moulded** into **any shape and used as per the requirement**, and it **further breaks down into natural substances once thrown out.**
- **Unlike Single Use Plastics** (SUP) which are currently in circulation and used extensively for packaging solutions, ***Compostable Plastic will convert into compost directly into the soil without having any adverse impact on the environment.***
- In **terms of strength, elasticity and retention, compostable plastic** has **exhibited similar properties as regular plastic.**
- The **concept of compostable plastic will be scaled up with further government support for driving global action on plastic pollution.**

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Prelims 2023

The Defence Minister has handed over several new defence systems including the F-INSAS, the Nipun mines, the Landing Craft Assault (LCA) to the Army.

F-INSAS system

- F-INSAS stands for **Future Infantry Soldier as a System**.
- It is a **programme for infantry modernisation**, which is **aimed** at **increasing the operational capability of the soldier**.
- Under the project, so**ldiers are being equipped with modern systems** that are **lightweight, all-weather-all-terrain, cost-effective and low maintenance.**
- The **full-gear of the F-INSAS system includes an AK-203 assault** rifle, which is a **Russian-origin gas-operated, magazine-fed, select-fire assault rifle**. It has a **range of 300 metre**, and is being made at Korwa near Amethi in a Russia-India joint venture.
- On the **weaponry front, other than the AK-203, the F-INSAS includes a multi-mode hand grenade**, which can be used in **defensive and offensive modes.**

- In **defensive mode, the grenades are to be hurled** when the **thrower is in a shelter or has a cover,** while the **target is in the open and can be harmed by fragmentation.**
- In the **offensive mode, the grenades do not fragment** and the **adversary is harmed by the blast or is stunned**. The weapon kit also has a multi-purpose knife for close quarters combat.
- Apart from this, the F-**INSAS provides soldiers with ballistic helmets and ballistic goggles for protection against small projectiles** and **fragments, along with a bullet-proof vest.**
- The F-INSAS **also comes with hands-free, secured advanced communications set for real-time exchange of information** with the **command post and fellow soldiers for enhanced situational awareness.**
- They **have been indigenously designed by the Indian entities,** including the **DRDO and the ordnance factories ecosystem.**

Nipun Mines

- Nipun mines are indi**genously designed and developed anti-personnel mines,** termed by the DRDO as '**soft target blast munition'.**
- These mines are **meant to act as the first line of defence against infiltrators and enemy infantry.**
- They are **smaller in size and can be deployed in large numbers**.
- They **provide protection to the troops on the borders** and are **more potent and effective than the existing anti-personnel mines** in their arsenal.

Landing Craft Assault

- The Landing Craft Assault (LCA) is **meant to serve as** a **replacement for the boats with limited capabilities currently** in use in the **Pangong Tso lake.**
- It **has better launch, speed and capacity to operate across water obstacles in eastern Ladakh.**
- Similar vessels are already in operation in the Indian Navy.

Other defence systems

- The **Ministry of Defence also handed over to the Army a thermal imaging sight for T-90 tanks**; **hand held thermal imager**; and **frequency-hopping radio relay for tactical communication** across much longer ranges.
- Further, **Downlink Equipment with Recording Facility** to **help helicopters in surveillance missions was also handed over.**
- Using this system, **reconnaissance data is recorded** and can be **accessed only when the helicopter returns to the base**.
- Some **other defence systems included, Infantry Protected Mobility Vehicles; Quick Reaction Fighting Vehicles** and **Mini Remotely Piloted Aerial System surveillance, detection** and **reconnaissance at the infantry battal**ion and **mechanised units level.**

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Prelims 2023

The U.S. Senate approved a Bill titled the Inflation Reduction Act (IRA) 2022.

Key Points

- The **IRA has a special focus on climate, healthcare**, and **tax provisions to address inflation.**
- The **Bill marks the largest American investment aimed toward making the U.S. a leader in clean energy.**

Climate change provisions

- It includes **packages worth $369 billion for the clean energy transition.**
- It **provides a tax deduction to low and middle-income households** to **go electric** and **seeks to lower the energy bills** of **American households.**
- It also **aims to bolster the domestic production of heat pumps** and **critical minerals**.
- For **disadvantaged low-income communities and tribal** communities, the **Bill provides funding to benefit from zero-emission technologies which reduce greenhouse gas emissions, enhance climate resilience, and mitigate risks from extreme heat**.

- **Significant investment in renewable energy through heavy tax** credits for **wind and solar energy projects and electric vehicles.**
- The Bill **imposes a tax on the largest and most profitable companies** in order that they **pay their fair share, without levying any taxes on households with income less than $40,000 per annum.**
- It **also imposes a fee on methane leaks from oil and gas drilling.**
- It **seeks to expand oil and gas drilling, with the federal government offering land for onshore and offshore drilling** as a **prerequisite for developing renewable energy**. Thus, it handcuffs the expansion of oil and gas with renewable energy development.

Need for such a bill

- The U**.S is currently facing extreme climate threats**. This includes **heatwaves, wildfires, cyclones, floods, and hurrica**nes that have **become frequent and intense in the past few years**.
- Additionally, **President Joe Biden has also undertaken certain climate commitments**. **Climate action has been a priority since** he **came into office.**
- In **2021, he committed to the new ambitious target of cutting emissions by 50-52% below 2005 levels by 2030** and **signed a new methane deal to curb methane emissions** from the oil and gas industry.
- He **introduced the Build Back Better plan** which was a **multi-trillion deal with key provisions for climate change.**

- In **May 2022, the Biden administration revoked the Alaska oil** and **gas drilling lease sales in the backdrop of soaring fuel prices**, a **move that is consistent with its climate commitment.**

Significance

- It **will help the nation get closer to its climate target of reducing 50-52% emissions below 2005 levels by 2030.**
- Further, the **investments in the Bill could reduce greenhouse gas emissions by 31 to 44% by 2030.**
- It **can help the U.S. compete with China in terms of renewable production as China is a leading producer of solar energy.**
- It **can also facilitate the creation of domestic jobs.**

Similar Climate Package by other Countries

- In **May 2022, Japan announced its 'Invest in Kisida' plan** which **aims for a $1.1 trillion investment to bolster the Japanese economy.**
- As **part of the plan, the country aims to transition to clean energy** and **achieve 46% reduction in greenhouse gas emissions by 2030.**
- In **June 2021, the European Union (EU) proposed a similar 'Fit for 55' plan** to **reduce emissions by 55% by 2030**. The plan is **expected to become law soon**. Being the la***rgest emitters, both the U.S. and the EU can play a significant role in taking responsibility for historical emissions.***

The Union Minister of State for Health has virtually launched the Paalan 1000 National Campaign and Parenting App to reduce child mortality.

Key Points

- The **programme was organised in Mumbai**.
- On the occasion, the **Union Minister of State for Health** has **highlighted that India has achieved great progress** in **reducing child mortality from 45 per 1,000 live births** in **2014 to 35 per 1,000 live births in 2019.**

What is the Paalan 1000 Campaign?

- **'Paalan 1000 - Journey of the First 1000 Days' focuses** on the **cognitive development of children in the first two years of their life**.
- It **will provide practical advice to caregivers on what** they **can do in their everyday routine and will help clear doubts.**
- It **combines coaching for parents, families** and other **caregivers with services designed to meet the families' basic needs.**

Significance

- A **baby's brain development begins during pregnancy** and is **influenced by the pregnant woman's health, nutrition and environment.**
- During the **first two years of a child's life, the growing child needs the right nutrition, stimulation, love and support.**
- The **campaign is aligned with the mission of the Rashtriya Bal Swasthya Karyakram(RBSK)** which **emphasizes responsive care and focused interventions during the first 1,000 days of a child.**
- The **first 1,000 days establish a solid platform for a child's** physical, **mental, emotional, cognitive and social health.**

The Union Ministry of Social Justice and Empowerment has launched the 'SMILE-75' initiative

What is the SMILE-75 Initiative?

- In the **spirit ofAzadikaAmritMahotsav**, the M**inistry of Social Justice & Empowerment,** Government of India, has **identified 75 Municipal Corporations to implement comprehensive rehabilitation of persons engaged in the act of begging** under ***"SMILE: Support for Marginalised Individuals for Livelihood and Enterprise"named as "SMILE-75 Initiative".***
- The **identified 75 Municipal Corporations, experts from the field** of **beggary and eminent NGOs will participate in this nationwide** launch **through online and offline mode.**
- The **objective** of SMILE- 75 is to **make our cities/town** and **municipal areas begging-free** and **make a strategy** for **comprehensive rehabilitation of the persons engaged in the act** of **begging through the coordinated action of various stakeholders**
- The **initiative is a part of the Ministry's ongoing SMILE project.**

SMILE (Support for Marginalised Individuals for Livelihood and Enterprise)

- The **Government of India has recognised the persisting problem** of **destitution and beggary and formulated a comprehensive scheme of SMILE**.
- It **includes a sub-scheme of comprehensive rehabilitation** for **persons engaged in begging** which **covers** ***identification, rehabilitation, provision of medical facilities, counselling, and education, skill development for decent job and self-employment / entrepreneurship.***
- The **2 sub-schemes of SMILE** are:

1. ***Central Sector Scheme for Comprehensive Rehabilitation for Welfare of Transgender Persons***
2. ***Central Sector Scheme for Comprehensive Rehabilitation engaged in the act of Begging'.***

India has hosted the Pre-Summit meeting of Tiger Range Countries (TRCs).

Key Points

- The **Tiger Range Countries Summit is scheduled to be held at Vladivostok, Russia on 5th September 2022**.
- In **January 2022, the 4th Asia Ministerial Conference** on **Tiger conservation was held.**
- The **meeting was attended by 12 tiger range countries except** for **China and Indonesia.**
- There are **13 Tiger Range Countries (TRC): *India, Bangladesh, Bhutan, Cambodia, Lao PDR (People's Democratic Republic), Malaysia, Myanmar, Nepal, Russia, Thailand, Viet Nam, China and Indonesia.***
- **India** is **committed to bringing all potential tiger habitats** within the country **under the tiger reserve network.**
- The **meeting aims to finalise the declaration on tiger conservation to be adopted at the Summit.**

Indian role/work in Tiger Conservation

- **India** is **home to 52 Tiger Reserves covering approximately 75,000 Sq Km area in 18 States with approximately 75% population of the wild tiger at global level**.
- India **achieved the goal of doubling the tiger numbers in 2018** itself, **four years in advance from the targeted year 2022.**
- Also, **so far 17 Tiger Reserves in the country have got CA|TS international accreditation** and **two Tiger Reserves** have got **International Tx2 Award.**
- India is **having bilateral agreements and MoU with several Tiger Range Countries** and is **working very closely with Cambodia**, for **technical assistance towards bringing back wild tigers.**
- Likewise, a **technical partnership has been firmed up with** the **Land of the Leopard National Park in Russia** for **sharing best practices in science based wildlife monitoring.**
- As the **Founding Member of the Global Tiger Forum**, an inter-governmental platform, **India intends to further partnerships** and **collaboration with all the Tiger Range Countries** to **secure the future of wild tigers both in India and as well at global level**.

An MoU was signed between the Department of Science and Technology and M/s Kritsnam Technologies Private Limited for production & commercialization of Dhaara Smart Flow Meter.

Key Point

Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space announced **financial support of Rs. 3.29 crores to M/s Kritsnam** Technologies, a **Start-up Company, incubated at IIT Kanpur** to **develop smart water management technologies.**

What is it?

- Dhaara Smart Flowmeter' – is an **integrated system for online monitoring using two beam ultrasonic flow meters** that is **designed to track the water distribution in real-time** for **applications** such as **drinking water supply, ground water extraction, industrial water usage and precision irrigation.**
- The **device collects data through sensors, stores it in the device,** and **transmits to the online cloud servers** and **thereafter the data**

transmitted to servers is analysed and **displayed in the dashboard.**

- This **unique solution is a combination of hardware & software** for flow **measurement and water management respectively.**

Features

- The Dhaara Smart Flow Meter is **battery operated** and **does not require external power** and the **hardware architecture** is **based on the internet of things (IoT) communication circuits** which is **patented in India.**
- In addition, it **complies with ISO and Central Ground Water Authority standards.**
- The **water usage data is automatically recorded in an online logbook through telemetry via 4G/2G.**
- The **built-in telemetry and battery-operated capabilities** make it **easy for users to monitor their water consumption virtually anywhere** (even when the power is out).
- The **product being developed initially aims at commercial users** like **hotels, hospitals, malls, IT parks, schools, colleges** and **industrial users (food products, packaged drinking water, pharmaceuticals, paper & pulp etc.).**

Significance

- The **technology, initially focused on commercial users, can be** a **game changer in effectively monitoring & controlling the ground water exploitation** across country in future.

- Dhaara Smart Flow Meter **will greatly benefit Prime Minister Modi's Atal Bhujal Yojana (Atal Jal), a Rs.6,000 crore Central Sector Scheme**, for **sustainable management of ground water** resources with **community participation.**
- Dhaara Smart Flow Meter **can also help bulk water consumers** to **budget their water usage and empower them to understand** their **patterns, points of inefficiencies** and **help them to build strong strategies for reducing water wastage.**
- Dhaara Smart Flow Meter' from startup 'Kritsnam' has been **designed in such a way that, it can perform ground water management with real time processing, even without electricity".**

Mudhol hounds, a breed of hunting dogs native to north Karnataka, could be inducted into the Special Protection Group (SPG), the elite force protecting the Prime Minister of India.

Mudhol Hounds

- The **dogs already serve with the Indian armed forces** and **some paramilitary forces** and **could become the first indigenous breed to be part of the SPG.**
- The Mudhol **hounds come from the region bordering Karnataka and Maharashtra.**
- Mudhol hounds ***get their name from the erstwhile kingdom of Mudhol*** (in present-day Bagalkot), whose **rulers first began to breed them.**

History

- The Mudhol hounds **are believed to have been bred first** by **Raja Malojirao Ghorpade of the erstwhile Deccan kingdom of Mudhol** who, **after seeing the qualities** of the

dogs that the tribals of his territory kept, decided to breed them selectively.

- The **Raja is said to have presented a couple of these dogs** to **King George V on a visit to England,** whereafter the breed got the name of Mudhol hound.

Physical Features

- It is an **indigenous breed**. They are **known for their hunting and guarding abilities.**
- These dogs **have athletic legs, an elongated skull and a 270-degree vision and a sharp sense of smell.**
- The dogs are **fast runners, with excellent stamina** and agility, and **have a sharp vision and a keen sense of smell.**
- Hence, they are **ideal for hunting, guarding, and surveillance.**

Concerns with using the Mudhol hounds

- There **aren't too many drawbacks of using Mudhol hounds** in security duties.
- **However**, is that the **performance of the hounds appears to dip in cold environments**, could be **because the species is native to an area with a warmer climate.**

Also

- Mudhol Hound dogs **have been trained and inducted in the dog squad of the Army, CISF and NSG.**
- Mudhol hounds **are being included in the BSF** and **Special Tiger Protection Force of the forest department at Bandipur Tiger Reserve (BTR).**
- The ***other Indian breeds are: Himachali Hound, Rajapalayam, Kanni, Chippiparai and Kombai.***
- **Research on the Indian breed dogs i**s also being **done by** the **Indian Council of Agriculture Research** with the aim to make them better and more beneficial.

TDB-DST (Technology Development Board – Department of Science and Technology) entered a new domain by funding its first ever Aquaculture project using state of the art Israeli technology for production of Tilapia Fish.

Tilapia

- 'Tilapia' has **emerged to be one of the most productive** and **internationally traded food fish in the world**
- It is **dubbed as "aquatic chicken" due to its quick growth** and **low maintenance cultivation.**
- If any fish could be named a global fish, no better name can be thought of than Tilapia.

Production

- In **order to facilitate the culture of Tilapia in India** in responsible manner, **M/s Fountainhead Agro Farms Private Limited envisages setting up of a complete production line** (from breeding to full fish) in **Mudhol (Karnataka).**

- The **company aims to produce 500 tons of Tilapia**, to be **grown from the imported parent broodstock 'Hermon'** from Nir David Fish Breeding Farm, Israel.
- The **company has adopted advanced Israeli Technology** from Aquaculture Production Technology Limited (APTIL), Israel (under Technology Service Agreement signed in October, 2020) **for land locked locations through closed loop farming for arid zone with seasonal water supply** from rivers, **which may be replicated throughout India** in **multiple arid landlocked locations with reasonable water sources.**
- In **order to suit Indian conditions, the complete engineering of the facility is tuned as per the requirement** of site **conditions such as land availability, water availability, weather conditions, availability of the surrounding resources, soil conditions, topography.**

Fishery sector in India

- Fisheries is **one of the fastest growing sectors amongst the primary producing sectors.**
- The **sector plays a vital role in economic and overall development of the country, also referred as the "sunrise sector**", it is **poised to bring in immense potential through equitable and inclusive growth.**

- The **sector is recognized as a powerful engine for providing employment to 14.5 million people** and **sustaining livelihood for 28 million fishermen community of the country.**
- Also, **India is the second largest fish producing country i**n the **world accounting for 7.56% of global production** and **contributing about 1.24% to the country's Gross Value Added (GVA) and over 7.28% to the agricultural GVA.**

Pradhan Mantri Matsya Sampada Yojana

- To **promote this sector, the cabinet came up with 'Pradhan Mantri Matsya Sampada Yojana** (PMMSY)' in September 2020 **to bring about 'Blue Revolution' through sustainable and responsible development of fisheries sector** in India.
- The **scheme targets to enhance fish production to 220 lakh metric tons by 2024-25**, at an **average annual growth rate of about 9%.**
- The **ambitious scheme also aims to double the export earnings to Rs.1,00,000 crore and generate about 55 lakhs direct and indirect employment opportunities** in **fisheries sector over a period of next five years.**

Using fossil evidence to create a three-dimensional model, researchers have found new evidence about the life of one of the biggest predatory animals of all time — the Megalodon.

Key Points

- Using **fossil evidence to create a three-dimensional model**, **researchers have found new evidence about the life of one** of the **biggest predatory animals of all time — the Megalodon.**
- According to the **new study published in the journal Science** Advances, the ***Megalodon could "completely ingest, and in as few as five bites," a prey as big as the killer whale.***

Megalodon (Otodus megalodon)

- Megalodon **meaning "big tooth", is an extinct species of mackerel shark**
- It **roamed the oceans an estimated 23 million to 2.6 million years ago.**
- It was the **largest shark to ever swim through Earth's oceans**.
- According to the study, the **Megalodon was bigger than a school bus at around 50 feet from nose to tail.**

- In **comparison, the great white sharks of the present can grow** to a **maximum length of around 15 feet.**
- Using their **digital model, the researchers have suggested** that the **giant transoceanic predator would have weighed around 70 tonnes — or as much as 10 elephants.**
- Megalodon **had an average cruising speed faster than sharks** today.
- According to the research team, the **Megalodon had the ability to migrate across multiple oceans.**
- It **could open its jaw to almost 6 feet wide, and therefore, feed** on **other big creatures**. With a full stomach, it could roam the oceans for months at a time.

3D modelling research

- The **technique was used as the Megalodon's skeleton is made** of **soft cartilage that doesn't fossilize well.**
- Using **fossils that were available, including mainly teeth and a rare collection of vertebrae that has been with a Belgium museum** since the 1860s, **computer modelling was used to reconstruct the entire body of the extinct and largest known macropredatory shark.**

A delegation from India and other member countries of the UN are in New York to deliberate on a one-of-its-kind agreement to conserve marine biodiversity in the high seas.

Key Point

- The **agreement follows a resolution by the UN General Assembly**.
- The **pact is expected to be the final in a series set in motion since 2018 to draft an international legally binding instrument** under the **1982 United Nations Convention on the Law of the Sea (UNCLOS).**

Key Features of Ocean diversity pact

- It **will decide on the rights of companies that undertake exploration for biological resources in the high seas.**
- **Companies' absolute rights on any discovery** or extraction in **these regions or should they share their gains**, in **terms** of **intellectual property and royalties with an UN-prescribed body** will be **scrutinized**.
- The **focus of mining activity in the sea has been for gas hydrates, precious metals and other fossil fuel**

- However, with **advances in biotechnology and genetic engineering, several companies see potential in exotic microbes** and other organisms **— several of them undiscovered** — that **abide in the deep ocean and could be used for drugs and vaccines**.
- The **treaty seeks to address the conservation and sustainable use** of **marine biodiversity in areas of the ocean which are beyond** the **limits of national maritime zones.**
- It **will also address marine genetic resources, including questions** on **benefit-sharing, measures such as area-based management tools, environmental impact assessments**, and the **transfer of marine technology.**
- The **Union Cabinet approved a 'Blue Economy' policy for India**, a nearly ₹4,000-crore programme spread over five years.
- **Studies on sustainable utilisation of deep sea bio-resources** will be the **main focus.**

What are High Seas?

- The high seas are the **parts of the ocean that are not included i**n the **exclusive economic zones, territorial sea or internal waters of a State.**
- The **high seas are open to all States, whether coastal or land-locked**.
- **Freedom of the high seas is exercised under the conditions** laid down **by this Convention and by other rules of international law.**

- The **high seas comprise nearly 45% of the Earth's surface**. They are also prime territory for the discovery of valuable mineral deposits, potent pharmaceuticals and oil and gas reserves.

United Nations Convention on the Law of the Sea (UNCLOS)

- UNCLOS is **sometimes referred to as the Law of the Sea Convention or the Law of the Sea treaty.**
- UNCLOS **came into operation and became effective from 16th November 1982**
- It **replaced the four Geneva Conventions of April, 1958**, which **respectively concerned** the **territorial sea and the contiguous zone, the continental shelf, the high seas, fishing** and **conservation of living resources on the high seas.**
- It **defines the rights and responsibilities of nations with respect** to **their use of the world's oceans, establishing guidelines** for **businesses, the environment, and the management of marine natural resources.**
- The **convention defines a distance of 12 nautical miles from** the **baseline as Territorial Sea limit and a distance of 200 nautical miles distance as Exclusive Economic Zone limit.**
- **India became a signatory to the UNCLOS in 1982**.
- It has created three new institutions on the international scene :

✓ ***International Tribunal for the Law of the Sea,***

✓ ***International Seabed Authority***

✓ ***Commission on the Limits of the Continental Shelf***

The Chhattisgarh government launched a plantation drive in the urban forests of the state called 'Krishna Kunj'

Key Points

- 'Krishna Kunj' is **being developed in all the urban bodies** of the **state by planting life-useful trees of cultural importance** in a **minimum of one acre of land**. For this, the urban administration will provide land.
- Its **purpose is to conserve the vanishing trees of religious, cultural** and **environmental importance** and to make **the coming generation aware of them and their importance.**

Features

- Krishna Kunj' has **been started in the entire state,** under which **cultural, religious and life-saving trees will be planted at 162 selected places in urban areas of the state.**
- **Trees of religious importance will be planted** along ***with banyan, peepal, amla, kadamba as well as life-saving harra, neem, mango, tamarind, plum, Ganga tamarind, jamun, Ganga ber, mulberry, tendu, chironji, pomegranate, kaitha, neem, gular, palas, guava, sitaphal and bel trees.***

Urban Forests

- Urban Forest is a **man-made forest in an urban-set up.**
- This type of **forest is planted, developed and created by human** and is **given the same environment as that of a natural forest.**
- Man-made Urban forest is **creating a forest by human-efforts creating all the natural circumstances** which exist in a natural forest
- Urban-forests **is to restore the imbalance in the forces of nation** and **restoring the lost forest cover in urban areas**

Forests

- Forest is a **world in itself - a natural grown self-sustained eco-system.**
- Our **planet is composed of five basic elements; Panch-Tatva** which **consist of land and soil, water, air, space and fire**.
- **Forest being a micro-cosmos of the planet-earth has all the five basic elements** like **fertile and rich soil; streams, rivulets, ponds and rivers**
- Forests are **like family of trees where each tree helps the other tree and plants to survive and grow.**
- As per the **latest scientific literature, trees help each other exchange nutrients, information and even alert each other against** any **attack**.
- They **protect each other from the vagaries of extreme weather and climatic fluctuations**. They exchange water, food and other nutrients through soil.

Techniques to create a forest

- In **India**, there is **an ancient Indian technique of forest making** known as '**Vrikshayurveda'** which is the **ancient Indian science** of **plant life, a body of knowledge that has been compiled** by **Surapala approximately 1000 years ago.**
  - It **discusses various topics related with the science of plant life** such as ***procuring, preserving, and treating of seeds before planting; preparing pits for planting saplings; selection of soil; method of watering; nourishments and fertilizers; plant diseases and plant protection from internal and external diseases; groundwater resources; etc.***

- The **other technique is the latest in vogue which is known** as **Miyawaki-method which was popularized by Japanese botanist** Akira Miyawaki. **Natural forest can be created in urban-areas** by **using the pattern as existing in a natural-forest** and by **planting native and bio-diverse trees**
- There **are also ancient Indian forest-making techniques known** as **Panchvati-Plantation, Triveni-Plantation, Harishankari-Plantation** and some of the other prevailing method of forest-plantation.
- Urban forest **requires minimum area of 2000 square feet** and there is no **limit of maximum area**. It **can be planted in open plots, along the drains, along the canal and riverbeds** and even in **schools, colleges and factory premises.**

Benefits

- They **help in reducing the rising temperature of the urban areas** by **moderating the extreme weather**.
- They **help in retaining water-table as trees soak much of water** and create **a water-reservoir**. It **can help sipping in excess water during the rainy seasons and prevent flood like situation.**
- They will **improve substantially the AQI of any urban area.**
- Further, they **will also help in using the bio-degradable urban waste** which is an **excellent base material for preparing any soil** for making urban-forests.
- Urban forests **will check the desertification of the soil** and will help in **maintaining the soil fertility and productivity.**
- It will **bring back the bio diversity both in terms of flora and fauna.**
- It will **check the urban pollution with its various variants like air-pollution, water-pollution, soil-pollution** and urban waste generation.

Rhinoceros poaching rates in Africa have declined from a peak of 5.3 per cent of the total population in 2015 to 2.3 per cent in 2021

Key Points

- The **report was compiled by the International Union for Conservation of Nature** (IUCN), S**pecies Survival Commission** (SSC), **African and Asian Rhino Specialist Group** (AfRSG) and **TRAFFIC.**
- The **report comes ahead of the 19th meeting of the Conference of** the **Parties to the Convention on International Trade** in **Endangered Species of Wild Fauna and Flora**, which will be held in Panama this year.
- At least **2,707 rhinos were poached in Africa between 2018** and **2021, including critically endangered black rhino** and **near threatened white rhino.**
- **African Rhino Specialist Group (AfRSG) gathered information** from **thirteen rhino range countries:**
    - ***Botswana, Chad, Eswatini, Kenya, Malawi, Mozambique, Namibia, Rwanda, South Africa, Tanzania, Uganda, Zambia and Zimbabwe***

Findings of the Report

- **Rhinoceros poaching rates in Africa have declined from a peak** of **5.3% of the total population in 2015 to 2.3% in 2021.**
- **South Africa accounted for 90% of all reported cases**, predominantly affecting white rhinos in Kruger National Park.
- South Africa **lost 394 rhinos to poaching in 2020,** while **Kenya didn't record any poaching that year.**
- The **total estimate of rhinos in Africa was 22,137 at the end of 2021.**
- The **number of white rhinos in the continent declined by almost 11.8 % while populations of black rhinos increased by just over 12.2%.**
- **Zimbabwe has the largest population of African rhinoceroses** among South Africa, Namibia, Kenya.

Black Rhinos (Diceros bicornis)

- Almost ***all black rhinos are found in four African counties — South Africa, Namibia, Zimbabwe and Kenya.***
- It is **also known as hook-lipped rhinoceros**.
- There are **two common theories about the black rhino's name**. One is that the u**pper lip's "beak" formation was translated to "black."**
- The **other is that it was simply called black to distinguish it from the white rhino.**
- The **black rhino is still considered critically endangered (IUCN), Appendix I (CITES)**

White Rhino (Ceratotherium simum)

- White rhinos **live primarily in South Africa with some smaller populations in Botswana, Namibia, Swaziland and Zimbabwe.**
- There are **two subspecies of white rhino, the southern white rhino and northern white rhino**
- **White rhinos are the second-largest land mammal**, after the elephant. Adult males can weigh 8,000 pounds and reach 6 feet tall.
- They are **found in grassland and savannah habitat.**
- The species is **considered near threatened (IUCN), Appendix I & Appendix II (CITES)**

Recently cloudbursts and flash floods were seen in different parts of Himachal Pradesh and Uttarakhand.

Key Points

- **Himachal Pradesh was hit by 29 cloudburst incidents** in the last three years
- Isolated areas in these two states have reported heavy rainfall during this time.
- The **rainfall triggered landslides and flash floods** that have **disrupted rail and road traffic and resulted in house** and **wall collapses.**

What are Cloudbursts?

- Cloudburst is **defined as a "sudden, very heavy" rainfall**, which **lasts only for a short period of time** and is **extremely local** in **nature**.
- It **usually occurs in connection with a thunderstorm.**
- During these **thunderstorms, a large amount of water** may **accumulate at high levels** and, **if the upward currents** are **weakened**, the **accumulated water comes down at one time, causing flash floods.**

- This **weather phenomenon is most common in hilly regions** because the **water gets concentrated in gullies and valleys**.
- It generally **occurs over a small geographical area for a short spell,** but the **intensity of rainfall can cause widespread destruction.**
- **Mountainous areas witness cloudbursts on a regular basis**. This explains why **hill states like Himachal Pradesh and Uttarakhand** are **frequently affected by this phenomenon.**
- The **frequent occurrence of cloudbursts in such areas takes place** probably **because the warm air currents in a thunderstorm** tend to **follow the upward slope of a mountain.**

Predictions

- The **Meteorological Department forecasts rainfall events well** in **advance, but it cannot predict the quantum of rainfall.**

Measure to tackle

- Several **measures listed to mitigate the effects of a cloudburst.**
- Suggest that **instead of valleys, people should live in areas** on **slopes with firm ground for safety reasons.**
- In **areas where ground fissures have developed, appropriate steps** should be **taken to check the infiltration of rainwater** and **surface water.**
- Suggests **banning "indiscriminate" and "unscientific" construction works**

What are flash floods?

- **Excessive or continuous rainfall over a period of days**, or during **particular seasons can lead to stagnation of water** and **cause flooding. Flash floods refer to such a situation**, but occurring in a much shorter span of time.

Cause

- The **US's meteorological agency, the National Weather Service,** says **flash floods are caused when rainfall creates flooding in less than 6 hours.**
- It **adds that flash floods can also be caused by factors apart** from **rainfall, like when water goes beyond the levels of a dam.**
- In **India**, flash floods are **often associated with cloudbursts** – sudden, intense rainfall in a short period of time.
- **Himalayan states further face the challenge of overflowing glacial lakes**, formed **due to the melting of glaciers,** and their numbers have been increasing in the last few years.
- **Flash flooding commonly happens more where rivers are narrow** and **steep, so they flow more quickly**
- They **can occur in urban areas located near small rivers**, since **hard surfaces such as roads and concrete do not allow the water** to **absorb into the ground.**

How common are flash floods and floods?

- **India is the worst flood-affected country in the world** after **Bangladesh and accounts for one-fifth of the global death** count due to floods.
- Flash floods have **been commonly witnessed in cities like Chennai and Mumbai.**

- **Depression and cyclonic storms in the coastal areas of Orissa, West Bengal, Andhra Pradesh,** and others **also cause flash floods.**

Reason behind it

- **Data from the National Disaster Management Authority** states that **one of the reasons for flood situations occurring** so frequently, is that **nearly 75 per cent of the total Indian rainfall** is **concentrated over a short monsoon season of four months** (June to September).
- As a result, the **rivers witness a heavy discharge during these** months.
- About **40 million hectares of land in the country are liable** to **floods**
- Flash floods **may in the future, begin to take place after wildfires** that **have been taking place more frequently**.
- This is **because wildfires destroy forests and other vegetation,** which in **turn weakens the soil and makes it less permeable** for **water to seep through.**

Recently Egypt released a Postage Stamp celebrating the 75th Anniversary of diplomatic ties with India.

Key Points

- **Diplomatic relations between Egypt and India** were **established** with **Egypt's recognition of the independence of India on 18 August 1947, just three days after India's independence.**
- The **two nations became even more closer in the 1950s** and concluded a **historic Friendship Treaty in 1955.**
- During the last couple of years, the traditionally strong bilateral relations enjoyed by the two countries have received an impetus with regular exchange of high-level meetings and contacts between the two sides.

Historic Relations

- **Egypt and India have shared historic ties in all fields** owing to the **trade contacts between the two ancient civilizations** that grew **along the banks of the river Nile and the river Indus**.
- The **two nations also concluded a historic Friendship Treaty in 1955.**

Economic Relations

- **Growing Egypt-India economic and commercial relations** contribute to the **stability and strength of a rapidly diversifying** and **deepening bilateral relationship.**
- The **India-Egypt Bilateral Trade Agreement has been in operation since March 1978** and is **based on the Most Favoured Nation clause.**
- In **2020-21Egypt's exports to India were valued at US$ 1.89 billion** and **imports from India at US$ 2.26 billion with India** having a **favourable trade balance of US$ 372 million.**
- In the same year, **India was 3rd largest export market for Egypt, 6th largest trading partner and 7th largest exporter to Egypt.**

Defence Relation

- It is **being revived with among other developments the visit** of the **Indian Navy ship to Egypt, a month-long Air Force exercise** and the **visit of the Egyptian Air Force chief to India in recent months.**
- **India Air Force-Egyptian Air Force Joint Tactical Air Exercise- 'Desert Warrior'**
- **Naval exercise between India's INS Kochi and Russian ships** in the **international Passage Exercise (PASSEX)** was closely cooperated by the Egyptian Navy.

Science and Technology

- **Technical cooperation and assistance have been a major part of the bilateral relationship.**
- Egyptian candidates visit India under the Indian Technical and **Economic Cooperation Programme (ITEC).**

- In the **field of Scientific Cooperation, ICAR and the Agricultural Research Center of the Ministry of Agriculture & Land of Egypt signed a MoU for cooperation in the field of agricultural research** in **1998**.
- **Egypt** signed the **International Solar Alliance (ISA) framework agreement** as a **founding member in March 2018 and ratified** it in **January 2019.**

Cultural

- The **Maulana Azad Centre for Indian Culture** (MACIC) has been **promoting cultural cooperation between the two countries**, through regular activities.
- **'India by the Nile' festival is produced by Delhi-based M/S Teamwork Arts** and **supported by ICCR and the Egyptian Ministry** of Culture. It is a **cultural festival celebrated annually in Egypt.**

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Prelims 2023

A group of researchers has discovered a new species of bent-toed gecko from Agasthyamalai hills in the Western Ghats.

Key Points

- The **species has been given the common name Aravind's ground gecko after noted malacologist N.A. Aravind.**
- The **new species, which has been given the scientific name Cyrtodactylus aravindi,** has been **described based on its distinctness in the morphological** and **molecular DNA data.**
- This **ground gecko has so far been found only at two locations**, ***Muppanddal and Thuckalay, in Kanyakumari district falling within the Agasthyamalai biosphere reserve in Tamil Nadu.***

About Geckos

- Geckos are **reptiles that are found on all continents except Antarctica.**

- These **colourful lizards have adapted to habitats** ranging from **rainforests, deserts, to cold mountain slopes**.
- Geckos are **spread across six families** namely ***Carphodactylidae, Diplodactylidae, Gekkonidae, Eublepharidae, Sphaerodactylidae and Phyllodactylidae.***
- Most of the **geckos are nocturnal, i.e., they are active** at **night**. However, **day geckos are active during the day.**
- They **depend on fruits, flower nectar and insects.**
- Gecko tails serve many purposes. They **help balance their weight as they climb branches,** they **act as fuel tanks** to **store fat, and as camouflage to help them disappear** into **their environment.**

The Agasthyamalai Biosphere Reserve

- The **Agasthyamala Biosphere Reserve is a biosphere reserve in India established in 2001,** located in the **southernmost end of the Western Ghats**
- ABR **straddles the border of Pathanamthitta, Kollam and Thiruvananthapuram Districts in Kerala** and **Tirunelveli and Kanyakumari Districts in Tamil Nadu, South India** at the **southern end of the Western Ghats.**
- ABR **includes the Indian Ecoregions of tropical wet evergreen forests**, **South Western Ghats moist deciduous**

forests, South Western Ghats montane rain forests and Shola

- Animals **include the Bengal Tiger, Asian Elephant**, and **Nilgiri Tahr**.
- Agastyamalai is **also home to the Kanikaran, one of the oldest surviving ancient tribes in the world.** Ecotourism is popular in the area.
- It is **also a unique genetic reservoir of cultivated plants** especially **cardamom, jamun, nutmeg, pepper and plantain.**
- T**hree wildlife sanctuarie**s, **Shendurney, Peppara, Neyyar and Kalakad Mundanthurai Tiger reserve** are **included** in the site
- Agasthyamalai Biosphere Reserve **became part of World Network of Biosphere Reserves in 2016**

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Prelims 2023

Garba Dance nominated in UNESCO Heritage List

Key Points

- **After the inclusion of 'Durga Puja'** on the UNESCO intangible cultural heritage representative last year, **India has now nominated 'Garba' for 2022.**
- **If approved, it will become the first intangible cultural heritage of Gujarat to be listed by UNESCO.**

Garba

- Garba is a **form of dance, as well as a religious and social event that originated in Gujarat.**
- The **word garba comes from the Sanskrit word for womb** and **so implies gestation or pregnancy — life.**

Performance

- **Traditionally**, it is **performed during the nine-day Hindu festival Navarātrī.**

- Traditionally, the d**ance is performed around a clay lantern with a light inside,** called a **Garbha Deep ("womb lamp").**
- This **lantern represents life and the fetus in the womb** in particular.
- The **dancers thus honour Durga, the feminine form** of **divinity**.
- Garba is **performed in a circle as a symbol of the Hindu view of time.** The **rings of dancers revolve in cycles**, as **time in Hinduism is cyclical.**
- As the **cycle of time revolves, from birth, to life, to death** and **again to rebirth, the only thing that is constant** is the **Goddess, that one unmoving symbol in the midst of all** of this **unending and infinite movement.**
- Garba is also **performed during social events like weddings and parties.**

Intangible Cultural Heritage

- Intangible cultural heritage **refers** to "*traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts"*

- **UNESCO's prestigious list is made up of intangible heritage** elements that **help to showcase the diversity** of **cultural heritage and raise awareness of its importance.**
- It was **established in 2008 after the Convention for the Protection of Intangible Cultural Heritage, 2003 came into force.**
- It **compiles two lists viz.** ***Representative List of the Intangible Cultural Heritage of Humanity and the List of Intangible Cultural Heritage in Need of Urgent Protection.***

List of Intangible Cultural Heritage of Humanity from India

- **Sanskrit Theater of Kudiyattam, Kerala**
- **Mudiyet, a ritual theater and dance drama from Kerala**
- **Tradition of Vedic Mantras;**
- **'Ram Leela' (traditional performance of Ramayana)**
- **'Ramman' (a religious festival and ritual theater of Garhwal, Uttarakhand)**
- **Kalbelia Folk Songs and Dances of Rajasthan**
- **Chhau Dance (Classical dance of West Bengal and Odisha)**
- **Buddhist chanting of Ladakh**

- **Sankirtana (a ritual singing, drumming and dance of Manipur)**
- **Traditional brass and copper craft of pottery amidst the laughs of Jandiala Guru, Punjab**
- **Yoga**
- **Nowruz**
- **Kumbh Mela**
- **Durga Puja (represents the collective worship of the Hindu goddess Durga)**

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Prelims 2023

Pact signed to establish India's first geothermal field development project in Leh

Key Points

- The **pact was signed between Union Territory Administration Ladakh, Ladakh Autonomous Hill Development Council** (LAHDC)-**Leh and Oil and Natural Gas Corporation (ONGC).**
- It **will be India's first geothermal energy proj**ect and also the **world's highest at 14,000ft.**

Background

- It **has long been reported that Puga Valley in Ladakh's south eastern part** may **have significant geothermal energy potential** and **now assessments have begun for the project's viability.**
- In **February, 2021, an agreement for establishing the first geothermal Power Project was announced.**
- **Ladakh's Puga valley was the natural choice**. The power plant here will be not only **India's first one but also the highest**.
- **ONGC has embarked upon a journey to generate electricity** on a **utility scale by tapping steam gushing from the earth at Puga**, a

remote valley located at an altitude of over 14,000 feet, off the road to Chumar on the de-facto border with China.

- **ONGC last week started drilling its first well for the project** and **encountered high-pressure steam at 100 degrees Celsius** with a **discharge rate of 100 tonne geothermal energy per hour.**

Phases:

- In the **first phase, the company will drill 1,000-metre-deep wells** to **run a one-megawatt power plant as a pilot.**
- The **second phase envisages a deeper exploration** of the **geothermal reservoir and a higher capacity demonstration plant**.
- The **third phase would involve commercial development** of the **geothermal plant.**

Benefits

- The **signing of the MoU with ONGC for the first geothermal project in India is a promising initiative towards innovative** and **sustainable development of Ladakh** and also a **step towards achieving the goal of carbon-neutral Ladakh**
- The **energy from this project will give round-the-clock power** supplies, and the **hot water from the spring could be used for space-heating**
- The **hot water from the spring could be used for space-heating** and **establishing hot swimming pools to attract tourists**, which **will give a boost to tourism in the UT.**

Puga Valley

- In **Eastern Ladakh, Puga and Chumathang are said to be the most promising geothermal fields in India**.
- These **areas were discovered in the 1970s and initial exploratory efforts were made in the 1980s by** the Geological Survey of India **(GSI).**
- Puga Valley is **situated in the Changthang Valley in the south-eastern part of Ladakh, about 22 km away from the Salt Lake Valley.**
- It is a **region of great significance known for its natural beauty** and geothermal activities.

Note

- **Ladakh is not the only region in India with geothermal potential.**
- The '**Geothermal Atlas of India**' prepared by the Geological Survey of India (GSI) in 1991 **has identified more than 300 sites** with **geothermal potential across India** spread across ***Himachal Pradesh, Gujarat, West Bengal, Chhattisgarh, Maharashtra and Jammu and Kashmir.***

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Prelims 2023

India to become next global SaaS capital

Key Points

- The **Confederation of Indian Industry(CII) and Ernst & Young Global Limited(EY)** have ***released a study titled "India: The next global SaaS capital".***
- According to a study, Ind**ia is poised to become the next SaaS capital over the next few years,** mainly **driven by small** and **medium businesses with a focus on large enterprises.**

Key findings of the study-

- The **Indian software-as-a-services** (SaaS) **market is expected** to **grow multi-fold by 2025**, accounting for **almost 7 to 10 % of** the **global market from 2 to 4 % currently.**
- According to industry estimates, the **market is expected to reach $20-25 billion by 2025 from $4-7 billion in 2020.**
- **Compared to only 1 SaaS unicorn in 2018**, India **now has a total** of **18, taking the third spot among the largest SaaS ecosystems** in **the world.**
- The study also highlights that **India more than doubled the number of its SaaS companies in 2021 in contrast to 2019.**

- Further, **funding has increased from $2.6 billion to $6 billion in the span of these two years**
- According to the study, **over 80 per cent of the SaaS promoters** who contributed to the report **feel there is the need to build** a **robust talent pool; 50 percent of SaaS providers feel driving greater awareness for SaaS products continues** to be a **prerequisite for customer acquisition.**
- Apart from this, the **study said that one-third of the SaaS providers are being increasingly cautious with their go-to-market strategy** and **mainly targeting niche segments to acquire marquee clients by understanding new digital buying preferences** of the customers, **following a digital-first approach and offering innovative pricing models.**
- The **large consumer base in India, coupled with a technology–first** mindset is **paving way for the emergence of consumer-focused SaaS solutions as adoption levels continue to rise.**

What is SaaS?

- Software as a service (or SaaS) is a **way of delivering applications over the Internet—as service (freeing up the need of installing and maintaining software). It is also called Web-based Software.**
- It **allows users to connect to and use cloud-based apps** over the **Internet.**
- It is a **software licensing model**. It **allows access to software** on a **subscription basis using external servers**.
- As its important feature, **SaaS allows each user to access programs via the Internet**. The **user need not install the software**

on his/her computer. The rise of SaaS and cloud-based computing go hand in hand.

Benefits of using SaaS

- SaaS **has many business applications**. It includes **file sharing, email, calendars, customer retention management**, and **human resources.**
- It is **easy to implement, update and debug**. Moreover, it is **not very costly as users pay for SaaS instead of purchasing multiple software licenses for multiple computers.**
- This is a **very cost-effective advantage**. SaaS **allows users to access the software through a web browser from multiple locations.**
- **He or she can have remote desktop software** and **can work from home.**

Disadvantages of SaaS

- Major disadvantages of SaaS consist of **security risks, slower speed, lack of customization, lack of control and lack of customization.**

Newly identified gene could be clue to treatment of fungal infection in immuno-compromised patients

Key Points

- According to a **recent study, researchers have identified gene called CSA6** which **could hold the key to prevent fungal infection Candidiasis that often affects intensive-care unit (ICU) patients, cancer patients** and **patients receiving immunosuppressive therapy.**
- It's a col**laborative study between Jawaharlal Nehru Centre for Advanced Scientific Research** (JNCASR), Bangalore, India and **Institut Pasteur, Paris, France.**
- They **carried out a large-scale screen to identify regulators** of **chromosome stability in Candida albicans,** a clinically relevant fungal model system.

Findings

- **Researchers screened the effect of overexpression of more than** a **thousand genes of C. albicans on genome stability.**

- They were **successful in identifying a set of six chromosome stability (CSA) genes that are important for maintaining genome integrity.**
- While **five of the CSA genes identified in the study are known** to be **important for cell division in other species**, the **sixth CSA gene**, **named CSA6 encoded for a protein that is essential** for **viability in C. albicans.**
- They **found that Csa6 was a critical regulator of cell cycle progression wherein both overexpression and deletion of CSA6** lead to **reduced growth of C. albicans cells.**

Significance of the study

- The **study published in the journal Nature Communications represents the first-ever report of such an extensive screen** in the **human fungal pathogen C. albicans**
- It **identifies and elucidates the functions of a novel regulator** of **chromosome stability that is exclusively present in a group** of **medically relevant human fungal pathogens**.
- Besides, it **also provides a systematic scheme for identifying genes** whose **products may serve as potential therapeutic interventions for fung**al **infections by posing lesser adverse effects on humans.**
- Hence, **small molecule modulators that alter expression levels** of the **gene called CSA6 offer potential avenues for treatment** with **no side effects in humans.**

Candida Albicans?

- Candida Albicans is **a fungal species infamous for causing high rates of morbidity and mortality under certain immuno-compromised conditions such as Acquired Immune Deficiency Syndrome (AIDS) or during cancer treatment.**
- It **resides in the mucosal linings of the gastrointestinal** and **urogenital tract of healthy individuals.**
- Further, it **turns into a pathogen under immuno-compromised conditions breaching the host defense causing superficial** as well as life-**threatening systemic infection.**

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Prelims 2023

The Anang Tal Lake in South Delhi has been declared a monument of national importance through a gazette notification by the Ministry of Culture.

About the notification

- The **notification issued states** "*The central government is of the opinion that the ancient mound including Anang Tal, Tehsil Mehrauli, district South Delhi, National Capital Territory Delhi… is an ancient site and remains of national importance"*
- Now, **therefore, in exercise of the powers conferred by sub-section (1) of section 4 of the Ancient Monuments** and **Archaeological Sites and Remains Act, 1958 (24 of 1958),** the **central government hereby gives notice of its intention** to **declare the said ancient** site and **remains to be of national importance**

Sub-section (1) of section 4 of the Ancient Monuments and Archaeological Sites and Remains Act
In exercise of the powers conferred by sub-section (1) of section 4 of the Ancient Monuments and Archaeological Sites and Remains Act, 1958 the central government declared the said ancient site and remains to be of national importance.

Anang Tal Lake

- As **per the website of National Mission on Monuments** and **Antiquities**, **Anang Tal is situated "to the north of Jog Maya temple and approximately 500 metres to the northwest of Qutub** Complex", and **dates back to 1,060 AD.**
- **Tradition ascribes this tank to** a **Tomar King, Anangpal II**, the **builder of Lal Kot**.
- It is **said to have been a place of a general resort** but **now it is dried up and used for cultivation.**
- Anang Tal **has a strong Rajasthan connection as Maharaja Anangpal is known as nana (maternal grandfather) of Prithviraj Chauhan** whose fort Rai Pithora is on the list of the ASI.

Anangpal II

- Anangpal II, **popularly known as Anangpal Tomar, belonged to the Tomar dynasty.**
- He was the **founder of Dhillika Puri, which eventually became Delhi.**
- **Evidence about the early history of Delhi is inscribed on the iron pillar of Masjid Quwaatul Islam, adjacent to Qutub Minar.**
- **Multiple inscriptions and coins suggest** Anangpal To**mar was the ruler of present-day Delhi and Haryana** in **between the 8th-12th centuries.**
- He was **succeeded by his grandson Prithviraj Chauhan.**

Pacific Bluefin Tuna stock to rebound sooner than expected due to global conservation efforts

Key Point

- The **stock assessment report was presented at a recent plenary meeting** of the **International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean** (ISC).

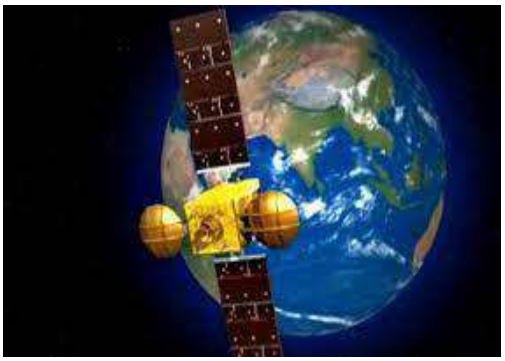
Findings

- **Concerted effort by countries like the United States, Japan, Korea, Taiwan** and **Mexico** for **decades to check overfishing has reaped results.**
- The **biomass of the Pacific Bluefin Tuna has increased** and is **second-highest in recorded history**
- The **current biomass also includes a significant young population,** which **can accelerate the process of rebound** to **levels before 1960, since when the population nosedived**
- The **bluefin biomass**, which is the **parameter used to assess** the **stock of the fish, is set to cross the second rebuilding target later** this year — **much ahead of the predicted timeline.**
- It has **already met the first target which was set for 2024.**

- The **biomass had shrunk to a sliver of its potential unfished biomass** (another major assessment metric for the species) through the late 1990s and 2000s due to overfishing.

About Pacific Bluefin Tuna (Thunnus orientalis)

- The **Pacific bluefin tuna (Thunnus orientalis) is a predatory species** of tuna **found widely in the northern Pacific Ocean**, but it is **migratory and also recorded as a visitor to the south Pacific**
- It is **mainly a pelagic species found in temperate oceans**, but it **also ranges into the tropics and more coastal regions**.
- It is **warm blooded, unlike other fishes.**
- There are **three species of bluefin: Atlantic (the largest and most endangered), Pacific, and Southern.**
- Status- **Endangered**



India's first commercial space situational awareness observatory will be set up in the Garhwal region of Uttarakhand.

Key Points

- Digantara, a **Bengaluru-headquartered space situational awareness firm** will be **setting up India's first commercial space situational observatory.**
- The **firm has signed an agreement for the same with** the **government of Uttarakhand.**
- The **observatory will be the first-of-its-kind in the region, set up to augment the start-up's SSA capabilities.**

Working

- It **will be strategically positioned to serve global space traffic management operations.**
- It **will assist in tracking any activity in space including** that **of space debris and military satellites hovering** over the **region**.

- At present, the **US is a dominant player in monitoring space debris.**
- The **observatory will help to monitor events occurring** in **deep space, especially in the geostationary, medium-Earth,** and **high-Earth orbits.**
- The **high-quality observations made will be complemented** by **observations of its partner ground-based sensor network.**
- With this data, **India would be able to reduce the potential** for **collisions between satellites** and other **spacecraft by making more accurate predictions** of their **location, speed, and trajectory.**

Significance

- The **observatory is designed with a capability to track objects as small as 10cm (in size**).
- It **would be able to reduce the potential for collisions between satellites and other spacecraft** by **making more accurate predictions of their location, speed**, and **trajectory**
- It **would improve the effectiveness of tracking** and **identifying pre-existing Resident Space Objects** (RSO).

- It **will result in the creation of a hybrid data pool** that will **serve both the commercial and the defence sectors** of the **space industry.**
- A **data gap has been witnessed due to the lack** of **dedicated SSA sensors between Australia and southern Africa**
- The **observatory will play a vital role in monitoring space** activities **above the Indian subcontinent**, relaying real-time data essential to safeguard the Indian assets.
- **Global networks of SSA sensors will be supplemented by this observatory** to **offer constant tracking of objects** over **this part of the globe.**

What is Space Situational Awareness(SSA)?

- ***Space* Situational Awareness** (SSA) refers to the **knowledge of the space environment, including location** and **function of space objects and space weather phenomena**
- It is the **European Space Agency's (ESA) initiative.**
- It is **designed to support Europe's independent space** access and **utilization through the timely and accurate information delivery regarding the space environment,** and **particularly hazards to both in orbit** and **ground infrastructure.**

- SSA is **generally understood as covering three main areas:**

✓ ***Space Surveillance and Tracking (SST) of man-made objects.***

✓ ***Space Weather (SWE) monitoring and forecast.***

✓ ***Near-Earth Objects (NEO) monitoring (only natural space objects).***

India's SSA Capability

✓ **ISRO's efforts towards SSA is coordinated by the SSA Control Centre in Bengaluru** and **managed by the Directorate of Space Situational Awareness and Management at the ISRO headquarters.**

✓ India depends on data from NORAD (North American Aerospace Defence Command) and others available in the public domain.

✓ However, these platforms don't provide accurate or comprehensive information.

✓ India uses a Multi Object Tracking Radar at Sriharikota range (Andhra Pradesh), but it has a limited range.

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Prelims 2023

The Union Minister of Commerce and Industry has released the 'Department of Commerce Restructuring Dossier'.

Department of Commerce
Ministry of Commerce and Industry
Government of India

About it

- The **Minister mentioned that Prime Minister** had **launched Mission Karmayogi with the objective of skill development** and **upgradation of employees in Govt. departments and Ministries**.
- It is **in pursuance of this restructuring of departments** of **commerce has been undertaken to meet the needs of the future.**

Aims

- The **restructuring of the entire department of commerce aims** at **preparing India to become a key global player in world trade**.
- This **will enable us to adopt international best practices** and **prepare ourselves for greater multilateral** and **bilateral engagement with other countries**

Features

- Restructuring exercise is a **mammoth endeavour focused** on **'Aatmanirbhar Bharat' and an Aatmanirbhar Commerce Department**.
- The **14 volumes of the report define the role of each section within the department** and **lays down the expected outcomes** and **key performance indicators.**
- These **manuals would enable all the relevant stakeholders** to **understand their role in the revamped department** and **help the organization perform effectively**
- The **focus on exports has been one of the most defining features** of the **government's efforts to make India a developed country by 2047**
- Under it a **dedicated Trade Promotion Body will also be set up** to **drive overall promotion strategy**

The restructuring rests on 5 major pillars:

- ***Increasing India's share in global trade***
- ***Assume leadership role in multilateral organisations***
- ***Democratisation of trade***
- ***Creating 100 Indian Brands as Global Champions***
- ***Setting up Economic Zones*** in India to strengthen the manufacturing base and attract greater investments to India.

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Prelims 2023

Africa has adopted the PEN-PLUS strategy to boost access to the diagnosis, treatment and care of severe non-communicable diseases (NCD).

What is the PEN-PLUS Strategy?

- It's a **regional strategy to address severe Non-Communicable Diseases** at **First-Level Referral Health Facilities.**
- The strategy is **aimed at bridging the access gap in treatment** and **care of patients with chronic and severe NCDs.**
- **Health ministers of African countries endorsed the strategy** at the **72nd session of the World Health Organization** (WHO) **Regional Committee for Africa in Lome, Togo** to **reduce premature mortality from NCDs.**
- It **urges countries to put in place standardised programmes** to **tackle chronic and serious non-communicable diseases** by **ensuring** that **essential medicines, technologies** and **diagnostics are available** and **accessible in district hospitals**

Non-communicable diseases

- The **term NCDs refers to a group of conditions** that are **not mainly caused by an acute infection**, result in **long-term health**

consequences and often **create a need for long-term treatment and care.**

- Is **also known as chronic diseases tend to be of long duration** and are the **result of a combination of genetic, physiological, environmental and behavioural factors.**
- These conditions **include cancers, cardiovascular disease, diabetes and chronic lung illnesses.**
- **Severe non-communicable diseases** are those **chronic conditions** that **lead to high levels of disability and death among children, adolescents and young adults** if **left undiagnosed or untreated**.

Key Facts

- **Globally**, NCDs are the **main cause of morbidity and mortality.** They **account for 71 per cent of global mortality, according to WHO.**
- In the **African Region, the proportion of mortality due to NCDs ranges from 27-88 per cent.**
- In **Africa, the most prevalent, severe non-communicable diseases** include **sickle-cell disease, type 1 and insulin-dependent type 2 diabetes, rheumatic heart disease, severe hypertension** and **moderate to severe and persistent asthma,**
- In **Africa, 24 million adults are living with diabetes**, according to IDF Diabetes Atlas, 2021.
- By **2045, the total number of people with diabetes** are projected to **increase 129 per cent to 55 million.**
- Mortality from NCDs has increased over the years in the African Region

- More **than 66 per cent of the 120 million people affected worldwide by sickle cell disease live in Africa.**
- Approximately **1,000 children are born with the disease** every day in **Africa, making it the most prevalent genetically-acquired disease in the region.**

India

- In **India, nearly 5.8 million people (WHO report, 2015) die from** NCDs (heart and lung diseases, stroke, cancer and diabetes) every year
- According to the **ASSOCHAM report, the prevalence of non-communicable diseases** (NCDs) in In**dia is 116 per 1,000 population with hypertension, digestive diseases and diabetes leading the burden.**
- There is **increase in the contribution of NCDs from 30%** of the **total disease burden- 'disability-adjusted life years'** (DALYs) in **1990 to 55% in 2016** and **also an increase in proportion of deaths due to NCDs (among all deaths) from 37% in 1990 to 61% in 2016**

A recent study described how marine life can sustain in sub-zero temperatures using their unique adaptation mechanisms.

Key highlights of the Study

- **Snailfish found on an iceberg habitat in Greenland can survive** in **icy Arctic waters** due to the **presence of 'antifreeze' proteins** in **their bloodstream.**
- Further, **scientists also discovered the most highly expressed genes were related to antifreeze proteins.**
- This **extraordinary feature, which is rare among sea organisms, allows snailfish to prevent ice crystals from accumulating** in their **cells and body fluid.**
- However, **climate change could affect its survivability**, as with **rising ocean temperature icebergs would melt at a faster rate.**
- The **increased biodiversity that warmer waters bring to higher latitudes can increase competition**, thereby **jeopardising its position in the food chain.**
- The **findings demonstrate how marine life can sustain in sub-zero temperatures using their unique adaptation mechanisms.**

Snailfish (Sea Snail/ Liparidae)

- Snailfish also **called sea snail is a species of marine fish found in the family Liparidae.**
- The Snailfish **releases biofluorescence, which allows it to glow green and red in the dark arctic waters.**
- Snailfish is the **only polar fish reported to have biofluorescence**. Biofluorescence is ***the ability of an organism to convert blue light into green, red, or yellow light.***
- It is **rarely found in Arctic fish due to prolonged periods** of **darkness in the region.**
- They have **antifreeze proteins, which allow snailfish to prevent ice crystals from accumulating in their cells and body fluid.**
- They are **found in oceans worldwid**e. But **they are strictly found** in **cold waters meaning that species of tropical and subtropical regions strictly are deepwater.**

The Union Cabinet chaired by the Prime Minister has approved the "Widening access of the Traditional Knowledge Digital Library(TKDL) database to users, besides patent offices".

Key Points

- The **approval of the Cabinet to widen the access of the database beyond patent office lays emphasis on integrating and co-opting traditional knowledge with current practices** towards **enhancing innovation and trade.**
- The **opening up of the TKDL database to users is an ambitious** and **forward-looking action by the Government of India.**
- The opening up of the TKDL is **also envisaged to inculcate thought** and **knowledge leadership through Bharatiya Gnana Parampara**, **under the New Education Policy 2020.**

Benefits

- This **will be a new dawn for Indian traditional knowledge**, as the TKDL **will drive research & development, and innovation based** on **India's valued heritage across diverse fields.**
- The TKDL **will act as an important source of TK information** for **advancing knowledge and technology frontiers**.

- The **current contents of TKDL shall facilitate wider adoption** of **Indian traditional medicines**, while also **propelling new manufacturers and innovators to gainfully build enterprises** based on our valuable knowledge heritage.

The **TKDL can cater to a vast user base that would include**

- **businesses/companies**: herbal healthcare (AYUSH, pharmaceuticals, phytopharmaceuticals, and nutraceuticals), personal care, and other FMCG,
- **research institutions**: public and private;
- **educational institutions**: educators & students; and
- Others: **ISM practitioners, knowledge holders, patentees and their legal representatives, and government**
- In **future, more information on Indian traditional knowledge** from **other domains will be added to the TKDL database** from the perspectives of the "**3P – Preservation. Protection and Promotion"**
- TKDL **database will also push creative minds to innovate** for **better, safer and more effective solutions for a healthier** and **technology endowed population**. India's rich heritage shall lay a strong foundation for newer socio-economic developments.

Continued relevance of traditional knowledge in address the current and emerging needs of the world

- Indian traditional knowledge (TK) **offers immense potential** to **serve national and global ne**eds, therewith **providing societal benefits as well as economic growth.**

- For example, the **traditional systems of medicine and wellness from our country, namely Ayurveda.**
- **Siddha, Unani, Sowa Rigpa, and Yoga are serving the needs** of **people from India and abroad even today.**
- The **recent COVID- 19 pandemic has also been witnessing** extensive **use of Indian traditional medicines** whose benefits **range from immune-boosting to symptoms-relief to anti-viral activity**.
- Earlier this year **in April, the World Health Organization** (WHO) **established its first off-shore Global Centre** for **Traditional Medicines (GCTM) in India.**

TKDL

- The Traditional Knowledge Digital Library (TKDL) is a **prior art database of Indian traditional knowledge established in 2001, jointly by the Council of Scientific and Industrial Research** (CSIR) and **Department of Indian Systems of Medicine and Homeopathy** (ISM&H, now Ministry of AYUSH).
- The TKDL is a **first of its kind globally and has been serving** as an **exemplary model to other nations**.
- The TKDL **currently contains information from existing literature related to ISM such as Ayurveda, Unani, Siddha, Sowa Rigpa and Yoga.**
- The **information is documented in a digitized format** in ***five international languages which are English, German, French, Japanese and Spanish.***

- TKDL **provides information in languages** and format **understandable by patent examiners at Patent Offices** worldwide, so as **to prevent the erroneous grant of patents**.
- Until now, **access to the complete TKDL database is restricted** to **14 Patent Offices worldwide for the purposes of search** and examination.
- This **defensive protection through TKDL has been effective** in ***safeguarding Indian traditional knowledge from misappropriation, and is considered a global benchmark.***