October 2022

CURRENT AFFAIRS

THE BEST MAGAZINE FOR GEOGRAPHY, ENVIRONMENT AND SCIENCE CURRENT AFFAIRS

GES REPORTER




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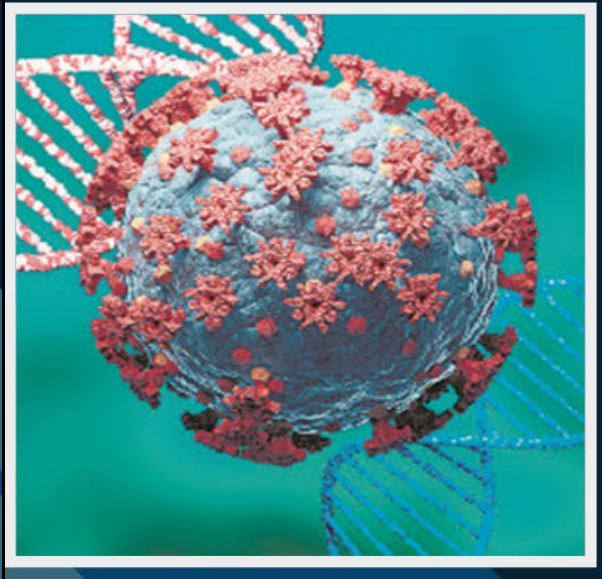

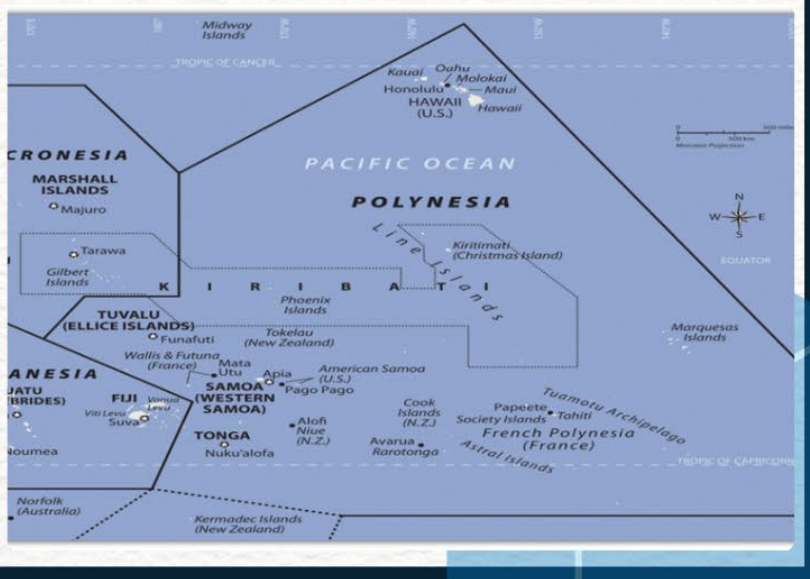

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Zhurong

China's Zhurong rover has peered under the surface of Mars and has found evidence of two huge floods that shaped the landscape.

- Since May last year, Zhurong has been exploring Utopia Planitia, in Mars's northern hemisphere
- Zhurong is an active Mars rover that is China's first rover to land on another planet
- It is part of the Tianwen-1 mission to Mars conducted by the China National Space Administration (CNSA).
- Tianwen-1 is an interplanetary mission by the China National Space Administration (CNSA) which sent a robotic spacecraft to Mars, consisting of 6 spacecrafts: an orbiter, two deployable cameras, lander, remote camera, and the Zhurong rover.
- The spacecraft, with a total mass of nearly five tons, is one of the heaviest probes launched to Mars and carries 14 scientific instruments.
- It is the first in a series of planned missions undertaken by CNSA as part of its Planetary Exploration of China program.

Impact of global warming

- Atmospheric carbon dioxide levels have increased by over 40%, from 280 ppm in the 18th century to 414 ppm in 2020, and greenhouse gases level by over these 200 years.
- India had 170 million people in 1800, which has risen to 1.4 billion people today.
- And industrial revolution started only after India's Independence 75 years ago.
- While it has helped in reduction of poverty, it has also led to rise in atmospheric carbon dioxide and greenhouse gases.
- The Food and Agriculture Organization (FAO) site points out that we have a rural population that constitutes 70% of the country, and their main occupation is agriculture.
- This gives us a total foodgrain production of 275 million tonne.
- India is the second largest producer of rice, wheat, sugarcane, cotton and groundnuts.
- Indian farmers not only grow rice and wheat but produce other food grains as well.
- They grew about 121.5 million tonnes of rice and 109 million tonnes of wheat during the year

2020-2021.

- They also produce other food grains such as millets (bajra), cassava and more. They grow about 12 million tonnes of millets annually.
- Likewise, the amount of maize produced per year is about 28.6 million tonnes.
- It is, thus, healthier for us to add more millets in our diet, besides rice and wheat.
- And wheat is superior to rice as it has more proteins (13.2 g per 100 g), fat (2.5 g per 100 g), and fibre (10.7 g per 100 g).
- India has about 20-39% vegetarians and 70% of the population eats meat mainly chicken, mutton and fish (Devi et al).
- India, with its many rivers, has a vast coastline which is rich in fishes.
- And fishes have high nutritional value and help in reducing carbon footprint

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Heat waves and heat dome

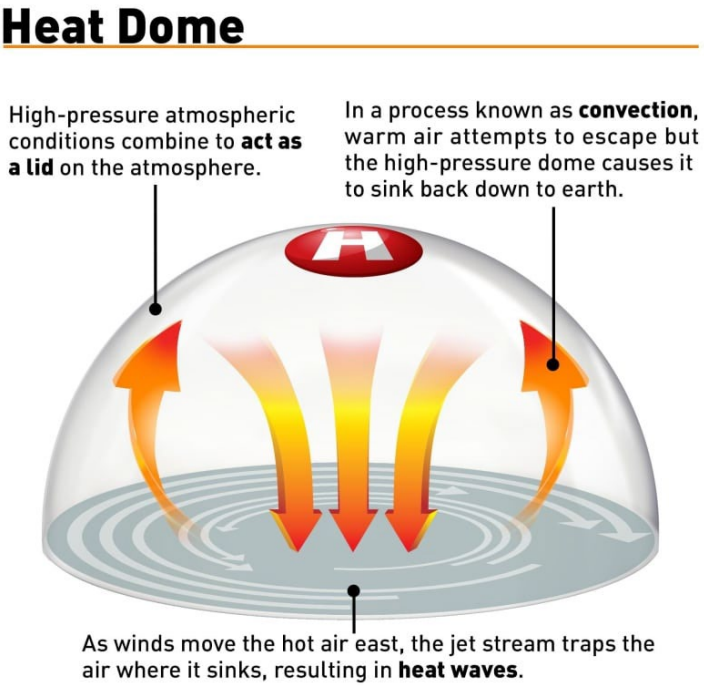
- Many parts of China are just emerging from an extreme heatwave that was followed by a severe drought and out-of-season wildfires.
- Some 360 million people experienced temperatures above 40°C at some point during the two-month-long heatwave.
- The Yangtze River basin, which is home to nearly one-third of China's population, received up to 80% less rain than the 30-year average for that period.
- Italy, on the other hand, has been reeling under a drought, with the Po river basin, one of Europe's 'food bowls', not having received rains in more than 200 days

What is behind the extreme heat waves?

- Scientists are near-unanimous that the heat waves are a result of climate change caused by human activity
- The rising global temperature, which this year led to deviations above the normal by as much as 15 degrees in Antarctica, and by more than 3 degrees in the North Pole, have also induced changes in old wind patterns.
- These changes turned western Europe into what has been described as a "heat dome" — a low pressure area that began to attract hot air from northern Africa.

Heat dome

- A heat dome is caused when atmosphere traps hot ocean air, as if bounded by a lid or cap.
- The upper air weather patterns are slow to move, referred to by meteorologists as an Omega block
- Blocks in meteorology are large-scale patterns in the atmospheric pressure field that are nearly stationary, effectively "blocking" or redirecting migratory cyclones. They are also known as blocking highs or blocking anticyclones.
- These blocks can remain in place for several days or even weeks, causing the areas affected by them to have the same kind of weather for an extended period of time (e.g. precipitation for some areas, clear skies for others)
- In still, dry summer conditions, a mass of warm air builds up.
- The high pressure from the Earth's atmosphere pushes the warm air down.
- The air is compressed, and as its net heat is now in a smaller volume, so it must get hotter.
- As the warm air attempts to rise, the high pressure above it forces it down, to get hotter, and its pressure grows higher.
- The high pressure acts as a dome, causing everything below it to get hotter and hotter



Cordycepin, a secondary metabolite

- Cordycepin, a secondary metabolite produced by Cordyceps species of fungus, is known to have antitumor properties.
- "Not only cordycepin, in general, several secondary metabolites are known to be beneficial for humans in terms of both therapy and health
- Secondary metabolites were structurally distant from existing drugs. Also, their 'scaffolding' was different from known drugs. About 94% of the chemical scaffolds identified in secondary metabolites of medicinal fungi were not present in approved drugs

Secondary metabolites

- Secondary metabolites, also called specialised metabolites, toxins, secondary products, or natural products, are organic compounds produced by any lifeform, e.g. bacteria, fungi, animals, or plants, which are not directly involved in the normal growth, development, or reproduction of the organism.

Nord stream

The European Union said they suspected "sabotage" behind the leaks while the Russian Foreign Ministry said that the ruptures to the pipelines took place in territory that was "fully under the control" of U.S. intelligence agencies.

What are the Nord Stream pipelines?

- The $7.1 (€7.4) billion Nord Stream 1 subsea pipeline has been operational since 2011, and is the largest single supply route for Russian gas to Europe.
- The Russian state-owned gas company Gazprom has a majority ownership in the pipeline
- While 40% of Europe's pipeline gas came from Russia before the war, the number now stands at just 9%.
- The construction of the $11 billion-worth Nord Stream 2 was completed in 2021 but never began commercial operations
- The pipelines were unlikely to provide any gas to Europe in the forthcoming winter months, even if the political will to resume supply was found.
- European gas prices spiked after reports of the leaks emerged;
- European Benchmark prices rose 12% on Tuesday, while Dutch and British Prices continued to

rise on Wednesday.

- Additionally, while analysts have not yet quantified the environmental impact of the leaks, Reuters quoted the commercial methane-measuring satellite firm GHGSat as saying that a "conservative estimate" based on available data suggested that the leaks together were releasing more than 500 metric tonnes of methane per hour when first breached.

What's the big deal about methane?

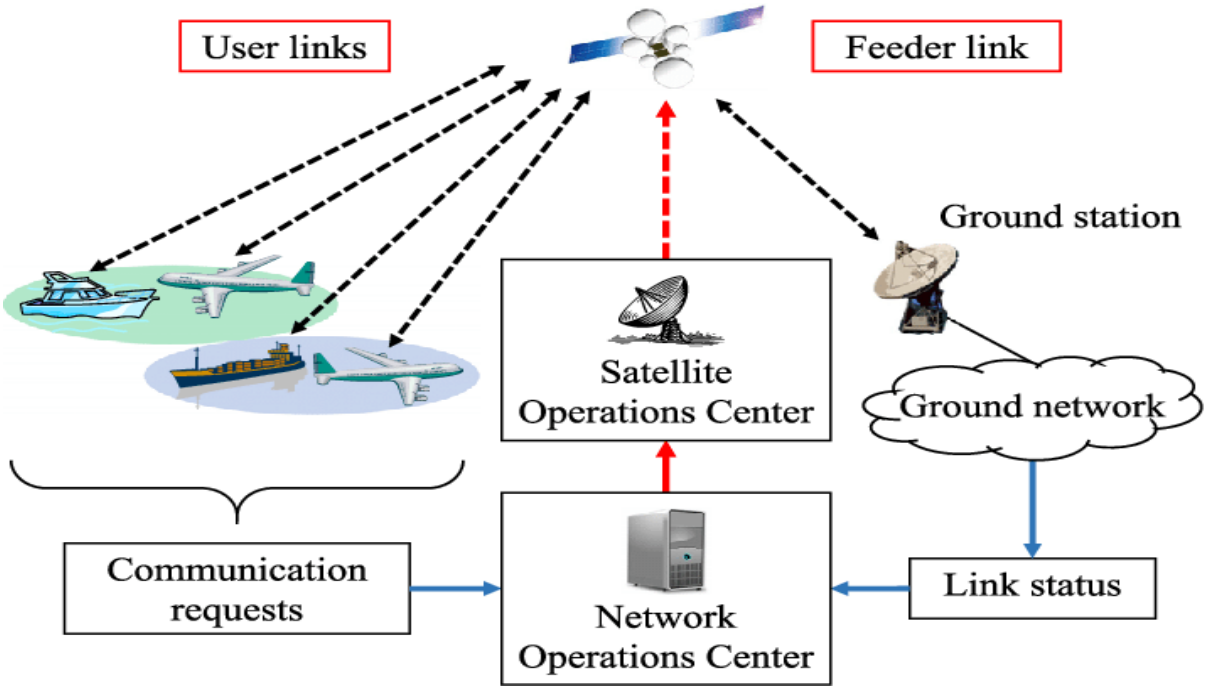
- Methane is the primary contributor to the formation of ground-level ozone, a hazardous air pollutant and greenhouse gas, exposure to which causes 1 million premature deaths every year. Methane is also a powerful greenhouse gas.
- Over a 20-year period, it is 80 times more potent at warming than carbon dioxide.
- Methane has accounted for roughly 30 per cent of global warming since pre-industrial times and is proliferating faster than at any other time since record keeping began in the 1980s.

Tap water

A fully functional tap water connection is defined as a household getting at least 55 litres per capita per day of potable water all through the year.

- Close to three-fourths of households received water all seven days a week and 8% just once a week.
- On an average, households got water for three hours every day, and 80% reported that their daily requirements of water were being met by the tap connections.
    - The water quality in some households was tested. It revealed 95% of households to have within acceptable limits of pH values.
- Over 90% of village-level institutions were getting potable water. Over half (57%) of the sampled households reported purifying water before drinking.
- However, the report mentions a concerning problem of chlorine contamination.
- Though 93% of the samples were reportedly free of bacteriological contamination, "most of the anganwadi centres and schools had higher than the permissible range of residual chlorine and indicated inappropriate local dosing.

Satcom and internet



- The two biggest developments in the global satellite communication space are the emergence of LEO (low-earth orbit constellations) that promises to provide truly global coverage and lower latency service, and HTS (High Throughput Satellites Service) which offers unprecedented capacity and flexibility.
- India is quickly catching up with global trends and we are optimistic about India's prospects in the global satellite communication market
- OneWeb has also partnered with NewSpace India Limited (NSIL), the commercial arm of Indian Space Research Organization (ISRO) and Elon Musk's SpaceX to resume its satellite launches
- Satellite service provider Hughes Communications India, (HCI) and Bharti Airtel announced a joint venture in January to provide satellite broadband services in India
- Tata-owned satcom company Nelco, and Canada's Telesat have also successfully conducted the first in-orbit demonstration of high-speed broadband connectivity in India
- Changing the Internet landscape Satcom companies reckon that satellite broadband services can connect the most remote parts of the country which are otherwise difficult to connect through fibres.
- Satellite broadband services can, therefore, help in addressing the need of the market for fibre-like connectivity in the remotest parts of the country with high reliability and flexibility

Challenges ahead

- Satellite data transfer provides very slow Internet speeds and limited satellite bandwidth because of the distances the signals have to travel and all the potential obstacles in between
- If the user is located under trees with light or medium foliage it might take over a minute to send a message, while the same message takes 15 seconds to be sent in ideal conditions with a direct view of the sky and the horizon.
- Users might not be able to connect to a satellite at all if they are located under heavy foliage or surrounded by other obstructions
- Satellite Internet latency can be a significant problem.
- This can be a matter of only a second or two, but a delay on that scale can seriously affect real-time applications like video chats.
- Unlike terrestrial communications, minor changes in weather can have a massive impact on both the speed and latency of satellite data

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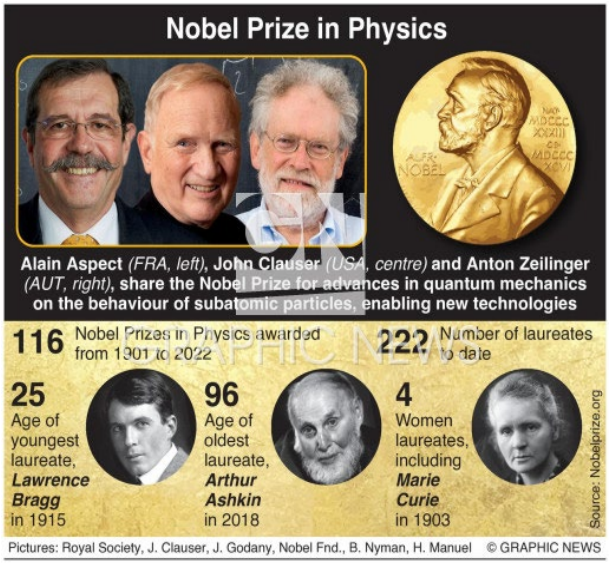
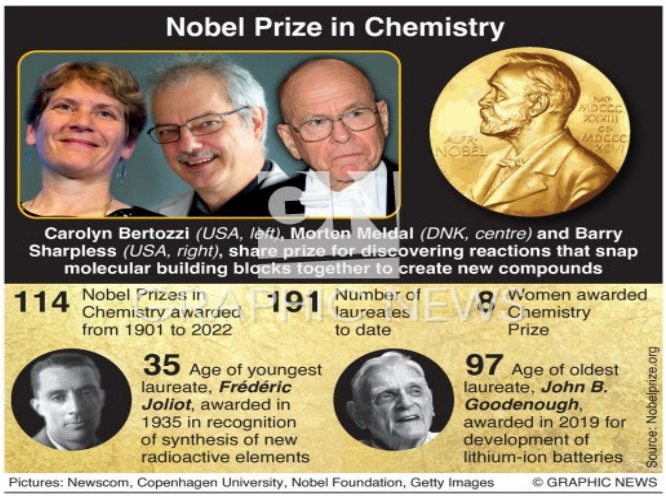
Nobel Prize 2022





Noble prize in medicine

- The Nobel Prize for Physiology this year has been awarded to Svante Pääbo, Swedish geneticist, who pioneered the field of palaeogenomics, or the study of ancient hominins by extracting their DNA.
- The study of ancient humans has historically been limited to analysing their bones and objects around them such as weapons, utensils, tools and dwellings. Pääbo pioneered the use of DNA,

the genetic blueprint present in all life, to examine questions about the relatedness of various ancient human species.

- He proved that Neanderthals, a cousin of the human species that evolved 1,00,000 years before humans, interbred with people and a fraction of their genes — about 1-4% — live on in those of European and Asian ancestry

How can DNA be extracted from fossils?

- The challenge with extracting DNA from fossils is that it degrades fairly quickly and there is little usable material.
- Because such bones may have passed through several hands, the chances of it being contaminated by human as well as other bacterial DNA get higher
    - DNA is concentrated in two different compartments within the cell: the nucleus and mitochondria, the latter being the powerhouse of the cell.
    - Nuclear DNA stores most of the genetic information, while the much smaller mitochondrial genome is present in thousands of copies and therefore more retrievable
    - Pääbo's most important contribution is demonstrating that ancient DNA can be reliably extracted, analysed and compared with that of other humans and primates to examine what parts of our DNA make one distinctly human or Neanderthal.
    - Comparative analyses with the human genome demonstrated that the most recent common ancestor of Neanderthals and Homo sapiens lived around 8,00,000 years ago.

What are the implications of palaeogenomics?

- The study of ancient DNA provides an independent way to test theories of evolution and the relatedness of population groups.
- In 2018, an analysis of DNA extracted from skeletons at Haryana's Rakhigarhi reported to be a prominent Indus Valley civilisation site provoked an old debate about the indigenousness of ancient Indian population.
    - These fossils, about 4,500 years old, have better preserved DNA than those analysed in

Pääbo's labs as they are about 10-times younger.

- The Rakhigarhi fossils showed that these Harappan denizens lacked ancestry from Central Asians or Iranian Farmers and stoked a debate on whether this proved or disproved 'Aryan migration.'
- Palaeogenomics also gives clues into disease. Researchers have analysed dental fossils to glean insights on dental infections.

Noble price in physics

Why were these three physicists chosen for the award?

- The prize has been given for experimental work in quantum entanglement, which Einstein referred to as 'spooky action at a distance'.
- John Clauser and Alain Aspect firmed up this concept, developing more and more complex experiments that demonstrated and established that entanglement was indeed a true characteristic of quantum mechanics.
- They did this by creating, processing and measuring what are called Bell pairs.
- Anton Zeilinger innovatively used entanglement and Bell pairs, both in research and in applications.
- These include quantum computation and quantum cryptography.

What is at the centre of the quantum revolution?

- Many of the concepts that were useful in visualising the movement of particles in the classical realm break down when applied to particles obeying quantum mechanics.
- For example, when a tennis ball is struck, we see that it traces out a definite path in space.
    - The path it traces out is called a trajectory, and it is eminently possible to theoretically calculate the trajectory to any given accuracy.
    - Simultaneously, there is no restriction on measuring the speed, or momentum of the ball at every point on the trajectory.
    - Particles that fall into the quantum regime on the other hand electrons or photons, for example do not even possess a definite trajectory because they are not little hard spheres that we initially imagined them to be, but are weird, wavelike quantum objects.
    - Because of this, there is a limit to how precisely you can measure the position and momentum of these particles simultaneously.
    - Many differences arise, starting from this fundamental difference. One important difference in the behaviour of quantum systems, when compared to classical bodies, is the concept of entanglement, which is at the heart of this year's Nobel Prize for physics

What is the practical use of quantum mechanics?

- Electronic devices that we employ today use transistors that apply quantum mechanical ideas.
- Lasers have been built that apply the quantum properties of light.

What is quantum entanglement? Does it have a classical counterpart?

- Quantum entanglement is a phenomenon by which a pair of particles, say photons, is allowed to exist in a shared state where they have complementary properties, such that by measuring the properties of one particle, you automatically know the properties of the other particle.
- This is true however far apart the two particles are, provided the entanglement is not broken. There is a trivial example of this from the classical domain.

What was the work done by the laureates?

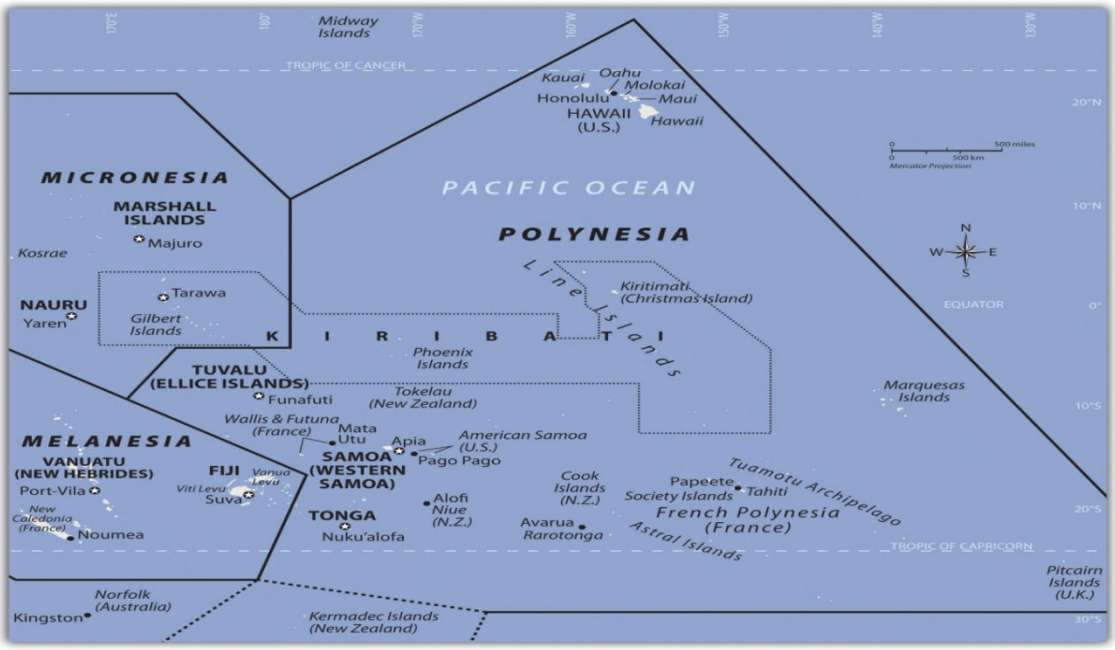
- John Clauser and Alain Aspect devised sophisticated experiments to test the above cases and establish through Bell's inequality, that entanglement was indeed a consequence of quantum physics.
- The third laureate Anton Zeilinger and his group used the phenomenon of entanglement to perform what is called quantum teleportation. This is a way of conveying information from one place to another without the actual transport of material

Where does the work find use in practical applications?

- The work of the three laureates can help in developing quantum technologies of the future, for example, quantum cryptography, and precise timekeeping as is done in atomic clocks.

Details of pacific islands

- The Pacific realm is home to many islands and island groups.
- The largest island is New Guinea, which is home to most of the realm's population
- The many islands can be divided into three main groups based on physical geography, local inhabitants, and location: Melanesia, Micronesia, and Polynesia.
- Indigenous cultural heritage remains strong in the South Pacific, but Western culture has made deep inroads into people's lives.
- The globalisation process bears heavily on the economic conditions that influence the cultural dynamics of the Pacific.



- The islands were economically self-sufficient. Fishing and growing crops were the main economic activities, and nearby islands often established trade and exchanged natural resources.
- Fishing has been one of the most common ways of supporting the economy.
- There have been changes in the national boundaries to protect offshore fishing rights around each sovereign entity. Many waters have been overfished, consequently reducing the islands' ability to provide food for their people or to gain national wealth.
- An increase in population and the introduction of modern technologies has brought about a dependency on the world's core areas for economic support.
- In recent decades, some national wealth has been gained from the mining of substances such as phosphates on a few of the islands.
- The main resources available are a pleasant climate, beautiful beaches, and tropical island terrain, all of which can be attractive to tourists and people from other places.
- Tourism is a growing sector of the service industry and a major means of gaining wealth for various island groups

Melanesia

- The region of the Pacific north of Australia that borders Indonesia to the east is called Melanesia.
- The name originally referred to people with darker skin but does not adequately describe the region's current ethnic diversity.
- The main island groups include Fiji, New Caledonia, Vanuatu, the Solomon Islands, and Papua New Guinea.

- All are independent countries except New Caledonia, which is under the French government

Micronesia

- North of the Solomon Islands and Papua New Guinea is the large region of Micronesia. The "micro" portion of the name refers to the fact that the islands are small in size often only one square mile or so in physical area.
- The region has more than two thousand islands. Most of the islands are composed of coral and do not extend above sea level to any large extent.

Independent Countries of Micronesia

- Federated States of Micronesia
- Kiribati (Western)
- Marshall Islands
- Nauru
- Palau

Other Island Groups

- Guam (US)
- Gilbert Islands (Kiribati)
- Northern Mariana Islands (US)
- Wake Island (US

Polynesia

- The largest region of the Pacific is Polynesia, a land of many island groups with large distances between them.
- The root word poly means "many." Numerous groups of islands have come together under separate political arrangements.
- The region includes the Hawaiian Islands in the north and the Pitcairn Islands and Easter Island to the east

Independent Countries of Polynesia

- Kiribati (eastern)
- Samoa
- Tonga
- Tuvalu

Main Island Possessions

- American Samoa (US)
- Cook Islands (NZ)
- Hawaiian Islands (US)
- Pitcairn Islands (UK)
- French Polynesia (FR)

Dark reserve

- A part of Changthang Wildlife Sanctuary at Hanle, Ladakh is all set to become India's first Dark Sky Reserve.
- The site will host activities to promote astronomy-tourism, giving a boost to local tourism and economy through science.
- Being a cold desert region, Ladakh holds great potential for undertaking uninterrupted astronomical observations.
- Dry weather and clear sky conditions prevail during most months of the year, making Hanle a naturally perfect setup for sky gazing and setting up astronomical observatories.
- At a height of 4,500 metres, Hanle is already home to an optical, a gamma ray and an infrared telescope at the Indian Astronomical Observatory complex operated by the IIA.
- These telescopes have been used to study stars, galaxies, exoplanets and the evolution of our Universe.
- The Ladakh government along with the IIA and India's Scientific Ministries is laying the groundwork to have Hanle declared as an International Dark Sky Reserve by the International Dark-Sky Association.
- Since 1988, the U.S.-based non-profit has been advocating the cause of minimising light pollution and certifies places where night skies are least polluted as International Dark Sky Reserves or sanctuaries.
- The Indian Institute of Astrophysics (IIA), with its headquarters in Bengaluru,is an autonomous Research Institute wholly financed by the Department of Science and Technology, Government of India.
- IIA conducts research primarily in the areas of astronomy, astrophysics and related fields.

What is click chemistry?

Click chemistry mechanism

- Click chemistry is a newer approach to the synthesis of drug-like molecules that can accelerate the drug discovery process by utilising a few practical and reliable reactions. Sharpless and coworkers defined what makes a click reaction as one that is wide in scope and easy to perform, uses only readily available reagents, and is insensitive to oxygen and water

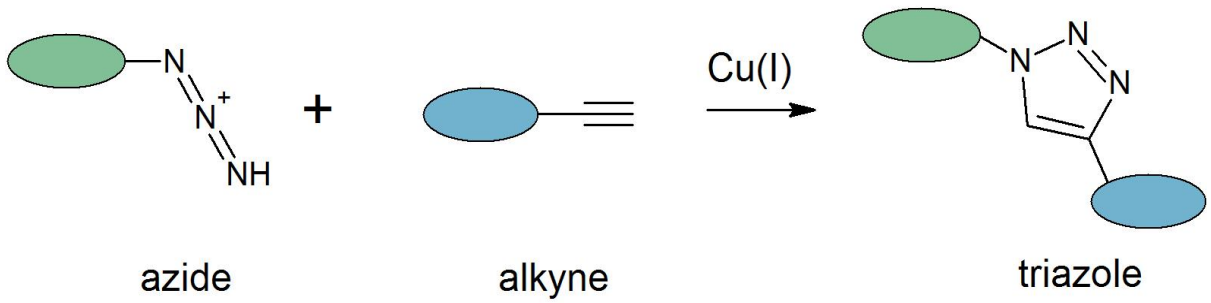
Click Chemistry Reaction Processes

- Simple to perform
- Wide in scope
- High yielding
- Adhere to the

Click Chemistry Reaction Characteristics

- Simple reaction conditions
- Readily and easily available starting materials and reagents
- Use of no solvent, a benign solvent (such as water), or one that is easily removed
- Simple product isolation
- Product should be stable under physiological conditions

Click chemistry involves the use of a modular approach and has important applications in the field of drug discovery, combinatorial chemistry, target-templated in situ chemistry, and DNA research



- The Nobel Prize for Chemistry has been awarded to Carolyn Bertozzi, Morten Meldal and Barry Sharpless, the last of whom features in a group of only five to have won the Prize twice.
- The three chemists have been awarded for pioneering ‘click chemistry’ or getting molecules that wouldn’t normally bond together to do so in an efficient and uncomplicated manner.
- Often, the number of intermediary steps is so great and complicated that the desired result is

usually too expensive to be useful.

- Sharpless began the conversation, almost immediately after winning his first Nobel Prize, of creating molecular building blocks like Lego blocks that could snap together quickly and efficiently.
- The first breakthrough came when Meldal and Sharpless, independently of each other, discovered what has become the foundational stone of click chemistry, namely the copper catalysed azide-alkyne cycloaddition.
- Two kinds of chemicals azides and alkynes react very efficiently when copper ions are added, Meldal discovered in his Copenhagen laboratory, and form a very stable structure called a triazole.
- From then on, if chemists wanted to link two different molecules, all that was required was to introduce an azide in one molecule and an alkyne in the other.
- They then snapped the molecules together with the help of some copper ions.
- This has now become an industry standard.
- However, Bertozzi took click chemistry to a new dimension and showed that it could be used in living organisms.
- Copper is toxic to living cells, but she figured out a way to produce a copper-free click reaction, called the strain-promoted azide-alkyne cycloaddition, and showed it could be used to treat tumour

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Australia set goal to prevent extinction

Australia sets goal to prevent new wildlife extinctions

- Australia's government has set the goal of preventing new extinctions of native wildlife, and conserving at least 30% of its land mass by 2030.
- More mammal species have gone extinct in Australia than on any other continent, and over 1,900 Australian species are listed as threatened.
- The government's 10-year threatened-species plan will prioritise the protection of 110 species.
- The commitment to zero extinction is commendable but there is still no clarity on how the plan will protect non-priority species.

Heat wave forecasting

Heatwave is a period of unusually hot weather with above normal temperatures that typically last three or more days.

- In India, heatwaves are generally experienced during March-June.
- On an average, two-three heatwave events are expected every season.
- Heatwaves are predominantly observed over two areas, central and northwest India and another over coastal Andhra Pradesh and Odisha, supported by favourable atmospheric conditions.
- Total duration of heatwaves has increased by about three days during the last 30 years and a further increase of 12-18 days is expected by 2060.
- In future climate, heatwaves will be spread to new areas including southern parts of India.
- Climate change is causing heat waves more frequently, and they are much stronger and can last for more day
- Caused fatalities Heat Waves have multiple and cascading impact on human health, ecosystems, agriculture, energy, water and economy.
- The recent 2022 heatwave in India and Pakistan in March-April made devastating impacts. It is estimated to have led to at least 90 deaths across India and Pakistan.
- It also triggered an extreme Glacial Lake Outburst Flood in northern Pakistan.
- Adaptation to heatwaves can be effective to minimise the negative impacts, by developing a comprehensive heat response plan that includes early warnings, awareness rising and technology intervention.
- India has now a strong national framework for heat action plans involving the India Meteorological Department (IMD), the National and State disaster management authorities, and local bodies.
- Early warning systems are an integral part of this heat action plan
- Heatwaves are caused by large scale atmospheric circulation anomalies like high pressure areas, upper-tropospheric, jet streams, etc.
- The global forcing like the El Nino/Southern Oscillation (ENSO) and the Indian Ocean modulate the frequency and duration of Indian heatwaves.
- Heatwave can be further accentuated by local effects like depleted soil moisture and enhanced sensible heat flux.

- Under the National Monsoon Mission, the Ministry of Earth Sciences (MoES) had established an advanced prediction system for early warnings of heatwaves.
- IMD has the capability to predict the genesis, duration and intensity of heatwave events with reasonable accuracy up to four-five days in advance.
- Scientific Reports by the scientists at the Indian Institute of Tropical Meteorology (IITM), Pune, has shown that heatwave genesis and duration in India can be predicted with good skill up to two weeks in advance.
- In another recent study published in the International Journal of Climatology of the Royal Meteorological Society last month, scientists from IMD, IITM and MoES have documented for the first time that Indian heat waves can be predicted even one season in advance.
- They used 37 years (1981-2017) of hindcasts from the Monsoon Mission Coupled Climate Forecast Model (MMCFS) to document that seasonal predictions of frequency and duration of Indian heat waves during April June are very useful
- We have an end to-end seamless prediction system to predict heat waves in all time scales, from short-range to seasonal.
- The seasonal forecast will provide an outlook or probability of frequency and duration of heatwaves, one season in advance.
- This early outlook can be further strengthened using the extended range (two weeks) and short range (four-five days) forecasts for more focused region wise response strategies

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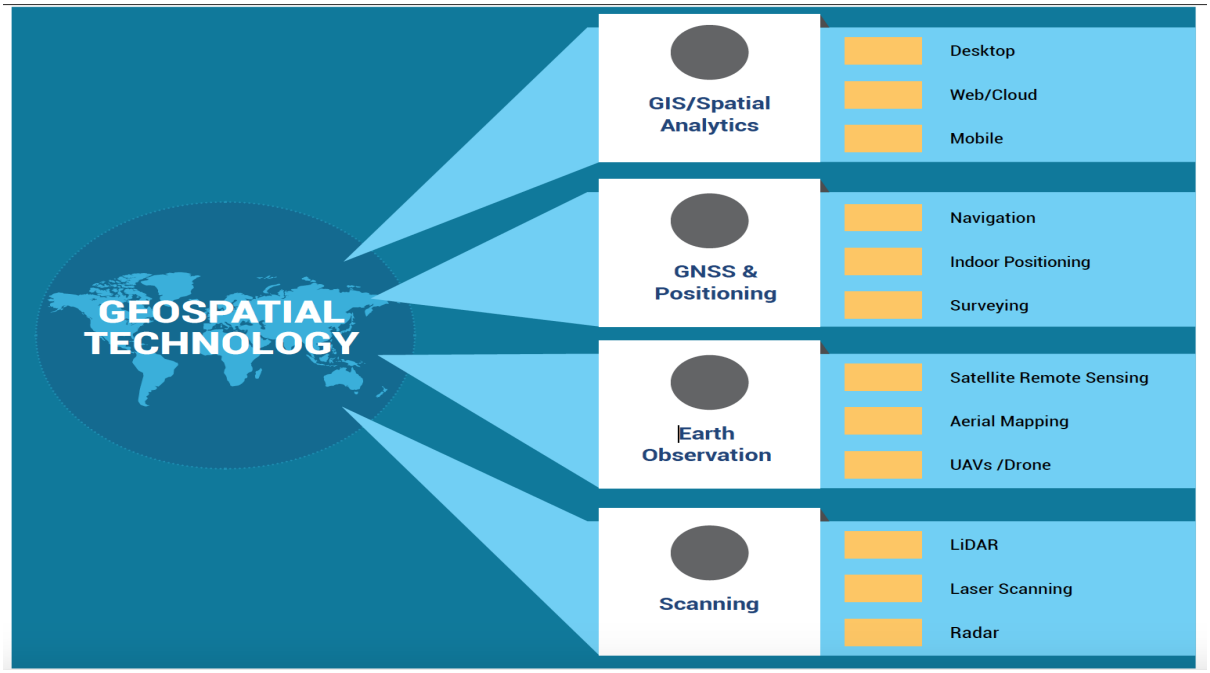
Geospatial technology and inclusion

In India, technology is a tool for inclusion and not exclusion

"Geospatial technology has been driving inclusion and progress. Take our SWAMITVA (Survey of Villages and Mapping with Improvised Technology in Village Areas) scheme.

We are using drones to map properties in villages.



For the first time in decades, people in rural areas have clear evidence of ownership,"

India's geospatial economy was expected to cross ₹63,100 Crore by 2025 at a growth rate of 12.8%.

Geospatial technology had become one of the key enablers in socioeconomic development by enhancing productivity, ensuring sustainable infrastructure planning, effective administration, and aiding the farm sector

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Life Initiative

- At the 2021 UN Climate Change Conference (UNFCCC COP26), Hon'ble Prime Minister of India Shri Narendra Modi announced Mission LiFE, to bring individual behaviours at the forefront of the global climate action narrative.
- LiFE envisions replacing the prevalent 'use-and-dispose' economy governed by mindless and destructive consumption with a circular economy, which would be defined by mindful and deliberate utilization.
- The Mission intends to nudge individuals to undertake simple acts in their daily lives that can contribute significantly to climate change when embraced across the world.
- LiFE plans to leverage the strength of social networks to influence social norms surrounding

climate.

- The Mission plans to create and nurture a global network of individuals, namely 'Pro-Planet People' (P3), who will have a shared commitment to adopt and promote environmentally friendly lifestyles.
- Through the P3 community, the Mission seeks to create an ecosystem that will reinforce and enable environmentally friendly behaviours to be self-sustainable

Focus on Individual Behaviours

Make life a mass movement (Jan Andolan) by focusing on behaviours and attitudes of individuals and communities

Co-create Globally

Crowdsource empirical and scalable ideas from the best minds of the world, through top universities, think tanks and international organisations

Leverage Local Cultures

Leverage climate-friendly social norms, beliefs and daily household practices of different cultures worldwide to drive the campaign

Approach of LiFE Campaign

Focus on Individual Behaviours

Make life a mass movement (Jan Andolan) by focusing on behaviours and attitudes of individuals and communities

Co-create Globally

Crowdsource empirical and scalable ideas from the best minds of the world, through top universities, think tanks and international organizations

Behaviour

Change solutions aimed at individuals, households and communities to drive climate-friendly behaviours in sectors, including:

- Water
- Transport
- Food
- Electricity

- Waste Management
- Recycle
- Reuse

Annually, approximately 500 billion plastic bags are used worldwide. More than one million bags are used every minute. A plastic bag has an average "working life" of 15 minutes.

An average global person wastes 2.5 litres of water in a day, in brushing, bathing, utensils, laundry, etc.

Turning off lights, ACs and heaters when not in use can save up to 282 kilowatts of energy per day

30 minutes of idling at traffic signals wastes nearly 1 litre of fuel.

- Innovative solutions that promote wider adoption of traditional, climate-friendly practices and/or create livelihood options for communities that may lose their jobs with a shift towards climate-friendly production.
- International, national and/or local best practices that can be feasibly scaled-up for driving behaviour change related to climate action.

Google controversy

On October 6, the News Broadcasters and Digital Association (NBDA) approached the Competition Commission of India (CCI) against search-engine operator Google, alleging that the latter had deprived them of their justifiable revenue acquired from news dissemination on the tech-giant's platforms

Why is Google dominant?

- As per the NBDA, Google's search engine commands a 94% market share in the country.
- The number becomes all the more crucial for news publishers with the increased transition toward news consumption online (inclusive of app-based consumption).
- The traditional newspaper industry in India has sustained itself on a business model wherein advertising accounts for two-third of its total revenue.
- Essential to understand here is that search engines are an important determinant in online news consumption.
- Readers would more often opt for an online web search rather than reaching out to a specific news website by typing its URL in a browser
- On similar lines, with online proliferation, there is an increased reliance of news publishers on digital ad revenues, and in turn, tech-based companies.
- More than half of the total traffic on news websites is routed through Google.
- The search engine, by way of its algorithms and internal quality vetting, determines which news websites would be prioritised in search queries.
    - The central contestation is that the tech-giant has not compensated news publishers for their contribution to Google's platforms and has engaged in practices to bolster its monopoly in the space.
- The European Publishers Council has also filed an anti-trust complaint against Google with the European Commission, challenging its existing "ad tech stranglehold" over press publishers

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Solidity, Rusk and Haskell

- The crypto ecosystem sits on top of distributed ledgers, which are broadly called blockchains.
- Apart from recording and verifying transactions, some crypto blockchains like Ethereum let

users launch agreements or special actions that execute on their own.

- These are known as smart contracts and to create them effectively, programming languages are a must.
- The importance of programming Crypto exchanges, decentralised apps, the automated buying or selling of orders, and even NFT-based games often rely on smart contracts to run smoothly.
- A smart contract failure can cause platform outages, and exploitation of the codes could devalue the entire ecosystem. Programming languages thus, help crypto platforms and protocols run effectively. C++ is a programming language commonly associated with Bitcoin.
- While the Bitcoin whitepaper explaining the peer-to-peer electronic cash system is written largely in English, the Bitcoin Core software, which makes transactions possible, uses C++
- Solidity is the programming language mainly used on the blockchain platform Ethereum.
- Some of its developers are Ethereum co-founders.
- The language is influenced by C++, Python, and JavaScript. It is also known as a 'curly bracket language' as it uses the flower bracket special character
- Rust has the unique distinction of being called the "perfect programming language" in 2021 by Twitter co-founder Jack Dorsey. Come 2022, Mr.
- Dorsey noted that Rust was a "close second" to C. In the crypto world, Rust is commonly associated with the Solana blockchain, which is known for its high speeds and relatively low transaction fees
- Cardano, for example, is a blockchain that takes pride in its academic rigour and scholarly approach to the crypto sector.
- Its smart contract programming language is based on Haskel

GRAP

How did GRAP come into being?

- To deal with the multi-faceted risks linked to air pollution, the Central Pollution Control Board submitted a list of measures to address different levels of air pollution to the Supreme Court in January 2016.
- These measures coalesced into GRAP a set of anti-air pollution measures which are to be followed in Delhi and its vicinity according to the severity of the situation.

- The Centre thus set up the Commission for Air Quality Management in National Capital Region and Adjoining Areas.
- This powerful body, which coordinates with other States to plan and execute strategies to prevent and control air pollution in the NCR, has been enforcing GRAP since 2021.

How will the action plan function?

- The GRAP for Delhi-NCR is divided into four stages of air quality Stage one for "poor" AQI ranging between 201 and 300, Stage two for "very poor" AQI of 301-400, Stage three for "severe" AQI of 401-450 and Stage four for "severe plus" AQI more than 450.
- In stage one, a ban on construction and demolition activities at specific sites will be implemented.
- Also, agencies should ensure that all solid waste is lifted from dedicated dump sites, and none is dumped on open land.
- Heavy fines are to be imposed for openly burning municipal solid waste and biomass.
- Roads will be mechanically cleaned and water sprinkled from time to time.
- The ban on firecrackers should be followed as per the directions of respective courts.
- In stage two, mechanised sweeping of roads will be done daily, while water will be sprinkled using dust suppressants at least on alternate days.
- Authorities would need to ensure an uninterrupted power supply to discourage the use of generators.
- At stage three, the frequency of cleaning roads intensifies.
- Water would be sprinkled daily before peak traffic hours.
- Authorities will levy different rates on public transport services to encourage off- peak travel.
- A strict ban will be enforced on all construction activities, except ongoing construction of railway, metro, airport and hospital projects.
- The State government will be empowered to impose restrictions on BS-III petrol and BS-IV diesel light motor vehicles (LMVs).
- During stage four, when the air quality rises to dangerous levels, entry of all trucks, except those carrying essential commodities, will be restricted.
- Fourwheeler diesel LMVs would also be banned except those used for essential or emergency services.
- All construction and demolition activities would have to be stopped.

- The respective governments could, meanwhile, take a call on allowing public, municipal and private offices to work on 50% strength.
- Additional emergency measures like closing schools, non emergency commercial activities and plying of vehicles on an odd-even basis may also be enforced.

Do citizens have a role?

Along with instructions for authorities, the GRAP also includes a graded advisory for the public.

The measures include properly tuning engines of their vehicles, ensuring accurate air pressure in tyres and updating PUC (pollution under control) certificates.

About Nobel Prize

India's economy and chips

- Chips today are manufactured in just a handful of nations: Taiwan, South Korea, the U.S., Japan, the Netherlands, and China. Second, Russia appears to be unable to dominate Ukraine in the war, one of the reasons being that it is using more brawn than brain.
- Ukraine is using precision-guided missiles to fight Russia, which it recently procured from its Western allies. These missiles are powered by chips.
- While Russia has some precision-guided missiles, it is unable to manufacture these at the scale required because of Western trade sanctions
- Third, earlier this year, Toyota temporarily shut down production at assembly lines at five domestic group plants in Japan due to the shortage of chips
- What is common in these scenarios is the importance of chips.

- Not just the ability to manufacture chips, but also the ability to integrate and synthesise them into complex systems will determine the fate of nations in the coming decades.
- Today, critical sectors such as defence, telecom, electronics and mobility are hugely impacted by the chip shortage, which won't end until 2023, as per research studies.
- If there ever is a natural disaster in South Korea or Taiwan, it could only worsen the crisis.
- The U.S., European Union, Japan, India and China have poured in about $200 billion into the semiconductors sector, but the impact of that will not be seen now
- India has taken a visionary step to subsidise chip manufacturing through the Production-Linked Incentive scheme
- Indian States, which are competing to court chip manufacturing investments, must also bear in mind that steady electricity and billions of gallons of clean water are required to set up a chip unit
- A chip manufacturing plant costs $15 billion-$20 billion which takes years to recoup profitably even if it runs all year.
- With global supply chains in turmoil thanks to COVID-19 and the Ukraine war, the game of chips is even more complicated now.

Space economy

The Indian space economy is set to reach $13 billion by 2025, according to a joint report prepared by EY and the Indian Space Association (ISpA), an apex industry association of space and satellite firms in the country.

- According to the report, the space-launch segment would grow at a CAGR of 13%, spurred by growing private participation, latest technology adoption and low cost of launch services.
- The satellite services and application segment would form the largest share of the space economy accounting for 36% of the ecosystem by 2025.

Bank run

What Is a Bank Run?

- A bank run occurs when large groups of depositors withdraw their money from banks simultaneously based on fears that the institution will become insolvent.
- With more people withdrawing money, banks will use up their cash reserves and ultimately end up defaulting.
- Bank runs have occurred throughout history including during the Great Depression and the 2008-09 financial crisis.
- The Federal Deposit Insurance Corporation was established in 1933 in response to a bank run.
- Silent bank runs occur when funds are withdrawn via electronic transfer instead of in-person.

One nation one fertiliser

- Prime Minister inaugurated 600 Kisan Samridhi Kendras and ‘One Nation, One Fertilizer’ scheme
- Under the scheme, ₹16,000 Crore will be credited into the bank accounts of over 8.5 Crore farmers.
- Over ₹2 Lakh Crore has been transferred to farmers, helping them manage costs, .
- The amount under the scheme would be credited directly into the accounts of farmers
- The Ministry of Chemicals and Fertilizers had issued an order to execute 'One Nation One Fertilizer' initiative by establishing a 'Single Brand for Fertilizers and Logo' under the fertilizer subsidy programme known as the 'Pradhanmantri Bhartiya Janurvarak Pariyojna' (PMBJP).

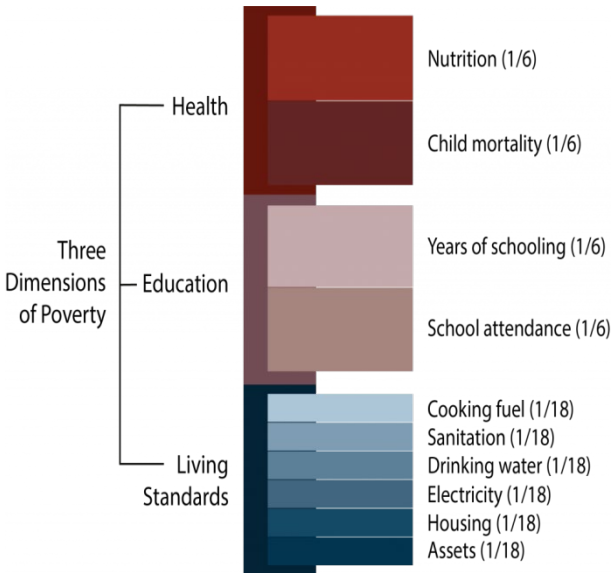
Why it matters:

- This is by far India's largest fertilizer initiative ONOF.
- This move by the Centre is to unify fertilizer brands across the country, regardless of the company that creates it.
- Under this rule, the government is mandating fertiliser producers to promote their products under the brand name 'Bharat'.
- According to the government release, the creation of the one brand 'Bharat' for all fertilizers will minimise the fertilizer's cross-country movement, which will result in large freight subsidies.

The new development:

- Under the new 'One Nation One Fertilizer' initiative, the companies are only permitted to advertise their name, brand, logo, and other pertinent product information on one-third of their bags.
- The "Bharat" brand and 'Pradhanmantri Bharatiya Jan Urvarak Pariyojana' logo will have to be displayed on the remaining two-thirds of the space.
- Moreover, for all fertilizer companies, State Trading Entities (STEs), and Fertilizer Marketing Entities (FMEs), the one brand name for UREA, Di-Ammonium Phosphate (DAP), Muriate of Potash (MOP), and Nitrogen Phosphorus Potassium (NPK), etc. would be BHARAT UREA, BHARAT DAP, BHARAT MOP, and BHARAT NPK, etc (FMEs), the new order mandates.

India and Multidimensional poverty



- About 41.5 Crore people exited poverty in India during the 15-year period between 2005-06 and 2019-21, out of which two-third exited in the first 10 years, and one-third in the next five years, according to the global Multidimensional Poverty Index (MPI)
- About 41.5 Crore people exited poverty in India during the 15-year period between 2005-06 and 2019-21, out of which two-third exited in the first 10 years, and one-third in the next five years, according to the global Multidimensional Poverty Index (MPI)
- The report produced by the United Nations Development Programme (UNDP) and the Oxford Poverty and Human Development Initiative (OPHI) shows that the incidence of poverty fell from 55.1% in 2005-06 to 16.4% in 2019-21 in the country and that deprivations in all 10 MPI indicators saw significant reductions as a result of which the MPI value and incidence of poverty more than halved.

- Improvement in MPI for India has significantly contributed to the decline in poverty in South Asia and it is for the first time that it is not the region with the highest number of poor people, at 38.5 Crore, compared with 57.9 Crore in Sub-Saharan Africa.

- The global MPI constructs a deprivation profile of each household and person through 10 indicators spanning health, education and standard of living.
- All indicators are equally weighted within each dimension.
- The global MPI identifies people as multidimensionally poor if their deprivation score is 1/3 or higher.
- Bihar, the poorest State in 2015-2016, saw the fastest reduction in MPI value in absolute terms
- India has by far the largest number of poor people worldwide at 22.8 Crore, followed by Nigeria at 9.6 Crore.
- Two-third of these people live in a household in which at least one person is deprived of nutrition.
- There were also 9.7 Crore poor children in India in 2019-2021 more than the total number of poor people, children and adults combined, in any other country covered by the global MPI

Tokenization of online cards

Tokenisation "refers to the replacement of actual card details with an alternative code called the 'token', which shall be unique for a combination of card and the token requestor (i.e. the entity which accepts the request from the customer for tokenisation of a card and passes it on to the card network to issue a corresponding token)."

- So, if you use a mobile app or a website for online purchases, the merchant can, on your behalf but only with your explicit consent, raise a request for a token with the card issuing bank or the card network such as MasterCard.

What are the benefits of tokenisation?

- The RBI says that a tokenized card transaction is safer as the actual card details are not shared with the merchant.
- Even if a hacker/scammer where to get their hands on one's token number, they would not be able to make indiscriminate use of it.

Linguistic movement

The story so far:

The reported recommendation of the Parliamentary Committee on Official Language to use Hindi as the medium of instruction in Central institutions of higher education in Hindi-speaking States and regional languages in other States

What is the backdrop to the Hindi imposition row?

- The origin of the linguistic row goes back to the debate on official languages. In the Constituent Assembly, Hindi was voted as the official language by a single vote.
- However, it added that English would continue to be used as an associate official language for 15 years.
- The Official Languages Act came into effect on the expiry of this 15-year period in 1965.
- This was the background in which the anti-Hindi agitation took place.
- However, as early as in 1959, Jawaharlal Nehru had given an assurance in Parliament that English would continue to be in use as long as non-Hindi speaking people wanted it.

Why do many parties in Tamil Nadu stand against the recommendation?

- In August 1937, in the then Presidency of Madras, the regime headed by C. Rajagopalachari, also known as Rajaji or CR, decided to make Hindi compulsory in secondary schools. E.V.
- Ramasamy, or Periyar as he was known, who was still in the Justice Party at that time, had spearheaded an agitation against the move, marking the first such stir.
- From Jawaharlal Nehru in the mid-1950s, assured the people of Tamil Nadu that there would be no “imposition” of Hindi.
- However, in recent years, be it the National Education Policy or reports of English signage on National Highways in the State getting replaced with Hindi signage, the political class of the State had overwhelmingly expressed its reservation
- A few months after CR’s resignation, the British government, in February 1940, made Hindi optional.
- In January 1965, the second round of agitations erupted in the wake of Hindi becoming the official language of the Union government coupled with the approach adopted by the Central government towards the whole issue.

Gray operation and cyber threat

- There is very little about the threat posed by cyber attacks. Ignored also is the new reality of the 'weaponization of everything' which has entered the vocabulary of threats.
- The latter clearly demands a 'proto-revolutionary' outlook on the part of policymakers

What are gray zone operations?

- The gray zone describes a set of activities that occur between peace (or cooperation) and war (or armed conflict).
- A multitude of activities fall into this murky in-between from nefarious economic activities, influence operations, and cyberattacks to mercenary operations, assassinations, and disinformation campaigns
- India's current national cyber security coordinator, as a "superset of interconnected information and communication technology, hardware, software processes, services, data and systems"
- The recent arrest in India, of a Russian for hacking into computers involved in the conduct of examinations for entry into the Indian Institutes of Technology (IITs), is a reflection of how cyber criminals are significantly amplifying their 'Grey Zone Warfare' tactics.
- This is, perhaps, the tip of the iceberg for, as a general rule, it takes a long time for the general public to become aware of the nature and consequences of cyber attacks
- In the case of the Russia-Ukraine war, cyber space has become an experiment for various players to try and support a weaker nation against a more powerful opponent, through distortion of information and communication flows, which are considered essential to the success or failure of any war strategy.
- While Russia may not publicly admit to the fact that it is hurting, with most global information networks being ranged against it and distorting realities, it has certainly added a new cyber dimension to the ongoing conflict.
- While its effect on the course of the conflict may not be decisive, the potential for mischief is immense.
- Additionally, distortion by private players of the concept of 'the information superhighway' casts a dark shadow over the entire current systems of belief, providing a great deal of fuel for thought more specifically when such influences turn out to be fake or distorted.

Anthropocene and new shrew species

The Geological era that we live in is called the anthropocene.

- This is because of the global impact that humans and their activities have made after they evolved.
- A notable effect of changes seen in the anthropocene has been a rapid increase in the rate of extinction of other species.

- Scientists from the Zoological Survey of India (ZSI) have discovered a new species of insectivorous mammal, a white-toothed shrew, from Narcondam Island of the Andaman and Nicobar group of islands.
- The species Crocidura narcondamica is a new addition to the list of mammals found in the country. Shrews are small and mouse-like mammals, and they live in sub-leaf stratum in the forests. Insects are the primary diet of these animals.

Monoclonal antibodies v/s polyclonal bodies

What are monoclonal antibodies?

- Monoclonal antibodies (also called moAbs or mAbs) are proteins made in laboratories that act like proteins called antibodies in our bodies. Antibodies are parts of your immune system.
- They seek out the antigens (foreign materials) and stick to them in order to destroy them.
- Laboratory-made monoclonal antibodies help stimulate your own immune system.
- The word “monoclonal” refers to the fact that the antibodies created in the laboratory are clones.
- They are exact copies of one antibody.
- The generic names of the products often include the letters “mab” at the end of the name.

What is the difference between monoclonal antibodies and polyclonal antibodies?

- The difference between the two types of antibodies is in the names.

- "Mono" refers to one and "poly" refers to many. Monoclonal antibodies are clones of just one antibody, and they bind to one antigen only.
- Polyclonal antibodies come from several different types of immune cells and will bind to more than one antigen.

How are monoclonal antibodies used?

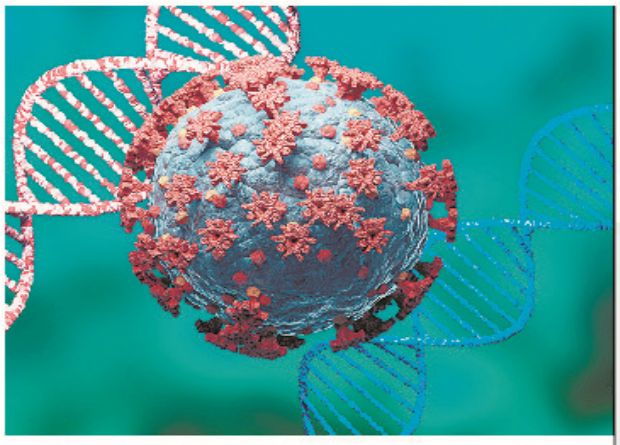
Monoclonal antibodies are used for diagnosis, disease treatment and research. They're used:

- As probes to identify materials in laboratories or for use in home-testing kits like those for pregnancy or ovulation.
- To type tissue and blood for use in transplants.
- For diagnosis.
- For disease treatment.

THE HINDU

Protection from multiple variants of concern

The mining of a unique antibody demonstrates India's R&D potential



Evolved: Omicron sub-lineages can evade antibodies generated by vaccines and natural infection.

1. Two premier research agencies — ICMR and DBT — had come together to identify a human monoclonal antibody for SARS-CoV-2

2. Approved monoclonal therapies block the interaction of the virus through its receptor binding domain with the host cell receptor

3. As the virus evolved, it acquired mutations in the RBD region. This allowed the virus to evade the antibody-based therapeutics

4. The antibody discovered by the Indian team binds to a region of the virus that is outside the main RBD-ACE2 motif

5. The region where the new antibody binds to the virus is currently not a mutational hotspot and is thus conserved across most variants

Polar region and Earth evolution

Can the Polar Regions provide clues about early-life evolution on Earth?

- The amazing survival strategies of polar marine creatures might help to explain how the first animals on Earth could have evolved earlier than the oldest fossils suggest, according to new research.
- These first, simple and now extinct animals might have lived through some of the most extreme, cold and icy periods the world has ever seen (Global Change Biology).
- The fossil record places the earliest animal life on Earth at 572-602 million years ago, just as the world came out of a huge ice age, whilst molecular studies suggest an earlier origin, up to 850 million years ago.

Climate justice

Floods in Pakistan highlight the need for climate justice

- Record rains this summer put one-third of Pakistan underwater, killing around 1,300 people and causing widespread devastation that has affected 33 million people.
- The disaster has highlighted the question of whether rich countries should provide funding to address the loss and damage inflicted by climate change on the people who have contributed least to emissions a key issue at the next United Nations climate conference, COP27, in November.
- Climate justice is a concept that addresses the just division, fair sharing, and equitable distribution of the benefits and burdens of climate change and responsibilities to deal with climate change

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Collegium

The story so far:

- A meeting of the Supreme Court Collegium, comprising the Chief Justice of India (CJI), and four senior-most judges, which was called for September 30 but did not take place, was subsequently “closed without there being any further deliberation”.

- What prevented further deliberations was the fact that the Union Law Minister, by a letter dated October 7, requested Chief Justice U.U. Lalit to nominate his successor, as the latter's tenure ends on November 8, 2022

What is the work of the Collegium?

- The Collegium system, one in which a group of the senior-most judges make appointments to the higher judiciary, has been in practice for nearly three decades.
- Its importance lies in the fact that its opinion has primacy in the matter of appointments to the high courts and the Supreme Court, as well as transfers.
- Its legal basis is found in a series of three judgments usually referred to as the 'Judges Cases' concerning the higher judiciary. Its manner of functioning has been laid down in the form of a 'Memorandum of Procedure'.
- The Constitution says a Supreme Court judge is appointed by the President in consultation with the Chief Justice of India. In the 'First Judges Case', the court held that the consultation with the CJI should be "full and effective".
- The Second Judges case introduced the collegium system in 1993. It ruled that the CJI would have to consult a collegium of his two senior-most judges in the apex court on judicial appointments.
- The 'Third Judges Case' case in 1998, which was a Presidential reference, expanded the collegium to its present composition of the CJI and four of his senior-most judges

How does it discharge its functions?

- The Collegium's functioning has been criticised for being opaque.
- Its resolutions and recommendations are hosted on the Supreme Court's website, giving relevant information about its decisions.
- However, the nature of the deliberations and whether there are any internal differences of opinion on the suitability of a particular candidate are unknown.
- It functions mainly through the system of adopting resolutions and sending them to the Union Law Ministry for further action.
- If a proposal for appointment of a judge is returned for reconsideration, the Collegium may either drop it or reiterate it.
- When the Collegium reiterates its decision after reconsideration, it is binding on the government.

Role of women in livestock

- The livestock sector is one of the most rapidly growing components of the rural economy of India, accounting for 5% of national income and 28% of agricultural GDP in 2018-19
- On the International Day of Rural Women (October 15), we need to recognise the role of women in livestock rearing, and to include women in all facets of livestock development, be it breeding, veterinary care, extension services, training or access to credit and markets.
- It is widely recognised that the majority of women workers in rural areas (72%) are engaged in agricultural activities.
- However, with the exception of participation in dairy co-operatives, specifically in milk marketing, women's role in the livestock economy is not as widely known or discussed.
- There were five million women members in dairy co-operatives in 2015-16, and this increased further to 5.4 million in 2020-21.
- Women accounted for 31% of all members of dairy producer cooperatives in 2020-21. In India, the number of women's dairy cooperative societies rose from 18,954 in 2012 to 32,092 in 2015-16.

- First, recent employment surveys such as the Periodic Labour Force Survey fail to collect data on specific activities of persons engaged primarily in domestic duties
- Second, the reach of extension services to women livestock farmers remains scarce.
- Third, in our village surveys, women in poor households, without collateral to offer to banks, found it difficult to avail loans to purchase livestock
- Fourth, women livestock farmers lacked technical knowledge on choice of animals (breeding) and veterinary care
- Fifth, our village studies showed that women were not aware of the composition and functions

of dairy boards and that men exercised decisions even in women-only dairy cooperatives.

- Women's labour is critical to the livestock economy.
- It follows then that women should be included in every stage of decision-making and development of the livestock sector.

Deep tech

- Four technology battlegrounds exist, i.e. semiconductors, 5G, revolutions in biology and autonomy.
- Each of these is vulnerable to military conflict, health emergencies and natural disasters.
- They are dual use and have steep entry barriers
- The Indian venture capital ecosystem is not even willing to discuss it.
- An Indian investor agreeing to fund a laser start up from an IIT Madras laboratory or a battery company out of IIT Mumbai still exists in the realm of the imagination.
- Not only do investors not understand Deep Tech but also investing in fundamental technology does not fit the 10-year fund return cycle because it takes much longer to mature.
- Deep Technology is almost always dual use. For example, position navigation timing technology such as GPS is needed for Google Maps and Uber but is also an extremely important aspect for fighter jet navigation and missile systems

What is Deep Tech

- The term "deep tech" was coined by Swati Chaturvedi, the founder and CEO of the online investment platform Propel(x), which connects early stage Deep Tech with investors.
- Deep tech, or deep technology, refers to those startups whose business model is based on high tech innovation in engineering, or significant scientific advances.
- The term deep tech is intended to set it aside from its opposite, "shallow tech".
- Shallow tech is a relatively simple technological advance moving a business from a non-digital

business model to a digital one.

- Shallow tech advances are easy for competitors to replicate so don't tend to disrupt the market so much.
- For example, a telephone-based delivery service now offered in digital fashion through a phone app, or a bookshop now offering e-books for digital download, would both be examples of shallow tech.
- Deep tech startups are likely to be based on artificial intelligence or machine learning, or other innovative applications to new or existing emerging technologies.
- Like block-chain, computer imaging, and VR.
- Examples of deep tech might include AI applied to predict natural disasters or molecular imaging technologies that identify disease or predisposition to disease far before any other existing test possible could.

Funding options

- CSR budgets: by some estimates, the annual CSR budget is ₹15,000 Crore, of which a substantial portion goes unutilised.
- CSR has traditionally been utilised for the social sector. However, this growing corpus should also be used for the development of strategic technology.
- To prevent a misuse of funds, it is important to create qualifying criteria
- India will remain a net importer of critical technology in the foreseeable future.
- While the Prime Minister's vision for an Atmanirbhar Bharat has created the right momentum, it will take close to a decade or more to fructify.
- If correctly aligned with the programmes launched by the Government, CSR funds and the right tax incentives to HNIs can create an almost self-fulfilling prophecy in the nascent Indian Deep Tech ecosystem.

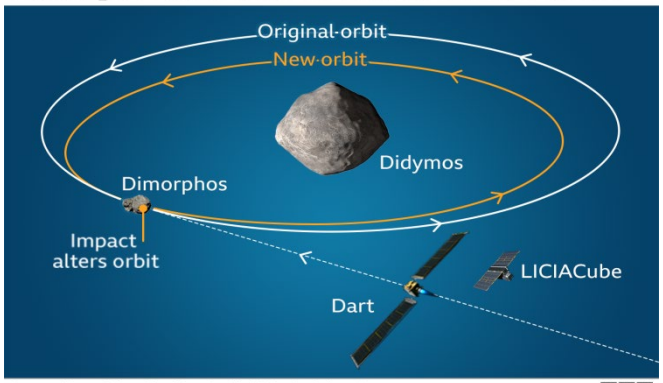
DART

- NASA scientists have succeeded in slightly altering the trajectory of an asteroid by using a spacecraft to slam into it.
- A small spacecraft DART (Double Asteroid Redirection Test) was aimed at a 160-metre-wide

asteroid Dimorphos, which was orbiting a larger asteroid Didymos, both of which were circling the sun

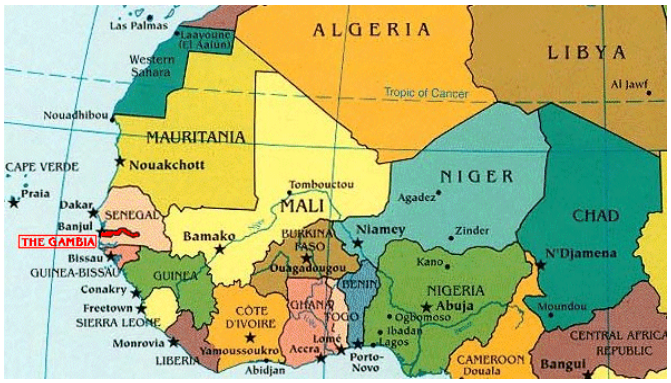
- DART was a test mission to see if this technique, known as kinetic impactor, would give the necessary 'nudge' to an asteroid and alter its course by a desired amount.
- After studying the two bodies for nearly 10 days, NASA announced that the course of the smaller asteroid has indeed been altered a little: initially, the orbit of Dimorphos around Didymos took 11 hours and 55 minutes
- After the impact, a 32-minute alteration in its orbital period has taken place it is now 11 hours and 23 minutes only.
- The reason for this test is to learn how to use the kinetic impactor technique to 'nudge' earthbound asteroids out of the way, years before impact
- China has a plan to deflect a 40 m wide, earth-crossing asteroid named 2020PN1 by 2026.
- There is a need to develop this technique because an impact with even a small asteroid can have serious consequences.
- The Chicxulub crater is a reminder of the impact of a 10 km wide large asteroid that fell on the earth 66 million years ago and wiped out nearly 75% of plant and animal life.
- An impact with an asteroid even about 100 m wide can destroy a city the size of Chennai.

Nasa spacecraft crashes into asteroid's moon



- The other question is whether this technique can be used to deflect asteroids bearing rich bounties of minerals and moving them to closer locations from where these can be harvested

Placebo



- India's apex drug regulator, the Central Drugs Standard Control Organization (CDSCO), has barred Haryana-based Maiden Pharmaceuticals Limited from manufacturing medicinal drugs.
- This was after some of the cold and-cough syrup it manufactured and exported to The Gambia were marked out by the World Health Organization (WHO) as being linked to the deaths of 66 children there.
- The concoctions were apparently contaminated with diethylene glycol (DEG) and ethylene glycol that may have caused acute kidney failure.
- The provisions of India's Drugs and Cosmetics Act, in theory, come down heavily on manufacturers for making adulterated drugs, and on gross violations of prescribed manufacturing practices with imprisonment up to 10 years and fines up to ₹10 Lakh.
- These provisions have been rarely executed despite multiple instances of DEG poisoning in India

What is placebo?

- A Substance given to someone who is told that it is a particular medicine, either to make that person feel as if they are getting better or to compare the effect of the particular medicine when given to others:

What Is Diethylene Glycol (DEG)?

- Diethylene glycol is a colourless chemical with a sweet taste that's toxic when ingested by humans.
- It's a solvent for water-insoluble drugs and chemicals, and it's used to make products such as cigarettes, antifreeze, lubricants, brake fluids, cosmetics and wallpaper strippers.
- Because of its toxicity, it's not allowed in food or drugs
- But because of its solubility, some drug makers have inappropriately substituted it for nontoxic ingredients, such as glycerin, in pharmaceuticals such as cough syrups and acetaminophen.
- Over the years, there have been more than a dozen instances of mass human poisonings with high death rates from consuming tainted medication.

- Acute kidney failure is the number one cause of death in poisoning cases, and it starts between 8 to 24 hours after exposure to lethal doses of DEG

Nord stream 2

About Nord stream

- Nord Stream is a pair of offshore natural gas pipeline sets in Europe that run under the Baltic Sea from Russia to Germany.
- It includes the Nord Stream 1 pipeline running from Vyborg in northwestern Russia, near Finland, and the Nord Stream 2 pipeline running from Ust-Luga in northwestern Russia, near Estonia.
- Both pipelines run to Lubmin in the northeastern German state of Mecklenburg-Vorpommern. Nord Stream 2 has been denied certification as a result of the Russian invasion of Ukraine.
- The name "Nord Stream" occasionally refers to a wider pipeline network, including the feeding onshore pipeline in Russia, and further connections in Western Europe.
- Nord Stream 1 is owned and operated by Nord Stream AG, whose majority shareholder is the Russian state company Gazprom. Nord Stream 2 is owned and planned to be operated by Nord Stream 2 AG, which is a wholly-owned subsidiary of Gazprom.
- The first line of Nord Stream 1 was laid by May 2011 and was inaugurated on 8 November 2011.
- The second line of Nord Stream 1 was laid in 2011–2012 and was inaugurated on 8 October 2012.
- At 1,222 km (759 mi) in length, Nord Stream 1 is the longest sub-sea pipeline in the world, surpassing the Norway-UK Langeled pipeline.
- The laying of Nord Stream 2 was carried out in 2018–2021.[7] The first line of Nord Stream 2 was completed in June 2021, and the second line was completed in September 2021
- According to data from 2015, Germany imported about 40% of natural gas from Russia, 29% from the Netherlands, 34% from Norway, with only around 10% from Germany's own gas fields.
- According to a media report, about a quarter of Germany's electricity now comes from coal, about another quarter from renewables, 16% from natural gas and around 11% from nuclear

energy.

- The dispute over Nord Stream 2 takes place at a time when Germany has set out a plan to shut down its nuclear and coal power plants, with an objective of gradually moving towards renewable sources of energy.
- In order to fill the supply gap and diversify the sources, the country plans to build its first LNG terminal to receive gas from Qatar, the U.S., and others

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World sloth bear day

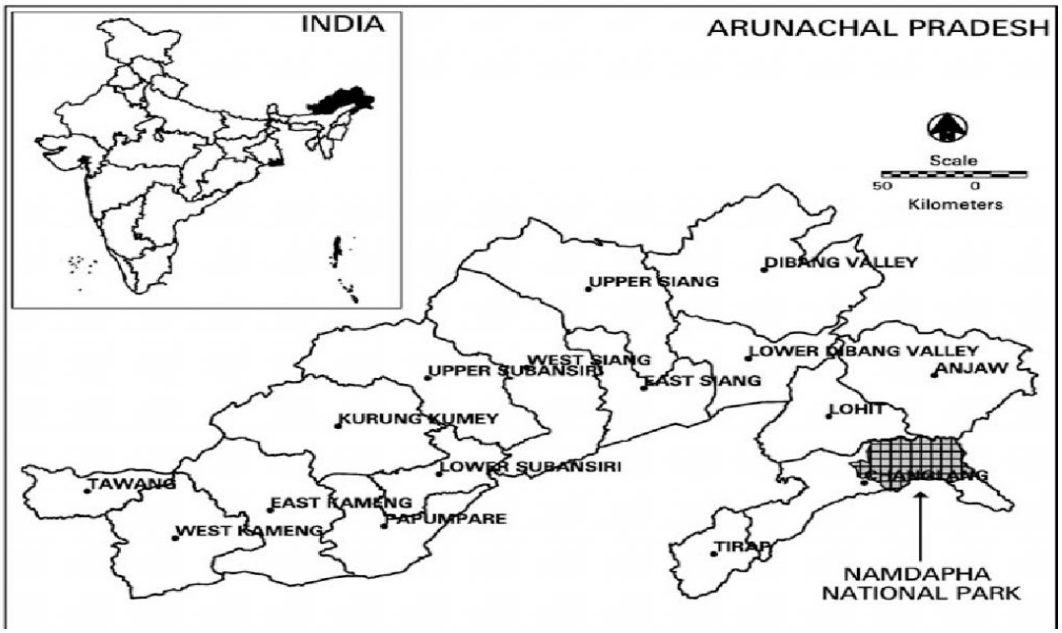
- The first World Sloth Bear Day was observed on 12th Oct to generate awareness and strengthen conservation efforts around the unique bear species endemic to the Indian subcontinent.
- Classified as "vulnerable" on the IUCN Red List, sloth bears are endemic to the Indian subcontinent and 90% of the species population is found in India.
- A proposal for observing World Sloth Bear Day was mooted by Wildlife SOS India, an organisation involved in sloth bear conservation and protection for over two decades and the IUCN-Species Survival Commission sloth bear expert team accepted the proposal and declared the day to be celebrated worldwide
- Listed under Schedule I of the (Wildlife Protection) Act of India, 1972, the species has the same level of protection as tigers, rhinos and elephants.

Forest led COP27

- COP26 at Glasgow also fuelled technological optimism.
- There was an observation that every technological solution discussed at COP26 depends on just three resources: nelectricity (non-emitting electricity generated by hydropower, renewables or nuclear fission), carbon capture and storage (CCS) or biomass.
- The total demand for those resources required by the plans discussed at COP26 cannot be met by 2050.

- We currently have 4kWh/day of electricity per person.
- But the COP26 plans require 32 (range 16-48).
- We currently have 6 kg of CCS per person per year, but the COP26 plans require 3,600 (range 1,400-5,700).
- We eat 100kg plant-based food per person each year, but producing enough bio-kerosene to fly at today's levels requires 200 kg of additional harvest.
- Tech-centric mitigation conversations leave forest economies and subjects such as conservation and forests, which are the best carbon removal instruments, to the ideological fringes of climate conversation.
- Forests absorb a net 7.6 billion metric tonnes of CO2 a year.
- A new study has found that their biophysical aspects have a tendency to cool the earth by an additional 0.5%.
- The conservation of forests, along with other nature-based solutions, can provide up to 37% of the emissions reductions needed to tackle climate change.
- The Dasgupta Review-Independent Review on the Economics of Biodiversity reports that green infrastructure (salt marshes and mangroves) are 2-5 times cheaper than grey infrastructure (breakwaters).
- Another study estimated that the annual gross carbon emissions from tropical tree cover loss between 2015 and 2017 was equivalent to 4.8 billion tonnes.
- This causes more emissions each year than 85 million cars do in their lifetime.
- In 2019, approximately 34% of total net anthropogenic greenhouse gas emissions came from the energy supply sector, 24% from industry, 22% from agriculture, forestry and other land use, 15% from transport and 6% from buildings.
- There is a growing body of evidence that a large proportion of the required removals could be achieved by conserving natural sinks, improving biodiversity protection, and restoring ecosystems.
- Preserving earth's cyclical processes by protecting terrestrial ecosystems and natural sinks and transformative agricultural practices under the leadership of indigenous people and local communities is a far more equitable and cost-effective way of tackling the climate crisis than it is being done now

Namdapha



- Namdapha National Park, Kamlang Wildlife Sanctuary and Jairampur Forest Division are located within India's northeastern frontier state–Arunachal Pradesh.
- Among the last great remote wilderness areas of Asia, Namdapha and its adjoining areas, is flanked by the Patkai hills to the south and south-east and by the Himalaya in the north.
- The area lies close to the Indo-Myanmar-China trijunction.
- Forests are contiguous across the international boundary with Myanmar, with several adjoining protected areas, including the huge recently declared Hukawng Valley Tiger Reserve
- The entire area is mountainous and comprises the catchment of the Noa-Dihing River, a tributary of the great Brahmaputra river which flows westwards through the middle of Namdapha
- Namdapha is the known home of three other large cats- tiger, leopard and clouded leopard

Stubble burning and Torrefaction

- With winter approaching and instances of stubble burning in Punjab and Haryana rising, the Union Environment Ministry announced a ₹50 Crore scheme to incentivise industrialists and

entrepreneurs to set up paddy straw pelletisation and torrefaction plants.

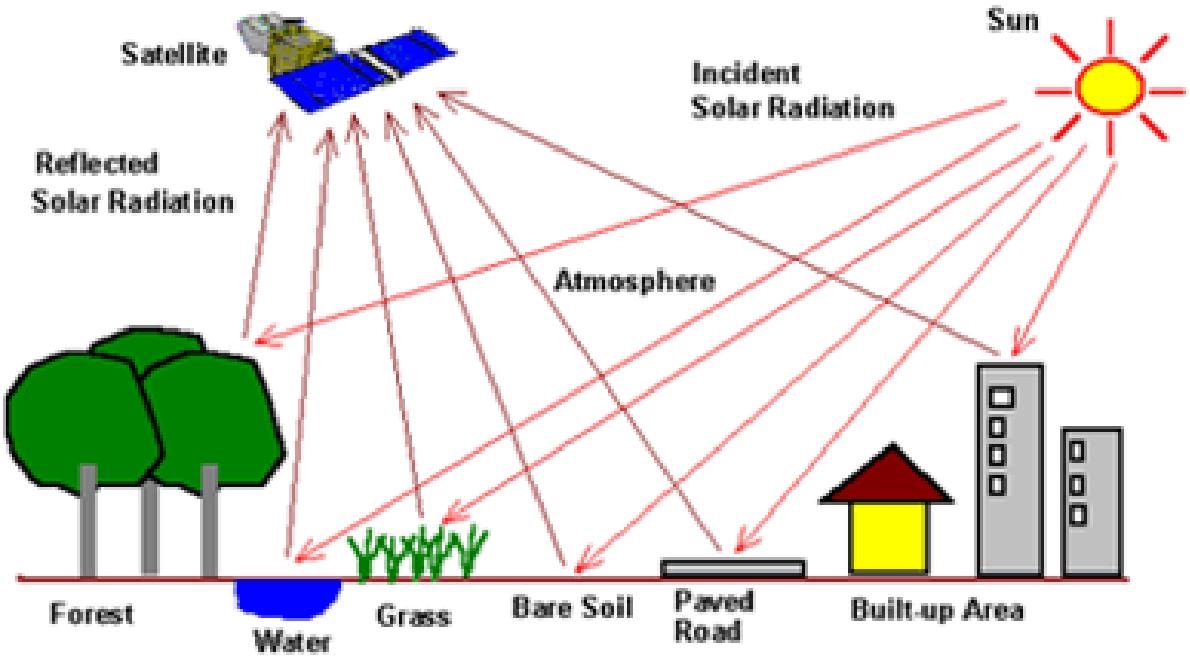
- Paddy straw made into pellets or torrefied can be mixed with coal in thermal power plants.
- This saves coal as well as reduces carbon emissions that would otherwise have been emitted were the straw burnt in the fields

What is Torrefaction?

- Torrefaction, a thermal pretreatment process, is gaining attention as it improves the physical properties and chemical composition of biomass for recycling
- During torrefaction, biomass is heated slowly in an inert or oxygen-deficit environment to a maximum temperature of 300°C.
- The torrefaction process creates a solid uniform product with lower moisture and higher energy content than the raw biomass.
- During torrefaction, moisture and some volatile organic compounds volatilize from the biomass

Satellite role in agriculture

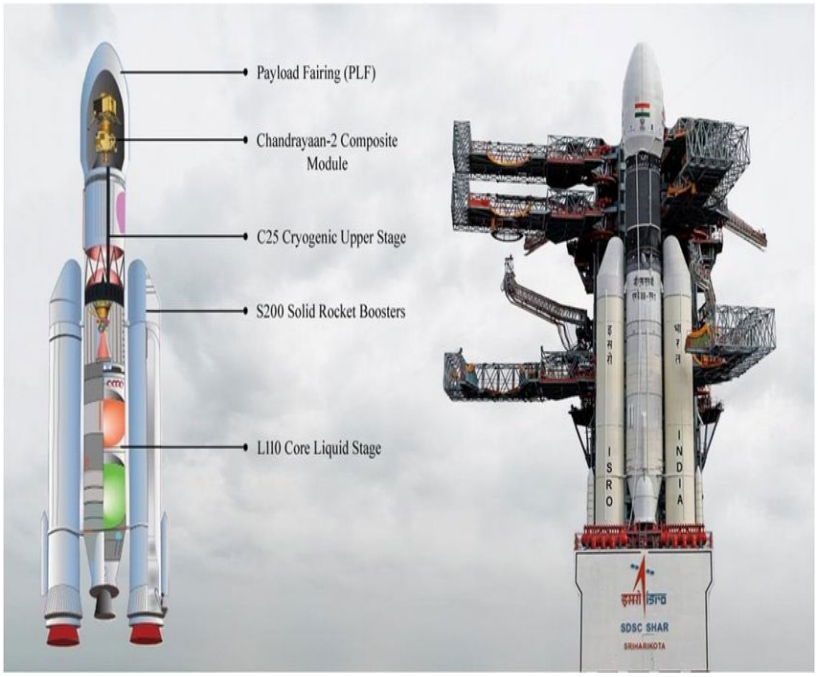
- The Indian Space Research Organization (ISRO) has proposed dedicated satellites for supporting the country's agriculture sector
- Proposed Bharat Krishi Satellite programme
- 'Earth Observation Council' be created for addressing the current deficiencies in earth observation capabilities and data utilisation.



- Such a council can tackle shortcomings in this area in a centralised manner.
- Minimum of two satellites will be needed to guarantee adequate coverage of the entire agricultural area of the country.
- They will aid a gamut of farm-related activities related to crop forecasting, pesticide application, irrigation, soil data, and generation of critical data related to drought
- Current deficiencies include a discontinuity in earth observation missions, low utilisation of available remote sensing data, technology gaps and absence of a streamlined mechanism for data processing and dissemination as required by the industry.

Next-Gen Launch Vehicle (NGLV)

- The Indian Space Research Organization (ISRO) is developing a Next-Gen Launch Vehicle (NGLV), which will one day replace operational systems like the Polar Satellite Launch Vehicle (PSLV).
- In NGLV, ISRO is understood to be looking at a cost-efficient, three-stage, reusable heavy-lift vehicle with a payload capability of 10 tonnes to



Geostationary Transfer Orbit.

- NGLV will feature semi-cryogenic propulsion for the booster stages which is cheaper and efficient
- NGLV will feature a simple, robust design that allows bulk manufacturing, modularity in systems, sub-systems and stages and minimal turnaround time.
- Potential uses will be in the areas of launching communication satellites, deep space missions, future human spaceflight and cargo missions

SLV-3

Height : 22.7m
Lift-off weight : 17 t
Propulsion : All Solid
Payload mass : 40 kg
Orbit : Low Earth Orbit

ASLV

Height : 23.5m
Lift-off weight : 39 t
Propulsion : All Solid
Payload mass : 150 kg
Orbit : Low Earth Orbit

PSLV-XL

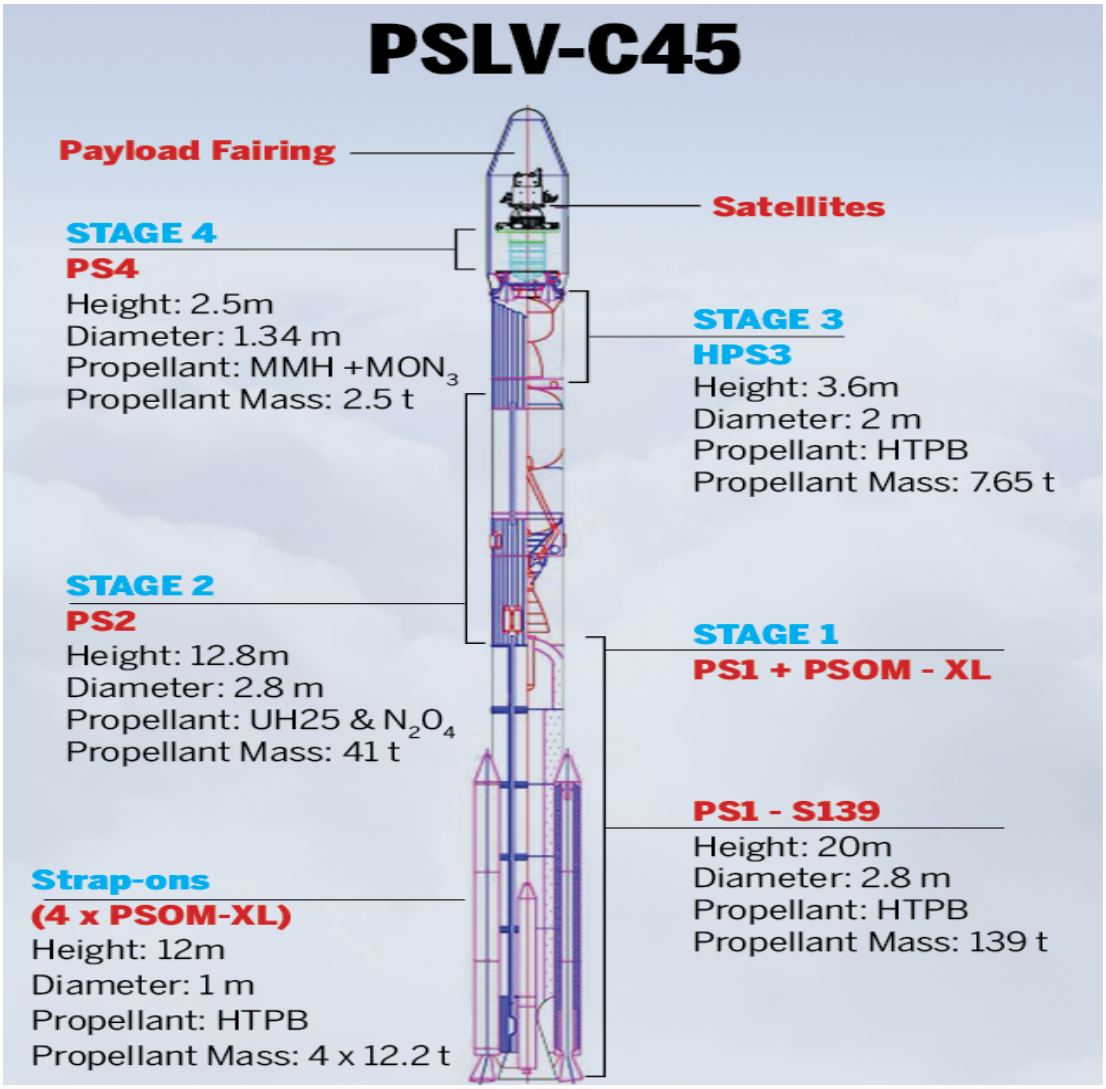
Height : 44m
Lift-off weight : 320 t
Propulsion : Solid & Liquid
Payload mass : 1860 kg
Orbit : 475 km Sun Synchronous Polar Orbit (1300 kg in Geosynchronous Transfer Orbit)

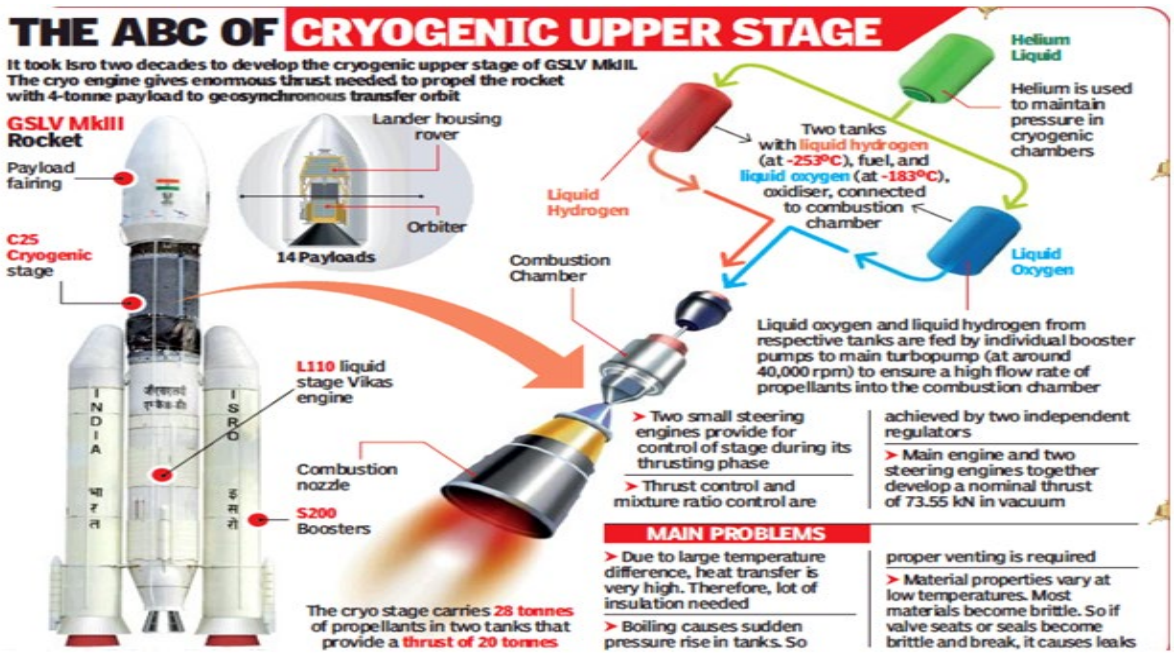
GSLV Mk II

Height : 49m
Lift-off weight : 414 t
Propulsion : Solid, Liquid & Cryogenic
Payload mass : 2200 kg
Orbit : Geosynchronous Transfer Orbit

GSLV Mk III

Height : 43.43 m
Lift-off weight : 640 t
Propulsion : Solid, Liquid & Cryogenic
Payload mass : 4000 kg
Orbit : Geosynchronous Transfer Orbit


PSLV-C45
Payload Fairing
Satellites
STAGE 4
PS4
Height: 2.5m
Diameter: 1.34 m
Propellant: MMH +MON3
Propellant Mass: 2.5 t
STAGE 3
HPS3
Height: 3.6m
Diameter: 2 m
Propellant: HTPB
Propellant Mass: 7.65 t
STAGE 2
PS2
Height: 12.8m
Diameter: 2.8 m
Propellant: UH25 & N2O4
Propellant Mass: 41 t
STAGE 1
PS1 + PSOM - XL
PS1 - S139
Height: 20m
Diameter: 2.8 m
Propellant: HTPB
Propellant Mass: 139 t
Strap-ons
(4 x PSOM-XL)
Height: 12m
Diameter: 1 m
Propellant: HTPB
Propellant Mass: 4 x 12.2 t


THE ABC OF CRYOGENIC UPPER STAGE
It took Isro two decades to develop the cryogenic upper stage of GSLV MkIII. The cryo engine gives enormous thrust needed to propel the rocket with 4-tonne payload to geosynchronous transfer orbit
GSLV MkIII Rocket
Payload fairing
C25 Cryogenic stage
L110 liquid stage Vikas engine
Combustion nozzle
S200 Boosters
Lander housing rover
Orbiter
14 Payloads
Helium Liquid
Helium is used to maintain pressure in cryogenic chambers
Two tanks with liquid hydrogen (at -253°C), fuel, and liquid oxygen (at -183°C), oxidiser, connected to combustion chamber
Liquid Hydrogen
Liquid Oxygen
Combustion Chamber
Liquid oxygen and liquid hydrogen from respective tanks are fed by individual booster pumps to main turbopump (at around 40,000 rpm) to ensure a high flow rate of propellants into the combustion chamber
Two small steering engines provide for control of stage during its thrusting phase
Thrust control and mixture ratio control are achieved by two independent regulators
Main engine and two steering engines together develop a nominal thrust of 73.55 kN in vacuum
MAIN PROBLEMS
Due to large temperature difference, heat transfer is very high. Therefore, lot of insulation needed
Boiling causes sudden pressure rise in tanks. So proper venting is required
Material properties vary at low temperatures. Most materials become brittle. So if valve seats or seals become brittle and break, it causes leaks
The cryo stage carries 28 tonnes of propellants in two tanks that provide a thrust of 20 tonnes

Food security and agri system

- Globally, food and nutrition security continue to be undermined by the impacts of the COVID-19 pandemic, climate change, spiralling food inflation, conflict, and inequality.
- Today, around 828 million people worldwide do not have enough to eat, and over 50 million people are facing severe hunger.
- The Hunger Hotspots Outlook (2022-23) a report by the Food and Agriculture Organization of the United Nations (FAO) and the World Food Programme (WFP) forebodes escalating hunger, as over 205 million people across 45 countries will need emergency food assistance to survive.
- This year's World Food Day (October 16) has been a reminder to ensure that the most vulnerable people within our communities have easy access to safe and nutritious food.
- The promise to end hunger by 2030 is possible only through collective and transformational action to strengthen agri-food systems; better production, better nutrition, a better environment, and a better life

Case of India

- During 2021-22, it recorded $49.6 billion in total agriculture exports a 20% increase from 2020-21.
- However, recent climate shocks have raised concerns about India's wheat and rice production over the next year.
- Therefore, it is important to place a greater focus on climate adaptation and resilience building. By 2030, India's population is expected to rise to 1.5 billion.
- Agri-food systems will need to provide for and sustainably support an increasing population.
- There is increased recognition to move away from conventional input-intensive agriculture towards more inclusive, effective, and sustainable agri-food systems that would facilitate better production
- One of India's greatest contributions to equity in food is its National Food Security Act (NFSA) 2013 which anchors the Targeted Public Distribution System (TPDS), the PM POSHAN scheme (earlier known as the Mid-Day Meals scheme), and the Integrated Child Development Services (ICDS).
- Nutrition and agricultural production are not only impacted by climate change but also linked to environmental sustainability.
- Soil degradation by the excessive use of chemicals, non-judicious water use, and declining nutritional value of food products need urgent attention.
- Millets have received renewed attention as crops that are good for nutrition, health, and the

plane.

- Additionally, their genetic diversity ensures that agrobiodiversity is preserved
- India has led the global conversation on reviving millet production for better lives, nutrition, and the environment, including at the UN General Assembly, where it appealed to declare 2023 as the International Year of Millets.
- It is the world's leading producer of millets, producing around 41% of total production in 2020
- Millet conservation and promotion contribute to addressing food security, improved nutrition, and sustainable agriculture, which aligns with the Sustainable Development Goals (SDG) agenda.
- Millet production has been proven to enhance biodiversity and increase yields for smallholder farmers, including rural women

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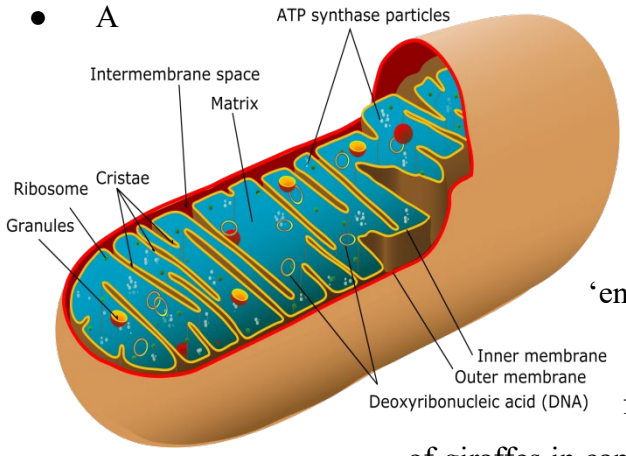
Plan to restore water bodies

- An expert committee will soon submit an action plan for the restoration of polluted waterbodies in Meghalaya.
- The Meghalaya government had set up the 10- member expert panel on the protection and restoration of the State's water bodies on June 23, following an order of the High Court of Meghalaya.
- The committee is headed by the State's Principal Chief Conservator of Forest, B.K. Lyngwa
- Members of the panel said the authorities of each district had prepared a list of waterbodies before the committee was formed.
- The expert committee had asked the districts to submit a new list barring 53 wetlands under the State Wetland Authority and seven rivers under the River Rejuvenation Committee (RRC).

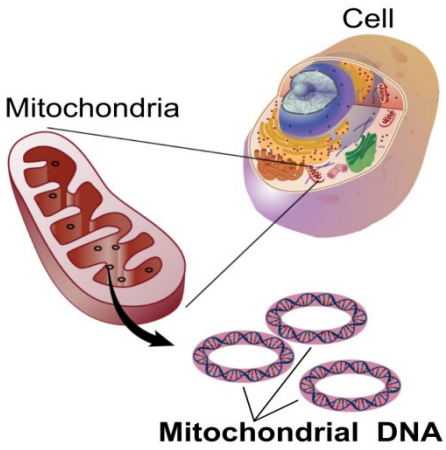
Giraffe and gene study

- A recent genealogical study of the largest captive herd in India at the Alipore Zoological Garden in Kolkata has confirmed that the giraffes in this facility, at least, are most likely "critically endangered" Nubian giraffes (Giraffa camelopardalis camelopardalis) or the endangered Rothschild giraffe (Giraffa camelopardalis rothschildi)

- A genetic distance analysis of the giraffes in Alipore showed that they were most closely related to Nubian and Rothschild giraffes.



- "As both the Nubian and Rothschild giraffes are listed as 'critically endangered' and 'endangered' by the IUCN [respectively], we think it's imperative that the Central Zoo Authority conducts further studies of giraffes in captivity so that the species are not interbred with each other and the giraffes' germplasm is preserved
- Only way to identify the species would be through a mitochondrial gene study.
- Mitochondrial DNA is the DNA located in mitochondria, cellular organelles within eukaryotic cells that convert chemical energy from food into a form that cells can use, such as adenosine triphosphate.



AK 203

- The Indo-Russian joint venture at Korwa in Uttar Pradesh will start manufacturing AK-203 assault rifles by 2022 end.
- Ordnance Factory Project, Korwa is a fast track & modernised project of Ordnance Factory Board. The project was established in December 2007 at Amethi, UP. HAL, Korwa is a neighbouring defence unit.

Star merging

- India does not believe in a hierarchical world order where a few countries are consi
- Africa, South East Asia and Middle East have emerged as major focus areas as India looks to emerge as a major global arms exporter.
- Stating that peace, security and development are inter-related, he said security is essential for enabling development in the region.
- "We have created a robust public and private defence industry.
- A defence manufacturing ecosystem has been created in India which has the advantage of abundant technical manpower.

The India-Africa Defence Dialogue (IADD)

- The India-Africa Defence Dialogue (IADD) was held on the sidelines of DefExpo 2022 in Gandhinagar, Gujarat
- The dialogue successfully brought out various aspects of the IADD's theme 'Adopting Strategy for Synergizing and Strengthening Defence and Security Cooperation'.
- Theme of IADD as the underlying commitment of India and African countries to explore new areas of convergence for defence engagements, including capacity building, training, cyber security, maritime security and counter terrorism.
- India & African countries as important stakeholders in ensuring a safe and secure maritime environment, especially in the Indian Ocean Region.
- India remains united with African countries in their quest for peace, security, stability, growth and prosperity.
- Our partnership with Africa is centered on the ten guiding principles articulated by Prime Minister during his address to Parliament of Uganda in 2018.
- India will continue to intensify and deepen our engagements with Africa.
- Apart from the goals of developmental, commercial and technological partnerships that India wants to forge with African nations, the statement also covered cooperation in strengthening capabilities in combating terrorism and extremism, supporting UN peacekeeping missions and work for open and free ocean
- He highlighted that India and Africa share a robust partnership, which is based on the cooperative framework of 'SAGAR' (Security and Growth for All in the Region), drawn upon the ancient ethos of 'Vasudhaiva Kutumbakam' (The World is One Family).

Step to protect vulture

●Alarmed at the 96% decline in India's vulture population between 1993 and 2003, the Central government put into place two action plans to protect the species at the national level the first in 2006 and the second, ongoing plan for 2020-2025.

●One of the important action points in this nationwide plan is the formation of State-level committees to save the critically endangered population of vultures.

- Acting on it, the Tamil Nadu Government formed a State-level Committee to set up an institutional framework for the effective conservation of vultures, which almost went extinct in the country at the beginning of the 21st century
- In Tamil Nadu, four species of vultures are found the Oriental white-backed vulture, the long-billed vulture, the red-headed vulture, and the Egyptian vulture.

- "The first three are residents and can be found in the landscapes of the Nilgiris and Sathyamangalam,
- The committee, which has a two-year tenure, will take steps for monitoring the conservation and recovery of existing vulture sites.
- Vultures play a key role as nature's scavengers, keeping the environment clean

Vulture saving in TN

- The State is home to four species of vultures the white-rumped vulture (Gyps bengalensis), long-billed vultures (Gyps indicus), the Asian king-vulture (Sarcogyps calvus) and the Egyptian vulture (Neophron percnopterus).
- Vulture numbers are decreasing over the last few years, with experts attributing the cause to lesser availability of prey as well as erratic weather.
- Experts also agree that the use of some Non-Steroidal Anti-Inflammatory Drugs to treat cattle has led to the crash in vulture populations across India

What role do vultures play in the local ecosystem?

- As scavengers, vultures help prevent the spread of many diseases and can remove toxins from entering the environment by consuming carcasses of dead cattle/wildlife before they decompose.

What are the challenges which impact vultures in the State?

- There are multiple. For one, temple tourism in the Sigur plateau is centred primarily around vulture habitats, such as Siriyur, Anaikatty and Bokkapuram.
- Another threat is the spread of invasive weeds such as the Lantana camara in vulture-landscapes, which hinder the birds from scavenging as their large wing-spans require plenty of open area to safely land and to take to the skies in case of any major threats.
- Finally, due to the illegal tapping of water along the streams running through these areas, possible climate change, and forest fires, the Terminalia arjuna trees, that many vultures use as nesting sites, are disappearing.
- Only through a multipronged approach of increasing the amount of food available to the birds and managing invasive species can vulture numbers start rebounding,

What are the steps taken to protect vultures in the State?

- State government has banned the use of diclofenac
- The drug, to treat cattle, while there are strict restrictions for the sale of other NSAIDs in the Nilgiris, Erode and Coimbatore districts.
- Additionally, as the vultures in the Sigur plateau utilise landscapes in neighbouring Karnataka and Kerala, experts have called for a synchronous vulture census to accurately identify vulture populations and nesting sites

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LiFE initiative

- China placed a “hold” on a joint India-U.S. proposal, to designate Lashkar-e-Taiba commander Shahid Mehmood under the United Nations Security Council’s (UNSC) 1267 list of terrorists affiliated to Al Qaeda and ISIS.
- The 1267 committee that was set up in 1999 (updated in 2011 and 2015) allows any UN member state to propose adding the name of a terrorist or terror group to a consolidated list, maintained by the Committee, that has affiliations to Al Qaeda and ISIS.
- Chinese Ambassador to India Sun Weidong said they needed “some time to study these specific cases, but that doesn’t mean China has changed its position on counter-terrorism cooperation efforts.”
- Since the Mumbai attacks in 2008, India has tried a number of different ways to build

international consensus on cross-border terrorism, and the UNSC terror listings have been one such route.

- India has successfully proposed the listing of several terror entities in the past two decades, including Pakistan-based Jaish-e-Mohammed (JeM) and Lashkar-eTaiba.

- LIFE, or Lifestyle for Environment, announced by Indian PM at COP26 in November 2021,

- Rather than framing climate change as a 'larger than life' challenge, LIFE recognises that small individual actions can tip the balance in the planet's favour.
- LIFE animate this spirit actions such as saving energy at home; cycling and using public transport instead of driving; eating more plant-based foods and wasting less; and leveraging our position as customers and employees to demand climate-friendly choices.
- Many of the goals of LIFE can be achieved by deploying 'nudges', gentle persuasion techniques to encourage positive behaviour.
- The UN Environment Programme (UNEP) employs proven nudging techniques such as discouraging food waste by offering smaller plates in cafeterias; encouraging recycling by making bin lids eye-catching; and encouraging cycling by creating cycle paths.
- According to the UNEP, more than two-thirds of greenhouse gas emissions can be attributed to household consumption and lifestyles the urgent cuts to global emissions we need can only be achieved through widespread adoption of greener consumption habits
- To become "Pro Planet People" by 2027, adopting simple lifestyle changes that can collectively lead to transformational change.
- The LIFE mission also recognises that accountability is relative to contribution.
- Emissions across the poorest half of the world's population combined still fall short of even 1% of the wealthiest.
- Those who consume the least, often the most vulnerable and marginalised members of society, will not be asked to consume less, but rather supported to participate in the green economy
- The average carbon footprint of a person in a high income country is more than 80 times higher than that of a person in a least developed country
- In the words of Mahatma Gandhi, "the world has enough for everyone's need, but not enough for everyone's greed.

Stubble burning and solution

- The root cause of stubble burning can be traced back to the 1960s-70s, when to meet the urgent challenge of feeding its rapidly growing population, India introduced several measures as part of its Green Revolution.
- The Green Revolution transformed the way agriculture was practised, especially in Punjab and

Haryana.

- The economics of high-yielding varieties of paddy and wheat, supported by a guaranteed buyer (the government) and minimum support prices led to a crop duopoly oriented solely around increasing caloric intakes, supplanting the earlier diversity of crops grown in the region.
- Further policy moves in subsequent decades, which included the introduction of subsidies for electricity and fertilizers, and ease of access for credit in agriculture only served to cement this duopoly.
- But this transition to a two-crop agricultural praxis, while filling godowns and feeding mouths, has been depleting the water table, increasing pesticide and fertiliser use exponentially.
- It has also led to the consolidation of small farms into larger landholdings.
- In an attempt to address the growing water crisis, the Punjab and Haryana governments introduced laws around water conservation, encouraging farmers to look to the monsoon rather than groundwater to irrigate their crops.
- The shortened harvesting season that arose resulting from a not clearly thought-out policy move brought about the need for farmers to rapidly clear their fields between the kharif and rabi crops; the quickest of these ways was to burn off the remaining stubble post-harvest.
- The repercussion of stubble burning is felt all through the Indo-Gangetic Plain (IGP) airshed, where what is burned in Punjab and Haryana has an impact on air quality all the way down to Bihar and West Bengal.

Steps

- In-situ solutions include happy seeders and bio-decomposers.
- While the ex-situ solutions include collecting and using stubble as fuel in boilers, to produce ethanol, or to simply burn away alongside coal in thermal power plants. Economic incentives to reduce burning have also been tested with limited success.
- The entire value-chain of agriculture in the region needs to change if air quality, water, nutrition, and climate goals are to be addressed.
- In practical terms, this means substantially reducing the amount of paddy being grown in the region and replacing it with other crops that are equally high-yielding, in-demand, and agro-ecologically suitable such as cotton, maize, pulses and oil seeds.

Great India bustard

- The recent sighting of three Great Indian Bustards (GIBs) deep in Pakistan's Cholistan desert has given rise to speculation that the endangered birds might have flown across the international border from India's Desert National Park (DNP).
- GIBs are critically endangered in Pakistan because of lack of protection and rampant hunting.
- The GIB the State bird of Rajasthan is considered India's most critically endangered bird and is protected under the Wildlife Protection Act.
- Its population of about 150 in Rajasthan accounts for 95% of its total world population.
- Historically, the great Indian bustard was distributed throughout Western India, spanning 11 states, as well as parts of Pakistan.
- Its stronghold was once the Thar desert in the north-west and the Deccan plateau of the peninsula. Today, its population is confined mostly to Rajasthan and Gujarat.
- Small population occur in Maharashtra, Karnataka and Andhra Pradesh. Bustards generally favour flat open landscapes with minimal visual obstruction and disturbance, therefore adapt well in grasslands.
- In the non-breeding season they frequent wide agro-grass scrub landscapes.
- While in the breeding season (summers and monsoons) they congregate in traditional undisturbed grassland patches characterized by a mosaic of scantily grazed tall grass (below 50 cm).
- They avoid grasses taller than themselves and dense scrub like thickets.
- Listed in Schedule I of the Indian Wildlife (Protection)Act, 1972, in the CMS Convention and in Appendix I of CITES, as Critically Endangered on the IUCN Red List and the National Wildlife Action Plan (2002-2016).
- It has also been identified as one of the species for the recovery programme under the Integrated Development of Wildlife Habitats of the Ministry of Environment and Forests, Government of India.

Coffee crisis

- The impact of the rains continues, with diseases affecting plants, and estate infrastructure suffering long-term damage.
- The volatility in market prices and the reduced influence of producers in the value chain render

coffee cultivation an increasingly loss-making proposition. “Producers are getting marginalised.

- More than 75% of Indian coffee production is exported.
- This has an impact on the cost competitiveness of Indian coffee vis-à-vis the coffee that is exported from other producer regions, especially since those growers get their finances at very low interest rates.
- In India, production of coffee is low while the cost of production is on the rise compared to other coffee countries such as Vietnam and Brazil.
- The cost of inputs around coffee such as fertilizers and agrochemicals has increased by almost 20% in a year.
- There is increasingly a shortage of labour while the cost of labour is on the rise in the coffee sector.
- The children of workers in all the three coffee-growing States Karnataka, Tamil Nadu and Kerala prefer to move to urban areas.
- This means plantations are forced to depend heavily on migrant labours who are unskilled.

The way forward

- The way forward, many feel, is finding alternative sources of revenue and increasing domestic consumption on the one hand and branding and promoting Indian coffee better in the global market on the other.
- According to the board, in addition to traditional inter-cropping of pepper and cardamom, coffee growers could try planting exotic fruit-bearing trees, food crops, or getting into fish farming, dairy farming, apiary or green tourism to increase incomes from their coffee gardens.
- On the brand front, Indian coffee is still facing an identity crisis in global markets, although the country started exporting coffee actively before the 19th century.

Agni prime

- India successfully test-fired indigenously-developed new generation medium-range ballistic missile Agni Prime from the Odisha coast.
- Agni Prime is a new generation advanced variant of the Agni class of missiles with range capability between 1,000 and 2,000km.
- A ballistic missile is a type of missile which uses projectile motion to deliver warheads on a

target.

- These weapons are guided only during relatively brief periods—most of the flight is unpowered.

Paddy pellet scheme

- Pellets, which are manufactured out of agriculture biomass, when properly made would provide much more heat, emit fewer than 50% of the particulate matter and only a fraction of the ash from burning an equivalent amount of coal.
- "Also they constitute a reliable source of income for farmers who can sell their agriculture byproducts.
- 270 million tonnes of such agricultural waste is annually available in India that can produce 28,000 MW of power.
- By comparison, about 818 million tonnes of coal was consumed by thermal power plants for producing electricity in 2021-22.
- Union Environment Ministry announced a scheme to incentivise entrepreneurs to manufacture pellets from paddy stubble.
- The entire outlay of the government project, described as a "one-time" scheme was ₹50 Crore of which ₹40 Crore was for pellet plants and ₹10 Crore for torrefaction plants.

5NR and 3GPP

- Only users of 5G capable smartphones will be able to experience these services.
- Currently, of the total smartphone base of about 600 million, only about 50-60 million handsets are estimated to be 5G smartphones, even though the first 5G smartphone was unveiled in the country two years ago in 2020.
- However, even users of these 50-60 million phones have been having trouble latching on to 5G services in the area where it is available.
- For the phones to start latching on to 5G networks in India, the first thing needed is support for 5G bands such as n1, n12, n78, n28, n58 (these are some of the bands that are expected to work in India).
- A user can check this by viewing the phone's specification on the manufacturer's website.

- A single phone can support multiple 5G band
- For phones that support the 5G bands in India, manufacturers need to undertake conformance and performance tests to make sure that network speed and quality are maintained.
- These tests take time, and hence the delay of a couple of months.

5G New Radio

- Frequency bands for 5G New Radio (5G NR), which is the air interface or radio access technology of the 5G mobile networks, are separated into two different frequency ranges.
- First there is Frequency Range 1 (FR1), which includes sub-6 GHz frequency bands, some of which are traditionally used by previous standards, but has been extended to cover potential new spectrum offerings from 410 MHz to 7125 MHz.
- The other is Frequency Range 2 (FR2), which includes frequency bands from 24.25 GHz to 71.0 GHz
- 5G NR (New Radio) is a new radio access technology (RAT) developed by 3GPP for the 5G (fifth generation) mobile network.
- It was designed to be the global standard for the air interface of 5G networks.

3GPP

The 3rd Generation Partnership Project (3GPP) is an umbrella term for a number of standards organizations which develop protocols for mobile telecommunications.

Its best known work is the development and maintenance of:

- GSM and related 2G and 2.5G standards, including GPRS and EDGE
- UMTS and related 3G standards, including HSPA and HSPA+
- LTE and related 4G standards, including LTE Advanced and LTE Advanced Pro
- 5G NR and related 5G standards, including 5G-Advanced
- An evolved IP Multimedia Subsystem (IMS) developed in an access independent manner

- 3GPP is a consortium with seven national or regional telecommunication standards organizations as primary members ("organizational partners") and a variety of other

organizations as associate members ("market representation partners").

- The 3GPP organizes its work into three different streams: Radio Access Networks, Services and Systems Aspects, and Core Network and Terminals.

- The project was established in December 1998 with the goal of developing a specification for a 3G mobile phone system based on the 2G GSM system, within the scope of the International Telecommunication Union's International Mobile Telecommunications-2000, hence the name 3GPP.

Particle pollution

Particle pollution also called particulate matter (PM) is made up of particles (tiny pieces) of solids or liquids that are in the air.

These particles may include:

- Dust
- Dirt
- Soot
- Smoke
- Drops of liquid

Some particles are big enough (or appear dark enough) to see for example, you can often see smoke in the air. Others are so small that you can't see them in the air.

Where does particle pollution come from?

- Particle pollution can come from two different kinds of sources primary or secondary. Primary sources cause particle pollution on their own. For example, wood stoves and forest fires are primary sources.
- Secondary sources let off gases that can form particles. Power plants and coal fires are examples of secondary sources. Some other common sources of particle pollution can be either primary or secondary for example, factories, cars and trucks, and construction sites.
- Smoke from fires and emissions (releases) from power plants, industrial facilities, and cars and trucks contain PM2.5.

Particle Pollution and Your Health

- Breathing in particle pollution can be harmful to your health. Coarse (bigger) particles, called PM10, can irritate your eyes, nose, and throat. Dust from roads, farms, dry riverbeds, construction sites, and mines are types of PM10.
- Fine (smaller) particles, called PM2.5, are more dangerous because they can get into the deep parts of your lungs or even into your blood.

Recombinant Virus and XBB lineage

Recombinant viruses

- A recombinant virus may occur naturally or be produced by recombining pieces of DNA using recombinant DNA technology.
- This may be used to produce viral vaccines or gene therapy vectors.
- The term is also used to refer to naturally occurring recombination between virus genomes in a cell infected by more than one virus strain.
- This occurs either by Homologous recombination of the nucleic acid strands or by reassortment of genomic segments.
- Both these and mutation within the virus have been suggested as ways in which influenza and other viruses evolve.

What is XBB lineage

- While Europe and North America are currently seeing an emergence of Omicron variants, especially BQ.1 and its sublineages, a recombinant lineage XBB has been emerging in Asia.
- This lineage comes out of recombination of two Omicron sublineages BJ.1 and BA.2.75.

BOAT

- Astronomers have spotted what they think might be the most powerful explosion ever observed.
- The explosion is a gamma-ray burst which is known as GRB221009A, which might have been caused by a supernova that left behind a black hole.
- “Informally, we’ve been calling it the BOAT the brightest of all time,”

- The problem, for scientists, is that the explosion is so bright that it is overwhelming the detectors of gamma-ray telescopes.

Grazing animals and climate change

Grazing ecosystems store carbon in the soil and therefore decarbonise the atmosphere. Large mammals are crucial for all this.

- Unfortunately, wild mammals are confined to a few parks and reserves. Elsewhere wildlife has long been replaced by domestic livestock.
- Grazing animals can have a significant impact on the stability of soil carbon in grazing ecosystems, finds a study.
- Researchers from Indian Institute of Science, Bengaluru (IISc), observed that experimentally removing grazing animals from the ecosystem resulted in higher fluctuations in soil carbon from one year to the next.

InviTS

An infrastructure investment trust, simply put, is a pooled investment vehicle like a mutual fund.

- While mutual funds invest the sum received in financial securities, an InvIT invests the same in real infrastructure assets like roads, power plants, transmission lines, pipelines etc.
- InvITs are a hybrid between equity and debt investment, i.e., it has features of both equity and debt.
- While the operating business model helps provide stable, predictable, and relatively low-risk cash flows like debt, there is growth potential like equity as the returns are not fixed with a scope of change in the unit price.
- InvITs are designed to mitigate the under-construction risks in the infrastructure sector as at least 80% of the investment must be made in completed and revenue-generating projects.
- The instrument aims to ensure steady predictable cash flows as 90% of the net distributable cash flow gets distributed to the investors.
- These assets have long-term contracts that provide a steady cash flow over the long term–

typically 15-20 years, depending on the underlying assets.

- Public InvIT units can be listed and traded on a stock exchange like equity stocks.

Use of InvITs

- InvITs help infrastructure developers to free-up capital by monetising completed assets.
- The infrastructure developer can transfer a part of its revenue-generating assets to an InvIT, which can then issue units to its holders.
- Thus, InvITs spur infrastructure creation, by providing an efficient way to raise capital from investors individual and institutional and fund new project development.
- On the other hand, InvITs offers an opportunity for individual investors to invest into a long term yield instrument in the infrastructure space and helps bring higher standards of governance into the sector.

New Basmati varieties

- Five new Basmati varieties, developed.
- Three of the five varieties can resist two common diseases of paddy.
- The other two can save 35% of the water now required as the seeds can be directly sown, obviating the need for transplanting seedlings.
- These two seeds are resistant to herbicides too, helping the farmers control weeds more efficiently.
- In the next three years, all of the five seeds will have the combined qualities of disease and herbicide resistance.
- India is known for its Basmati rice, with the produce from seven States Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Uttar Pradesh and Uttarakhand earmarked for Geographical Indication.
- Basmati, known for its mouthfeel, aroma, length of the grain when cooked and taste, has a market abroad and brings about ₹30,000 Crore in foreign exchange every year.
- While 75% of the export is to West Asian countries, European Union countries also import Indian Basmati.
- However, recently, the export to EU countries faced certain hurdles due to the increase in the

pesticide residue levels in the rice from India.

- Over a period of time, as the area of cultivation increased, traditional varieties become susceptible to two major diseases bacterial leaf blight (BLB) and blast (leaf and collar) diseases caused by the fungus Magnaporthe oryzae.
- Pesticides and fungicides used against these diseases increased the residue levels permitted in developed countries.
- From Pusa Basmati 1121, we developed Pusa Basmati 1885; from Pusa Basmati 1509, we developed Pusa Basmati 1847; Pusa Basmati 1401 was improved to develop Pusa Basmati 1886.
- All these varieties have two genes to resist BLB and two genes to resist blast disease.
- Farmers need not use pesticides and it will decrease the cost of farming by ₹3,000 an acre
- Around 3,000 litres of water is required for one kilogram of Basmati rice.
- This has impacted the water table of States such as Punjab and Haryana.
- We have to change the practice of cultivating transplanted variety of paddy to direct sowing of rice (DSR).
- Water saving is 35% in DSR and the requirement will be 2,000 litres for a kilogram of rice.
- The second advantage is that the green house gas emission is reduced by 35% as water is not stagnating in this process.
- Labour cost of transplantation, which is about ₹3,000, is also saved. Overall saving will be at least ₹4,000 per acre,"
- However, one of the major problem in the DSR is weeds. Without the water acting as a herbicide, the DSR method allows for a lot of weeds to crop up in the field.
- Gene transferred that is resistant to a herbicide. So, when farmers spray herbicide, weeds will be killed, not paddy.

CCI Imposed penalty on Google

How did Google violate the competition law in India?

- Google makes sure that the manufacturers who wished to use Google apps had to use Google's version of Android.
- Secondly, Google is the dominant player in the app store market for Android OS worldwide (except China).

- According to the EU, the Google Play Store accounts for more than 90% of apps downloaded on Android devices globally

- Third is the company's dominance in the general internet search market and the non-OS specific browser market (meaning engines like Chrome, Firefox, etc.).
- As of last year, Google has a 92% share in the global search engine market.
- The CCI said that due to Google's various agreements with manufacturers, one of its major revenue-earning apps, YouTube, gained a significant edge over competitors in the online video hosting platforms market.
- The mention of Google's antitrust practices with regard to YouTube was the distinguishing factor between the CCI probe and the EU probe of Google in 2018.
- The CCI, the country's competition watchdog, is empowered under the Competition Act, 2002, to check whether companies, especially large tech companies are not eliminating healthy competition in the market and creating a monopoly.

Sandalwood spike disease

- The threat to India's pride, sandalwood, is increasing as the deadly sandalwood spike disease (SSD), which hitherto was confined mainly to forest areas, has started spreading to private fields .
- This 'invisible' disease, which is wiping out the sandalwood trees, can transmit through seeds of infected trees through the presence of disease-causing bacteria called Phytoplasma.

Cyclone sitrang

How did Cyclone get its name?

- As per the World Meteorological Organization (WMO), it is necessary to name tropical cyclones because there can be more than one such system operating in a

particular zone

- The names are kept according to the rules at the regional level. In the case of the Indian Ocean and South Pacific regions, the tropical cyclone names are allotted in alphabetical order.
- Sitrang is the Thai name for it (pronounced as Si-trang). According to sources, it is a Thai surname. The name is one of 169 storms identified by IMD for 2020.

Storm names

- Within this basin, a tropical cyclone is assigned a name when it is judged to have reached Cyclonic Storm intensity with winds of 65 km/h (40 mph).
- The names were selected by a new list from the Regional Specialized Meteorological Center in New Delhi by mid-year of 2020.
- There is no retirement of tropical cyclone names in this basin as the list of names is only scheduled to be used once before a new list of names is drawn up.
- Should a named tropical cyclone move into the basin from the Western Pacific, it will retain its original name.
- The next eight available names from the List of North Indian Ocean storm names are below.
    - Asani
    - Sitrang (active)
    - Mandous (unused)
    - Mocha (unused)
    - Biparjoy (unused)
    - Tej (unused)
    - Hamoon (unused)
    - Midhili (unused)

The criteria below have been formulated by the Indian Meteorological Department (IMD), which classifies the low pressure systems in the Bay of Bengal and the Arabian Sea on the basis of capacity to damage, which is adopted by the WMO.

Type of Disturbances	Wind Speed in Km/h	Wind Speed in Knots
Low Pressure	Less than 31	Less than 17
Depression	31-49	17-27
Deep Depression	49-61	27-33
Cyclonic Storm	61-88	33-47
Severe Cyclonic Storm	88-117	47-63
Super Cyclone	More than 221	More than 120

Report-The Lancet countdown on health and climate change

- An estimated over 3,30,000 people died in India due to exposure to particulate matter from fossil fuel combustion in 2020, says the 2022 report of The Lancet countdown on health and climate change: health at the mercy of fossil fuels.
- The report adds that from 2000-2004 to 2017-2021, heat-related deaths increased by 55% in India.
- The report states that in 2021, Indians lost 16,720 Crore potential labour hours due to heat exposure with income losses equivalent to about 5.4% of the national GDP.
- Stating that climate change is amplifying the health impacts of multiple crises, the report further found that from 2012 to 2021, infants aged under one experienced a higher number of heatwave days.
- Additionally, it added that the duration of the growth season for maize has decreased by 2%, compared with a 1981-2010 baseline, while rice and winter wheat have each decreased by 1%.
- Warning that governments are not focusing on the issue as much as required, it said that in 2019, India had a net negative carbon price, indicating that the government was effectively subsidising fossil fuels.
- "India allocated a net 34 billion USD [around ₹2,80,000 Crore to this in 2019 alone, equivalent to 37.5% of the country's national health spending that year.
- Biomass accounted for 61% of household energy in 2019, while fossil fuels accounted for another 20%.
- With this high reliance on these fuels, average household concentrations of particulate matter exceeded the WHO recommendation by 27-fold nationally and 35-fold in rural homes,"

Tension in Ethiopia

The breakdown in the already strained relations between the federal government in Addis Ababa and the Tigray People's Liberation Front (TPLF)'s leaders in Tigray has resulted in the national crisis.

- In 2018, anti-government protests by the marginalised Oromo population forced the TPLF to step down, resulting in the election of Prime Minister Abiy Ahmed and his subsequent crackdown on Tigrayan politicians for corruption and human rights abuses.

- Internal conflict in Ethiopia has resulted in the death of 52,000 people and the displacement of over 2 million, over 60,000 of whom have taken refuge in Sudan's eastern border.
- This has triggered an influx of Sudanese and Eritrean military personnel near Ethiopia's northern frontier.
- The complex process of developing a post-conflict reconstruction framework requires a comprehensive analysis, one that compels immediate coordination between the federal, regional and local governments, independent and partial adjudicators, civil society and victims' and community groups.
- The first formal African Union-led peace talks between an Ethiopian government team and Tigray forces (since the war of 2020 with Tigray), in South Africa have started from October 24.
- The history of conflict in Ethiopia starts from the modern period from around the 1850s to the present.
- During this time, there was a mix of warfare and nation-building under the reigns of the emperors, notably Menelik and later Haile Selassie, to the regime of Mengistu Haile Mariam, and later the Transitional Government of Ethiopia (TGE) under soldier-politician Meles Zenawi beginning 1991.
- While with the term of Abiy Ahmed, the long-drawn conflict over nearly 20 years may have ended, ethnic politics and economic hurdles have not stopped.
- In 2020, a year after Mr. Ahmed was awarded the Nobel Prize, Tigray in the north erupted in conflict against government forces, triggering charges of Ethiopia's gruesome human rights violations against Tigrayans.

Agriculture and renewable energy

- The beginnings of a renewable energy revolution rooted in agriculture are taking shape in India with the first bio-energy plant of a private company in Sangrur district of Punjab having commenced commercial operations on October 18.
- It will produce Compressed Bio Gas (CBG) from paddy straw, thus converting agricultural waste into wealth.
- The Commission for Air Quality Management in National Capital Region and Adjoining Areas (CAQM) had developed a framework and action plan for the effective prevention and control of stubble burning.

- The framework/action plan includes in-situ management, i.e., incorporation of paddy straw and stubble in the soil using heavily subsidised machinery (supported by crop residue management (CRM) Scheme of the Ministry of Agriculture and Farmers Welfare).
- Ex-situ CRM efforts include the use of paddy straw for biomass power projects and co-firing in thermal power plants, and as feedstock for 2G ethanol plants, feed stock in CBG plants, fuel in industrial boilers, waste-to-energy (WTE) plants, and in packaging materials, etc.
- Additionally, measures are in place to ban stubble burning, to monitor and enforce this, and initiating awareness generation.
- Despite these efforts, farm fires continued unabated.
- A techno-economic assessment of energy technologies suggested that rice straw can be cost-effective for producing CBG and pellets.
- Pellets can be used in thermal power plants as a substitute of coal and CBG as a transport fuel.
- With 30% of the rice straw produced in Punjab, a 5% CBG production target set by the Government of India scheme, "Sustainable Alternative Towards Affordable Transportation (SATAT)" can be met.
- It could also increase local entrepreneurship, increase farmers' income and reduce open burning of rice straw.
- From paddy stubble, CBG valued at ₹46 per kg as per the SATAT scheme will be produced.
- Paddy straw from one acre of crop can yield energy output (CBG) worth more than ₹17,000 an addition of more than 30% to the main output of grain
- The slurry or fermented organic manure from the plant (CBG) will be useful as compost to replenish soils heavily depleted of organic matter, and reduce dependence on chemical fertilisers.
- The plant will also provide employment opportunities to rural youth in the large value chain, from paddy harvest, collection, baling, transport and handling of biomass and in the CBG plant.

Dirty bombs

What is a dirty bomb?

A dirty bomb is a mix of explosives, such as dynamite, with radioactive powder or pellets.

When the dynamite or other explosives are set off, the blast carries radioactive material into the surrounding area.

A dirty bomb is not the same as an atomic bomb

- An atomic bomb, like those bombs dropped on Hiroshima and Nagasaki, involves the splitting of atoms and a huge release of energy that produces the atomic mushroom cloud.
- A dirty bomb works completely differently and cannot create an atomic blast.
- Instead, a dirty bomb uses dynamite or other explosives to scatter radioactive dust, smoke, or other material in order to cause radioactive contamination.

What are the main dangers of a dirty bomb?

- The main danger from a dirty bomb is from the explosion, which can cause serious injuries and property damage.
- The radioactive materials used in a dirty bomb would probably not create enough radiation exposure to cause immediate serious illness, except to those people who are very close to the blast site.
- However, the radioactive dust and smoke spread farther away could be dangerous to health if it is inhaled.
- Because people cannot see, smell, feel, or taste radiation, you should take immediate steps to protect yourself and your loved ones.

Blyth's horseshoe bat

- A colony of bats was evicted from a Manipur cave system with a Palaeolithic past to make it tourist friendly, a zoological study that recorded new fauna in the State has said.
- The Khangkhui, locally called Khangkhui Mangsor, is a natural limestone cave about 15 km from Ukhrul, the headquarters of Ukhrul district

- The cave was also used as a shelter by the local people during the Second World War after the Japanese forces advanced to Manipur and the adjoining Nagaland
- Blyth's horseshoe bat (Rhinolophus lepidus) is a species of bat in the family Rhinolophidae. It is found across southern Asia from Afghanistan to Vietnam
- The Blyth's horseshoe bat population on Tioman Island, Malaysia, is known to fly and hunt in the forest during the day and night
- Blyth's horseshoe bat is widely distributed in South and Southeast Asia, and has been documented in the following countries: Afghanistan, Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Thailand, and Vietnam.

GEAC and GM crops

- The Genetic Engineering Appraisal Committee (GEAC) that functions under the Union Environment Ministry has yet again cleared the proposal for commercial cultivation of genetically modified (GM) mustard.
- "The environmental release of mustard hybrid Dhara Mustard Hybrid (DMH-11)
- 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.

About GM crops

- Transgenic plants have genes inserted into them that are derived from another species.

Benefit

- Improved shelf life, improved nutrition (golden rice- rich in vitamin A-Gene is derived from the bacterium Erwinia uredovora); stress resistance, insect resistance etc.

Production of biofuel

- Algae is used for the production
- Modified jatropha

Useful products

- Bioplastic- use of potato
- Oilseed can be modified to produce detergent

Potential risk

- Allergenicity
- May impact human health
- Loss of indigenous crops
- Some have toxic properties

Advantage of GM

- Increasing population and food security
- Drought resistant
- Salinity tolerance
- Nutrition

Disadvantages

- More safety testing
- More use of pesticide and pesticide resistance
- Impact on consumer behaviour

CODEX alimentarius

The Codex Alimentarius is a collection of internationally recognized standards, codes of practice, guidelines, and other recommendations published by the Food and Agriculture Organization relating to food, food production, food labelling, and food safety.

Sanitary and phytosanitary measures

Kherson region

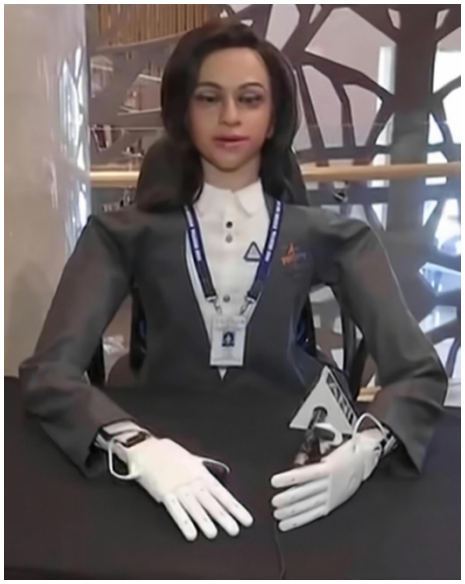
- Kherson is a port city of Ukraine that serves as the administrative centre of Kherson Oblast.
- Located on the Black Sea and on the Dnieper River, Kherson is the home of a major ship-building industry and is regional economic centre

Burkina Faso

Ibrahim Traore At 34, Burkina's new junta chief is world's youngest leader

- Burkina Faso, landlocked country in western Africa.
- The country occupies an extensive plateau, and its geography is characterized by a savanna that is grassy in the north and gradually gives way to sparse forests in the south
- A former French colony, it gained independence as Upper Volta in 1960.
- The name Burkina Faso, which means "Land of Incorruptible People," was adopted in 1984.
- The capital, Ouagadougou, is in the centre of the country and lies about 500 miles (800 km) from the Atlantic Ocean.

Vyommitra



- Vyommitra, the humanoid designed and developed by the Indian Space Research Organization (ISRO) to fly aboard unmanned test missions ahead of the Gaganyaan human spaceflight mission, is undergoing pre-flight ground tests at the ISRO Inertial Systems Unit (IISU) here.
- The ISRO and the IISU were in the news when they unveiled Vyom Mitra, a "female" robot astronaut, in 2020.
- Vyom Mitra is a half-humanoid lacking lower limbs.
- The IISU was responsible for the design, development, and integration of the robot, while the Vikram Sarabhai Space Centre (VSSC) at Thumba here developed its fingers.
- The AI-enabled robot is designed to fly aboard a rocket, withstanding vibrations and shock during the flight
- The IISU, which designs and develops navigational systems for ISRO launch vehicles.

Prachand

The indigenously developed Light Combat Helicopter (LCH) Prachand

- The multi-role attack helicopter has been customised as per the requirements of the Indian armed forces to operate both in desert terrains and high-altitude sectors.

- The LCH is the only attack helicopter in the world that can land and take off at an altitude of 5,000 metres (16,400 ft).
- The LCH project can be traced to the 1999 Kargil war when the armed forces felt the need for a dedicated platform capable of operating at high altitudes and delivering precision strikes as the existing attack choppers couldn't effectively hit target

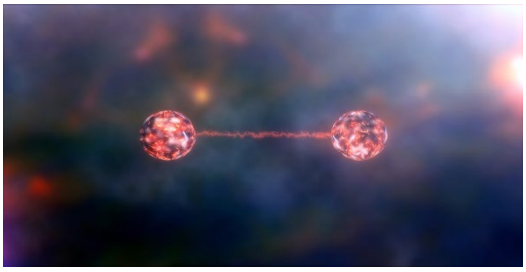
- Powered by twin Shakti engines, a collaborative effort of the HAL and France's Safran company, the LCH is a 5.8-tonne class combat helicopter with potent ground attack and aerial combat capability.
- The helicopter can fly at a maximum speed of 288 kmph and has a combat radius of 500 km, which can go up to a service ceiling of 21,000 feet, making it ideal to operate in Siachen.
- It incorporates several stealth features such as reduced radar and infrared signatures, crashworthy features for improved survivability, armoured-protection systems and night attack capability.
- The LCH helicopters can be deployed to assume air defence, anti-tank roles in high-altitude, counter-insurgency, and search and rescue operations, and are equipped with advanced technology which can be used to destroy the enemy's air defence, as per HAL.
- It can be deployed to perform Combat Search and Rescue (CSAR), bunker busting operations, counter-insurgency operations in the jungle and urban areas and support the ground forces.

Moonlighting

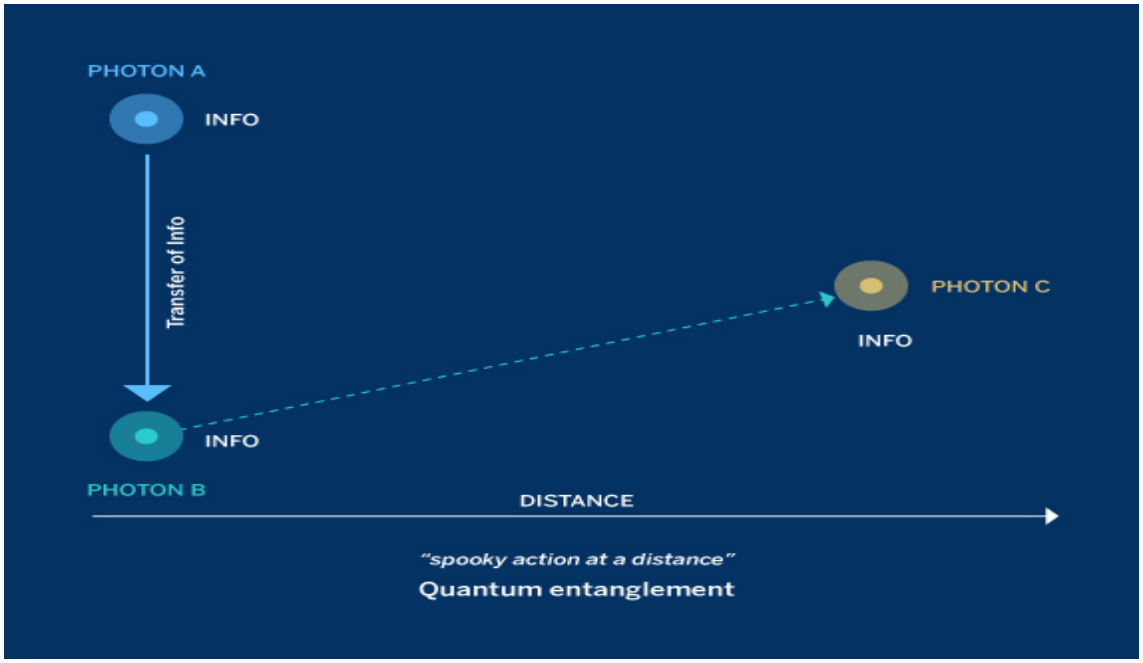
- Moonlighting is a state where employees work for remuneration with entities other than their employers. It is not defined in any of the statutes in India.
- However, there are enactments that deal with double employment. Moonlighting is subject to law of the land.
- The sphere of employment cannot be extended by the employer beyond working hours and outside his place of employment.
- The Courts of law in India dealing with employment are Writ Courts and Labour Courts, which exercise jurisdiction based on equity or fairness.

- Therefore, the Courts may lean in favour of the employee unless the contravention of the employee has led to serious prejudice and loss to the employer.

Quantum entanglement and quantum teleportation



- Quantum entanglement is the physical phenomenon that occurs when a group of particles are generated, interact, or share spatial proximity in a way such that the quantum state of each particle of the group cannot be described independently of the state of the others, including when the particles are separated by a large distance.
- This is what Einstein called 'spooky action
- Quantum teleportation is a technique for transferring quantum information from a sender at one location to a receiver some distance away.



Corporate social responsibility

- Ever since the establishment of the Corporate Social Responsibility (CSR) regime in India under Section 135 of the Companies Act 2013, CSR spending in India has risen from ₹10,065 Crore in 2014-15 to ₹24,865 Crore in 2020-21.
- The first proviso to Section 135(5) of the Act is that the company should give preference to local areas/areas around it where it operates.
- However, a report by Ashoka University's Centre for Social Impact and Philanthropy says that 54% of CSR companies are concentrated in Maharashtra, Tamil Nadu, Karnataka, and Gujarat (receiving the largest CSR spends) while populous Uttar Pradesh and Madhya Pradesh receive little
- Item (iv) of Schedule VII of the Act deals with broader environmental issues to create a countervailing effect.
- However, an analysis of CSR spending (2014-18) reveals that while most CSR spending is in education (37%) and health and sanitation (29%), only 9% was spent on the environment even as extractive industries such as mining function in an environmentally detrimental manner in several States.
- Under the existing regulation, monitoring is by a board-led, disclosure-based regime, with companies reporting their CSR spends annually to the Corporate Affairs Ministry (MCA) through filing of an annual report.
- It is not known if there is a review of these reports and companies taken to task.

A pathway to follow

- There is a need to curate a national-level platform centralised by the MCA where all States could list their potential CSR-admissible projects so that companies can assess where their CSR funds would be most impactful across India with, of course, preferential treatment to areas where they operate.
- Invest India's 'Corporate Social Responsibility Projects Repository' on the India Investment Grid (IIG) can serve as a guide for such efforts.
- Companies need to prioritise environment restoration in the area where they operate, earmarking at least 25% for environment regeneration.
- All CSR projects should be selected and implemented with the active involvement of communities, district administration and public representatives.
- These include strengthening the reporting mechanisms with enhanced disclosures concerning

selection of projects, locations, implementing agencies, etc.; bringing CSR within the purview of statutory financial audit with details of CSR expenditure included in the financial statement of a company, and mandatory independent third-party impact assessment audits.

- The MCA and the line departments need to exercise greater direct monitoring and supervision over CSR spend by companies through the line ministries.

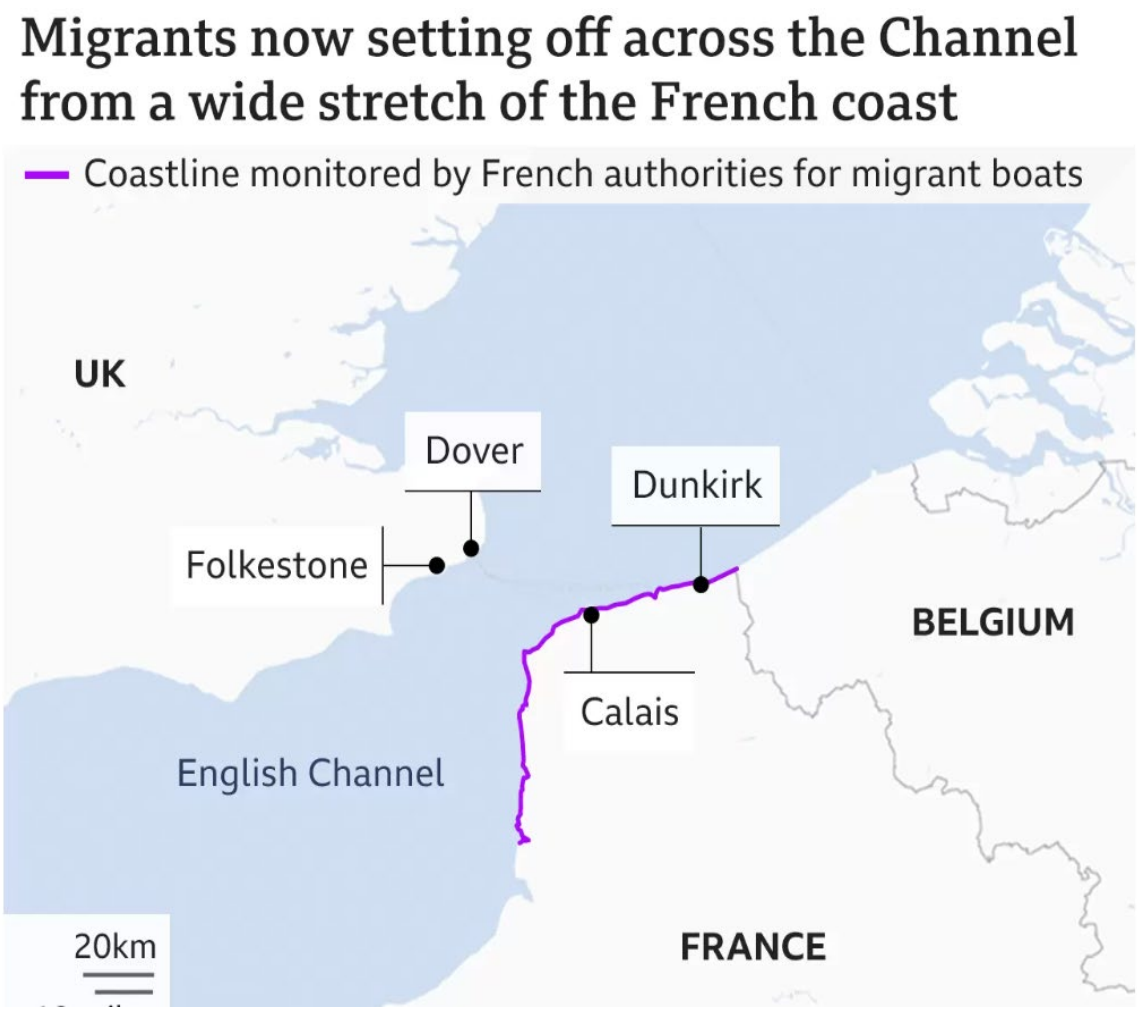
Evangelical environmentalism and TN Government steps

- Tamil Nadu has struck out clearly for a future that would be climate conscious, greener, with a series of announcements this year in the form of government orders and via the Budget.
- Apart from getting the Ramsar Site declaration for a record number of ecological zones as a well-planned and implemented initiative, it has also declared its intention to create green parks in 100 villages, that would cater to local requirements too.
- Also proposed are an elephant reserve at Agasthiyarmalai in the south, a dugong conservation park in the Palk Bay, a new bird sanctuary at Tiruppur, and establishing India's first-ever wildlife sanctuary for the slender loris in Dindigul and Karur district.
- All modern states are beset by challenges in the sectors of energy transition, mobility transition and agricultural transition. It is crucial to build capacity capable of fashioning local solutions, and ensure that the announcements are all implemented, in a time-bound manner.

Evangelical environmentalism

- Evangelical environmentalism is an environmental movement in the United States in which some Evangelical Christians have emphasized biblical mandates concerning humanity's role as steward and subsequent responsibility for the care taking of Creation.
- While the movement has focused on different environmental issues, it is best known for its focus of addressing climate action from a biblically (The meaning of BIBLICAL is of, relating to, or being in accord with the Bible)-grounded theological perspective.
- Some Evangelical groups have allied with environmentalists in teaching knowledge and developing awareness of global warming.
- The National Association of Evangelicals, a nonprofit organisation, is working to encourage lawmakers to pass a law that would put restrictions on carbon emissions in the United States

Migration through English channel



Who are the migrants and where are they from?

In the first six months of 2022, more than half were from three countries:

- 18% came from Albania
- 18% from Afghanistan
- 15% from Iran

What is the Rwanda plan?

- The government wants to send some asylum seekers to Rwanda for their claims to be processed.
- It argues this will deter people who arrive in the UK through what it calls "illegal, dangerous or unnecessary methods".

- However, the numbers crossing the Channel have continued to rise since the policy was announced.
- The plan was widely condemned by charities and campaign groups, who have launched a series of legal challenges.
- The policy is currently on hold until a decision is reached in the courts.

What happens when people arrive in the UK?

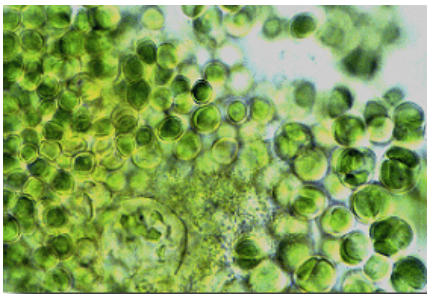
- Most of the people who come by boat claim asylum on arrival in the UK. An asylum seeker is a person who has applied for the right to seek shelter and protection in another country.
- Asylum seekers have an initial interview and - if their case is accepted - they can apply to remain in the UK.
- However, recent changes to immigration law mean an asylum claim can be rejected if the applicant has a connection to a safe third country.

COP27

- Despite nervousness in making bold commitments in these uncertain times, a breakthrough must be made in rectifying decades of lopsided emissions by rich countries
- Just as problematic is the continuous and heavy burning of fossil fuels by the top five emitters China, the United States, India, Russia, and Japan as well as Southeast Asian countries taken together.
- India's reliance on fossil fuels is extremely high. High GDP growth, India's biggest goal, just cannot be achieved in the face of runaway climate change.
- The country has set a target date of 2070 for net zero. China is the world's leader in renewable energy, but its share of coal and gas in energy production remains over 70%, with the country continuing to finance massive fossil fuel-based infrastructure.
- China has announced net zero for 2060
- Energy is responsible for about three-fourths of GHGs in the air, and low carbon energy needs to lead the decarbonisation of the global economy. India's plan for decarbonisation, even if very gradual at present, will nevertheless need to see a massive switch to renewable energy.
- Electric power has made progress in adopting renewables in its energy mix, but a far bigger switch from fossil fuel is needed for domestic heating and cooling.
- Factors in the way of a more ambitious adoption of renewables such as solar and wind include

the variability in their generation due to weather conditions, weak transmission grids, and poor financial conditions of power distribution companies.

Hardy bacteria



- Researchers have discovered that certain hardy bacteria could survive in the hostile Martian conditions for millions of years, by testing the ability of a selection of 'extremophile' microbes which can live in harsh environments to survive in cold, radioactive conditions similar to those on Mars.
- An extremophile is an organism that thrives in extreme environments.
- The team found that, when dried and frozen, the Deinococcus radiodurans microbe could survive under the surface of Mars for 280 million years
- Hardy bacteria form a hard outer covering called cyst around themselves.
- They do this when conditions are not favourable, such as under extreme conditions of temperature and dryness. Heart outlined.

Thrombosis

- A study sheds further light on the risk of developing a very rare blood-clotting condition known as thrombosis with thrombocytopenia syndrome (TTS) after COVID-19 vaccination with AstraZeneca.
- Thrombosis occurs when blood clots block veins or arteries. Symptoms include pain and swelling in one leg, chest pain, or numbness on one side of the body.
- Complications of thrombosis can be life-threatening, such as a stroke or heart attack.

Ancient viral DNA

Previous studies have shown that fragments of ancient viral DNA called endogenous retroviruses in the genomes of mice, chickens, cats and sheep provide immunity against modern viruses that originate outside the body by blocking them from entering host cells.

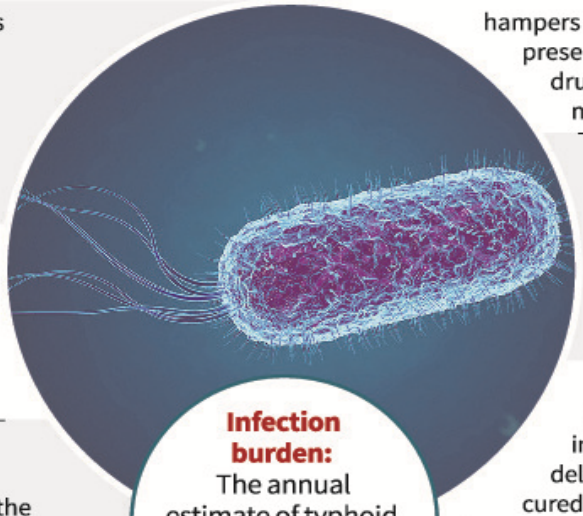
- A type of virus that has RNA instead of DNA as its genetic material. It uses an enzyme called reverse transcriptase to become part of the host cells' DNA.
- A retrovirus is a type of virus that inserts a DNA copy of its RNA genome into the DNA of a host cell that it invades, thus changing the genome of that cell.
- Endogenous retroviruses are endogenous viral elements in the genome that closely resemble and can be derived from retroviruses.
- Now a study (Science) conducted with human cells in culture in the lab has found that the antiviral effect of endogenous retroviruses likely also exists for humans.
- The work reveals the possibility of a genome defence system that has not been characterised, but could be quite extensive.
- Endogenous retroviruses account for about 8% of the human genome.
- Retroviruses introduce their RNA into a host cell, which is converted to DNA and integrated into the host's genome.
- The cell then makes more virus.
- Typically, retroviruses infect cells that don't pass from one generation to the next, but some infect germ cells, such as an egg or sperm, which opens the door for retroviral DNA to pass from parent to offspring.

AMR salmonella

The continuous adaptation of this bacteria to the available antibiotics creates a risk of developing antimicrobial resistance in the future.

Neutralising multi-drug resistant Salmonella

The bacteria causes bloodstream infection in malnourished and immunocompromised people



- The bacteria undergoes continuous adaptation to the available antibiotics creating a risk of developing antimicrobial resistance to all drugs
- The outer membrane porins of the bacteria play an essential role in the survival of the bacteria in the presence of antibiotics
- The outer membrane protein A restricts the entry of antibiotics into the bacteria, thus improving the survival of the pathogen
- Deleting the outer membrane protein A (OmpA) from Salmonella hampers its survival in the presence of two beta-lactam drugs — ceftazidime and meropenem
- Removing OmpA resulted in a greater intake of antibacterial drugs, which ultimately killed the mutant bacteria
- Administration of ceftazidime in mice infected with the OmpA-deleted strain of Salmonella cured the infection
- The strategy of targeting the outer membrane protein A can also be used to develop novel antimicrobials for other pathogens

Infection burden: The annual estimate of typhoid fever in India is 4.5 million cases and 8,930 deaths.

Bipolar disorder

- Brain development starts early during pregnancy.
- This starts with a single layer of cells that roll up to form a tube called the neural tube.
- The brain develops at one end of this neural tube. It is a process that takes up many cell divisions as well as cells migrating through large distances.
- The key result of the work is that the neural precursor cells derived from stem cells from people with bipolar disorder showed a difference in the way they migrated as compared to neural precursors derived from stem cells of people without bipolar disorder (Controls).
- Bipolar disorder is a severe disabling illness where a person's mood, energy, activity levels and ability to carry out day-to-day activities undergo unusual shifts over a period.
- The illness has a genetic basis and neurodevelopmental origin. Many studies have documented abnormalities in the brain structure of patients with BD.

CCI against Google

- The Google Play Store is a marketplace for apps and services and has a collection of more than three million applications.
- In the current matter involving Google, the CCI examined if the company violated the Competition Act through its policy of requiring app developers to mandatorily use Google Play's billing system (GPBS) not only for receiving payments for paid app downloads but also for in-app purchases.
- The probe also noted that if the app developers did not comply with Google's policy of using GPBS, they would not be permitted to list their apps on the Play Store.
- The CCI thus concluded that making access to the Play Store contingent on mandatory usage of GPBS was "one-sided and arbitrary" and it also denied app developers "the inherent choice to use payment processor[s] of their liking from the open market."
- It also examined the service fee that Google charges developers of paid apps and for in-app purchases. Compared to the 0-3% fee by other payment aggregators in India, the Commission found Google's service fee (between 15-30%) to be excessive, unfair, and discriminatory.
- Google submitted that only 3% of developers on Google Play are subjected to a service fee.
- The current investigation found that in the market for licensable Operating Systems (OS), Google enjoys a dominant position.
- OS are complex software products needed to run applications and programs on smartphones. Android, which is the most prominent such OS, was acquired by Google in 2005.
- Android is a licensable OS, meaning the developer Google licences it to smartphone manufacturers like Samsung, Vivo, and so on.
- According to Counterpoint research, 97% of India's 600 million smartphones are powered by Google's Android OS. While Android is an in-principle open-source OS, the CCI found that it is controlled by Google.
- The Commission noted that through its restrictive agreements with smartphone manufacturers, Google made sure that manufacturers who wished to use its proprietary apps such as Chrome, Play Store, YouTube and so on had to use Google's version of Android.
- The order noted that the Play Store, which is a part of the Google Suite (Chrome, Gmail, YouTube etc.) comes pre-installed in 100% of Android OS devices and owing to the mandatory pre-installation and entry barriers in the market, users did not have the option of side-loading or downloading apps outside of the Play Store.

Doctrine of pleasure

What is the concept?

- The pleasure doctrine is a concept derived from English common law, under which the crown can dispense with the services of anyone in its employ at any time.
- In India, Article 310 of the Constitution says every person in the defence or civil service of the Union holds office during the pleasure of the President, and every member of the civil service in the States holds office during the pleasure of the Governor.
- However, Article 311 imposes restrictions on the removal of a civil servant.
- It provides for civil servants being given a reasonable opportunity for a hearing on the charges against them.
- There is also a provision to dispense with the inquiry if it is not practicable to hold one, or if it is not expedient to do so in the interest of national security.
- In practical terms, the pleasure of the President referred to here is that of the Union government, and the Governor's pleasure is that of the State government.
- Under Article 164, the Chief Minister is appointed by the Governor; and the other Ministers are appointed by the Governor on the CM's advice. It adds that Ministers hold office during the pleasure of the Governor.
- In a constitutional scheme in which they are appointed solely on the CM's advice, the 'pleasure' referred to is also taken to mean the right of the Chief Minister to dismiss a Minister, and not that of the Governor.

Governor ''pleasure''

- The text of Article 164(1) of the Constitution that the "Ministers shall hold office during the pleasure of the Governor" the indication was clear
- The Governor's other move, in the meantime, for ousting Vice-Chancellors of universities in the State, alleging deficits in their appointment process, is purported to be in exercise of his statutory power as Chancellor.
- As against the Ministers, he has no such special power.
- Constitutional provisions cannot be read in isolation. Article 163(1) says that the Council of Ministers must aid and advise the Governor.
- However, according to Article 163(2), the Governor can act in his discretion in certain

matters as permitted by the Constitution.

- This would mean that the Governor is generally bound by the Cabinet decision except when he has a legitimate right to invoke his discretion, say, for example, in deciding on sanction to prosecute a Cabinet Minister or in his decisions as Administrator of a Union Territory, as per the orders of the President of India, etc.
- In Shamsher Singh, for the purpose of comparison, the Supreme Court extracted Dr. B.R. Ambedkar's introductory statement made on November 4, 1948 in the Constituent Assembly, which said: "The President of the United States is not bound to accept any advice tendered to him by any of his secretaries.
- The President of the Indian Union will be generally bound by the advice of his Ministers.
- He can do nothing contrary to their advice nor can he do anything without their advice.
- The President of the United States can dismiss any Secretary at any time.
- The President of the Indian Union has no power to do so, so long as his Ministers command a majority in Parliament".
- The same principles apply to the Governors as well, since the Union Minister also holds the office "during the pleasure of the President" as in Article 75(2) of the Constitution.
- "Withdrawal of pleasure", without advice from the Council of Ministers, as indicated by Raj Bhavan is a misconception.
- The words 'during pleasure' were, always understood to mean that the 'pleasure' should not continue when the Ministry had lost the confidence of the majority; and the moment the Ministry lost the confidence of the majority, the Governor would use his 'pleasure' in dismissing it"
- The Governor's office has a colonial origin.
- The Government of India Act, 1858 situated the post of Governor under the supervision of the Governor General.
- The subsequently promulgated Government of India Act, 1935 was enforced with effect from April 1, 1937.
- The Supreme Court did in Shamsher Singh. Justice V.R. Krishna Iyer, in that judgement, "The omnipotence of the President and of the Governor at State level is business has to be disposed of decisively by the Ministry answerable to the Legislature''

Ipcc report and India

What did the IPCC report state?

- This year's Intergovernmental Panel on Climate Change (IPCC) assessment report stated that climate change has produced irreversible losses to natural ecosystems and has warned of severe consequences to food supply, human health and biodiversity loss if carbon emissions from human activity are not sharply reduced.
- As per the report, 3-14% of all species on earth face a very high risk of extinction at even 1.5°C, with devastating losses at higher temperatures in the current situation.
- It adds that limiting warming to around 1.5°C requires global greenhouse gas emissions to peak before 2025 and be reduced by 43% by 2030.
- Coal-fired power plants operating without technology to capture and store carbon would need to be shuttered by 2050, a warning relevant to India which operates roughly 10% of global capacity.
- The World Resources Institute also paints a grim picture in its report.
- It suggests that the world needs to curb emissions six times faster by 2030 than the current trajectory to meet the 1.5°C target. Of the 40 indicators examined, none is on track to reach the 2030 target.
- "Unabated coal-based electricity generation, although declining worldwide, continues to expand across some regions, while unabated fossil gas-based electricity, is still rising globally," it notes.
- Mitigation measures to keep temperatures below 2°C and the need for climate change adaptation mentioned in these reports are likely to come up for discussion at the COP27.

Where does India stand?

- India is one of the 197 countries that has promised to limit the increase to no more than 1.5°C by 2030. It is also working on a long-term roadmap to achieve its target of net zero emissions by 2070.
- Prime Minister had committed at the Glasgow summit that the country would get its non-fossil energy capacity to 500 GW by 2030, meet half of its energy requirement from renewable sources and reduce carbon emissions.
- India is the third-largest greenhouse gas emitter in the world. Though India updated its climate pledges in line with commitments made at the previous summit, experts have slammed New Delhi for not setting ambitious targets.

- The Climate Action Tracker, an independent analysis that tracks government climate action classifies India's action as "highly insufficient".
- It says India's continued support to the coal industry undermines a green recovery.

One web

The OneWeb satellite constellation is a planned initial 648-satellite internet constellation which is in the process of being completed in 2022, with a goal to provide global broadband internet services by the end of 2023.

- The constellation is being deployed by OneWeb, headquartered in London, with offices in California, Florida, Virginia, Dubai and Singapore.
- OneWeb's first six satellites were launched in February 2019,] the first large batch of 34 satellites was launched in February 2020,[5] and another 34 were put into orbit in March 2020.
- These were followed by more launches in 2021.
- The small satellites were built by OneWeb Satellites, a joint venture between Airbus and OneWeb.
- The satellites are in a circular low Earth orbit, at approximately 1,200 km (750 mi) altitude, transmitting and receiving in the Ku-band of the radio frequency spectrum.
- The LVM3-M2 mission is a dedicated commercial mission for a foreign customer OneWeb, through NSIL.
- It is the first multi-satellite mission with 36 OneWeb Satellites to the LEO

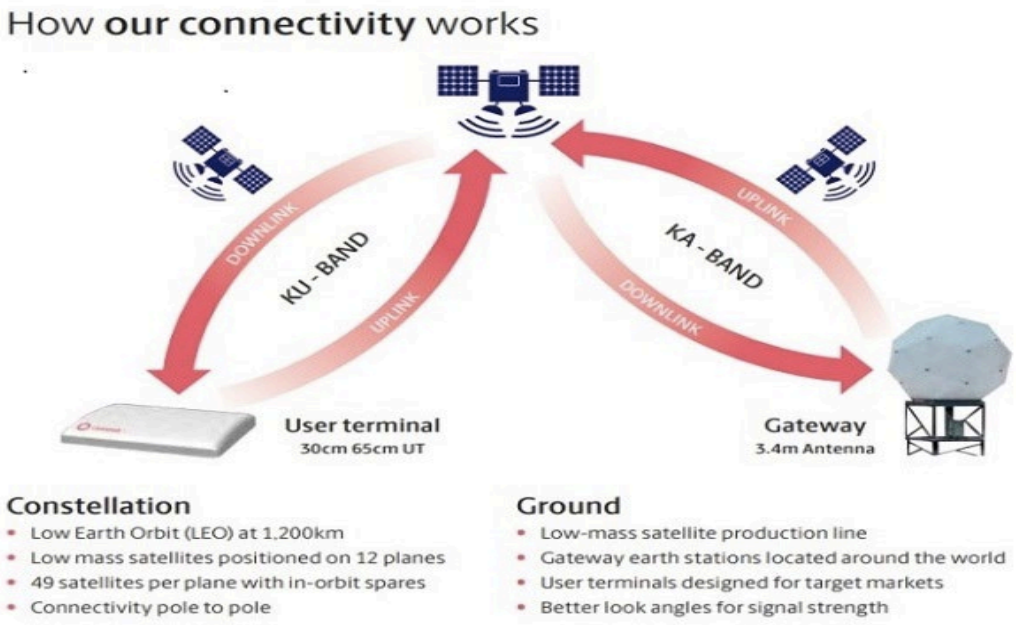
Salient features of the Mission

- First Commercial Mission of LVM3
- First Multi-Satellite mission with 36 OneWeb Satellites onboard
- First launch of LVM3 to LEO
- First Indian rocket with six ton payload
- First NSIL Mission with LVM3
- First OneWeb Mission with NSIL/DoS

OneWeb Constellation Summary:

- OneWeb Constellation operates in a LEO Polar Orbit

- Satellites are arranged in 12 rings (Orbital planes) with 49 satellites in each plane.
- The orbital planes are inclined to be near polar (87.9 Deg.)
- The orbital planes are 1200 km above the Earth
- Each satellite completes a full trip around the earth every 109 minutes.
- Theearth is rotating underneath satellites, so they will always be flying over new locations on the ground.
- In full service, each plane will have 49 satellites = 588 Satellite



United Nations Security Council's Counter-Terrorism Committee Delhi declaration

- India's decision to host the United Nations Security Council's Counter-Terrorism Committee (CTC) is an important marker of the Government's ongoing effort to highlight terrorism issues at a time the global body has been more focused on the Ukraine war.
- Held in Mumbai and Delhi, it brought UN officials, and ministers and diplomats from all members of the Security Council (UNSC), to discuss challenges to the global counter-terrorism architecture.
- The U.S., which has cooperated in many other ways with India on terrorism, convicted conspirators David Headley and Tahawwur Rana for the attacks, but has refused to extradite them.

- Meanwhile, China continues to block designating LeT leaders on the UNSC 1267 terror list, a problem External Affairs Minister S. Jaishankar and U.S. Secretary of State Antony Blinken specifically mentioned it at the conference.
- In Delhi, the CTC focus was on online radicalisation and terror recruitment, terror financing through crypto-currency and virtual assets, and unmanned aerial system use including drones for terror strikes, transporting drugs and arms.
- The deliberations led to the "Delhi Declaration on countering the use of new and emerging technologies for terrorist purposes".
- The Counter-Terrorism Committee (CTC) unanimously adopted the Delhi Declaration on countering the use of new and emerging technologies for terrorist purposes.
- Guiding principles to assist Member States to counter the threat posed by the use of new and emerging technologies for terrorist purposes.
- The declaration aims to cover the main concerns surrounding the abuse of drones, social media platforms, and crowdfunding, and create guidelines that will help to tackle the growing issue.

What is UNSC-CTC?

- It was established by Security Council resolution 1373 which was adopted unanimously on 28th September 2001 in the wake of the 9/11 terror attacks in the US.
- The Committee comprises all 15 Security Council members.
- The Committee was tasked with monitoring implementation of resolution 1373 which requested countries to implement a number of measures aimed at enhancing their legal and institutional ability to counter terrorist activities at home and around the world.

USA national security strategy

The United States has launched its much anticipated National Security Strategy (NSS).

- All U.S. Presidents are mandated by the Goldwater-Nichols Department of Defense Reorganization Act of 1986 to bring out their NSS, to communicate the executive's vision of national security to the legislative.
- U.S. seeks to sustain U.S. leadership, improve the U.S. economy, build on a vast network of alliances and partnerships; counter China as its strategic competitor and Russia as a disruptor, and boost U.S. competitiveness and defend democracy.
- The document portrays the ambitious agenda of the Biden administration to cover a

comprehensive set of transnational challenges tying the domestic with the international.

- These include climate change, food insecurity, pandemics, terrorism, energy shortages and inflation. Besides, the administration's NSS has considerable focus on outer space security and governance.
- It seeks to invest in the "tools of American power and influence" by strengthening the economy at home, improving critical infrastructure and investing in technologies such as microchips and semiconductors.
- Furthermore, the NSS seeks to build 'the strongest possible coalition of nations' a recognition of both the U.S.'s ambitions as well as limitations in driving global geopolitics unilaterally.
- Finally, the modernisation sought by the U.S. is intended to cater to the wide-ranging demands of internal and external security, simultaneously.
- These capability enhancements underscore the recognition by the U.S. of the unprecedented scale and scope of strategic competition with China.
- It seeks to outline a joint strategy to tackle external challenges for the U.S. by out-competing China and constraining Russia.
- The Biden administration places competition with China at the centre of its decadal outlook, which is increasingly global in character and most pronounced in the Indo-Pacific region across a range of domains such as the economy, technology, development, security, global governance and diplomacy.
- The NSS is clear about the opposition to any unilateral change to Taiwan's status by China, portending a contested Indo-Pacific region between China on one hand and a host of democratic partners on the other
- The NSS makes a serious case for downgraded Russian economy, military, soft power and influence globally, even as it identifies countries such as Japan and India to fill the emerging gaps.
- One such process at which the NSS hints is India's possible integration in important global forums such as the G7.
- As India looks to diversify and indigenise its defence needs in the medium and long term, the NSS lays out the space for partnership between India and the U.S.
- India's partnership in the Indo-Pacific has been assessed as critical in building a "latticework of strong, resilient and mutually reinforcing relationships" through regional partnerships such as the Quad (India, Australia, Japan the U.S.) and the I2U2 (India, Israel, the United Arab Emirates, and the U.S