Monthly Magazine December 2022

GES REPORTER

Intranasal SARS-CoV-2 Vaccines
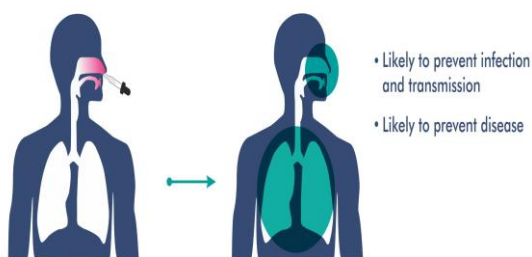
- Likely to prevent infection and transmission
- Likely to prevent disease

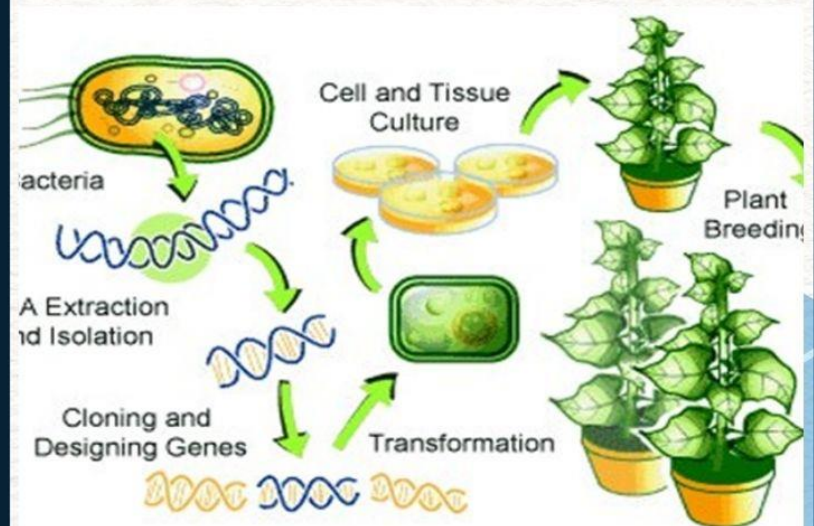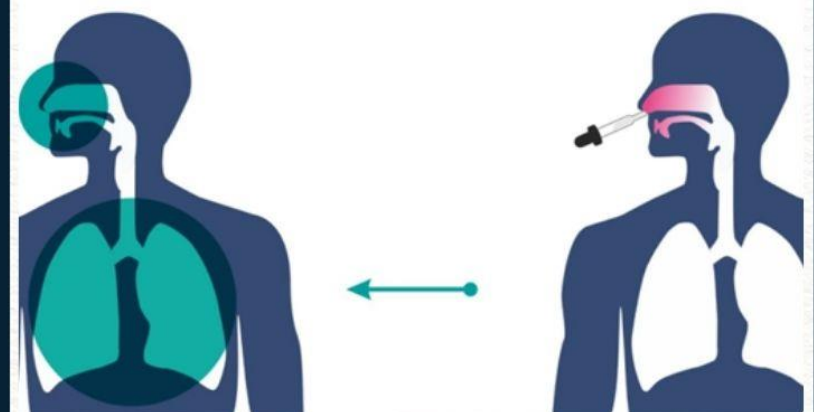| Saurabh Pandey | Mentor |
| Vishali Sharma | Editor |
| Anisha Udaiwal | Assistant Editor |

CURRENT AFFAIRS

GES REPORTER

The best magazine for Geography,
Environment and Science Current Affairs

Contents

SC on Jallikattu

● The Supreme Court said the sport of Jallikattu as such now might not be brutal but the "form" in which it was being held in Tamil Nadu might be cruel.

● A Constitution Bench led by Justice K.M. Joseph said the Prevention of Cruelty to Animals (Tamil Nadu Amendment) Act of 2017 and Prevention of Cruelty to Animals (Conduct of Jallikattu) Rules of 2017 had laid down procedures to protect the bulls from brutality.

● Violation of these rules would attract penal action

Eg Human animal conflict

An eight -member team from Chinnakkanal that comes under the Munnar forest division, which has been instrumental in bringing down the incidents of man- animal conflict in the region, has won recognition for its efforts.

● Taking note of its contributions in mitigating man animal conflicts as well as in ensuring the protection of wild elephants over the past eight months, the Wildlife Trust of India has selected the team for its award this year.

Ransomware attack in AIIMS

● On November 23, e-services at the All- India Institute of Medical Sciences (AIIMS) were crippled by what is being suspected to be a ransomware attack.

What is ransomware?

● Ransomware is a type of malicious software, used by cyber criminals, to infect a computer system by blocking access to the stored data by encrypting the files.

● A ransom is then demanded from the owner in exchange for the decryption key

Which agencies in India deal with cyber-attacks?

● Set up in 2004, the Indian Computer Emergency Response Team (CERT-In) is the national nodal agency that collects, analyses and circulates inputs on cyber-attacks; issues guidelines,

advisories for preventive measures, forecasts and issues alerts; and takes measures to handle any significant cyber security event.

● It also imparts training to computer system managers.

● The National Cyber Security Coordinator, under the National Security Council Secretariat, coordinates with different agencies at the national level on cybersecurity issues, while the National Critical Information Infrastructure Protection Centre has been set up for the protection of national critical information infrastructure.

● According to the government, the Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) has been launched for detection of malicious software programmes and to provide free tools to remove the same, while the National Cyber Coordination Centre works on creating awareness about existing and potential threats.

Women and GM Crops

The Supreme Court expressed concern about the plight of thousands of women agricultural laborers in rural areas traditionally engaged in deweeding as they would be part of the human cost if the government permitted the commercial cultivation of herbicide -tolerant crops such as GM mustard.

● "In rural areas, women are experts in removing weeds.

● They are a part of the labor force in agriculture in India.

● It brings them employment. You know it is because women started agriculture that humankind stopped being nomads and we saw the sprouting of civilizations

● Widespread use of herbicide- tolerant crops would encourage farmers to spray chemical weed

killers, leaving toxic chemical residue in large amounts on the crops.

● The Supreme Court's own Technical Expert Committee [TEC] had said that these GM crops were not meant for agriculture in the Indian context.

● They may be suitable in the western context where there are large farms, but not here.

Fortification and malnutrition

● According to an FAO Food Security Report for 2021, India ranks 101 out of 116 countries in the Global Hunger Index 2021, with a 15.3% undernourished population, the highest proportion of stunted children (30%), and wasted children (17.3%).

● The picture the Global Nutrition Report 2021 paints is cause for concern, noting that stunting among children in India is significantly higher than the Asian average of 21.8%

● Pilot projects on the distribution of fortified rice have been taken up in select States

● Experiences from the different States on the fortified rice project, so far tally with the results of global programmes that use fortified food as a cost -effective strategy.

● The health benefits accruing from food fortification have made 80 countries to frame laws for the fortification of cereal flour, and 130 countries with iodized salt, where 13 countries have mandated rice fortification

● Noon meal scheme in Gujarat In Gujarat, an eight -month long study on multiple micronutrient fortified rice intervention for schoolchildren (six-12 years) in 2018-2019, as part of the Midday Meal Scheme

● Despite the programme's proven efficacy, activists have expressed concern that excess iron overload from fortified rice has been dangerous for Jharkhand's tribal population suffering from sickle cell anaemia and thalassaemia

● Food fortification, according to stalwarts of nutrition, is a cost- effective complementary strategy to address multiple micronutrient deficiencies.

Why global layoff?

Why are layoffs becoming common?

● Alphabet CEO Sundar Pichai had warned of a coming winter in the tech sector earlier this year.

● In an all-hands meeting in September this year, one of his responses to staff queries on budget cuts was: "We don't get to choose the macroeconomic conditions always."

● With inflation soaring in most parts of the world, central banks have been scrambling since March this year to rein it in by increasing rates so as to make it more costly to borrow and consume.

● This will eventually affect economic growth and jobs. The International Monetary Fund (IMF) has cited forecasts for global GDP growth in both 2022 and 2023 as gloomy, given the pandemic and ongoing Russia- Ukraine war.

● Setting aside the 2008 crisis numbers, estimates for this calendar and the next by the IMF are the weakest since 2001.

Traffic and turtle protection

● India has 29 species of freshwater turtles (24) and tortoises (5).

● The main difference between the two is that turtles are primarily aquatic whereas tortoises are terrestrial and spend more time on land.

● More than half of the turtle species are threatened and 11 are protected under Schedule I of The Wildlife Protection Act, enjoying the same protection as tigers

● For the red-crowned roofed turtle, found only within the National Chambal Gharial Wildlife Sanctuary (NCGWS) spread across Rajasthan, Madhya Pradesh and Uttar Pradesh, threats have been mounting over the past few decades.

● The species recently made it to the list of the 25 most threatened freshwater turtles in the world, along with northern river terrapin (Batagur baska) which is left only in the Sundarbans.

● Turtles are smuggled primarily for three reasons for their meat (mainly within the country), as pets (within and outside India) and to extract their calipee.

● "There is demand for the calipee, to meet which a supply system is already in place.

● Right now, efforts by forest departments and the WCCB (Wildlife Crime Control Bureau) are keeping the illegal trade in check,"

● The WCCB, a statutory body with the mandate to prevent wildlife trafficking in the country, has carried out a pan- India crackdown on turtle smuggling.

● Two more such initiatives 'Operation Turtshield-I' (December 2019 to January 2020) and 'Operation Turtshield-II' (December 2020 to February 2021) were taken up to tackle the illegal trade of live turtles

About TRAFFIC

● TRAFFIC is an organization that was established in 1976 by WWF and IUCN as a wildlife trade monitoring network to undertake data collection, analysis, and provision of recommendations to inform decision making on wildlife trade.

● For over 40 years TRAFFIC performed that function as a leader in wildlife trade research, as a joint program of WWF and IUCN.

● TRAFFIC became an independent non-profit organization in 2017, with WWF and IUCN

sitting on its Board of Directors along with independent Board members.

● TRAFFIC is renowned globally for its expertise and influence in the wildlife trade and conservation arena, as a provider of objective and reliable information.

Road safety and environment

In 2021, India reported 4, 03,116 crashes, each of which adversely impacted the environment in various ways and in different degrees.

● Most vehicles contain toxic metals such as lead, mercury, cadmium or hexavalent chromium, which are detrimental to the environment.

● Fuel and fluid leaks are seen at crash sites.

● Severe road crashes lead to automobile wreckage, which becomes a part of unusable end of life vehicles.

● This gives rise to scrappage.

● India is estimated to have about 22.5 million end of life vehicles by 2025.

● Despite being one of the largest car and light commercial vehicle markets in the world, India's National Automobile Scrappage Policy, launched in 2021, is still in its nascent stages

● Several governments globally have reduced speed limits to prevent crashes and lower air pollution.

● Vegetation on or very close to the road stretches often falls prey to road widening initiatives

● Initiatives included guarding natural hard structures such as trees using crash barriers to prevent direct collisions, and installing retro reflective signage on the trees to make them more visible to commuters.

● Missing or inadequate signages are another leading cause of road crashes.

● Their absence results in road users being unaware of a stretch's unique features in a timely manner, which could lead to crashes.

● It is a common standard practice to use asbestos for creating these signages. As asbestos has an adverse impact on the environment

● Despite being more expensive than asbestos, one of the most sustainable and recyclable materials, Aluminum Composite Panels, are employed for signages.

Flue gas desulphurisation (FDG)

● Not a single coal -based thermal power plant in West Bengal has installed flue gas desulphurisation (FDG), a technology to eliminate sulphur compounds from exhaust emissions

● The country's first emission norms for control of sulphur dioxide, nitrogen oxide, and mercury from coal- fired power plants were notified in December 2015

● Flue-gas desulfurization (FGD) material is a product of a process typically used for reducing SO_2 emissions from the exhaust gas system of a coal-fired boiler.

How red sand dunes created?

● Red sand dune ecosystem with different land forms and features, and sporadic and scanty vegetation is located along the coastline in Visakhapatnam Region.

● In this ecosystem, 36 plant species consisting of herbs, climbers/creepers, shrubs, trees and grasses were recorded.

● The species such as Indigofera sp., Tephrosia species, Atylosia scarabaeoides, Ipomoea repens, Merremia tridentata, Aristida funiculata and Spinifex littoreus have been found to be very effective sand-fixers; they stabilize and strengthen dune land forms and control the erosion of dune sand.

● Aged trees with their well-built root network pose a great threat for dune stability.

● Human activities involving digging for sand, playing and climbing the dune structures, small vendors vending edible items to people visiting the site and littering have been found to be destabilizing and degrading the stability of dunes making them very prone to erosion by wind and rain water.

● With these activities, this natural heritage site has lost its scenic ecological beauty and glory

How Red Sand dunes are created?

●When the dry monsoon wind blows with high velocity, the red loam is churned and driven east in huge columns of red sand, till they are met by sea breeze near the coastal tract

●The fine materials with light weight are picked up, suspended in the air and carried away.

- While heavy or large grains are rolled along the ground, grains of intermediate size and weight are carried out at one time and rolled to another.

- Severe gusts of wind are capable of picking up and carrying materials for short distances and larger materials can be consistently held in the air..

- Thus, some grains are carried and dropped innumerable times in the course of the history

- These processes of erosion, transport and deposit of sediments that are caused by wind at or near the surface of the earth, are called Aeolian processes. They lead to continual sand redistribution.

- The formation of a sand dune is a most characteristic and conspicuous process.

- When the high velocity wind blowing sand above the ground meets any obstruction like a fence post, bush, shrub or any other vegetation, the force of the wind is checked and the sand is deposited on the leeward side of the obstruction.

North East and Indo Pacific region

The Northeast which comprises seven 'sisters' or States and one 'brother', Sikkim, has been witnessing transformation as it heads towards better security conditions and development

- The pernicious phenomena of smuggling, drug trafficking, transnational border crime, insurgent activity, and the influx of refugees (from Myanmar) represented serious non- traditional threats.

- China was viewed as a 'constant player' behind these nefarious activities.

- This has necessitated vigilance and strict action by the Assam Rifles and other security agencies

- Manipur needs to be promoted as the hub of medical tourism for other Indian States and neighbors such as Myanmar.

- The State's research and development facilities to leverage the region's biodiversity should be expanded.

- Accelerated development requires increased investment by Indian corporates and foreign investors as well as better management

- region's 'unity in diversity' through music, dance, drama, and cuisine.

- Clearly, expanding the reach of cultural diplomacy and people-to-people cooperation through greater educational exchanges, tourism, and trade is desirable

- Moving beyond geopolitics and geo-economics, neighbors should focus on "the geo- cultural

dimension" of the Indo-Pacific.

● Diplomats from the region agree on the importance of expanded people- related cooperation which would lead to wider acceptance of the Indo- Pacific and consolidation of the Quad.

● First, the growing significance of the Bay of Bengal region permeates the thinking of scholars.

● The concept of the Indo-Pacific seems distant, but the moment it is perceived as the outer circle of the Bay of Bengal and its littorals, it comes closer to home.

● Therefore, member -states need to invest more in the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) to enhance its effectiveness.

● Second, in implementing India's Indo- Pacific strategy, voices from Northeast and eastern India must be heard.

Dash diet

● DASH diet (Dietary Approaches to Stop Hypertension). DASH is the best recommended diet to prevent cardiovascular events.

● The DASH diet involves eating fruits, vegetables, lean meat, poultry, nuts, whole grains, and reducing the intake of saturated fats, cholesterol, and sugar.

● The WHO recommends only 5 gm of salt per day.

Human evolution

● A rare, well- preserved ancient human skull found in central China could be a million- year-old Homo erectus.

● As excavation of the fossil continues, archaeologists and palaeo anthropologists anticipate that the skull could give a fuller and a detailed picture of the diverse family tree of archaic humans

living throughout Eurasia in prehistoric times

The human lineage
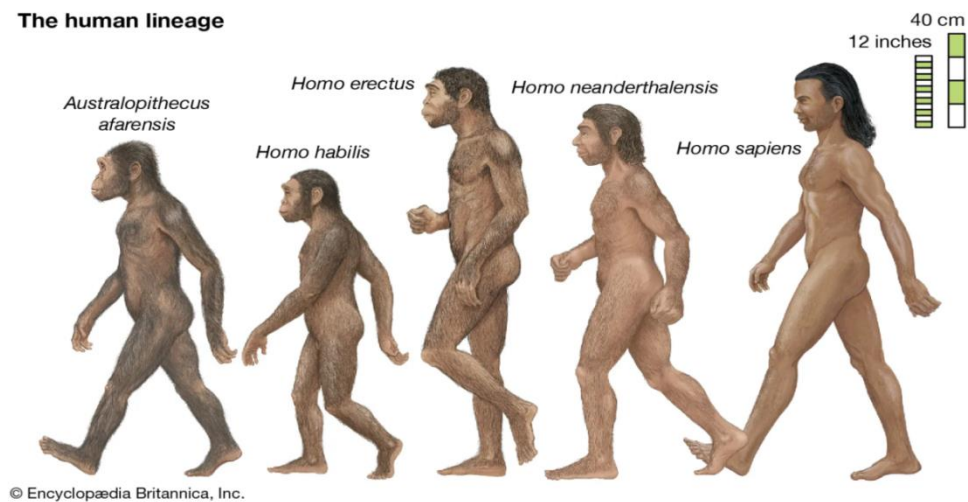
Meteorites

Researchers have identified two, possibly even three, new minerals in a huge iron- based meteorite that landed in Somalia.

- The minerals have been named elaliite, after the meteorite's location near the town of El Ali

Meteors and Meteorites

Meteor
Streak of light seen when a meteoroid heats up in the atmosphere

Comet
Icy body that releases gases as it orbits the Sun

Asteroid
Rocky body smaller than a planet that orbits the Sun

Meteoroid
Rocky or metallic fragment of an asteroid, comet, or planet

Meteorite
Meteor fragment that reaches the ground

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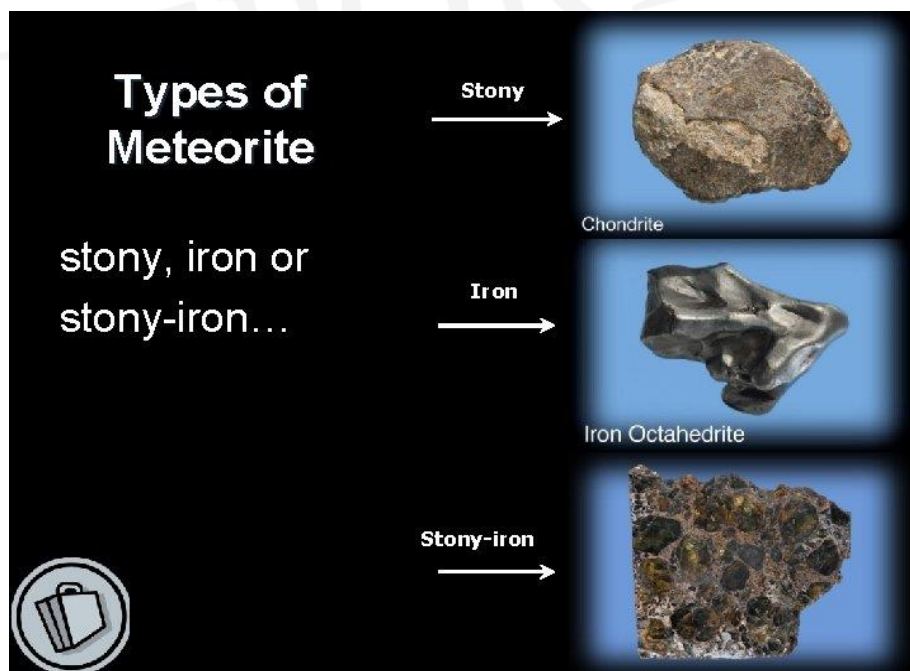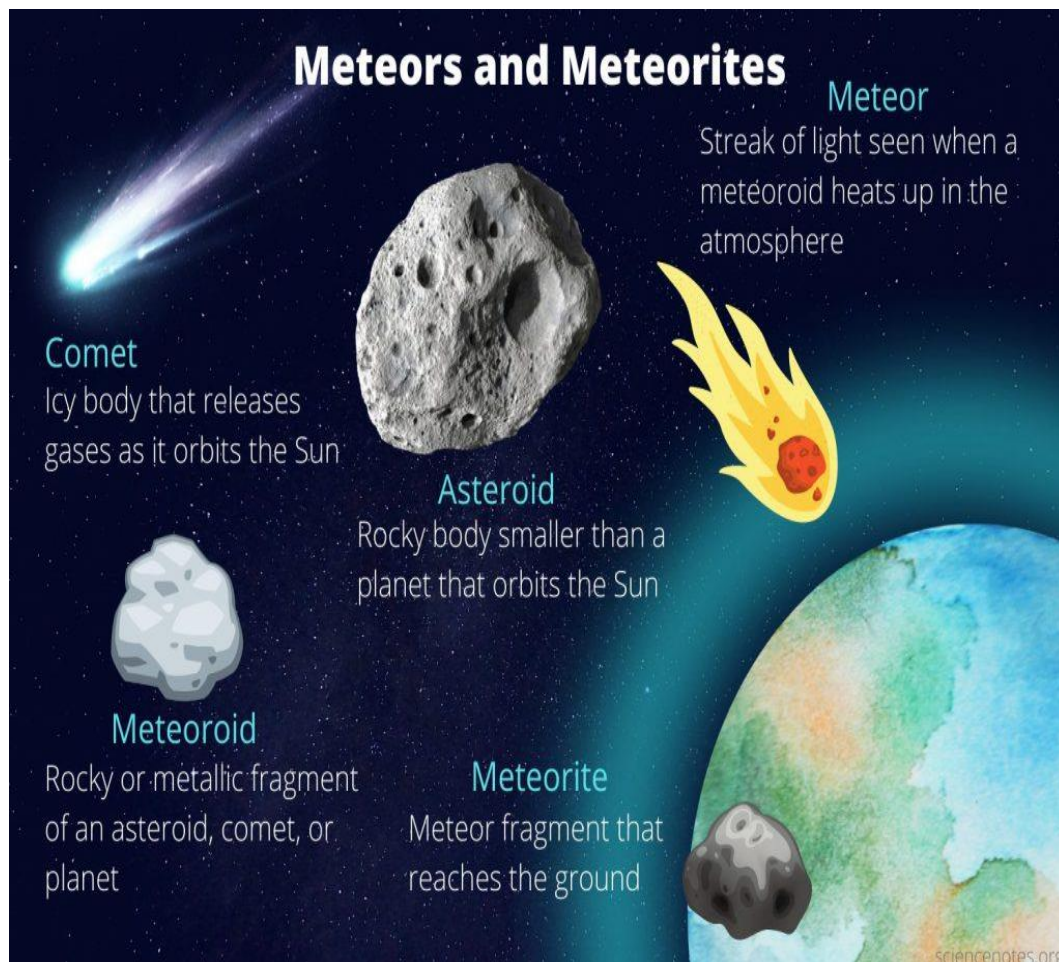
Mega Constellation

● Mega-constellations are systems utilizing hundreds to tens of thousands of satellites in Low Earth Orbit (LEO) to deliver low latency broadband data services anywhere on the plane

● Satellite 'mega constellations' such as SpaceX's Starlink Internet network, which already consists of thousands of satellites might soon face some regulation in the United States.

● A U.S. government report suggests that regulators should revisit a 1986 decision that

effectively exempts communications satellites from the U.S. National Environmental Policy Act.

● Mega Constellations can disrupt the radio frequencies used for astronomical observation and intensify congestion in orbit.

Nanofibrous sheet and blood shelf life

● Blood bag technology to enhance the quality and shelf life of stored blood.

● Despite inadequate blood donation, millions of blood units are discarded due to decline in quality during storage. Stored blood has a finite shelf life.

● Typically, stored cells produce various extracellular components known as damage-associated molecular patterns (DAMPs), which damage the blood cells during storage.

● Typical extracellular components being generated are free- iron and free- hemoglobin, bioactive lipids such as poly unsaturated fatty acids, extracellular DNA, nucleosomes, and proteins.

● During the storage, these components interact and damage red blood cells (RBCs).

● Capturing these DAMPs components without causing damage to the stored blood cells is highly challenging.

● Therefore, we have custom -designed nanofibrous sheets that can capture such damage-causing components and protect RBCs

● nanofibrous sheets made with cationic and anionic polymers will help scavenge damage-causing agents through ionic interactions.

● These nanofibrous sheets can be made into blood bags.

● DAMPs are produced when cells get destroyed and the DAMP components, in turn, damage the membrane of RBCs and reduce the membrane integrity

● Intermittent capturing of DAMPs on day 21 or 28 after collection using the novel blood bags helped protect RBCs from losing their membrane integrity, and enhanced the transfusion efficiency

● A blood transfusion is a routine medical procedure in which donated blood is provided to you through a narrow tube placed within a vein in your arm.

Rhino population

What is the rhino population?

- The population of the one horned rhino was about a dozen when Kaziranga became a protected area in 1905.

- According to the State of Rhino Report 2022, the poor -sighted herbivore's number in Kaziranga is an estimated 2,613, more than 65% of its total population of 4,014 across 11 habitats in India and Nepal.

How have anti-poaching measures helped?

- The strengthening of the anti poaching mechanism in India and Nepal with more manpower, capacity -building of frontline staff and equipping forest guards with better fighting gears have helped protect the rhino.
- The sentiments of local people attached to the rhino have also been a factor in the sharp drop in the number of rhinos killed
- The threat from poachers cannot be wished away because of the illegal wildlife trade in next-door Myanmar and beyond in Southeast Asia

Are elephants endangered?

- India is home to nearly 60% Asian elephants and the last count of the species in 2017 had put the number at 29,964.
- While the number of elephants in India has increased in the past few years, the species is listed as 'Endangered' on the IUCN Red List of threatened species and Schedule I of The Wildlife Protection Act.

What are the challenges?

- The largest land -dwelling mammal is under continuous threat of poaching and conflict with humans.
- The elephant population is not evenly distributed in the country.
- The south Indian States of Karnataka, Kerala, Andhra Pradesh, and Tamil Nadu are home to nearly 44% of India's elephant population.
- Fragmentation of elephant habitats and construction of linear (railways and roads) and power infrastructure have led to many elephant deaths.

- The change of land use, particularly bringing erstwhile forested areas under agriculture, has aggravated the conflict.
- The Ministry of Environment, Forest and Climate Change launched Project Elephant in 1992 to ensure the long -term survival of elephants in their natural habitats.
- The number of elephant reserves in India is 32 with the latest addition being the Agasthyamalai Elephant Reserve in 2022.
- Elephant corridors, linear narrow habitat linkages which allow elephants to move between secure habitats are crucial for conservation.

Cheetah protection

The story so far:

- This year marked the arrival of Namibian cheetahs to India, the first intercontinental transfer of wild cats into the country since independence.
- Eight cheetahs were flown into the Kuno National Park (KNP), Madhya Pradesh, from Namibia

Why should cheetahs be outside of Africa?

- Cheetahs were once widespread in India as well as in many parts of the world until they were hunted to extinction.
- Only around 8,000 of them survive, and overwhelmingly in Namibia and South Africa.
- A different species, called the Asiatic cheetah, once abundant in India, is found in Iran.
- As part of improving their odds of long-term survival, young animals are being reared as part of conservation efforts in Namibia and then sent to different parts of the world, including India.
- While it is still early days for the cheetah, experts have raised concerns that the KNP has limited space for the cheetah to co-exist with other predators such as tigers and lions, for which the KNP was originally prepared.

What is the tiger population in India?

- Every four years, India carries out a census of the tiger population across India.
- The latest estimate put the tiger population at 2,967.
- Tigers were reportedly increasing at a rate of about 6% per annum and the area that they

occupied was roughly stable, at about 89,000 square km since 2014.

How did the numbers increase?

● The consistent implementation of Project Tiger since 1973, whereby dedicated tiger reserves were established in India, as well as anti poaching measures have played a significant role in tiger conservation.

●India has 53 tiger reserves with the latest being added early this year

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GIBs conservation

What is endangering the birds?

● Hearing petitions highlighting deaths of the GIBs due to power transmission lines, a special bench of the apex court led by Chief Justice D.Y. Chandrachud directed Chief Secretaries of Gujarat and Rajasthan to undertake and complete a comprehensive exercise within four weeks to find out the total length of transmission lines in question and the number of bird diverters required

● in April 2021, the Supreme Court had directed the authorities to convert the overhead cables into underground power lines, (where feasible) within a period of one year and that till such time diverters would have to be hung from existing power lines

● The GIBs are not great fliers and have wide sideways vision to maximise predator detection but the species' frontal vision is narrow.

● These birds cannot detect power lines from far and since they are heavy fliers, they fail to manoeuvre across power lines within close distances.

What steps have been taken?

●Listed in Schedule I of the Indian Wildlife (Protection) Act, 1972, in Appendix I of CITES, as Critically Endangered on the IUCN Red List, the GIBs enjoy the highest protection both in India and globally.

●The earliest estimates show the population was about 1,260 in 1969, but has declined by 75% in the last 30 years

Are there other threats to the GIB?

- According to scientists, the GIBs are slow breeders and they build their nests on the ground.
- The species have also been subjected to hunting and egg collection in the past. There also has been a decline in prevailing habitat loss as dry grasslands have been diverted for other use.
- Experts also warn of pesticide contamination and increase of populations of free- ranging dogs and pigs along with native predators, putting pressure on nests and chicks.
- While most of the population of the species is confined to the Jaisalmer Desert National Park (DNP), wildlife enthusiasts believe that more areas outside the protected area must be made suitable for the species.

Drone and health

- The Meghalaya government decided to capitalize on the liberalized Drone Rules, 2021, announced by the Civil Aviation Ministry to usher in a new era of transportation.
- We focused on the public health logistics because of the difficult terrain and the challenging road network in our State.

Soil nutrients and food security

- Healthy soils are essential for our survival.
- They support healthy plant growth to enhance both our nutrition and water percolation to maintain groundwater levels.
- Soils help to regulate the planet's climate by storing carbon and are the second largest carbon sink after the oceans.
- They help maintain a landscape that is more resilient to the impacts of droughts and floods.
- As soil is basis of food systems, it is no surprise that soil health is critical for healthy food production.
- World Soil Day (WSD) 2022, annually observed on December 5, aligns with this. WSD 2022, with its guiding theme, 'Soils: Where food begins', is a means to raise awareness on the importance of maintaining healthy soils, ecosystems and human well -being by addressing the growing challenges in soil management, encouraging societies to improve soil health, and advocating the

sustainable management of soil

● . The main drivers contributing to soil degradation are industrial activities, mining, waste treatment, agriculture, fossil fuel extraction and processing and transport emissions.

● The reasons behind soil nutrient loss range from soil erosion, runoff, leaching and the burning of crop residues.

● Soil degradation in some form or another affects around 29% of India's total land area.

● This in turn threatens agricultural productivity, in- situ biodiversity conservation, water quality and the socio-economic well-being of land dependent communities.

● Nearly 3.7 million hectares suffer from nutrient loss in soil (depletion of soil organic matter, or SOM).

● Further, excessive use of fertilizers and pesticides, and irrigation with contaminated wastewater are also polluting soils.

● Impacts of soil degradation are far reaching and can have irreparable consequences on human and ecosystem health

India's conservation strategy

● The Government of India is implementing a five- pronged strategy for soil conservation.

●This includes making soil chemical- free, saving soil biodiversity, enhancing SOM, maintaining soil moisture, mitigating soil degradation and preventing soil erosion. Earlier, farmers lacked information relating to soil type, soil deficiency and soil moisture content.

● To address these issues, the Government of India launched the Soil Health Card (SHC) scheme in 2015.

● The SHC is used to assess the current status of soil health, and when used over time, to determine changes in soil health.

● Other pertinent initiatives include the Pradhan Mantri Krishi Sinchayee Yojana, to prevent soil erosion, regeneration of natural vegetation, rainwater harvesting and recharging of the groundwater table.

● In addition, the National Mission for Sustainable Agriculture (NMSA) has schemes promoting traditional indigenous practices such as organic farming and natural farming, thereby reducing dependency on chemicals and other agri -inputs, and decreasing the monetary burden on smallholder farmers

● FAO is collaborating with the National Rainfed Area Authority and Ministry of Agriculture and Farmers' Welfare (MoA&FW) to develop forecasting tools using data analytics that will aid vulnerable farmers in making informed decisions on crop choices, particularly in rainfed areas.

Working with target States

●The FAO, in association with the Ministry of Rural Development, supports the Deen Dayal Antyodaya Yojana-National Rural Livelihoods Mission's (DAY-NRLM) Community Resource Persons to increase their capacities towards supporting on-farm livelihoods for the adoption of sustainable and resilient practices, organic certification and agri- nutri-gardens

● There is a need to strengthen communication channels between academia, policymakers and society for the identification, management and restoration of degraded soils, as well as in the adoption of anticipatory measures.

● These will facilitate the dissemination of timely and evidence- based information to all relevant stakeholders.

● Greater cooperation and partnerships are central to ensure the availability of knowledge, sharing of successful practices, and universal access to clean and sustainable technologies, leaving no one behind.

China -Indian Ocean Region Forum

On November 21, China's top development aid agency convened the first "China -Indian Ocean Region Forum" in the southwestern Chinese city of Kunming.

● The meet organized by the China International Development Cooperation Agency (CIDCA) is the latest Chinese initiative focusing on the Indian Ocean Region (IOR), underlining Beijing's growing strategic interests in a region where its economic footprint has been deepening

What is the China Indian Ocean Region forum about?

●The CIDCA, which is China's new development aid agency, currently headed by former Vice Foreign Minister Luo Zhaohui, said in a statement the forum was "the first high-level official development cooperation forum jointly held by China and countries in the Indian Ocean Region"

● China "proposed to establish a marine disaster prevention and mitigation cooperation mechanism between China and countries in the Indian Ocean region"

● and "all parties agreed" to "strengthen policy coordination, deepen development cooperation,

increase resilience to shocks and disasters,

● and enhance relevant countries' capacity to obtain economic benefits through use of marine resources such as fisheries, renewable energy, tourism, and shipping in a sustainable way."

Which countries have backed the forum?

● The organizers have said the forum was attended by "high -level representatives" and "senior officials" from 19 countries: Indonesia, Pakistan, Myanmar, Sri Lanka, Bangladesh, Maldives, Nepal, Afghanistan, Iran, Oman, South Africa, Kenya, Mozambique, Tanzania, Seychelles, Madagascar, Mauritius, Djibouti, and Australia

Where does India stand?

● Xu Wei, spokesperson for CIDCA, said India as "a major country in the Indian Ocean region, was invited to this forum" and added that China "looks forward to meeting India at the next forum".

● That prospect appears unlikely.

● New Delhi has viewed China's recent moves in the region warily, including the recent visit of a Chinese military tracking vessel, the Yuan Wang 5, to Sri Lanka.

● Moreover, India sees the IORA as an already established platform for the region, which has 23 members, including Australia and Maldives with 10 dialogue partners which include China, Japan, Russia, the U.K. and the U.S.

What are China's plans for the IOR?

● The forum has underlined China's stepped-up interest in the IOR, where it is already a major trading partner for most countries and where lies sea routes vital to China's economic interests.

● The CIDCA forum is the latest initiative to reflect Beijing's view that it has a clear stake in the region, and that more such initiatives are likely.

● Earlier this year, China's Foreign Minister Wang Yi, during a visit to Sri Lanka, proposed creating a forum "on the development of Indian Ocean island countries" to "build consensus and synergy, and promote common development".

● He called on Sri Lanka to "play an important role" in this initiative.

● The stepped- up regional diplomacy comes while China is establishing a more frequent military presence in the waters of the IOR.

● Beijing's first ever overseas military facility was set up in Djibouti near the Horn of Africa.

● Chinese military ships, tracking vessels, and submarines have been visiting ports in the region

with greater frequency.

SpaceTech Innovation Network (SpIN)

The Indian Space Research Organization (ISRO) has signed an MoU with Social Alpha, a multistage innovation curation and venture development platform for science and technology start-ups, to launch SpaceTech Innovation Network (SpIN).

● SpIN is India's first dedicated platform for innovation, curation, and venture development for the burgeoning space entrepreneurial ecosystem.

● novel partnership is a significant step forward in providing further stimulus to India's recent space reform policies and will work towards identifying and unleashing the market potential of the most promising space tech innovators and entrepreneurs in India,

● SpIN will primarily focus on facilitating space tech entrepreneurs in three distinct innovation categories: Geospatial Technologies and Downstream Applications; Enabling Technologies for Space & Mobility; and Aerospace Materials, Sensors, and Avionics.

● "Innovative technologies are expected to bring a paradigm shift in utilizing the space applications to maximise the economic, social, and environmental benefits for the larger society.

Kaundinya Wildlife Sanctuary

The story so far:

● The State of Punjab has furthered the cause of right to life and personal liberty of prisoners by allowing conjugal visits for inmates.

● It is expected that this initiative will lead to strengthening of matrimonial bonds and also ensure good conduct of prisoners.

What are conjugal rights?

●Broadly speaking, conjugal rights are rights created by marriage, that is, the right of the husband

or the wife to the company of their spouse.

- ●In the context of prisons, however, conjugal visits refer to the concept of allowing a prisoner to spend some time in privacy with his spouse within the precincts of a jail

- ● Prisoner rights are internationally recognised through the United Nations Standard Minimum Rules for the Treatment of Prisoners, the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights etc.

- ● Through such instruments, prisoners are guaranteed the right to life and inherent dignity.

- ● The right to maintain family relations including conjugal visits are included in these treaties.

What are the judicial views?

- ● In the case of Sunil Batra vs Delhi Administration (1979, SC), Justice Iyer observed that "visits to prisoners by family and friends are solace in isolation: and only a dehumanised system can derive vicarious delight in depriving prison inmates of this humane amenity."

- ● The High Court held that this right to conjugality is available to prisoners under Article 21, subject to restrictions.

- ● However, in the case of Meharaj vs State (2022), the Madras HC while considering the question of whether conjugal rights form part of the right to life and personal liberty guaranteed by Article 21, observed that there have to be differential standards in enforcement of Article 21 for law abiders and law violators.

- ● The Court observed that even though conjugal visits could not be held as a fundamental right, the prisoner would still be eligible to avail leave for conjugal visits if there are 'extraordinary reasons' such as 'infertility treatments.

Wild Life (Protection) Amendment Bill

- ● Wild Life (Protection) Amendment Bill which seeks better management of protected areas and also provides for certain permitted activities like grazing or movement of livestock and bona fide use of drinking and household water by local communities.

- ● The Bill, which had undergone scrutiny of a parliamentary panel, seeks to conserve and protect wildlife through better management of protected areas and rationalize schedules which list out species under the Wildlife (Protection) Act, 1972

- ● The Wild Life (Protection) Act, 1972, was enacted to provide for the protection of wild animals, birds and plants with a view to ensure the ecological and environmental security of the

country.

● The bill also seeks to include the aspects of "conservation" and "management" of wildlife which are covered by the Act and make amendments for better management of protected areas.

● It proposes to rationalize and amend the schedules, which list out wildlife species, for the purposes of clarity, and ensure better care of seized live animals and disposal of seized wildlife parts and products.

● The bill further seeks to enable control of invasive alien species and allow for transfer or transport of live elephants by person having ownership certificates in accordance with conditions prescribed by the central government.

● It also proposes to insert a new Chapter VB in the principal Act for regulation of international trade in endangered species of wild fauna and flora and allow state boards for wildlife to constitute standing committees.

● India is a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which requires that appropriate measures are taken to enforce the provisions of the convention.

Dhara Mustard Hybrid -11 (DMH-11)

● Field trials of the transgenic mustard variety, Dhara Mustard Hybrid -11 (DMH-11), revealed them to be higher yielding and they did not deter the pollination habits of honeybees,

● The DMH-11 had recently been approved by the Genetic Engineering Appraisal Committee (GEAC) for cultivation in farmer fields, as a precursor to commercial cultivation.

● The GEAC is an autonomous body of experts authorized by the Environment Ministry to appraise the safety of genetically modified seeds.

● The only other transgenic seed permitted to be commercially cultivated in India is BT cotton.

● "Extensive studies carried out on toxicity, allergenicity, compositional analysis, field trials and environmental safety studies of GM mustard lines vs their non-transgenic comparators have provided evidence that they are safe for cultivation and for food and feed use.

● Visitation of bees to the transgenic lines is similar to the non-transgenic counterparts as per the data recorded during the trials.

Three medicinal plant

Three medicinal plant species found in the Himalayas have made it to IUCN Red List of Threatened Species following a recent assessment.

● Meizotropis pellita has been assessed as 'critically endangered', Fritilloria cirrhosa as 'vulnerable', and Dactylorhiza hatagirea as 'endangered'.

● Meizotropis pellita, commonly known as Patwa, is a perennial shrub with restricted distribution that is endemic to Uttarakhand.

● "The species is listed as 'critically endangered' based on its limited area of occupancy (less than 10 sq. km)

● "The essential oil extracted from the leaves possesses strong antioxidants and can be a promising natural substitute for synthetic antioxidants in pharmaceutical industries

● Fritillaria cirrhosa (Himalayan fritillary) is a perennial bulbous herb.

● "It is reasonable to conclude a decline of at least 30% of its population over the assessment period (22 to 26 years).

● Considering the rate of decline, long generation length, poor germination potential, high trade value, extensive harvesting pressure and illegal trade, the species is listed as 'vulnerable,'"

● In China, the species is used for the treatment of bronchial disorders and pneumonia.

● The plant is also a strong cough suppressant, the IUCN

● The third listed species, Dactylorhiza hatagirea (Salampanja), is threatened by habitat loss, livestock grazing, deforestation, and climate change.

● It is extensively used in Ayurveda, Siddha, Unani and other alternative systems of medicine to cure dysentery, gastritis, chronic fever, cough and stomach aches.

Trisonic wind tunnel

● The Trisonic Wind Tunnel is a system to aid aerodynamic design of rockets and re-entry spacecrafts by characterizing a scaled model by evaluating forces, moments, load distribution, unsteady pressures, acoustic levels etc.

● The tunnel has an overall length of about 160m and has a maximum cross section of 5.4m.

- The tunnel can be used for testing various space vehicles in three flight regimes - below the speed of sound, at the speed of sound and above the speed of sound: hence the name trisonic wind tunnel.

- The tunnel can simulate flight conditions from 0.2 times the speed of sound (68 m/s) to 4 times the speed of sound (1360 m/s).

- The new trisonic wind tunnel at the Vikram Sarabhai Space Centre (VSSC) was inaugurated

- For the country as a whole, it is a big step towards self -reliance in the aerospace sector,

- . Wind tunnels are devices used to study the effects of air flows on solid object

- In a 'blow down test', stored gases are released and blown through the tunnel's test section, simulating flight conditions.
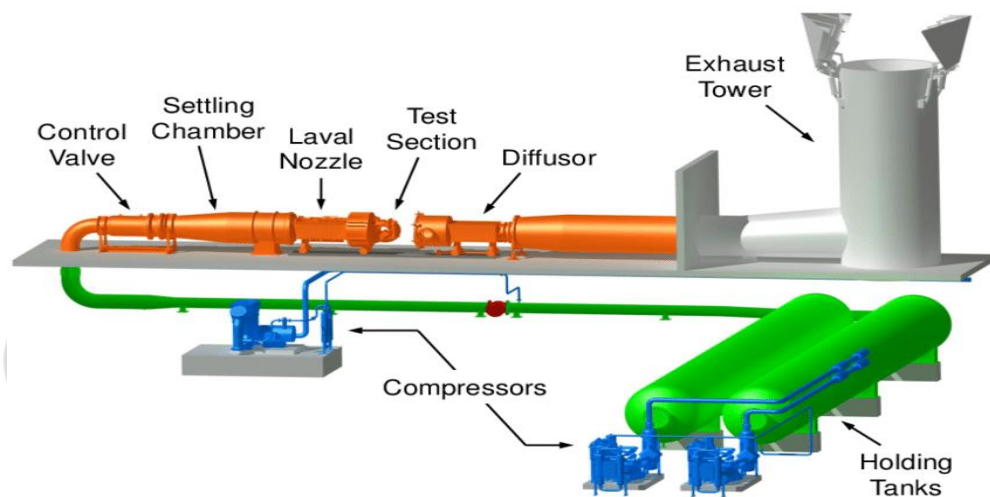
Scramjet engine- Hot test v/s cold test

- The main difference is that a rocket carries its own supply of oxygen (Oxidizer Tank) for combustion while a jet engine utilizes oxygen from the atmosphere for combustion.

- This makes rocket engine less energy efficient when compared to Jet engines

Jet Engine

- A jet engine is a machine that converts energy-rich, liquid fuel into a powerful pushing force called thrust.

- The thrust from one or more engines pushes a plane forward, forcing air past its scientifically shaped wings to create an upward force called lift that powers it into the sky.

A Jet Engine has 3 main processes:

It

(a) **Turbojet**

It

(b) **Ramjet**

It

(c) **Scramjet**

Compression | Combustion | Expansion
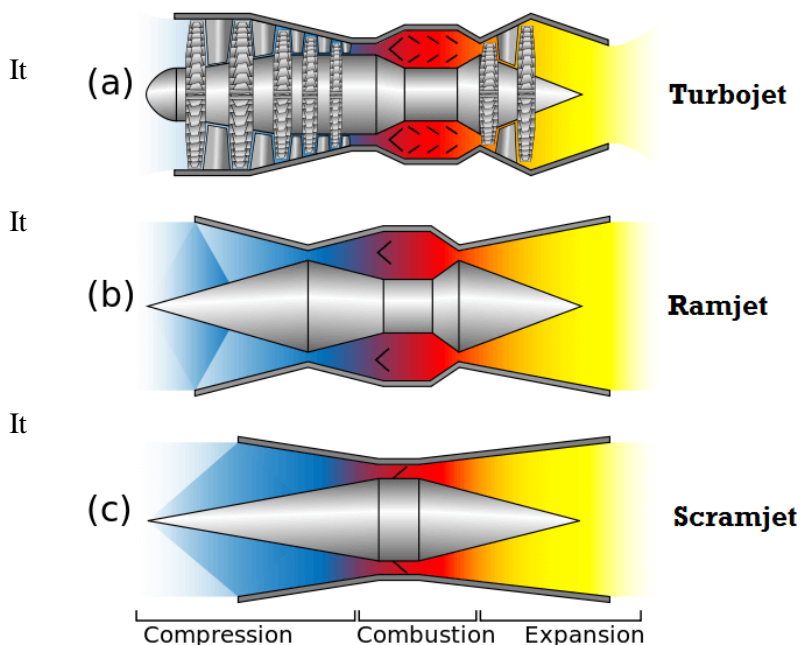
1. COMPRESSION

increases the pressure of the air trapped inside the chamber.

2. COMBUSTION

increases the temperature of the air-fuel mixture by releasing heat energy from the fuel.

3. EXHAUST

increases the velocity of the exhaust gases, thereby powering the vehicle.

TURBO JET

● Turbo jet engine is an air-breathing jet engine. This is one of the most common types of jet engines. It is still widely used in airplanes.

TURBOFAN ENGINES

● Turbofans differ from the turbojets in the way they have an additional component – a fan. The fan sucks in the air and then further gets compressed and combustion takes place in the burner.

RAMJET

●High-speed forward motion is used to compress the air (no compressor).

●Fuel is injected into the combustion chamber where it mixes with the hot compressed air and ignites.

●The average speed of Ramjet is 3-6 Mach. But the ramjet efficiency starts to drop when the vehicle reaches hypersonic speeds.

SCRAMJET

●Here also, the high-speed forward motion is used to compress the air (nocompressor), but it is an improvement over the ramjet engine as it efficiently operates at hypersonic speeds and allows supersonic combustion.

●Speed is greater than 6 Mach (Six times the speed of Sound).

● A hot test system is a 100% production test used to check all the engine operating parameters as they would function real-time in an actual vehicle

● Whereas a cold test consists of a leak test, which includes the testing of all cavities and systems that must not leak, such as oil, water, fuel and air.

Singapore declaration -ILO

● The 17th Asia and the Pacific Regional Meeting of the International Labor Organization (APRM of ILO) set ten-point priorities of national action for the member countries to deal with the issue of dwindling wages of workers, inflation and unemployment.

● The "Singapore Declaration", which was adopted, agreed that social dialogue was essential to address labor market challenges and finding solutions in crisis situations.

● It urged the governments to ensure labor protection for all through the promotion of freedom of association and the effective recognition of the right to collective bargaining throughout the regions, including for workers in vulnerable situations and workers in the informal economy, as enabling rights for decent work.

● It called for closing gender gaps in the world of work through measures that increase women's labor force participation, promote equal pay for work of equal value, balance work and responsibilities, and promoting women's leadership.

● The declaration also urged the governments to strengthen governance frameworks and respect for freedom of association to protect the rights of migrant workers.

Cyclone mandous

● The cyclonic storm will cross north Tamil Nadu, Puducherry, and adjoining south Andhra Pradesh coasts between Puducherry and Sriharikota

About Bay of Bengal Region

- This region of the world has two distinct tropical cyclone seasons - April to June and October to November.
- The conditions will become favourable for advance of south-west monsoon over south Bay of Bengal, Andaman Sea and Andaman and Nicobar Islands around May 16.
- During the monsoon season upper level winds are not favorable for tropical cyclone development.
- BoB water is warmer than Arabian sea water
  - Landlocked- less heat circulation
  - less powerful winds- again lesser heat circulation

- fresh water from rivers fall into BoB, (as suggested in and above) making the water as a light thin layer, more prone to evaporation

- Easterly jet - causing the windfall in eastern coastal States of India. And in Arabian sea these winds will steer the windfall towards eastern Africa , not towards western coast of India

- On an average, five to six significant cyclonic storms emerge in the Bay of Bengal region every year.

- The months of April and May just before the start of the monsoon, and then October to December immediately after the end of the monsoon, are the prime seasons for tropical cyclones.

- A big difference between the strengths of cyclones in April-May and October-December is that the former originate in situ in the Bay of Bengal itself, barely a few hundred kilometers from the landmass.

- On the other hand, cyclones in October-December are usually remnants of cyclonic systems that emerge in the Pacific Ocean, but manage to come to the Bay of Bengal, considerably weakened after crossing the southeast Asian landmass near the South China Sea.
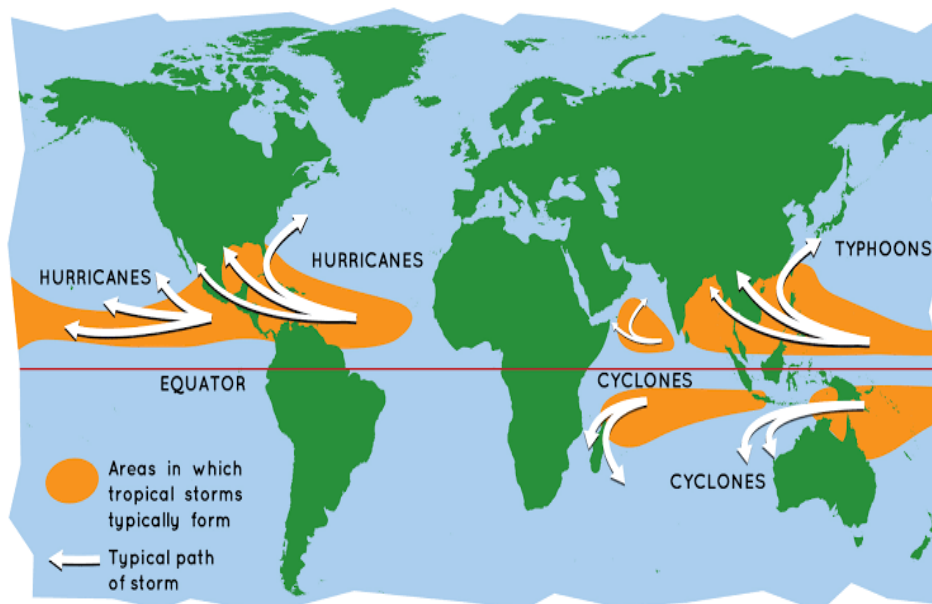
- Cyclones are named as per guidelines decided by the World Meteorological Organization (WMO). The WMO says that countries in the affected region should name the cyclones.

- In the north Indian Ocean region, eight countries decide the names of cyclonic storms. These countries include India, Bangladesh, Maldives, Myanmar, Oman, Pakistan, Sri Lanka and Thailand.

- 'Mandous' was a name submitted by WMO member United Arab Emirates and is pronounced as 'Man-Dous.

Nikshay mitra

The President has launched the 'Pradhan Mantri TB Mukt Bharat Abhiyan'and announced the Nikshay 2.0 portal to eliminate TB by 2025.

About Ni-kshay Mitras initiative

- The initiative ensures three-pronged support includes: Nutritional, Additional diagnostic, and Vocational support.
- The programme was brought in to fill the critical ``community'' elements into India's fight towards the Pradhan Mantri TB Mukt Bharat Abhiyaan aimed at eliminating TB by 2025.

- The NIKSHA 2.0 portal provides additional patient support to TB patients to take advantage of Corporate Social Responsibility (CSR) opportunities to improve treatment outcomes, enhance community participation and fulfill India's commitment to TB eradication.

- Ni-kshay Mitra (Donor) for this programme includes co-operative societies, corporates, elected representatives, individuals, institutions, non-governmental organizations, political parties and partners who can support by adopting the health facilities (for individual donor), blocks/urban wards/districts/States for accelerating the response against TB to complement the government efforts.

- The support provided to the patient under this initiative is in addition to the free diagnostics, free drugs and Ni-kshay Poshan Yojana provided by the National TB Elimination Programme (NTEP) to all the TB patients notified from both the public and the private sector.

G20 Logo - Hornbill

The logo for India's upcoming G20 presidency was officially unveiled recently at the Hornbill festival in Nagaland.

- This popular festival showcases the art, culture and cuisine of Nagaland.

- It also brings attention to a family of some of the largest, most magnificent birds in our country.

- The Great Hornbill is found in the Himalayan foothills, the Northeast and the Western Ghats.

- It is the state bird of Arunachal Pradesh and Kerala.

- With a wingspan of five feet, it presents an awesome (and noisy) spectacle while landing on a perch.

- The wreathed hornbill, the brown hornbill and the rufousnecked hornbill are slightly smaller, and only found in Northeast India.

- A great place to spot the oriental pied hornbill is the Rajaji National Park, Uttarakhand.

- The Malabar grey hornbill's loud 'laugh' echoes in the Western Ghats.

- The smallest of the group, the Indian grey hornbill is found all over (except the Thar Desert), and is often spotted in urban settings such as Theosophical Society gardens in Chennai

- Tall trees preferred Hornbills prefer tall trees for their nests (breast height being 1.5 meters or more).

- There is a mutualism between these birds and the trees where they nest.

- As large fruit eating birds, hornbills play a vital role in dispersing the seeds of about 80 rainforest trees.

- Some trees, such as the cupcalyx white cedar suffer a 90% decline in seed dispersal beyond the parent tree when hornbill populations decline, negatively impacting the biodiversity of forests.

- Tall trees are the first targets of illegal logging, and so there has been a slow decline in hornbill numbers, as reflected in bird counts.

CrCoNi

- CrCoNi is a subset of a class of metals called high entropy alloys (HEAs).

- All the alloys in use today contain a high proportion of one element with lower amounts of additional elements added, but HEAs are made of an equal mix of each constituent element.

- These balanced atomic recipes bestow some of these materials with an extraordinarily high combination of strength and ductility when stressed, which together make up what is termed "toughness".

- The toughness of this material near liquid helium temperatures (20 kelvin, -424 Fahrenheit) is as high as 500 megapascals square root meters.

- The metal exceptionally strong and ductile which, in materials science, means highly malleable and impressively strong; its strength and ductility improves as it gets colder.

Americium -241 batteries

- Scientists are developing batteries containing americium-241, a radioactive isotope that can be extracted from power plants' spent fuel.

- Americium -241, a by-product of plutonium decay, has never been used as a fuel.

- The project is funded by the European Space Agency (ESA), which hopes to wean itself off plutonium- powered equipment sourced from international partners.

- Nuclear waste could power space missions to the far reaches of the Solar System places that are too dark for solar panel.

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a DNA

- Two- million- year- old DNA sequences the oldest ever obtained recovered from a 100 -metre -thick deposit of frozen mud and sand in the Northeastern tip of Greenland, shattering the record for ancient- DNA preservation.

- Suggest that the region was once home to mastodons and reindeer that roamed a forested ecosystem unlike any now found on Earth.

- Reindeers were also unheard of in Greenland.

Lecanemab

Normal | Alzheimer's disease | Healthy Brain | Severe Alzheimer's
A — Neuron
B — Neurofibrillary tangles, Amyloid plaques
C
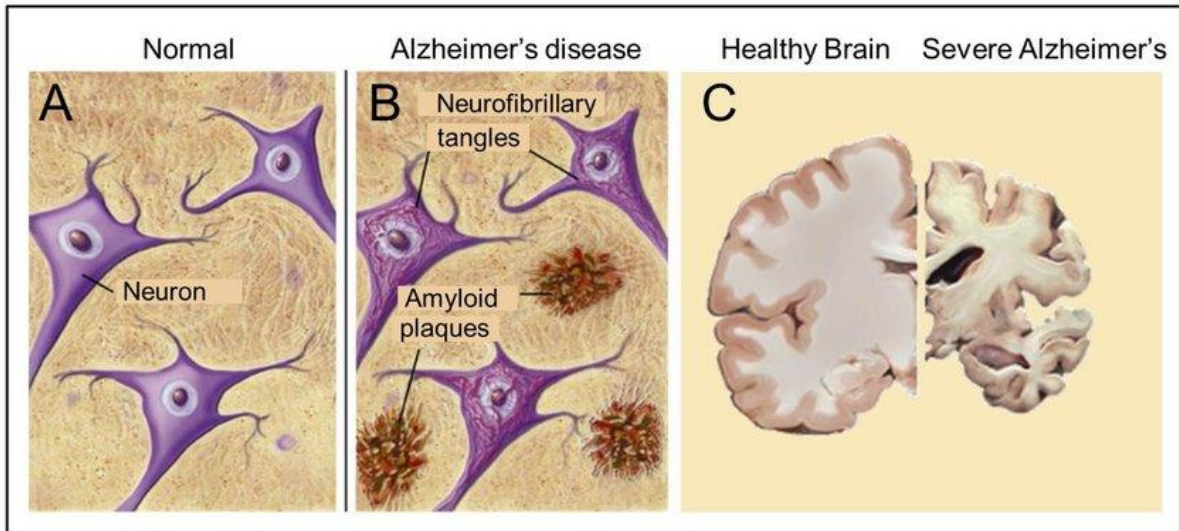
● The drug, lecanemab, jointly developed by pharma companies Biogen and Eisai, was tested on patients with early Alzheimer's.

● Results of the study published in the New England Journal of Medicine (NEJM) showed modest effects in arresting decline of cognitive and functional aspects in patients with early disease.

What is lecanemab?

● Lecanemab belongs to a class of drugs called monoclonal antibodies.

● These antibody -mediated drugs target beta amyloid, the protein deposition that is seen in patients with Alzheimer's disease, and disrupts cells function

● "For years amyloid plaques have been thought to be an important target for treatment in Alzheimer's. This class of drugs does precisely that.

China test

● From an operational point of view, the 'China test' consists of three distinct elements.

● First, an assessment of how a certain Indian decision or a specific regional development squares with Chinese regional strategy or interests.

● Second, an assessment of whether India's decision or a certain regional development would require India to make modifications at the level of secondary contradictions.

● And third, an assessment of whether this would require any major policy changes internally

● Despite its withdrawal from the region, Washington is seeking to re engage southern Asia (Pakistan, South Asia in general, the Indo-Pacific, and perhaps even the Taliban).

● It appears that one of the lessons New Delhi learnt from the standoff with China along the Line of Actual Control in 2020 was that it was perhaps a consequence of India's growing proximity to the U.S

● The lack of/lukewarm India-U.S. Strategic engagement in the region is precisely what would help Beijing's long- term objectives.

● A China test would suggest that New Delhi should not give into the short- term temptation of not being on the wrong side of China given its long- term implications

● The U.S. and its allies would like India to stop engaging with Moscow and condemn its aggression against Ukraine which India has refused to do so far.

● In return, there is on offer greater accommodation of Indian interests including perhaps diplomatic and political support against Chinese aggression.

● There is also the growing proximity between Moscow and Beijing which reduces the robustness of India- Russia relations.

● In the absence of an India-Russia relationship, the extent of Sino- Russian cooperation is likely to strengthen.

Laws on religious conversion

In post -independent India, Odisha became the first State to enact a law restricting religious conversions, which later became a model framework for other States

● The Himachal Pradesh High Court in 2012 struck down certain provisions of the State's 2006 law restricting conversions, holding them "unconstitutional".

● The Court said that the individual converting their faith also enjoyed their right to privacy and the provision to give a month's prior notice to the District Magistrate violated this right.

● In 2021, the Gujarat High Court stayed some provisions of the Gujarat Freedom Of Religion Act, 2003, which the State amended in 2021 to add the grounds of marriage to prohibit conversions.

● This year, the Madhya Pradesh High Court also held certain provisions of the MPFRA unconstitutional.

● In November last year, the Allahabad High Court allowed several interfaith couples to register their marriages despite not having sought the DM's approval

End to end encryption

What is end-to-end encryption?

- End -to- end encryption is a communication process that encrypts data being shared between two devices.
- It prevents third parties like cloud service providers, internet service providers (ISPs) and cybercriminals from accessing data while it is being transferred.
- The process of end- to -end encryption uses an algorithm that transforms standard text into an unreadable format.
- This format can only be unscrambled and read by those with the decryption keys, which are only stored on endpoints and not with any third parties including companies providing the service.
- End -to- end encryption has long been used when transferring business documents, financial details, legal proceedings, and personal conversations.
- It can also be used to control users' authorization when accessing stored data, which seems to be what Apple intends to do.

Where is it used?

- End -to -end encryption is used to secure communications.
- Some of the popular instant -messaging apps that use it are Signal, WhatsApp, iMessage, and Google messages.
- However, instant messaging is not the only place where user data is protected using end -to- end encryption.
- It is also used to secure passwords, protect stored data and safeguard data on cloud storage

Why are government agencies unhappy with it?

- The FBI in a statement expressed displeasure at the idea of increasing use of end -to- end encryption by technology companies.
- It said that while it remains a strong advocate of encryption schemes that give "lawful access by design", that would enable tech companies "served with a legal order" to decrypt data, it "continues to be deeply concerned with the threat end -to- end and user -only- access encryption pose
- The legislation, according to government agencies was necessary to prevent "terrorists" and other serious criminals from hiding from the law

Arth Ganga

- PM first introduced the concept during the first National Ganga Council meeting in Kanpur in 2019, where he urged for a shift from Namami Gange, the Union Government's flagship project to clean the Ganga, to the model of Arth Ganga.

- The latter focuses on the sustainable development of the Ganga and its surrounding areas, by focusing on economic activities related to the river

- At its core, the Arth Ganga model seeks to use economics to bridge people with the river.

- "strives to contribute at least 3% of the GDP from the Ganga Basin itself," and added that the Arth Ganga project's interventions are in accordance with India's commitments towards the UN sustainable development goals.

Features

- Under Arth Ganga, the government is working on six verticals.

- The first is Zero Budget Natural Farming, which involves chemical-free farming on 10 km on either side of the river, and the promotion of cow dung as fertiliser through the GOBARdhan scheme.

- The Monetization and Reuse of Sludge & Wastewater is the second, which seeks to reuse treated water for irrigation, industries and revenue generation for Urban Local Bodies (ULBs).

- Arth Ganga will also involve Livelihood Generation Opportunities, by creating haats where people can sell local products, medicinal plants and ayurveda.

- The fourth is to increase public participation by increasing synergies between the stakeholders involved with the river.

- The model also wants to promote the cultural heritage and tourism of Ganga and its surroundings, through boat tourism, adventure sports and by conducting yoga activities.

- Lastly, the model seeks to promote institutional building by empowering local administration for improved water governance.

National policy on rare diseases

- A rare disease is a health condition of low prevalence that affects a small number of people compared to diseases prevalent in the general population.

- It is estimated that around 6000 to 8000 rare diseases exist globally and new rare diseases are being reported regularly in the medical literature.

- The generally accepted international research is between 6% and 8% Rare diseases include genetic diseases, rare cancers, infectious tropical diseases, and degenerative diseases.

- 80% of rare diseases are genetic in origin and hence disproportionately impact children.

- There is no universally accepted definition of rare disease.

- Different countries define rare diseases differently

- Rare diseases constitute a significant economic burden independent of a country's size and demographics; arising from increased healthcare spending.

- As resources are limited, there is a macroeconomic allocation dilemma due to opportunity cost of funding rare disease treatment. On one hand, health problems of a much larger number of persons can be addressed by allocating a relatively smaller amount, on the other hand much greater resources will be required for addressing health problems of a relatively smaller number of persons.

National Policy for Rare Diseases (NPRD), 2021

The Government has launched National Policy for Rare Diseases (NPRD), 2021 in March, 2021 for the treatment of rare disease patients. The salient features of NPRD, 2021 are as under:

- The rare diseases have been identified and categorized into 3 groups namely Group 1, Group 2 and Group 3

- Group-2: Diseases requiring long term/lifelong treatment having relatively lower cost of treatment and benefit has been documented in literature and annual or more frequent surveillance is required.

- Group 3:- Diseases for which definitive treatment is available but challenges are to make optimal patient selection for benefit, very high cost and lifelong therapy.

- Provision for financial support of up to Rs. 50 Lakh to the patients suffering from any category of the Rare Diseases and for treatment in any of the Centre of Excellence (CoE) mentioned in NPRD-2021, outside the Umbrella Scheme of Rashtriya Arogaya Nidhi.

- In order to receive financial assistance for treatment of rare disease, the patient of the nearby area may approach the nearest Centre of Excellence to get him assessed and avail the benefits.

- Eight (08) Centres of Excellence (CoEs) have been identified for diagnosis, prevention and treatment of rare diseases.
- Five Nidan Kendras have been set up for genetic testing and counselling services.
- The NPRD, 2021 has provisions for promotion of research and development for diagnosis and treatment of rare diseases;
- Promotion of local development and manufacture of drugs and creation of a conducive environment for indigenous manufacturing of drugs for rare diseases at affordable prices.

Big tech and anti competition law

The Indian anti-trust body, the Competition Commission of India (CCI)'s move, in October, to impose a penalty of ₹1,337.76 Crore on Google for abusing its dominant position in the android mobile device ecosystem.

- When India established the CCI under the Indian Competition Act 2002, it was to protect and promote competition in markets, and prevent practices that hinder competition.
- However, it did not account for the network effect of Big Tech companies as a force to reckon with.
- As their market dominance increased rather exponentially, the European Union, the United States, and even Australia realized their market- distorting abilities and moved to transform their competition law.
- The EU's Digital Market Act and "gatekeepers" who will enforce rules and regulations extant to foresee anti-competitive practices is an example

Market dominance issue

- As the CCI says, the intent of Google's business was to make users on its platforms abide by its revenue earning service, i.e., an online search to directly affect the sale of their online advertising services.
- Thus, network effects, along with a status quo bias, created significant entry barriers for competitors to enter or operate in the markets concerned.
- While the competition laws address that anomaly, they are too slow to respond in complex technical sectors.
- By the time an order is passed, the dominant player has gained an edge — as in the case of Google.

- Thus, in this context, there is an urgent need for ex-ante legislation to prevent market failures and mitigate possible anti-competitive conduct.
- Thus pricing plays a fundamental role in defining the position of any digital platform in the marketplace. It is essential to establish an ex-ante framework to ensure a level playing field for local sellers.
- The Government's Open Network for Digital Commerce (ONDC) platform is a reliable option for these small players

Use of data, issue of consumer protection

- While the data economy has evolved, we have not dealt with its regulation as effectively.
- There is sensitive data stored on these platforms (financial records, phone location, and medical history).
- Big corporations have asserted ownership of the right to use or transfer this data without restriction.
- Predatory pricing entails the lowering of prices that forces other firms to be out competed.
- Amazon and Flipkart were accused of deep discounting and creating in-house brands to compete with local sellers.
- Only recently, the CCI raided their offices in an anti- competition probe, leading to Amazon being forced to cut its ties with Cloudtail.
- While one might attribute it to efficiency barriers, the greed for data is a motivation.
- Further, the storage and collection of women's and children's data need to be dealt with more cautiously to build a safe digital place.
- Finally, market distortion can also lead to poorer quality of services, data monopoly, and stifle innovation.
- For a consumer, there is a need to establish harmony of the Competition law with the new Consumer Protection Act 2020 and e-commerce rules.
- The new law should include a mechanism to ensure fair compensation for consumers who face the brunt of the anti-competitive practices of the Big Techs
- There is an urgent need to contextualise the law to the digital marketplace and devise new provisions with adequate ex-ante legislation.
- The EU has already noted this need through the Digital Markets Act.
- It is time that similar legislation is adopted in India. It is equally important to contextualise India's reality
- Kirana stores competing with retailers such as Big Basket is an example of unfair competition

between legacy businesses and their digital counterparts.

IR HEADLINES

- Chinese hospitals caught off-guard as COVID cases surge after opening
- Iran publicly carries out second protest execution
- 3 killed in attack on Kabul hotel popular with Chinese
- Protests against the ouster of Castillo turn violent in Peru; new President proposes moving up elections

Economy Headlines

- Oct. industrial output contracts 4%, slide seen second time in 3 months
- Net direct tax revenue growth accelerated to 24.3% by November
- India imported coal worth ₹2.3 Lakh Crore in April- September

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Criticism of conservation bill

- The need for criminal laws to assist wildlife conservation has remained unchallenged since its conception.
- From regulated hunting to complete prohibition and the creation of 'Protected Areas (PA)' where conservation can be undertaken without the interference of local forest -dwelling communities, State and Forest Department control over forests
- The recent move to increase penalties by four times for general violations (from ₹25,000 to ₹1,00,000) and from ₹10,000 to ₹25,000 for animals receiving the most protection should raise questions about the nature of policing that the WPA engenders.
- Hunting offences that were primarily filed against Schedule III and IV animals (wild boars) which have lesser protection than tigers and elephants formed over 17.47% of the animals 'hunted' between 2016-20.
- Among the animals hunted the highest, only one in top five belonged to Schedule I (peacock).
- Surprisingly, fish (only certain species relegated to Schedule I) formed over 8% of the cases filed.

- A whopping 133 cases pertaining to fishing (incorrectly classified as Schedule V species) were filed in the last decade in Madhya Pradesh.
- Forest rights, individual and collective, as part of the Forest Rights Act (FRA) were put in place to correct the injustice meted out by forest governance laws in recognizing forest- dependent livelihoods.
- The natural overlap of recognizing forest rights in intended- as -inviolate PAs was quickly resolved by making the FRA subservient to the WPA, thereby impeding its implementation.

Rise of rural manufacturing

There is growing evidence to suggest that the most conspicuous trend in the manufacturing sector in India has been a shift of manufacturing activity and employment from bigger cities to smaller towns and rural areas.

- This 'urban- rural manufacturing shift' has often been interpreted as a mixed bag, as it has its share of advantages that could transform the rural economy, as well as a set of constraints, which could hamper higher growth
- Recent data from the Annual Survey of Industries for 2019-20, shows that the rural segment is a significant contributor to the manufacturing sector's output.
- While 42% of factories are in rural areas, 62% of fixed capital is in the rural side.
- This is the result of a steady stream of investments in rural locations over the last two decades.
- several causes for the relatively steady rise and presence of rural manufacturing.
- Rural areas have generally been more attractive to manufacturing firms because wages, property, and land costs are all lower than in most metropolitan areas.
- Locations get more urbanized and congested, the greater these space constraints are.
- In cities, factories just cannot be expanded as opposed to rural areas.
- Thus, increased capital intensity of production is one reason for this trend.
- Many firms experience substantially higher operating costs in cities than in rural areas, with inevitable consequences for the firm's profitability and competitiveness.
- Big firms deliberately shift production from cities to take advantage of the availability of less skilled, less unionized and less costly rural labor.
- The shift in manufacturing activities from urban to rural areas has helped maintain the importance of manufacturing as a source of livelihood diversification in rural India

Challenges ahead

- The shift towards rural manufacturing faces two major challenges.
- First, though firms reap the benefits of lower costs via lower rents, the cost of capital seems to be higher for firms operating on the rural side.
- This is evident from the shares in rent and interest paid.
- Second, there exists an issue of "skills shortage" in rural areas as manufacturing now needs higher skilled workers to compete in the highly technological global 'new economy'

China v/s USA

- China rose to the status of the second largest economy and got itself ingrained into the global economy.
- This eventually translated into China's growing economic competence as well as its rising political ambition and might.
- China then started to systematically undermine U.S. global dominance through military and diplomatic means.
- . The administration's imposition of tariffs on China's exports turned into a "trade war" which started to reverse the trajectory of U.S.-China relations.
- China's crackdown in Xinjiang and Hong Kong, its "wolf warrior diplomacy" during the COVID-19 blame game, its evident support to Russia during the Ukraine crisis, and its escalating offensive posturing towards Taiwan, made it imperative for the U.S. to continue with a confrontational posture towards China
- The year 2022 witnessed the relations descend into an abysmal trajectory with the Speaker of the U.S. House of Representatives, Nancy Pelosi visiting Taiwan
- In order to undercut China's growing technological prowess, the U.S. imposed a series of restrictions on China targeting its semiconductor chip industry
- China has not moved away from its path to attain its long term goal of centrality in the international system.
- In fact, Xi Jinping has at multiple times underlined China's time bound aspiration to achieve such a goal through phased modernization of the country. China's more specific objectives like the reunification of Taiwan with the mainland
- On the other hand, the Biden administration has continued with intensifying the U.S.'s rivalry

with China by expanding it beyond trade and into avenues like technology and political freedoms.

● It has also utilized multilateral approaches like strengthening the Quad in the Indo-Pacific, and the founding of the Indo- Pacific Economic Framework

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Long-Term Low-Carbon Development Strategy (LT-LCDS) and cities

●India unveiled its long- term climate action plan at the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27), held in Sharm el -Sheikh, Egypt

●The document titled 'Long-Term Low-Carbon Development Strategy (LT-LCDS)' has multi-sectoral measures to reach a net- zero emissions status; climate- resilient urbanization forms a cornerstone of the Government of India's strategy under the Paris Agreement.

●This three -pronged and long- term plan for urban areas focuses on adaptation and resource efficiency in urban planning, climate -responsive and climate- resilient buildings, and municipal service delivery

●To facilitate implementation of the LT-LCDS and other missions, and enable their integration, a data -driven approach may be useful

● The Urban Sustainability Assessment Framework (USAF), a decision support tool of UN-Habitat for municipal commissioners and urban practitioners, supports the sustainable and resilient urban planning and management of Indian cities.

●It enables cities to regularly capture inter-sectoral data and corresponding analysis on urban metrics,

●By designing 'shared streets' for personal vehicles, public transport, NMT s (non -motorized) transport and pedestrians, and linking them with future economic activity zones and underserved areas, the city has immense potential to reduce its carbon footprint.

●These streets can also be conduits for native plant species and groundwater recharge by integrating water -sensitive urban design features

●Jaipur has also witnessed a significant decline in porous surfaces (by 50%) in the last three

decades and a corresponding sharp increase in surface stormwater run-off (156%) which the city struggles to accommodate leading to regular urban flooding.

- Simple yet effective solutions that can increase Jaipur's resilience include community recharge pits in neighborhood parks, and increasing permeable spaces along mobility corridors to decrease the run-off by a sizeable fraction

- Active involvement from various tiers of government, non-governmental, community -based organizations and academic institutions is desirable at each step from building a sustainability profile to arriving at very specific interventions.

Agni V

- India on successfully test -fired nuclear- capable ballistic missile Agni -V that can strike targets at ranges up to 5,000 km, marking a significant boost to the country's strategic deterrence, people familiar with the development said.

- The test- firing of the missile from the APJ Abdul Kalam Island off Odisha coast comes amid India's lingering border row with China.

- Agni-V can bring almost the entire Asia including the northernmost part of China and regions in Europe under its striking range

About Agni V project

- The Agni V project is aimed at boosting India's nuclear deterrence against China, which is known to have missiles like Dongfeng-41 having ranges between 12,000-15,000 km.

- Agni V can bring almost the entire Asia, including the northernmost part of China as well as some regions in Europe, under its striking range.

- The Agni 1 to 4 missiles have ranges from 700 km to 3,500 km and they have already been deployed.

- In June, India successfully carried out a night launch of the nuclear-capable Agni-4 ballistic missile, in a boost to India's military capabilities.

WB Report on air pollution

- Currently over 60% of South Asians are exposed to an average 35 g/m3 of PM2.5 annually.

- In some parts of the Indo-Gangetic Plain (IGP) it spiked to as much as 100 g/m3 – nearly 20 times the upper limit of 5 g/m3 recommended by the World Health Organization, says the World Bank report.

- The six major airsheds in South Asia where air quality in one affected the other were: West/Central IGP that included Punjab (Pakistan), Punjab (India), Haryana, part of Rajasthan, Chandigarh, Delhi, Uttar Pradesh; Central/ Eastern IGP: Bihar, West Bengal, Jharkhand, Bangladesh;

- Middle India: Odisha/Chhattisgarh; Middle India: Eastern Gujarat/ Western Maharashtra; Northern/Central Indus River Plain: Pakistan, part of Afghanistan; and Southern Indus Plain and further west: South Pakistan, Western Afghanistan extending into Eastern Iran.

- When the wind direction was predominantly northwest to the southeast, 30% of the air pollution in Indian Punjab came from the Punjab Province in Pakistan and, on average, 30% of the air pollution in the largest cities of Bangladesh (Dhaka, Chittagong, and Khulna) originated in India.

- In some years, substantial pollution flowed in the other direction across borders.

- What this means is that even if Delhi National Capital Territory were to fully implement all air pollution control measures by 2030 while other parts of South Asia continued to follow current policies, it wouldn't keep pollution exposure below 35 g/m3.

- However if other parts of South Asia also adopted all feasible measures it would bring pollution below that number.

Five agriculture product get GI Tag

Five agricultural products of Kerala have been granted Geographical Indication (GI) status.

- Attappady Attukombu Avara (beans), Attappady Thuvara (red gram), Onattukara Ellu (sesame), Kanthalloor-Vattavada Veluthulli (garlic), and Kodungalloor Pottuvellari (snap melon) are the latest Geographical Indications that have been registered.

- The unique features of the products, imparted by the agro-climatic conditions of the geographical area of their production, are the basis for getting Geographical Indication tag.

- Attappady Attukombu Avara, cultivated in the Attappady region of Palakkad, is curved like a goat's horn as its name indicates.

● Its higher anthocyanin content, compared to other dolichos beans, imparts violet color in the stem and fruits.

● Attappady Thuvara has seeds with white coat.

●These are bigger and have higher seed weight than the regular variety.

●Compared to the garlic produced in other areas, the garlic from the Kanthalloor- Vattavada area of Devikulam block panchayat in Idukki contains higher amount of sulphides, flavonoids, and proteins.

●Onattukara Ellu and its oil are famous for its unique health benefits.

●Relatively higher antioxidant content in Onattukara Ellu helps in fighting the free radicals which destroy the body cells.

● Kodungalloor Pottuvellari cultivated in Kodungalloor and parts of Ernakulam is consumed as juice and in other forms.

● This snap melon, which is harvested in summer, is excellent for quenching thirst.

Osumi and Miyako Strait

●A squadron of Chinese Navy ships sailed through straits near Japan into the Western Pacific, while Beijing blasted Tokyo's adoption of a new national security strategy putting itself on a more offensive footing.

●The destroyers Lhasa and Kaifeng, and a replenishment ship, sailed through the Osumi Strait while a Dongdiao -class surveillance ship sailed through the Miyako Strait.

SOURCE: REUTERS STRAITS TIMES GRAPHICS

What are destroyer ships?

●In naval terminology, a destroyer is a fast, manoeuvrable, long-endurance warship intended to escort larger vessels in a fleet, convoy or battle group and defend them against powerful short range attackers.

●They were originally developed in 1885 by Fernando Villaamil for the Spanish Navy as a defense against torpedo boats.

Quantum computing

- The allure of quantum computers (QC) is their ability to take advantage of quantum physics to solve problems too complex for conventional computer

- In 2021, the Indian government launched a mission to study quantum technologies with an allocation of ₹8,000 Crore; the army opened a quantum research facility in Madhya Pradesh; and the Department of Science and Technology co-launched another facility in Pune

- Quantum physics describes reality at the subatomic scale, where the objects are particles like electrons.

- Here, you can't pinpoint the location of an electron.

- You can only know that it will be present in some volume of space, with a probability attached to each point

- Another relevant phenomenon is entanglement.

- When two particles are entangled and then separated by an arbitrary distance (even more than 1,000 km), probing one particle, and thus causing its superposition to collapse, will instantaneously cause the superposition of the other particle to collapse as well

How would a computer use superposition?

- The qubit is the fundamental unit of a QC. It could be a particle like an electron.

- Some information is directly encoded on the qubit: if the electron's spin is pointing up, it means 1; if the spin is pointing down, it means 0.

- But instead of being either 1 or 0, the information is encoded in a superposition: say, 45% 0 plus 55% 1. This is entirely unlike the two separate states of 0 and 1 and is a third kind of state.

- The qubits are entangled to ensure they work together.

- If one qubit is probed to reveal its state, the states of all entangled qubits will be revealed as well.

- The computer's final output is the state to which all the qubits have collapsed.

- One qubit can encode two states, so a computer with N qubits can encode 2N states.

- A computer with N transistors can only encode 2N states

- Qubits exist in superposition in specific conditions, including very low temperature (~0.01 K), with radiation -shielding and protection against physical shock.

- Tap your finger on the table and the superposition of the qubit sitting on it could collapse.

- Material or electromagnetic defects in the circuitry between qubits could also 'corrupt' their states and bias the eventual result.

- Researchers are yet to build QCs that completely eliminate these disturbances in systems with a

few dozen qubits.

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mRNA vaccine and cancer

The story so far:

The results of a trial of an experimental cancer vaccine built on the mRNA (messenger ribonucleic acid) platform, made by Moderna and MSD (Merck&Co.), have shown promising results.

How does the vaccine work?

- The personalized cancer vaccine uses the same messenger -RNA technology that was used to produce the COVID vaccine.

- It allows the body's immune system to seek and destroy cancerous cells,

- The mRNA instructs cells that take up the vaccine to produce proteins that may stimulate an immune response against these same proteins when they are present in intact viruses or tumor cells."

- The mRNA included in the Pfizer- BioNTech and the Moderna vaccines instructs cells to produce a version of the "spike" protein that studs the surface of SARS-CoV-2, he explains.

- The immune system sees this spike protein as foreign and mobilizes immune cells to produce antibodies to fight off the infection

- A Reuters story on the breakthrough study explained that the personalized cancer vaccine works in concert with Merck's Keytruda, to disable a protein called programmed death 1, or PD-1, that helps tumours to evade the immune system.

- Listing out CAR--T cells and bi specific antibodies among newer cancer therapies, he said both approaches have already produced spectacular results in many cancers.

- While in CAR--T treatment, scientists take the immune systems cells out, engineer them to target a specific cancer and then put them back in the body to kill cancer cells, bispecific antibodies attach to immune system cells with one arm and cancer cells with the other, thereby bringing powerful immune system killer cells.

China and deepfake technology

The story so far:

The Cyberspace Administration of China, the country's cyberspace watchdog, is rolling out new regulations, to be effective from January 10, to restrict the use of deep synthesis technology and curb disinformation.

- Deep synthesis is defined as the use of technologies, including deep learning and augmented reality, to generate text, images, audio and video to create virtual scenes.
- One of the most notorious applications of the technology is deepfakes, where synthetic media is used to swap the face or voice of one person for another.
- Deepfakes are getting harder to detect with the advancement of technology.
- It is used to generate celebrity porn videos, produce fake news, and commit financial fraud among other wrongdoings.

What is a deepfake?

- Deep Fakes are a compilation of artificial images and audio put together with machine -learning algorithms to spread misinformation and replace a real person's appearance, voice, or both with similar artificial likenesses or voices.
- The term deepfake originated in 2017, when an anonymous Reddit user called himself "Deepfakes

Does this technology disrupt the right to privacy?

- While Canada does not have any regulations to tackle deepfakes, it is in a unique position to lead the initiative to counter deepfakes.
- Within Canada, some of the most cutting- edge AI research is being conducted by the government with a number of domestic and foreign actors.
- Furthermore, Canada is a member and leader in many related multilateral initiatives like the Paris Call for Trust and Security in Cyberspace, NATO Cooperative Cyber Defence Centre of Excellence and the Global Partnership on Artificial Intelligence.
- It can use these forums to coordinate with global and domestic actors to create deep fake policy in different areas.

INS MORMUGAO

● India has been focusing on bolstering its maritime capability with a focus on the Indian Ocean in the backdrop of concerns over China's growing forays into the region, considered the backyard of the Indian Navy.

● With a clear focus on indigenisation and self-reliance, 42 out of the 44 ships and submarines under construction are being built in the Indian shipyards,

●China is vying for influence in the strategic Indian Ocean region with substantial investments in ports and infrastructure investments in several countries, including Pakistan and Sri Lanka.

About INS Mormugao:

- Named after the historic Goan port city Mormugao, the ship undertook her first sea sortie on 19 December last year when Goa celebrated 60 years of liberation from Portuguese rule.

INS Mormugao is the second of the four 'Visakhapatnam' class destroyers, indigenously designed by the Indian Navy's Warship Design Bureau and constructed by Mazagon Dock Shipbuilders Ltd

- The majestic ship measuring 163 meters in length and 17 meters in breadth with a displacement of 7,400 tonnes can be regarded as one of the most potent warships to have been constructed in India.

- 70% of the components used in the construction of INS Mormugao are indigenous.

The ship is propelled by four powerful gas turbines and it is capable of achieving speeds over 30 knots.

- The Navy said the ship is equipped to fight under nuclear, biological, and chemical (NBC) warfare conditions and that it is fitted with a modern surveillance radar that provides target data to the gunnery weapon systems.

●In a boost to the country's maritime capabilities, INS Mormugao has officially joined the Indian Navy's fleet, marking a significant milestone for indigenous military expedition.

●The warship 'Yard 12705', named after the Goan port city of Mormugao, is the second of the four Visakhapatnam -class destroyers being built under the Indian Navy Project 15B, or P15B

What is Project 15B?

●Project 15 was launched in the 1990s to add guided missile destroyers to the inventory of the Indian Navy. The project was named 'Delhi class'.

●It was followed by Project 15A or Kolkata class which primarily focused on advanced technology and equipment in surface ships.

●Project 15B or the Visakhapatnam class is a follow -on class of weapon- intensive Project 15A destroyers.

●The project was launched in January 2011 to incorporate advanced design concepts such as state-of-the-art weapons and sensors, advanced stealth features and a high degree of automation for "improved survivability, sea keeping, stealth and manoeuvrability"

What are the capabilities of INS Mormugao?

●The destroyer is 163 meters long, 17 meters wide and displaces 7,400 tonnes when fully loaded.

● The ship is propelled by four gas turbines in a combined gas and gas (COGAG) configuration.

●The propulsion system allows the ship to achieve a speed of more than 30 knots (50km/h) and a maximum range of 4,000 nautical miles.

● It can accommodate a crew of about 300 personnel.

●INS Mormugao's firepower comprises BrahMos surface-to-surface missiles (SSM), Barak-8 surface-to-air (SAM) missiles for a long range of shore and sea-based targets and a 76mm super rapid gun mount.

●The ship is armed with RBU-6000 anti-submarine rocket launchers and 533mm torpedo launchers.

●It is also equipped to carry and operate multi-role helicopters.

●Its enhanced stealth features ensure a reduced Radar Cross Section or radar signature.

● It is automated with sophisticated digital networks such as the Gigabyte Ethernet-based Ship Data Network (GESDN), the Combat Management System (CMS), Automatic Power Management System (APMS), Integrated Platform Management System (IPMS) and Ship Data Network (SDN).

●While the CMS performs threat evaluation and resource allocation based on the tactical picture compiled and ammunition available onboard, APMS controls power management.

● IPMS is used to control and monitor machinery and auxiliaries and the SDN is the 'information highway for data' from sensors and weapons.

Built with over 75% indigenous content, the commissioning of INS Mormugao

What is the strategic importance?

- While India's interests are closely tied to the Indian Ocean, China has been rapidly expanding its naval footprint in the region.
- Amid growing Chinese strategic interests, India renewed its focus on bolstering its maritime capabilities in the region to counter the threat
- Rule- based freedom of navigation, security of sea lanes etc. have become more important than ever for stability and economic progress of the world,"


Lollapalooza Effect

There is an urgent need to create a new and dedicated fund to help developing countries successfully implement a post-2020 global framework to halt and reverse biodiversity loss, India has said at the U.N. biodiversity conference in Canada's Montreal.

- The country said that conservation of biodiversity must also be based on common but differentiated responsibilities and respective capabilities (CBDR) as climate change also impacts nature.
- As the 196 parties to the Convention on Biological Diversity (CBD) finalize negotiations for a post-2020 Global Biodiversity Framework (GBF) a new set of goals and targets to halt and reverse biodiversity loss there have been repeated calls for the inclusion of the CBDR principle in finance- related targets
- So far, the Global Environment Facility which caters to multiple conventions, including the UNFCCC and UN Convention to Combat Desertification, remains the only source of funding for biodiversity conservation.
- At CBD COP15, developing countries have been demanding a new and dedicated biodiversity fund, saying the existing multilateral sources are not up to the task of meeting the requirements of the GBF.

Intranasal vaccine

Intranasal SARS-CoV-2 Vaccines

- Likely to prevent infection and transmission
- Likely to prevent disease
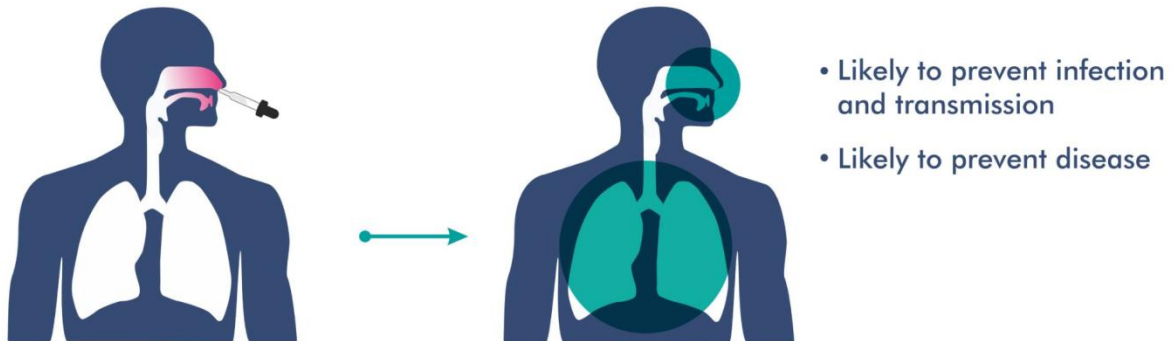
●The nasal route has excellent potential for vaccination due to the organized immune systems of the nasal mucosa.

● Non-invasive, Needle-free.

● Ease of administration – does not require trained health care workers.

● Elimination of needle-associated risks (injuries and infections).

● High compliance (Ideally suits for children's and adults).

● Scalable manufacturing – able to meet global demand.
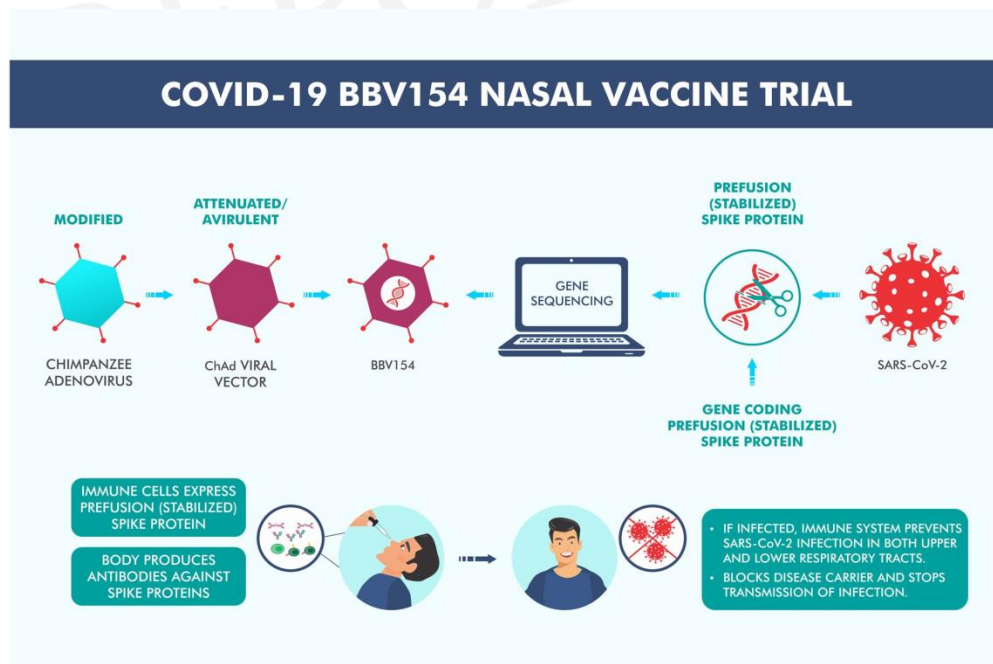
- Oxford vaccine an adenovirus vector vaccine originally developed for intramuscular administration, elicited antigen specific mucosal antibody
- The Oxford vaccine, as an intranasal vaccine, did not elicit "consistent mucosal antibody response nor a strong systemic response.

HPV

- The Lancet published this month showing that India accounts for the highest number of cervical cancer cases in Asia, followed by China.
- More than 58% of all cases of cervical cancer and deaths globally were estimated in Asia with India accounting for 21% of cases and 23% of deaths, followed by China (18% and 17%).
- Cervical cancer is a preventable and treatable cancer.
- It is caused by infection with the human papillomavirus (HPV) and there are vaccines which protect against carcinogenic HPV
- Human papillomavirus (HPV) is a viral infection that's passed between people through skin-to-skin contact
- According to the International Agency for Research on Cancer, the WHO has specified that countries must reach and maintain an incidence rate of fewer than 4 new cases of cervical cancer per 1,00,000 women a year.
- To achieve that goal, it is necessary that 90% of girls will have to be fully vaccinated with the HPV vaccine by the age of 15.
- To that end, the government's intent to introduce the HPV vaccine in the Universal Immunization Programme (UIP)

Kamikaze drones

What are Kamikaze Drones

- These are small unmanned aircraft that are packed with explosives that can be flown directly at a tank or a group of troops that are destroyed when it hits the target and explodes.

- They are called Switchblade because their bladelike wings spring out on launch.

- The drones have the capability of going past traditional defenses to strike its targets and also cost a fraction of what the larger counterparts do.

- These small lethal drones are difficult to detect on radar and they can even be programmed to hit targets without human intervention, based on facial recognition.

Rwanda plan
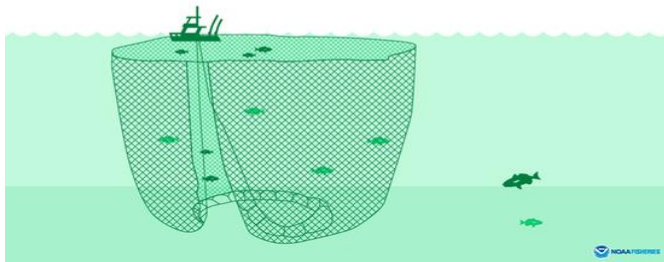
What is the Rwanda asylum plan?

- The five-year trial will see some asylum seekers who arrive in the UK sent to Rwanda on a one-way ticket, to claim asylum there.

- They may be granted refugee status to stay in Rwanda. If not, they can apply to settle there on other grounds, or seek asylum in a "safe third country".

- The government says it will deter people arriving in the UK through "illegal, dangerous or unnecessary methods", such as on small boats which cross the English Channel.

- The UK government previously said "anyone entering the UK illegally" after 1 January 2022 could be sent, with no limit on numbers.

- Rwanda says it can process 1,000 asylum seekers during the trial period, but has capacity for more.

- Under the deal, Rwanda can also ask the UK to take in some of its most vulnerable refugees.

What is an asylum seeker?

- The UN Refugee Agency defines an asylum seeker as someone who has applied for shelter and protection in another country.

- ●A refugee is a person who has fled conflict or persecution in their own country.

- ●The legal rights of refugees are protected by international law. However, it is up to host countries to decide whether an asylum seeker is granted refugee status.

Purse seine fishing

- ● Purse seine is a large wall of netting deployed around an entire area or school of fish.

- ●The seine has floats along the top line with a lead line threaded through rings along the bottom.

- ●Once a school of fish is located, a skiff encircles the school with the net.

- ●The lead line is then pulled in, "pursing" the net closed on the bottom, preventing fish from escaping by swimming downward.

- ●Purse seining is a non-selective fishing method that captures everything that it surrounds, including protected species.

- ● Sea turtles can be captured by a purse seine as it is set and then become entangled in the net mesh as it is hauled in.

- ● Purse seines can easily encircle marine mammals along with target species as the net is set.

New biodiversity deal

Negotiators at a UN biodiversity conference on Monday reached an agreement hailed as a landmark global effort to protect the world's lands and oceans.

- ●The most significant part of the deal is the commitment to protect 30% of land and water considered important for biodiversity before the end of the decade. Currently, just 17% of terrestrial and 10% of marine areas is protected.

- The agreement comes a day before the United Nations Biodiversity Conference, or COP15, is set to end in Montreal, Canada.

What else does the deal contain?

The agreement envisages putting $200 billion (€188 billion) toward supporting biodiversity by 2030, with another $500 billion to be possibly raised by phasing out or reforming subsidies, such as those for food or fuel.

The deal also calls for giving low-income countries far more than is currently provided for their efforts to protect nature. This amount is to reach at least $20 billion annually by 2025, increasing to $30 billion by 2030.

- A month after the 27th Conference of the Parties to the UN Framework Convention on Climate Change (COP27) in Egypt, diplomatic retinue went into a contentious huddle again to save the planet in Montreal, Canada, this time, and as the Convention on Biological Diversity (CBD).
- While both these conferences can trace their origins to the Rio summit of 1992, the CBD does not get anywhere near the media attention COP commands
- Unlike cyclones and melting glaciers that have become visual aids to bring home the climate crisis wrought by invisible gases, biodiversity loss continues to be largely invisible despite its victims being extremely visible.
- Based on current trends, the UN reckons, an estimated 34,000 plant and 5,200 animal species, including one in eight of the world's bird species, face extinction.
- About 30% of breeds of main farm animal species are currently at high risk of extinction.
- Forests are home to much of the known terrestrial biodiversity, but about 45% of the earth's original forests are gone, cleared mostly during the past century
- India, adopting a negotiating tack from climate conferences, has argued that different nations have differing levels of responsibility towards biodiversity conservation (which requires richer nations to be more generous funders of global conservation efforts), it is well known that such demands are a dead end unless countries agree to definite targets.

Carbon market

The story so far:

- The Energy Conservation (Amendment) Bill, 2022 was passed in Parliament
- The Bill empowers the government to establish carbon markets in India and specify a carbon credit trading scheme

What are carbon markets?

- Article six of the 2015 Paris Agreement provides for the use of international carbon markets by countries to fulfil their nationally determined contributions (NDC) to keep global warming within 2°C.
- Carbon markets are essentially a tool for putting a price on carbon emissions they establish trading systems where carbon credits or allowances can be bought and sold.
- A carbon credit is a kind of tradable permit that, as per UN standards, equals one tonne of carbon dioxide removed, reduced, or sequestered from the atmosphere.
- There are broadly two types of carbon markets that exist today compliance markets and voluntary markets.
- Voluntary markets are those in which emitters corporations, private individuals, and others buy carbon credits to offset the emission of one tonne of CO_2 or an equivalent greenhouse gas.
- Such carbon credits are created by activities which reduce CO_2 from the air, such as afforestation.
- In a voluntary market, a corporation looking to compensate for its unavoidable emissions, purchases carbon credits from an entity engaged in projects that reduce, remove, capture, or avoid emissions.
- For instance, in the aviation sector, airlines may purchase carbon credits to offset the carbon footprint of the flights they operate.
- Compliance markets on the other hand which is set up by policies at the national, regional, and/or international level are officially regulated.

What are the challenges?

- The UNDP points out serious concerns pertaining to carbon markets ranging from double counting of greenhouse gas reductions, quality and authenticity of climate projects that generate credits to poor market transparency.
- There are also concerns about 'greenwashing' companies may buy credits, simply offsetting

carbon footprints instead of reducing their overall emissions.

What are concerns about new Bill?

● The Bill empowers the Centre to specify a carbon credits trading scheme.

● Under the Bill, the central government or an authorized agency will be able to issue carbon credit certificates.

● These carbon credit certificates will be tradeable in nature.

● Other persons would be able to buy carbon credit certificates on a voluntary basis.

● Opposition members pointed out that the Bill does not provide clarity on the mechanism to be used for the trading of carbon credit certificates and about who will regulate such trading

● Members also raised questions about the right Ministry to bring in a scheme of this nature, pointing out that while carbon market schemes in other countries are framed by their environment ministries, the Indian Bill was tabled by the Power Ministry.

● Another important concern raised is that the Bill does not specify whether certificates under already existing schemes would also be interchangeable and tradeable with carbon credit certificates.

● Two types of tradable certificates are already issued in India Renewable Energy Certificates (RECs) and Energy Savings Certificates (ESCs).

GI

● Joynagar moa, the popular Bengal sweetmeat available only during the colder months of the year, with the number of registered manufacturers witnessing a massive rise and its Geographical Indication tag getting a 10-year extension.

● The moa is a popped rice ball held together with fresh date- palm jaggery, extracted from the beginning of December till the end of February

What is a geographical indication?

● A geographical indication (GI) is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin.

● In order to function as a GI, a sign must identify a product as originating in a given place.

● In addition, the qualities, characteristics or reputation of the product should be essentially due to the place of origin.

- Since the qualities depend on the geographical place of production, there is a clear link between the product and its original place of production

What rights does a geographical indication provide?

- A geographical indication right enables those who have the right to use the indication to prevent its use by a third party whose product does not conform to the applicable standards.

- For example, in the jurisdictions in which the Darjeeling geographical indication is protected, producers of Darjeeling tea can exclude use of the term "Darjeeling" for tea not grown in their tea gardens or not produced according to the standards set out in the code of practice for the geographical indication.

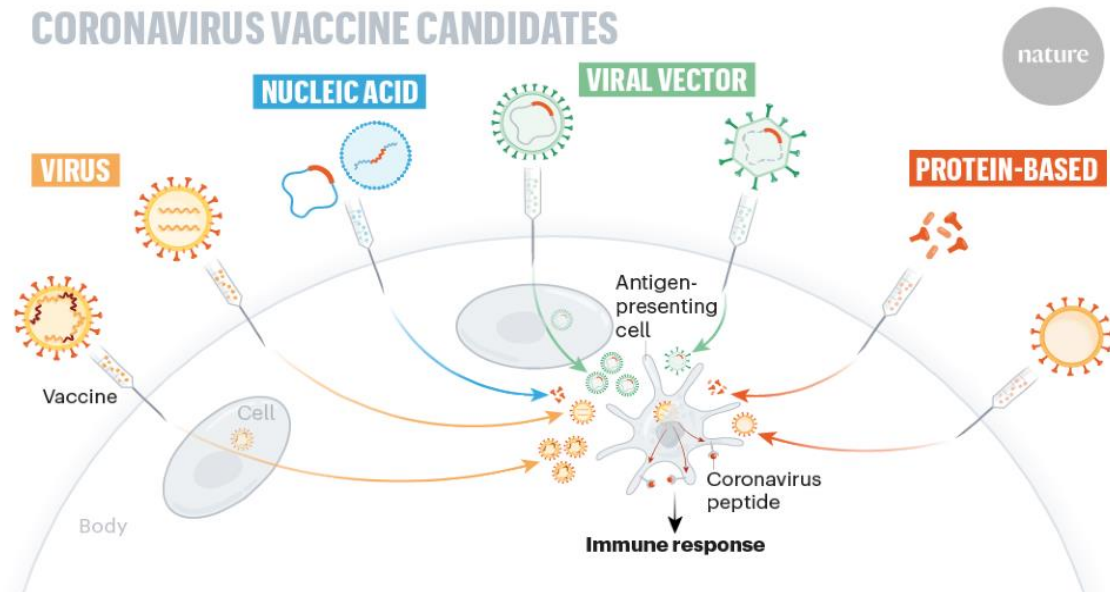## For what type of products can geographical indications be used?

- Geographical indications are typically used for agricultural products, foodstuffs, wine and spirit drinks, handicrafts, and industrial products.

What is the difference between a geographical indication (GI), an appellation of origin (AO), a protected designation of origin (PDO) and a protected geographical indication (PGI)?

The term "geographical indications", in its broad sense, includes a variety of concepts used in international treaties and national/regional jurisdictions, such as: appellation of origin (AO), protected designation of origin (PDO) and protected geographical indication (PGI).

- "Geographical indication" is defined in the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and in the Geneva Act of the Lisbon Agreement on Appellations of Origin and Geographical Indications.

- "Appellation of origin" is defined in the Lisbon Agreement for the Protection of Appellations of Origin and their International Registration and in the Geneva Act of the Lisbon Agreement on Appellations of Origin and Geographical Indications.

- "Protected Designation of Origin (PDO)" and "Protected Geographical Indication (PGI)" are terms used within the European Union.

Different types of vaccines
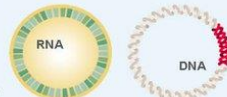
Live Attenuated Vaccines

Live, weakened (attenuated) vaccines which do not cause disease
More powerful immune response

Potential contraindications in immunocompromised patients

Examples:
MMR Vaccine
Yellow Fever

Mechanism of Action:

Weakened version of the virus causing disease

Vaccination

Presentation of viral antigen on Antigens Presenting Cells (APC)

Immune Response and Memory T cell and B cell formation

Inactivated Vaccines

Viral particles or pathogens grown in culture and killed.
Less potent than live attenuated vaccines.
Safer than live vaccines.
Requires booster doses due to weaker induction of immunity

Examples:
Polio Vaccine
Pertussis Vaccine

Mechanism of Action

Inactivation of virus through heat or chemicals

Inactivated/killed virus

Vaccination

Presentation of viral antigen on Antigen Presenting Cells (APC)

Immune Response and Memory T cell and B cell formation

DNA Vaccine

DNA plasmids containing DNA sequence encoding for viral/pathogenic antigen

No risk for disease
Strong immune response
Easily developed
Possibility of tolerance to antigen

Examples
Currently in use for Ebola
SARS-CoV-2 vaccines in development

Mechanism of Action

antigen gene
DNA vaccine plasmid

Vaccination

Translation of DNA into proteins to express as antigens

Presentation of viral antigen on Antigen Presenting Cells (APC)

Immune Response and Memory T cell and B cell formation

RNA Vaccines

These vaccines use mRNA sequences that encode for viral antigenic proteins. Often carried by lipid nanoparticles

Cheaper, easily produced

Reactogenicity in susceptible patients

Examples
Moderna SARS-CoV-2 Vaccine
Pfizer-BioNTech SARS-CoV-2 Vaccine

Mechanism of Action

mRNA carried by lipid nanoparticle

Vaccination

Transcription and translation of mRNA of viral sequence into proteins to express as antigens

Presentation of viral antigen on Antigens Presenting Cells (APC)

Immune Response and Memory T cell and B cell formation

Subunit Vaccines

Present antigens to the immune system without genetic material from viral particles.

Focused immune response toward antigen, safer due to lack of viral genetic material.

Require multiple doses to induce long term immunity

Examples
Hepatitis B Vaccine
Pertussis Vaccine
HPV Vaccine

Mechanism of Action

Viral/pathogenic antigens

Vaccination

Presentation of viral antigen on Antigen Presenting Cells (APC)

Immune Response and Memory T cell and B cell formation

Replicating Viral Vector Vaccine

Low pathogenic viruses are altered to viral vectors to produce similar proteins/antigens as the disease causing virus

Limited efficacy on preexisting immunity
Otherwise powerful immune response

Examples:
SARS-CoV-2 Vaccinations in development

Mechanism of Action
Viral Vector of target antigen through combination of disease causing virus and low pathogenic virus.

Vaccination

Replication of virus inside of body

Presentation of viral antigen on Antigen Presenting Cells (APC)

Immune Response and Memory T cell and B cell formation

Non-Replicating Viral Vector Vaccines

Only produce antigen, unable to replicate inside of the body unlike replicating viral vector vaccines.
Safer vaccine.
Requires higher dosing to induce immunity

Examples
Oxford-AstraZeneca SARS-CoV-2 Vaccine
Other SARS-CoV-2 Vaccinations in development

Mechanism of Action
Viral Vector of target antigen through combination of disease causing virus and low pathogenic virus

Vaccination

No replication of virus occurs.

Presentation of viral antigen on Antigens Presenting Cells (APC)

Immune Response and Memory T cell and B cell formation

CDK (cyclin dependent kinase)

In the treatment protocol for breast cancer, CDK (cyclin-dependent kinase) inhibitors constitute a major therapeutic tool, especially for metastatic breast cancer. Three drugs, Ribociclib, Palbociclib and Abemaciclib, belong to this therapeutic class, which help in slowing the spread of cancer cells in the body.

● A cyclin-dependent kinase inhibitor protein is a protein which inhibits the enzyme cyclin-dependent kinase (CDK).

● Several function as tumor suppressor proteins.

● Cell cycle progression is delayed or stopped by cyclin-dependent kinase inhibitors, abbreviated CDIs, CKIs or CDKIs.

ChatGPT & Ramanujan Machine

● The recent buzz around ChatGPT (Chat Generative Pre-trained Transformer), a software tool that can answer questions on almost any topic, carry on conversations with humans, write poems, computer programs and perform many more complex tasks that require intelligence, is testimony that artificial intelligence can "create".

● One can also mention here Google's product LaMDA (Language Model for Dialogue

Applications) that is similar to ChatGPT and other sophisticated products (Dall E) that can create image from verbal descriptions

● In early 2021, a team of Israeli scientists announced a software tool called The Ramanujan Machine that creates mathematical conjectures which are equations without proof.

●Mathematicians then prove or disprove these conjectures, thereby establishing theorems. Conjectures in mathematics shed light on newer frontiers.

Japan New nuclear plan

●Japan on adopted a new policy promoting greater use of nuclear energy to ensure a stable power supply amid global fuel shortages and to reduce carbon emissions, in a major reversal of its phase- out plan following the Fukushima crisis.

●The new policy says Japan must maximize the use of existing nuclear reactors by restarting as many of them as possible and prolonging the operating life of old reactors beyond their 60-year limit, and by developing next generation reactors to replace them.

● Anti-nuclear sentiment and safety concerns rose sharply in Japan after the 2011 Fukushima disaster, and restart approvals have since come slowly under stricter safety standards.

Greenwashing

What Is Greenwashing?

●Greenwashing is the process of conveying a false impression or misleading information about how a company's products are environmentally sound.

●Greenwashing involves making an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly or have a greater positive environmental impact than they actually do.

●Performed through the use of environmental imagery, misleading labels, and hiding tradeoffs

●Also known as "green sheen," greenwashing is an attempt to capitalize on the growing demand for environmentally sound products, whether that means they are more natural, healthier, free of chemicals, recyclable, or less wasteful of natural resources.

CROMESH Technology

- Scientists working on Australia's Great Barrier Reef have successfully trialled a new method for freezing and storing coral larvae they say could eventually help rewild reefs threatened by climate change.
- Scientists are scrambling to protect coral reefs as rising ocean temperatures destabilise delicate ecosystems.
- The Great Barrier Reef has suffered four bleaching events in the last seven years, including the first ever bleach during a La Nina phenomenon, which typically brings cooler temperatures.

What is Cryomesh?

- Cryomesh is a specially fabricated mesh used as substrate in cryopreservation. This is lightweight and can be manufactured cheaply. It better preserves coral and has the properties of cryoplates
- The mesh technology will help store coral larvae at -196°C (-320.8°F)
- Preserving corals cryogenically, frozen coral can be stored and later reintroduced to the wild but the current process requires sophisticated equipment including lasers.
- Scientists say a new lightweight "cryomesh" can be manufactured cheaply and better preserves coral.

Mesh technology

- The mesh technology, which will help store coral larvae at -196°C (-320.8°F), was devised by a team from the University of Minnesota's C

Significance of Coral Cryopreservation

- Cryogenically frozen coral can be stored and later reintroduced to the wild. This could eventually help to rewild reefs threatened by climate change
- It can build a bigger, more diverse bank of frozen living corals, preserving biodiversity.

Types of diabetes

- Diabetes is a chronic (long-lasting) disease that affects how your body turns food into energy.
- There are three main types of diabetes: type 1, type 2, and gestational diabetes (diabetes while pregnant).
- Type 1 diabetes, your pancreas doesn't make insulin or makes very little insulin. Insulin helps blood sugar enter the cells in your body for use as energy.
- Without insulin, blood sugar can't get into cells and builds up in the bloodstream
- Type 2 diabetes, cells don't respond normally to insulin; this is called insulin resistance.
- Your pancreas makes more insulin to try to get cells to respond.
- Eventually your pancreas can't keep up, and your blood sugar rises, setting the stage for prediabetes and type 2 diabetes.
- High blood sugar is damaging to the body and can cause other serious health problems, such as heart disease, vision loss, and kidney disease.

Neuro marker

Researchers have found a neuroimaging signature to predict the intensity of drug and food cravings (Nature Neuroscience).

- Cravings to use drugs or to eat are considered driving factors for substance use or overeating.
- Cravings induced by drug- or food related stimuli help predict drug use and relapse, unhealthy eating and weight gain.
- They identified a neuromarker that predicted the intensity of drug and food cravings among users of nicotine, alcohol and cocaine alongside matched controls.

Strep A

- An unseasonal rise in group A Streptococcus (strep A) infections has killed over a dozen children.
- Strep A infections cause a mild sore throat but occasionally they can lead to scarlet fever and, rarely, to even more serious conditions such as meningitis.
- Some researchers theorized that the off season outbreaks are a result of past surges that spawned

new strep strains, which happened before the pandemic.

Hybrid immunity

- It is becoming clear that hybrid immunity, that is immunity provided by a combination of infection and vaccination, provides better protection against subsequent COVID-19 than either vaccination or infection alone – higher antibody levels, less frequent and less severe infection

- Irrespective of whether an antigen is introduced as a vaccine or due to pathogen replication, repeated exposure stimulates B cell responses and antibody production.

- Most people with hybrid immunity will have encountered SARS-CoV-2 antigens more often than people who were only vaccinated or only infected.

- Additionally, the quality of the immune responses differs.

- Infection exposes the body to a whole range of antigens coming from different parts of the virus; mRNA and virus-vectored vaccines express only spike, which is the most important vaccine target on the virus surface and exposed to secreted antibodies.

- However, other antigens are also important for T cell responses.

"**B cells** produce and secrete antibodies, activating the immune system to destroy the pathogens. The main **difference between T cells** and **B cells** is that **T cells** can only recognize viral antigens outside the infected **cells** whereas **B cells** can recognize the surface antigens of bacteria and viruses." Sep 25, 2017

Although all lymphocytes originate from only one type of stem cell, the final steps in their development lead to the production of two distinct types of lymphocyte: T-lymphocytes and B-lymphocytes.

T-lymphocytes	B-lymphocytes
Produced in the bone marrow and migrate to the thymus gland for final maturation.	Produced in the bone marrow and mature in the bone marrow itself.
If the antigen comes from outside the body, it needs to be presented to the T-cells on the surface of an antigen presenting cell.	Recognize and bind antigen particles without having to be presented by an antigen presenting cell.
Cell- mediated immunity	Antibody mediated (humoral) immunity

How did India handle the Ukraine crisis?

●The war in Ukraine saw the government spell out its version of "non-alignment", as it sought to keep a balance in the growing polarization between the U.S. and the European Union on one side, and Russia on the other.

● In the past 10 months, the war has led to thousands of deaths, and nearly 8 million refugees.

●Meanwhile, a slew of sanctions by the West meant to target the Russian economy led to food and fuel shortages and price increases, which worried India.

●The government's stand through the year was a tight-rope walk: with the Prime Minister making his discomfort with the war clear directly to Russian President Vladimir Putin with the words "This era is not for war",

● But at the same time refusing to accept western sanctions, growing military and oil trade with Russia, and seeking rupee -based payment mechanisms to facilitate them.

●Most significantly, in more than a dozen resolutions at the UNSC, UNGA, IAEA, Human Rights Commission and other multilateral platforms seeking to censure Russia for the invasion and humanitarian crisis, India chose to abstain.

● Mr. Jaishankar said India's stand was guided by its national interests

What were the other highlights?

In 2022, India returned to Free Trade Agreements, after a hiatus of several years when the Modi government had called for a review of all FTAs, scrapped all Bilateral Investment Treaties (BITs) and walked out of the 15-nation Asian Regional Comprehensive Economic Partnership (RCEP).

● In 2022, India signed trade agreements with the UAE and Australia, and hopes to progress on talks with the EU, Gulf Cooperation Council and Canada for others. India also joined the U.S. led Indo- Pacific Economic Forum (IPEF), although it later decided to stay out of trade talks.

●At the G-20, India is expected to highlight climate change transitions, "women -led" development and multilateral reform, among other key issues.

What about ties with neighbors?

● In the neighborhood, India's foreign policy was marked by economic assistance to Sri Lanka in the midst of its collapse, and regional trade and energy agreements with Bangladesh, Bhutan and Nepal that could see a South Asian energy grid emerge.

●India has also strengthened ties with Central Asian countries on connectivity.

●The government kept channels open with repressive regimes like Afghanistan's Taliban and the Myanmar Junta, opening a "technical mission" in Kabul and sending the foreign secretary to Nay Pyi Taw.

●This week, India abstained on a UNSC vote calling for Myanmar to end violence and release political prisoners.

●With Iran too, where protests against the killing of activist Mahsa Amini has brought thousands onto the streets, India has steered clear of any criticism. However, with Pakistan, ties remain flat lined.

Dark pattern

The story so far:

●Some Internet based firms have been tricking users into agreeing to certain conditions or clicking a few links.

●The unsuspecting users would not have accepted to such terms or clicked urls (uniform resource locator), but for the deceptive tactics deployed by tech firms.

- Such acceptances and clicks are flooding inboxes of the users with promotional emails they never wanted, making it hard to unsubscribe or request deletion.
- These are examples of "dark patterns," also known as "deceptive patterns."

What are dark patterns?

- Such patterns are unethical user interface designs that deliberately make your Internet experience harder or even exploit you.
- In turn, they benefit the company or platform employing the designs.
- By using dark patterns, digital platforms take away a user's right to full information about the services they are using and their control over their browsing experience.
- The term is credited to UI/UX (user interface/user experience) researcher and designer Harry Brignull, who has been working to catalogue such patterns and the companies using them since around 2010.

XBB Lineage

What is the XBB lineage?
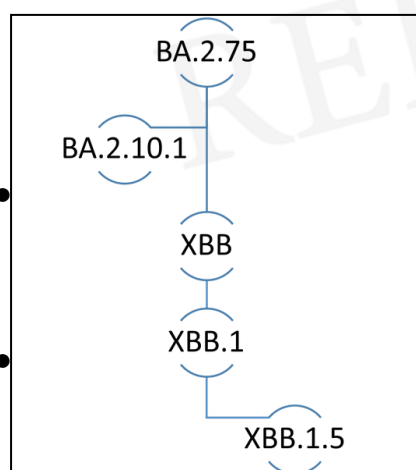
- The SARS-CoV-2 virus has the potential to evolve by exchanging large fragments of the genome, called recombination.

First detected in January 2022, the XBB lineage of SARS-CoV-2 resulted from recombinant between Omicron sublineages BA.2.10.1 and BA.2.75.

The lineage was largely detected in genomes from Singapore and India, with the largest number of genomes on GISAID belonging to the U.S. and India

- Lineage BQ.1 is a BA.5 sublineage having the mutations K444T and N460K in the spike protein of the virus

About GISAID

- Stands for the Global Initiative on Sharing Avian Influenza Data.

- It is a global science initiative and primary source established in 2008 that provides open-access to genomic data of influenza viruses and the coronavirus responsible for the COVID-19 pandemic.

World heritage and forest rights

- Of the 39 areas declared by UNESCO in 2012 as being critical for biodiversity in the Western Ghats, 10 are in Karnataka.

- Before recognizing areas as world heritage sites, UNESCO seeks the opinion of the inhabitants on the implication of the possible declaration on their lives and livelihoods.

- Development activities like road repair have been stopped.

- Farming is not allowed in a normal way, a slight sound is demurred, the use of fertilizers is banned, and even a small knife is not allowed to be carried into the forest.

- The people are prohibited from cutting trees falling on their houses to undertake repair work or move the earth.

- A striking revelation was that these restrictions were in enforcement from the time these areas were declared as protected areas and not necessarily after their declaration as world heritage sites.

- The increasing animal insurgency is causing damage to the crops of the farming forest dwellers.

- Those who don't have recognition over their lands are not given compensation for the loss.

- Monkeys and snakes released from urban settings into the forests enter their houses.

- More importantly, the monkeys do not survive in the wild for long.

- Owning livestock in the villages close to forests is more challenging than in regular revenue villages.

- In the areas where irrigation projects have come up, the affected people reported that grazing lands have been taken over by the government to compensate for the forest land lost to such projects

- Half the world heritage sites in Karnataka fall under protected areas (National Park: 1; Wildlife Sanctuaries: 4) and the remaining are reserved forests.

- The issue becomes complicated when the people refuse to 're-locate' on grounds of their attachment to the land fearing extinction of their culture and religious roots.

CPCB Report on polluted river

- The number of polluted stretches in India's rivers has fallen from 351 in 2018 to 311 in 2022, though the number of most polluted stretches is practically unchanged, according to a report from the Central Pollution Control Board (CPCB) in November but made public this week. The CPCB network monitors water quality at 4,484 locations across the country.

- Biochemical oxygen demand (BOD) exceeding 3 milligrams per litre (mg/l) is identified as polluted locations.

- Two or more polluted locations identified on a river in a continuous sequence are considered as a "polluted river stretch."

- A BOD less than 3 mg/l means the river stretch is fit for "outdoor bathing."

- Further, stretches with BOD exceeding 30 mg/l are considered "Priority 1" (P1), meaning, the most polluted and thus needing the most urgent remediation.

- There are five such categories with "Priority 2" (P2) indicating a BOD of 20- 30 mg/l and "Priority 5" (P5) indicating 3-6 mg/l.

- The success of river -cleaning programmes are measured by the number of stretches moving from 1 to 2, 2 to 3 until those in 5 (requiring the least action) too reduce

- While Gujarat and Uttar Pradesh had the highest number of "Priority 1" river stretches (6), Maharashtra had the most polluted river stretches of 55, followed by Madhya Pradesh (19), Bihar (18), Kerala (18), Karnataka (17) and Uttar Pradesh (17)

Bomb cyclone

A bomb cyclone is a large, intense midlatitude storm that has low pressure at its center, weather fronts and an array of associated weather, from blizzards to severe thunderstorms to heavy precipitation.

It becomes a bomb when its central pressure decreases very quickly by at least 24 millibars in 24 hours.

- Two famed meteorologists, Fred Sanders and John Gyakum, gave this pattern its name in a 1980 study.

- When a cyclone "bombs," or undergoes bombogenesis, this tells us that it has access to the

optimal ingredients for strengthening, such as high amounts of heat, moisture and rising air.

- The U.S. Eastern Seaboard is one of the regions where bombogenesis is most common.
- That's because storms in the midlatitudes a temperate zone north of the tropics that includes the entire continental U.S. draw their energy from large temperature contrasts.
- Along the U.S. East Coast during winter, there's a naturally potent thermal contrast between the cool land and the warm Gulf Stream current.
- Over the warmer ocean, heat and moisture are abundant.
- But as cool continental air moves overhead and creates a large difference in temperature, the lower atmosphere becomes unstable and buoyant.
- Air rises, cools and condenses, forming clouds and precipitation.

AVGC Sector

- A "Create in India" campaign with an exclusive focus on content creation; an international platform for animation, visual effects, gaming and comics (AVGC) aimed at attracting foreign direct investment, co-production treaties and innovation in collaboration with international counterparts; national and regional centres of excellence for skill development; and leveraging the National Education Policy to develop creative thinking at school level.
- These are among the recommendations in the report of a task force on AVGC promotion, submitted to the Union government.
- The task force has proposed a national AVGC Extended Reality Mission with a budget outlay to be created for the integrated promotion and growth of the sector.
- The Ministry of Education may advise NCERT (National Council of Educational Research and Training) to create books focusing on subjects relevant to AVGC
- The task force has proposed standardization of admission tests for AVGC -related courses.
- "With an eye on the demand for 20 Lakh skilled professionals in the AVGC sector in this decade, there is a need to augment skilling initiatives and enhance industry participation for training purposes and to ensure employment opportunities,"
- "Memorandum of Cooperation may be signed between India and other developed global AVGC markets the U.S., Japan, South Korea and Germany for providing internships (six months to a year) to Indian AVGC professionals,"
- The report has also recommended establishment of AVGC accelerators and innovation hubs in

academic institutions;

- democratizing AVGC technologies by promoting subscription based pricing models for micro, small and medium enterprises (MSME)

- Start-ups and institutions; indigenous technology development through incentive schemes and Intellectual Property (IP) creation

- And setting up a dedicated production fund for domestic content creation from across India to promote the country's culture and heritage globally.

- The team, which emphasized skilling and industry outreach for youth in tier- 2 and 3 towns and villages, said there should be special incentives for women entrepreneurs in the sector and promotion of local children's channels for raising awareness of the rich culture and history of India among children and youth.

- It also suggested the establishment of a framework to ensure protection of child rights in the digital world.

- India today contributes about $2.5-3 billion of the estimated $260-275 billion worldwide AVGC market.

- According to industry experts, the Indian market that currently employs about 1.85 Lakh AVGC professionals, can witness a growth of 14- 16% in the next decade

STOBAR v/s CATOBAR

- STOBAR ("short take-off but arrested recovery" or "short take-off, barrier-arrested recovery") is a system used for the launch and recovery of aircraft from the deck of an aircraft carrier,

combining elements of "short take-off and vertical landing" (STOVL) with "catapult-assisted take-off but arrested recovery

●Compared to CATOBAR, STOBAR is less expensive to develop. It is easier to operate than a CATOBAR configuration, which requires large number of operators to launch the aircraft. Lack of any moving parts in ski-jump makes it less expensive to maintain the launch system.

●It does not require any additional system to generate force required to launch the aircraft, unlike CATOBAR where an external force is needed to be generated either from steam catapult or electromagnetic aircraft launch system (EMALS) to launch the aircraft.

●India's first aircraft carrier, INS Vikrant (British -built), predecessor to INS Vikrant (IAC-1), was a 19,000-tonne CATOBAR -type light carrier designed for fleet air defense.

● It could carry between 21 to 23 aircraft (including helicopters).

● Its replacement, INS Viraat (British built), at 28,000 tonnes, was a V/STOL-type light fleet air defense carrier, with an air wing of 26 to 30 aircraft and helicopters.

●Notably, its Sea Harrier aircraft also possessed dedicated land attack capability.

●INS Vikramaditya (Russian -built), at 45,000 tonnes, is a medium- sized STOBAR -type aircraft carrier, capable of both fleet air defense and land attack, carrying up to 30 aircraft and helicopters.

● INS Vikrant IAC-1) is almost similar in size, classification, role and capability to INS Vikramaditya.

Great lake

Canadian and U.S. Areas of Concern

U.S. Army Corps of Engineers, Detroit District

- The Great Lakes are the largest group in a chain of large lakes (including Winnipeg, Athabasca, Great Slave and Great Bear) that lies along the southern boundary of the Canadian Shield.
- From west to east the Great Lakes comprise lakes Superior, Michigan (entirely in the US), Huron, St. Clair, Erie and Ontario.
- They have a total area of approximately 244,100 km^2 and drop from 183 m above sea level at Lake Superior to 74 m at Lake Ontario the most dramatic drop occurring at Niagara Falls.
- Lake St Clair, while not properly a "great lake," is considered part of this Laurentian chain
- The Great Lakes lie near the intersection of the Hudson Bay, Mississippi River and St. Lawrence River drainage basins.

Cervical cancer

The story so far:

- The government has announced that it will roll out vaccines for the prevention of cervical cancer to girls aged between 9 and 14 years through schools.
- The National Technical Advisory Group for Immunization (NTAGI) had recommended the introduction of the Human Papillomavirus (HPV) vaccine in the Universal Immunization Programme (UIP)

Why is it important to launch the HPV vaccine?

- Cervical cancer is preventable and curable if it is detected early and managed effectively.
- It is the second most common cancer in women in India, and the cause of a large number of deaths annually.
- It is caused by infection with the human papillomavirus, and there are vaccines to protect against cancerous HPV.
- A recent study in The Lancet shows that more than 58% of all cases of cervical cancer and deaths globally were estimated in Asia with India accounting for 21% of cases and 23% of deaths, followed by China (18% and 17%).

What are the challenges?

- The study identified substantial geographical and socioeconomic inequalities in cervical cancer globally, with a clear gradient of increasing rates for countries with lower levels of human

development.

●In 2022, India ranked 132 out of 191 countries on the Human Development Index.

● However, health experts say the fact that India's fertility rate is declining due to a variety of factors, including improved literary rate, increase in the age of marriage and so forth, should prompt everyone in the ecosystem, from the government, doctors to ground level health workers to launch campaigns on cervical cancer awareness, push vaccinations and screening for all girls.

Single cigarette ban

The story so far:

The Parliamentary Standing Committee on Health and Family Welfare, in its latest report about cancer management, prevention and diagnosis, recommended that the government institute a ban on the sale of single sticks of cigarettes.

●It also recommended that the government increase taxes on all tobacco products and utilize the acquired revenue for cancer prevention and awareness

● It recommends that the government prohibit the sale of single sticks of cigarettes and suggests the abolition of all designated smoking areas in airports, hotels, and restaurants in addition to encouraging a smoke--free policy in organizations.

●The Committee also found that India has the lowest prices for tobacco products and thus, it must look to increase taxes on them.

●These measures flow from the observation that oral cancer accounts for the highest proportion of cancer cases in the country.

●Additionally, the committee also sought a ban on gutka and pan masala alongside a prohibition on their direct and indirect advertisement

●Single-stick sales, owing to their easier accessibility and affordability, can also work as a disincentive to quit smoking.

Kalasa Banduri project

The water disputes in India stem from a lack of a similar cooperation.

The conflict on the Mandovi / Mahadayi river flowing through Goa, Karnataka and Maharashtra is one such example.

●The Kalasa-Banduri Project undertaken by the Karnataka government proposes to divert Mandovi river water from Kalasa and Banduri canals into the Malaprabha River in the state to facilitate drinking water to 13 towns of Dharwad, Belagavi, Bagalkote and Gadag.

●The entire project aims to construct a total of 11 dams on the river Mandovi.

●The diversion of water from Kalasa and Banduri *nullahs,* however, has been the point of contention between Karnataka and Goa, with the latter claiming it would strip the state of its flora and fauna

The conflict

●The Mandovi originates from Karnataka's Belagaum district.

●The Mandovi river basin falls into the states of Goa, Karnataka and Maharashtra.

●The river is 81 kilometers (km) in length; 35 km of which flows in Karnataka, 1 km in Maharashtra and 45 km in Goa.

●The seeds of the conflict were sowed over 40 years ago: In 1985, Karnataka initially explored a 350 megawatt-hydro-electric project to divert 50 per cent of the Mandovi river water in Karnataka for irrigation.

●The plan was also to allow a steady flow of water from the power project's storage dam after using the water for irrigation purposes in Karnataka.

●This would have served drinking water and irrigation purposes in Goa as well.

Voice technology

- Voice Technology (VT), which encompasses voice biometrics or voice/speech recognition technology.
- The global adoption of smart phones has led to a dramatic increase in biometrics for security.
- However, these methods are cumbersome, not entirely secure, and vulnerable to deep fakes
- . The technology creates a digital voiceprint and compares it to a caller's voice.
- Voice authentication can significantly improve security over knowledge -based authentication methods, which fraudsters have exploited to scam people.
- Compared to other biometrics, voice use is the cheapest technology, and does not require a reader or special device.
- It is also non-invasive, portable and affords remote identification.
- The police can leverage voice to improve investigation efficiency, identify criminals, track criminals, and better respond to and prevent crimes.
- Not surprisingly, voice is finding use from criminal background checks to airport security
- Voice has a much lower error rate, and requires no eye contact
- VT has the advantage of improving user experience, reducing call handle times and call centre costs, besides ensuring high -accuracy authentication in seconds.
- It also has the ability to resist playback attacks.
- The technology is sensitive enough to detect if someone is impersonating the user or playing a recording.
- It can identify even if the user has a cold or a sore throat.
- Voice could be an excellent tool for the Government to disburse money for various schemes and verify the proof of life of pensioners from their homes.
- Voice biometrics tech is making waves in the world of fraud protection by providing an extra layer of protection for data

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BCAS

- The Bureau of Civil Aviation Security was initially set up as a Cell in the Directorate General of Civil Aviation (DGCA) in January 1978 on the recommendation of the Pande Committee constituted in the wake of the hijacking of the Indian Airlines flight on 10th September, 1976.
- The role of the Cell was to coordinate, monitor, inspect and train personnel in Civil Aviation

Security matters.

- The BCAS was reorganized into an independent department on 1st April, 1987 under the Ministry of Civil Aviation as a sequel to the Kanishka Tragedy in June 1985.
- The main responsibility of BCAS are lay down standards and measures in respect of security of civil flights at International and domestic airports in India.
- Laying down Aviation Security Standards in accordance with Annex 17 to Chicago Convention of ICAO for airport operators, airlines operators, and their security agencies responsible for implementing AVSEC measures.
- Monitoring the implementation of security rules and regulations and carrying out survey of security needs
- Ensure that the persons implementing security controls are appropriately trained and possess all competencies required to perform their duties.
- Planning and coordination of Aviation security matters.

Conducting -

Surprise/Dummy checks to test professional efficiency and alertness of security staff. Mock exercise to test efficacy of Contingency Plans and operational preparedness of the various agencies.

Ethylene glycol

The ministry said that preliminary tests showed a batch of the medicine contained ethylene glycol, a toxic substance

What is ethylene glycol?

- Ethylene glycol is a colorless and odorless alcoholic compound that can be fatal if consumed.
- The sweet-tasting ethylene glycol is a syrupy or viscous liquid at room temperature,
- It is mostly used as an automotive antifreeze and as a raw material for manufacturing polyester fibers.
- It is also found in several products such as hydraulic brake fluids, stamp pad inks, ballpoint pens, solvents, paints, cosmetics and plastics
- Diethylene glycol and ethylene glycol are adulterants that are sometimes illegally used as solvents in liquid drugs.

- Diethylene glycol and ethylene glycol may be used by pharma companies as an alternative to non-toxic solvents such as glycerine or propylene glycol to cut costs.
- The ingestion of ethylene glycol can cause severe health effects.

Butterfly mimic

- In a five -year study, scientists of the National Centre for Biological Sciences (NCBS) in Bengaluru have discovered secrets of a long evolutionary game through which butterflies come to warn, fool, and escape their predators using traits such as wing color patterns and even flight behavior.
- Mimicry is an adaptive phenomenon, and in mimicry, a palatable organism resembles an unpalatable organism to deceive predators.
- Palatable species are agreeable to the palate or taste, and are preferred by grazing animals or predators
- "The unpalatable one is called models (Müllerian co-models) and the palatable one is called mimics (Batesian mimics).
- Interestingly, mimicry in butterflies is not limited to the resemblance in wing color patterns alone, as some mimics have also evolved to imitate the flight behaviors of model species.
- In nature, multiple model and mimic butterflies could be found in the same habitat at the same time.
- These similar -looking co occurring butterflies together form a mimetic community"

About Model species

A model organism is a non-human species that is extensively studied to understand particular biological phenomena, with the expectation that discoveries made in the model organism will provide insight into the workings of other organisms.

What are cloud services??

- Cloud services are infrastructure, platforms, or software that are hosted by third-party providers and made available to users through the internet.
- All infrastructure, platforms, software, or technologies that users access through the internet without requiring additional software downloads can be considered cloud computing services—including the following as-a-Service solutions.
- Infrastructure-as-a-Service (IaaS) provides users with compute, networking, and storage resources
- Platforms-as-a-Service (PaaS) provides users with a platform on which applications can run, as well as the entire IT infrastructure required for it to run.
- Software-as-a-Service (SaaS) provides users with essentially a cloud application, the platform on which it runs, and the platform's underlying infrastructure.
- Function-as-a-Service (FaaS), an event-driven execution model, lets developers build, run, and manage app packages as functions without maintaining the infrastructure.

Dozee

- Dozee, a contactless remote vital parameter monitoring (RPM) device which can convert any normal bed into a step-down ICU, will be deployed in six States.


Military exercises

- . The 18th edition of India- U.S. Army exercise 'Yudh Abhyas' which is under way at Auli in Uttarakhand, about 100 km from the Line of Actual Control, has entered the validation phase and is set to conclude this week.
- Other exercises such as Ex Austra Hind with Australia are under way at Mahajan field firing ranges in Rajasthan from November 28 to December 11 and
- Ex Agni Warrior with Singapore at Deolali from November 13 to December 03.
- The outgoing exercises are Ex Harimau Shakti with Malaysia from November 28 to December 12
- Ex Garuda Shakti with Indonesia, between Special Forces began on November 21.

●Ex KazInd with Kazakhstan is scheduled in mid- December.

CCUS technology

●Carbon Capture Utilization and Storage (CCUS), the technology for decarbonising emissions from high polluting sectors such as steel, cement, oil, gas, petrochemicals, chemicals and fertilizers, has a critical role to play for the country to halve carbon dioxide emissions by 2050, says a report on the policy framework of the CCUS prepared by the NITI Aayog and MN Dastur & Company.
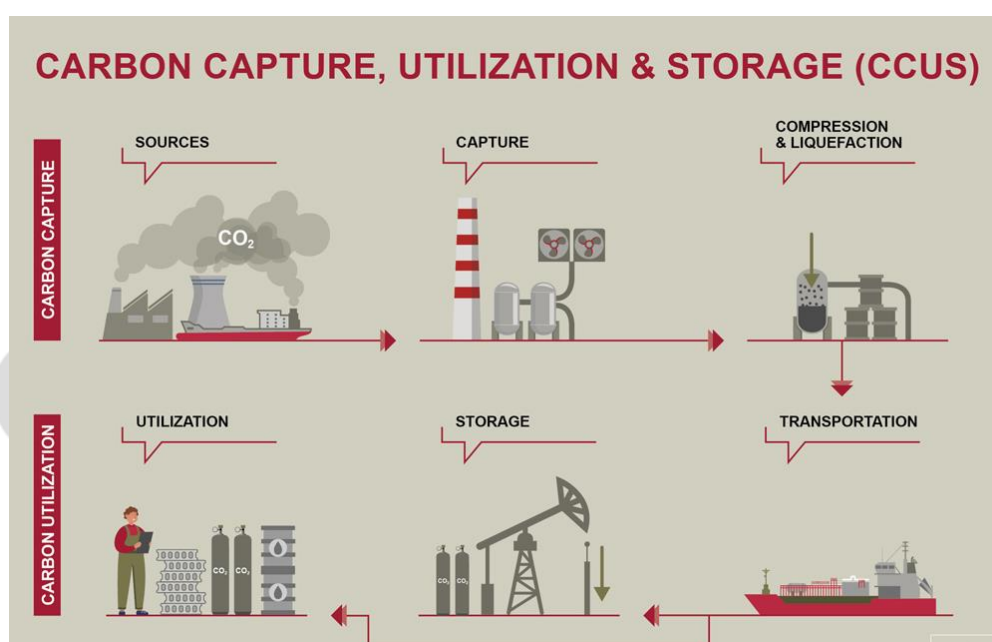
●CCUS technology would help in promoting the low carbon hydrogen economy and in removal of the CO2 stock from the atmosphere

● CCUS has an important and critical role to play in it, especially for India to accomplish net-zero by 2070."

●CCUS could enable the production of clean products while utilizing rich endowments of coal, reducing imports and thus leading to a self-reliant India economy.

● "CCUS also has an important role to play in enabling sunrise sectors such as coal gasification and the nascent hydrogen economy in India

SARAS-3
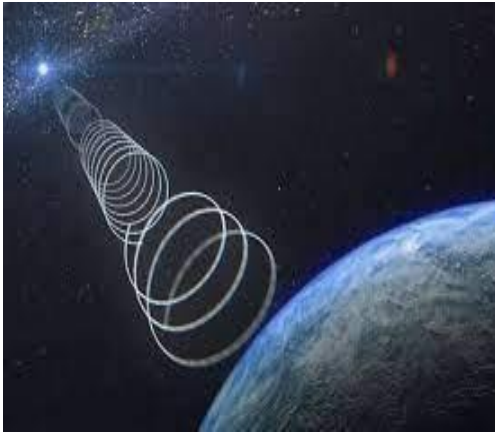
- SARAS is a niche high-risk high-gain experimental effort of RRI initiated and led by Prof. Ravi Subrahmanyan, along with Prof. N. Udaya Shankar.

- SARAS aims to design, build and deploy in India a precision radio telescope to detect extremely faint radio wave signals from the depths of time, from our "Cosmic Dawn" when the first stars and galaxies formed in the early Universe.

- The signal from Cosmic Dawn is expected to arrive on Earth stretched in wavelength to meters and lowered in frequency by the expansion of the Universe to lie in the radio frequency band 50-200 MHz.

SARAS 3, a radio telescope designed and built at the Raman Research Institute (RRI) here, has provided clues to the nature of the universe's first stars and galaxies.

Raman Research Institute, an autonomous institute of the Department of Science & Technology, Govt. of India refuted this claim.

Using data from the telescope which has been deployed over the Dandiganahalli Lake and Sharavati backwaters (Karnataka) since 2020, astronomers and researchers have been able to determine properties of radio luminous galaxies formed just 200 million years post the Big Bang.
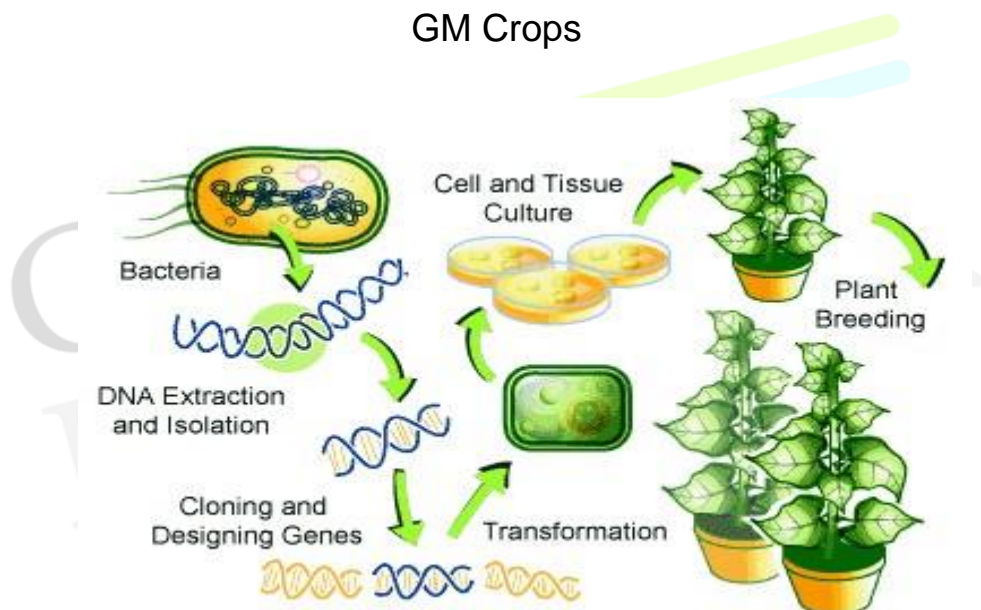
Kolkari arts

Kolkali is a folk art performed in Malabar region of Kerala, India.

The dance performers move in a circle, striking small sticks and keeping rhythm with special steps. The circle expands and contracts as the dance progress

● The accompanying music gradually rises in pitch and the dance reaches its climax.

GM Crops

● *BT* cotton is the only genetically modified (GM) crop that has been approved for commercial cultivation in 2002 by the Government of India. Long term studies were conducted by ICAR on the impact of *BT* cotton which did not show any adverse effect on soil, microflora and animal health.

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● However, the Parliamentary Standing Committee on Science and Technology, Environment and Forests, in its report on 'Genetically modified crops and its impact on environment', submitted to

parliament on August 25, 2017, recommended that GM crops should be introduced in the country only after critical scientific evaluation of its benefit and safety, and also recommended restructuring of regulatory framework for unbiased assessment of GM crops.

- In 2002 approval for the commercial release of *BT* cotton hybrids/ varieties resistant to cotton bollworm was given.

- *Bt* Brinjal resistant to brinjal shoot fly developed by M/S Mahyco in collaboration with University of Agricultural Sciences, Dharwad; Tamil Nadu Agricultural University, Coimbatore and ICAR-Indian Institute of Vegetable Research, Varanasi was approved by GEAC in 2009 but due to 10 years moratorium imposed on GM crops by the Technical Expert Committee (TEC) appointed by the Hon'ble Supreme Court of India, no further action on commercialization has been taken.

- GM mustard Dhara Mustard Hybrid 11 (DMH 11) developed by Delhi University is pending for commercial release as GEAC has advised to generate complete safety assessment data on environmental bio-safety, especially effects on beneficial insect species. No such request is pending in the matter.

- ICAR always promotes the science based innovative technology including research on GM crops. 'Network Project on Transgenic in Crops' (presently Network Project on Functional Genomics and Genetic Modification in Crops) was launched by ICAR in 2005 for development of GM crops in case of pigeonpea, chickpea, sorghum, potato, brinjal, tomato and banana for different traits and the material is in different stages of development.

- The Government of India has very strict guidelines to test and evaluate the agronomic value of the GM crops so as to protect the interests of the farmers.

- These guidelines address all concerns with regard to the safety of GM seeds.

- The regulatory system for GM crops as operative in the Department of Biotechnology, Ministry of Science and Technology (Review Committee on Genetic Manipulation; RCGM) and Ministry of Environment and Forests (Genetic Engineering Appraisal Committee; GEAC) has guidelines to consider the GM crops on case-by-case basis towards testing.

First ever launch pad

- Agnikul, the Chennai-headquartered space tech startup, has established India's first ever launch pad for a private launch vehicle at Sriharikota.

- It was inaugurated recently by S. Somanath, Chairman of Indian Space Research Organization (ISRO) and Secretary of the Department of Space
- The first exclusive launch pad for a private launch vehicle has come up at the Satish Dhawan Space Center. Now, India can travel to space from one more platform
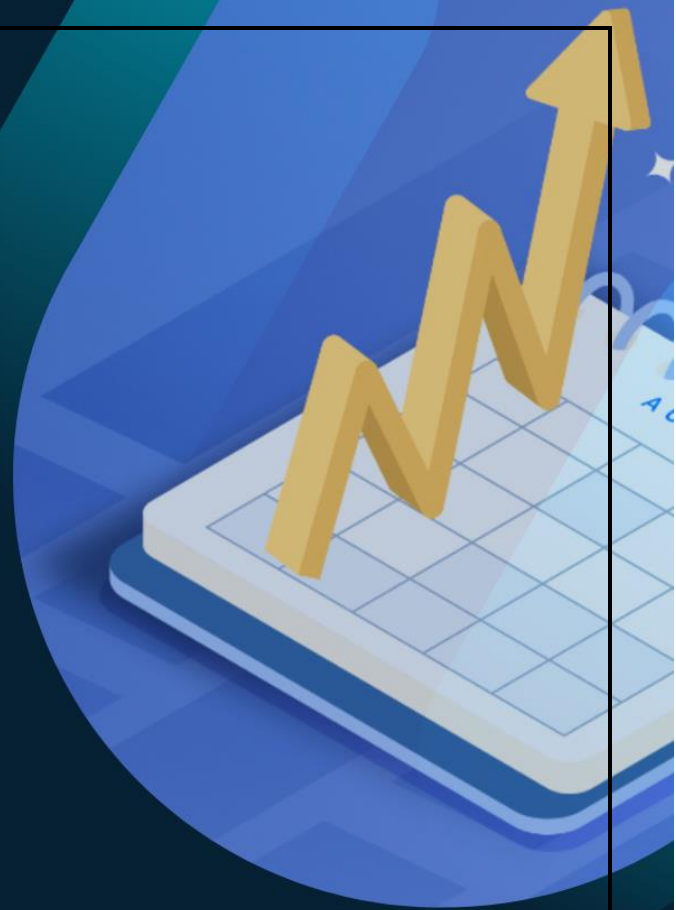

Global shield schemes

- Germany will provide €170 million ($172 million) to a "Global Shield" insurance initiative to help low-income and vulnerable countries to rebound in the event of climate calamities.
- It aims to strengthen social protection schemes and climate risk insurance , so when an extreme weather event like flooding strikes, communities can access aid quickly
- Germany, G7 launch 'Global Shield' climate finance at COP27
- A protection scheme that "kicks in automatically in the case of a crisis" frees up money for new seeds immediately, limiting the damage, the statement continued.
- Countries like Canada, Ireland and Denmark have so far pledged a further €40 million to the initiative.
- Scheme towards LOSS AND DAMAGE