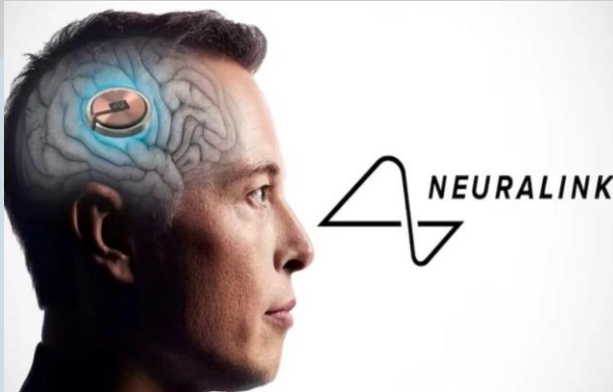


FEBRUARY 2024 CURRENT AFFAIRS COMPILATION PDF



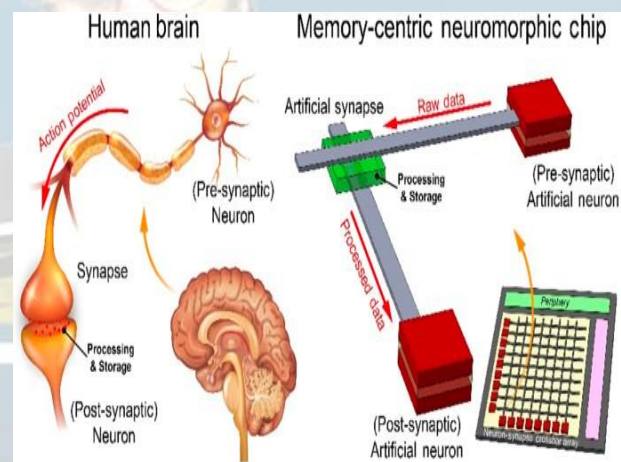
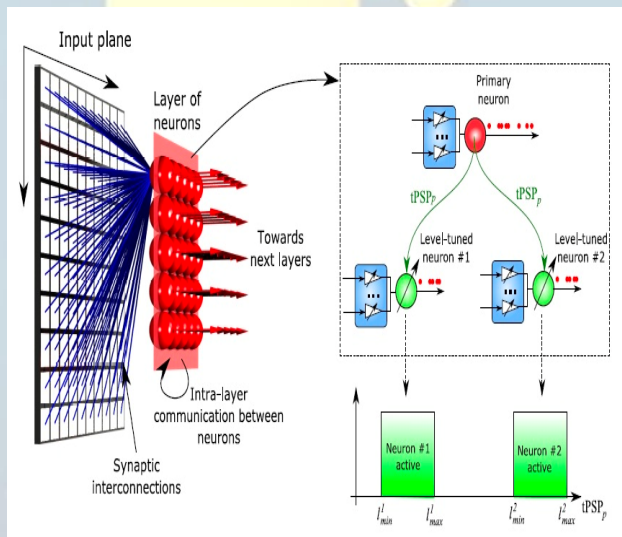
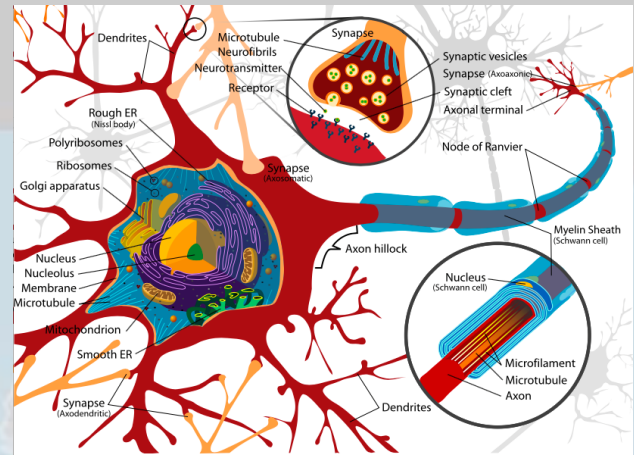
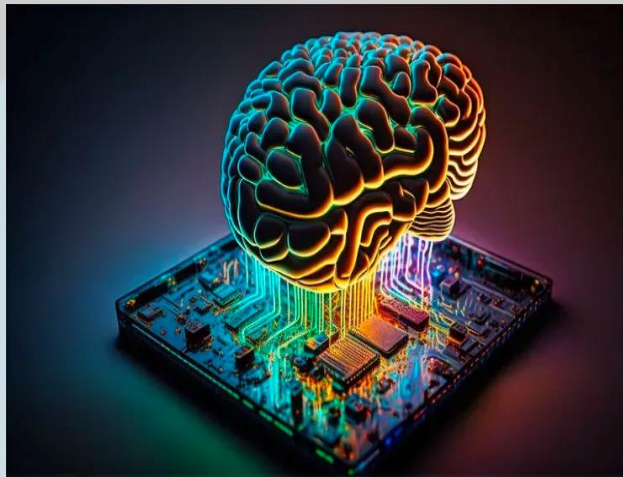
Neuralink



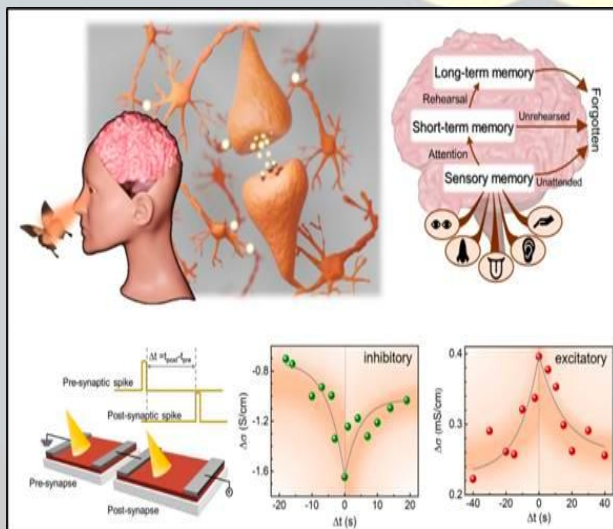
- According to Elon Musk, the first human received an implant from his computer brain interface company Neuralink over the weekend.

- Neuralink is one of many groups working on linking the nervous system to computers, efforts aimed at helping treat brain disorders, overcoming brain injuries, and other applications.
- There are more than 40 brain computer interface trials underway
- Neuralink's device is about the size of a large coin and is designed to be implanted in the skull, with ultrathin wires going directly into the brain.
- In its September announcement, Neuralink said the wires would be surgically placed in a region of the brain that controls movement intention.
- The initial goal of the so-called brain-computer interface is to give people the ability to control a computer cursor or keyboard using their thoughts alone.
- In a separate Monday post on X, Musk said that the first Neuralink product is called "Telepathy", which he said will enable users to control their phones or computers "just by thinking".
- He added that initial users would be those who have lost use of their limbs.
- [The Hindu](#)

Neuromorphic computing



- Scientists have fused brain-like tissue with electronics to make an 'organoid neural network' that can recognize voices and solve a complex mathematical problem.



- Their invention extends neuromorphic computing the practice of modeling computers after the human brain to a new level by directly including brain tissue in a computer.
- The work comes against the backdrop of the staggering rise of artificial intelligence (AI), itself founded on the development of

artificial neural networks brain-like networks of neurons except they're made with silicon chips that can process large datasets that conventional computers struggle with.

The Hindu

Separating memory and processing

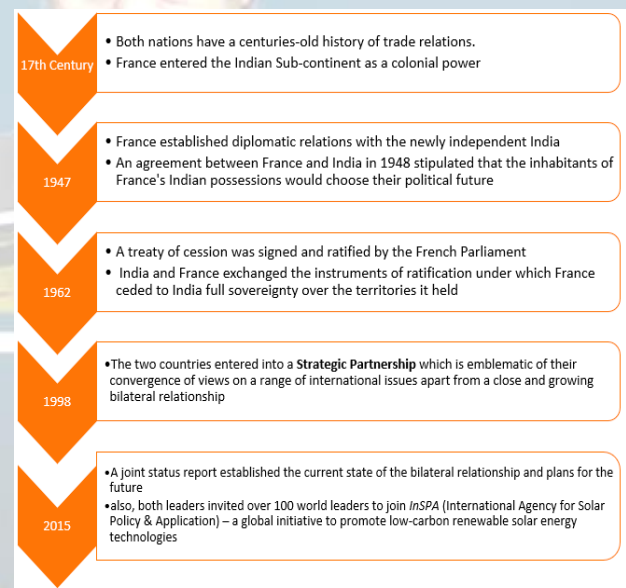
- The hardware on which these neural networks run has a problem, however: the memory units and the data processing units are separate.
- When a neural network operates, the network will have to access the data in the memory unit, bring it over to the processing unit, and work on it and it needs to do this many times over.
- Scientists have tried to build more efficient neuromorphic chips that include some short term memory, so they can avoid going back and forth just a bit.
- These chips have been used for applications like computer vision and speech recognition.
- Brain organoids are three dimensional aggregates of brain cells.
- The scientists made them by extracting human pluripotent stem cells, which are cells that can develop

to become almost any kind of cell within the human body, and made them into brain cells.

- Brain organoids that are aggregates of such cells have a mix of the different types of cells in the brain.

The Hindu

India France relationship



- India and France have valued strategic autonomy, in their own fashion. India adopted non-alignment.
- After the Second World War, France was one of the founding members of North Atlantic Treaty Organisation (NATO) in 1949 and hosted the NATO headquarters; it withdrew from its integrated military command in 1966 due to reservations over U.S. insistence on subordinating French

nuclear deterrent to NATO and accepting any collective control.

- After the Cold War ended, both countries were quick to espouse the virtues of multipolarity.
- Both France and India share a common trait of 'civilization exceptionalism' and pride themselves on their 'argumentative intellectualism' but have wisely refrained from preaching to each other.
- From the original three pillars of nuclear, space and defence, the agenda gradually expanded to include counterterrorism, intelligence sharing and cyber-security issues.
- Convergence has also evolved on global challenges such as climate change, reform of multilateral development institutions, globally beneficial Artificial Intelligence, and as the joint statement indicates, ongoing conflicts in Ukraine and Gaza.
- On the defence side, six Scorpene submarines have been built by Mazagon Dock Shipbuilders Limited with transfer of technology from the Naval Group.
- Technology sharing memoranda of understanding and acquisitions of

short range missiles and radar equipment were concluded.

- Joint exercises between the navies, air forces and the armies were instituted in 2001, 2004 and 2011, respectively.
- The government to government agreement for 36 Rafale aircraft, salvaged out of the prolonged negotiations
- Mr. Macron's visit saw the conclusion of a India France Defence Industrial Road map that fits in with the goal of atmanir bharta.
- Tata Advanced Systems Ltd. and Airbus concluded an agreement to set up a final assembly line by 2026 for H125 civilian helicopters.
- Cooperation in the space domain began in the 1960s with French assistance to set up the Indian launch facility at Sriharikota but languished in later years because of export controls.
- The strategic dialogue helped restart this cooperation and the Indian Space Research Organization (ISRO) and the French Space Agency (CNES) now work on joint missions.
- The visit saw a new MoU being signed by NewSpace India Limited, a Government of India company under the Department of Space and the

commercial arm of ISRO, and French satellite launch company Arianespace for collaboration on space launches.

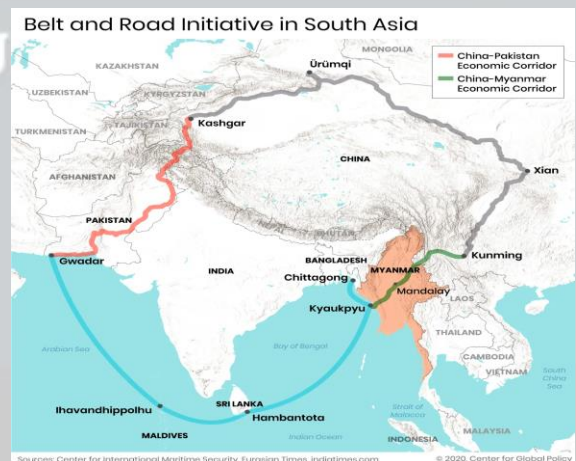
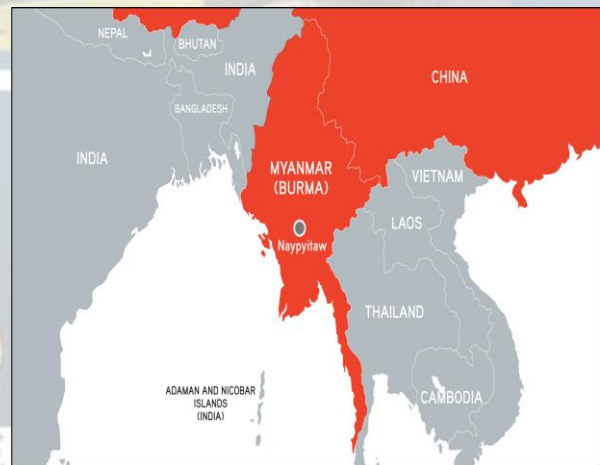
- The challenge for both countries has been to take the partnership out of the government domains into the commercial and civilian spaces.
- As a result, joint working groups on a range of subjects covering agriculture, environment, civil aviation, IT and telecom, urban development, transportation, culture and tourism have been set up over the years.
- One of the success stories has been the growing number of Indian students going to France for higher education.
- A decade ago, it was less than 3,000 and today it is upwards of 10,000.
- The target is now 30,000 by 2030.
- The visa issue is being addressed with a five year Schengen visa for Indians who pursue a postgraduate course in France.
- The operationalization of the Young Professionals Scheme under the Migration and Mobility Partnership Agreement will help.
- Last year, the University Grants Commission revised rules regarding

foreign universities setting up campuses in India.

- ‘Strategic Partnership’ does not require convergence on all issues but sensitivity so that differences, where these exist, are expressed in private and not publicly.
- This is where India-France ties, nurtured over the last quarter century, reflect maturity and resilience.

The Hindu

Myanmar and India





The Hindu

SAURABH PANDEY — CSE —

(CIVIL SERVICES EXAMINATION)
FROM BASICS TO UPSC BRILLIANCE

Some Major Ch in Myanmar



PANDEY
SE
(EXAMINATION)
UPSC BRILLIANCE

Current Affairs 1st February 2024 by Saurabh Pandey

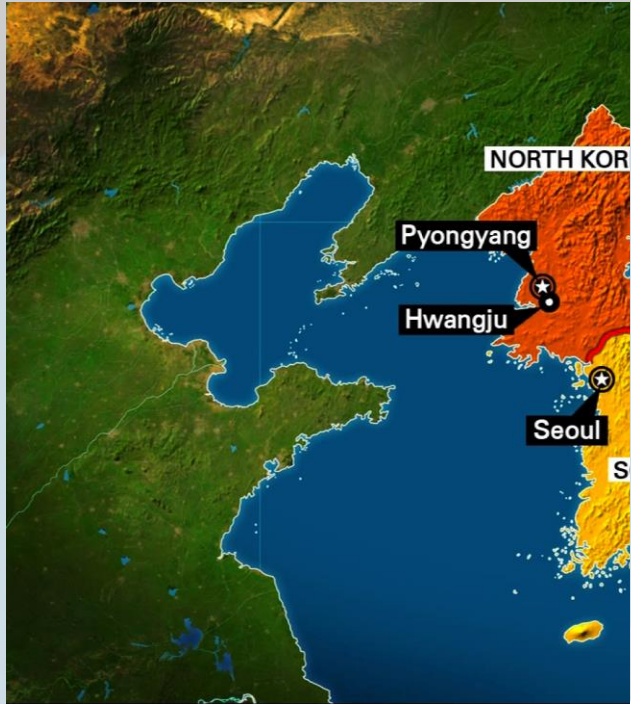
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- illegal military coup deprived Myanmar of limited democracy, the nation continues to fight its inner demons. Dubbed the 'sick man of Southeast Asia.
- Myanmar is a large multiethnic nation, located in a strategically significant neighborhood.
- What happens in the country impacts its five neighbours: China, Laos, Thailand, Bangladesh, and India
- Two pillars of the power architecture — the political class and ethnic groups — are ranged against the third — the military; now, all three are facing trouble.
- The political class, represented by the unrecognised group called the National Unity Government (NUG), has defied the odds to assert itself through militia units called the People's Defence Forces.
- They have won many battles against the army, especially in rural Bamar areas.
- The NUG has articulated its vision of a 'federal democratic union'. But due to the regime's ruthless suppression, its leaders operate underground or from Thailand.
- The ethnic armed organisations have inflicted a heavy toll on the Myanmar military along the Thai border in the southeast and the Chinese border in the northeast.
- The victories secured at the end of 2023 by the Three Brotherhood Alliance comprising the Myanmar National Democratic Alliance Army, the Arakan Army, and the Ta'ang National Liberation Army shook the army as nothing else had done before.
- Yet, ethnic organisations remain divided: some oppose the army, some support it quietly, and some stay neutral.
- Given this situation, it is not surprising that the international community has failed to help Myanmar. Various attempts by the United Nations, ASEAN, Japan, and Myanmar's neighbours have been unable to move the country towards reconciliation.
- India's interests, options India's policy of maintaining cordial relations with the government while also supporting the cause of democracy has served both countries well and strengthened bilateral ties.
-

Current Affairs 1st February 2024 by Saurabh Pandey

- India should balance its friendly ties with the military government while broadening the space for engagement with other stakeholders.
- At the same time, it must not interfere in Myanmar's internal affairs.
- Only then can India protect its national interests.
- Several policy adaptations should, therefore, be considered.
- First, the inflow of refugees into Mizoram and Manipur has risen. There is also greater activism of Myanmar based anti India insurgents indulging in illegal activities along the border.
- Second, communication links with certain components of the resistance such as the Chin National Army, Arakan Army and the NUG need to be established, as they gain the upper hand in battles against the military in areas bordering India.
- Third, a strong message of the need for cessation of violence and restoration of normalcy should be relayed to both the government and the resistance.
-
- The 'transition to a federal democracy', which India supports, can only come later.
- Fourth, India should consider convening a Peace Conclave of senior officials from the member states of the Quad and the ASEAN Troika comprising Indonesia, Laos and Malaysia.
- Finally, seeking immediate freedom for Daw Aung San Suu Kyi from her unjustified solitary confinement should be a key element in the calculus of the conclave

• Korean peninsula





concerns about the deterioration of the international security environment and a deepening of major power rivalry.

What has led to recent aggravation?

- There has been a notable uptick in provocative moves by North Korea and the subsequent rebuttals by South Korea and its allies.
 - North Korea has rescinded its national objective of Korean reunification and has formally categorised South Korea as an adversarial state.
 - The country has also ramped up the frequency and diversity of its missile tests, expanding its strategic capabilities.
 - These actions were responded to by South Korea through joint military drills with the U.S. and Japan.
 - The ongoing developments in the Korean peninsula have raised serious concerns about the deterioration of the international security environment and a deepening of major power rivalry.
- ### What has led to recent aggravation?
- Mr. Kim, in his address to the Supreme People's Assembly on January 15, proclaimed that he is scrapping the decades old North Korean goal of reunifying the South, and has rebranded the South as an enemy state.
 - He ordered the rewriting of the North Korean constitution to reflect this new shift in the regime's thinking.
 - The offices related to reunification were closed, and a landmark monument in Pyongyang portraying the reunification ideal was brought down.
 - In addition to these moves, North Korea has also flexed its military muscle by testing multiple types of missile systems during the first month of 2024 itself.
 - One such important test was that of a solid fueled missile carrying a hypersonic warhead.
 - The U.S., Russia, China, India and Iran are working on such hypersonic weapons, and North Korea could now join the club.

Current Affairs 1st February 2024 by Saurabh Pandey

- The U.S., South Korea and Japan have conducted joint naval drills in response to the provocations by North Korea, featuring nine warships.
- North Korea has drifted further into the camp of the Sino Russian axis, as a result of the choices made by Mr. Kim. Russia has boosted its engagement with North Korea, especially in the wake of the Russia Ukraine war.
- Mr. Kim visited Russia in September 2023 and met with Russian President Vladimir Putin.
- During the visit, Mr. Kim was invited to the Vostochny spaceport of Russia, where he was promised assistance in enhancing North Korea's space capabilities in return for arms supplies.
- China has always been consistently supportive of North Korea, being the single largest trading partner of the country.
- At a time when the U.S. is preoccupied with conflicts in Europe and West Asia, Mr. Kim could have found the moment opportune to conduct provocative actions for bargaining with North Korea's adversaries as well as partners.
- Russia and China are on the same side when it comes to the Russia Ukraine as well as the Israel Hamas conflict.
- They have a lot to gain from North Korea creating a distraction for the U.S. by opening a "third front"
-

Impact of heat waves on human

- Global warming is causing temperatures across the globe to rise significantly enough to cause disruptions.
- Heat waves are occurring with greater frequency and are lasting longer than ever before, with the World Meteorological Organisation declaring that 2023 was the hottest year on record.
- While humans have adapted and acclimatized themselves to several variations in climate, there is believed to be a limit beyond which our bodies cannot process this change.
- Powerful effects that extreme temperatures can have during pregnancy and early childhood, including impacts on learning, sleep quality, and mental and behavioral health.
- It also explains how heat amplifies systemic inequities, including air quality, access to nutritious foods, and structural disadvantages.
- In addition, it provides some practical solutions to mitigate climate change, slow the heating of our environment, and provide new ways of cooling our communities.
- This includes tips on how to mitigate the impact of extreme temperatures,

finding new ways of cooling the communities where children live, and grow, along with some community initiatives that have reportedly started to bear fruit.

Impact of heat waves

- It stands to reason that extreme heat affects infants and young children more than most adults because their smaller bodies heat up more quickly, and their capacity for body temperature modulation is still under development and therefore, far less efficient.
- Infants and young children also can't seek out cooler environments or get water to drink without relying on adults.
- The human body responds to excessive heat primarily by redistributing blood flow toward the skin so heat can transfer out of the body and into the environment through sweat which evaporates on the skin, bringing body temperature down.
- The blood flow cooling method is especially important for young children.
- As long as the air temperature is cooler than the body's temperature, heat dissipates through the skin to the outside environment.
- When temperatures rise, the brain regulates these physiological

responses, with additional input from temperature-sensitive nerve cells in the skin and throughout the body.

- Cells also produce heat shock proteins, which act as “chaperones” that stabilize the structure of other proteins that high temperatures could damage.
- Every cell in the body contains heat shock proteins, protecting a variety of other proteins that are critical to life, including hemoglobin, which carries oxygen to our cells.
- **Brain** — The hypothalamus acts as a thermostat for the entire body, sensing temperatures and reacting to keep core temperatures within a healthy range.
- Continuous, high temperatures prevent the hypothalamus from shutting off these cooling responses.
- Also, when the heat shock proteins break down, the body identifies them as invaders and sends out immune cells to fight them, thus keeping them from their main task of fighting infections.
- **Skin and Gut** — In response to heat, pores in the skin open to allow more sweat to pass through and evaporate, increasing the body’s ability to cool itself.

- The lining of the gut can become leaky allowing bacteria to pass through to other parts of the body.

Pregnant women and children

- In pregnant women, high temperatures may result in reduced blood flow in the placenta, dehydration, and inflammation, which can trigger preterm birth.
- There is evidence that during times of high temperatures, there are increased rates of stillbirth, as well as more premature and lower birth weight babies, again, linked to a greater risk of a range of poor outcomes later in life, including impaired cognition, reduced growth, and chronic health issues such as cardiovascular disease and diabetes in adulthood.
- **Learning loss** — heat is linked to slower cognitive function and reduced concentration ability.
- **Sleep quality** — getting enough good quality sleep is essential for healthy growth and development.
- A growing body of evidence shows associations between less sleep in infancy and childhood obesity, and sleep habits in childhood may impact weight well into adulthood.
- The third crucial factor is Mental and behavioral health because children’s brains and bodies are developing rapidly and are highly

sensitive to their experiences, early childhood is a period where threats to well-being can have long-lasting effects on mental health.

- The Hindu

Capex

What is Capex?

- A capital expenditure, or Capex, is money invested by a company to acquire or upgrade fixed, physical or non-consumable assets.
- Capex is primarily a one-time investment in non-consumable assets used to maintain existing levels of operation within a company and to foster its future growth.
- Capex is used to buy or invest in tangible capital assets, such as real estate; raw materials; and plant, property, and equipment (PP&E).
- Out of the budgeted capex outlay of ₹11.11 trillion, nearly two thirds is earmarked for economic services
- In the case of the railways, the Finance Minister has announced the identification of three major economic rail corridors under the PM Gati Shakti programme to improve logistics efficiency and reduce cost; energy, mineral, and cement corridors; port connectivity corridors; high traffic density corridors, and 40,000 normal rail bogies will be upgraded to meet

Vande Bharat standards Defence capex, a niche priority segment under the Atmanirbhar Bharat campaign, will see a record high allocation of ₹1.72 trillion

- This will be supplemented with the launch of a new scheme for strengthening deeptech technologies for defense purposes and expediting 'atmanir bharta'.
- the government has also been active in pushing forward its inclusion agenda with interlinkages with the infrastructure sector.
- the capex thrust is also seen to be integrating the government's green energy ambitions
- Notwithstanding the unambiguous policy focus on government capex, there seems to be a slowdown in capex spending by public sector enterprises (PSEs).
- The Hindu

ICJ and case on Israel

- The International Court of Justice (ICJ) ordered Israel to take measures to prevent acts of genocide in Gaza, but stopped short of calling for an immediate ceasefire as requested by South Africa.
- A final verdict can only be pronounced after hearings on jurisdictional challenges and the

merits of the claim are concluded, which will likely take several years.

- The Court also ordered Israel to permit the entry of urgently needed basic services and humanitarian assistance into the Palestinian enclave.

What gives ICJ jurisdiction?

- The ICJ is the principal judicial organ of the United Nations. The statute that created it makes it clear that only states may be parties in cases before the Court.
- Both South Africa and Israel are signatories to the Genocide Convention of 1948, which has now been invoked by South Africa.
- Provisional measures are interim rulings of the ICJ aimed at preventing either party from doing irreparable harm to the main case.
- Proceedings instituted before the ICJ usually take years for disposal.

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- South Africa had alleged that Israel's blockade of food, water, medicine, and other essential supplies had pushed Palestinians to the "brink of famine."

- The UN Security Council (UNSC) is set to meet next week to deliberate upon the decision.

Can South Africa move against Israel?

- The Genocide Convention has been ratified by an overwhelming number of states, including South Africa (1998) and Israel (1950).

- Article IX allows any state party to institute a case against another in the ICJ, even if it is not directly involved in the conflict.

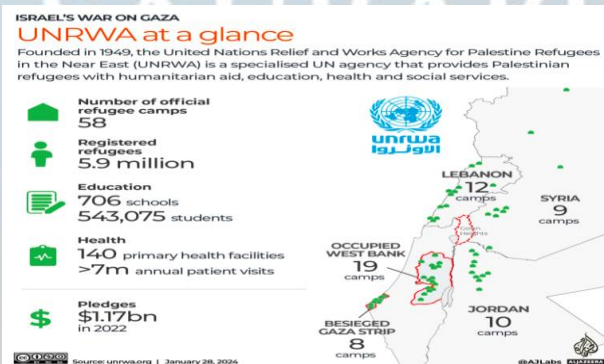
- This is because the prohibition of genocide is considered a peremptory norm of international law (jus cogens) from which no derogation is permissible.

- This is the basis on which South Africa, a party that is technically unrelated to the conflict, instituted the ongoing proceedings.

- For instance, in December 2022, the Court ruled that Gambia could bring a genocide claim against Myanmar for its treatment of the ethnic Rohingya population.
- Upholding South Africa's standing to sue, the Court noted that "all States parties to the Convention have a common interest to ensure the prevention, suppression, and punishment of genocide" and thus any of them can seek compliance of such erga omnes obligations (obligations towards the international community as a whole) in any given case.

The Hindu

(UNRWA)



- The UN Relief and Works Agency for Palestinian Refugees in the Near East (UNRWA), which is the main humanitarian agency in Gaza, has been facing an unprecedented funding crisis after its main international donors led by the United States cut its funding over "terror" allegations.

Why was UNRWA created?

- UNRWA was created by the UN General Assembly on December 8, 1949, to provide basic support including food, healthcare and education to tens of thousands of Palestinian refugees.
- More than 700,000 Palestinians were forcefully displaced leading up to Israel's creation in 1948, which Palestinians remember as [the Nakba](#), or "the catastrophe".
- The UNRWA operations are spread across the occupied West Bank – including East Jerusalem, the Gaza Strip, Syria, Lebanon and Jordan.

What does it do?

- UNRWA supports some six million Palestinian refugees who live within and outside Palestine. It is like a quasi-state providing direct services, such as schools, primary health centres and other social services.
- It also provides loans to Palestinians.
- However, it does not run refugee camps, as the maintenance of law and order and security are not part of its mandate.
- UNRWA operates separately from the United Nations High Commissioner for Refugees (UNHCR), which was also established in 1949.

- While UNHCR provides temporary protection and assistance to refugees, it does not have a mandate over Palestinian refugees within the UNRWA fields of operations.

The Hindu

Volt Typhoon

- US authorities they had dismantled a network of hackers known as Volt Typhoon, which was targeting key American public sector infrastructure like water treatment plants and transportation systems at the behest of China.
- In May 2023, the United States and its allies had accused Volt Typhoon, described as a “state-sponsored hacking group” backed by China, of infiltrating critical U.S. infrastructure networks claims rejected by Beijing.

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Mindanao island

Multi-pronged approach



Residents push a makeshift raft carrying a motorcycle through floodwaters on southern Mindanao island in the Philippines on Friday. AFP

- Mindanao is the second-largest island in the Philippines, after Luzon, and seventh-most populous island in the world.
- Located in the southern region of the archipelago, the island is part of an island group of the same name that also includes its adjacent islands, notably the Sulu Archipelago..



Luang Prabang

- Landlocked Laos doesn't have the famous beaches of its neighbours to attract tourists, but instead relies on the pristine beauty of its mountains and rivers and historical sites to bring in visitors.
- The crown jewel is Luang Prabang, a UNESCO World Heritage Site where legend has it that Buddha once rested during his travels.
- It brings all the elements together, with its mix of historic Laotian and French colonial architecture on a peninsula at the confluence of the Mekong and the Nam Khan rivers.
- The Nam Khan is a river in Laos that is a major tributary of the river Mekong, with which it joins at Luang Prabang.





- But a multibillion dollar dam project underway 25 kilometers upstream has prompted concerns that it could result in the city losing its UNESCO status, and broader questions about what the government's ambitious plans to build multiple dams across the Mekong will do to the river, the lifeblood of Southeast Asia.

About Luang Prabang

- Luang Prabang, the ancient capital of Luang Prabang Province in northern Laos, lies in a valley at the confluence of the Mekong and Nam Khan rivers.
- Inhabited for thousands of years, it was the royal capital of the country until 1975.
- It's known for its many Buddhist temples, including the gilded Wat Xieng Thong, dating to the 16th century, and Wat Mai, once the residence of the head of Laotian Buddhism.



Ancient rites



Marking the year: Purepecha's indigenous people carry incense during a three-day ceremonial procession in Michoacan State, Mexico. Every year, they celebrate the 'Tuego Nuevo Purepecha', a fire lighting ceremony to mark the start of the new year. AFP

The Purépecha

- The Purépecha were an ancient civilization in western Mexico that inhabited the area of the Mexican state of Michoacán.
- They were also known as the Tarascan civilization.
- Their name comes from the Nahuatl word which means "place of fish masters."
- Every year, they celebrate the 'Fuego Nuevo Purepecha', a fire-lighting ceremony to mark the start of the new year.



- The Reserve Bank of India's (RBI) January 31 action directing Paytm Payments Bank Ltd. (PPBL) to cease all new business transactions by February 29 and settle all pipeline transactions by March 15, was triggered by major irregularities in the bank's compliance with Know Your Customer (KYC) norms, thus exposing customers, depositors and

wallet holders to grave risk, said people aware of the developments.

The Hindu

Why Paytm unit ban?

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Multiple issues

RBI action against Paytm Payments Bank said to have been triggered by irregularities in its compliance with KYC norms

- Auditors found PAN validation failures in lakhs of accounts, with a single PAN used by thousands of customers
- Bank seen to have enabled transactions worth crores in prepaid instruments, raising money laundering concerns
- An unusually high number of dormant accounts were found to have been used as 'mule accounts' to facilitate transactions



Payments Bank

- Payments banks are a new model of banks, conceptualized by the Reserve Bank of India (RBI), which cannot issue credit.
- These banks can accept a restricted deposit, which is currently

limited to ₹200,000 per customer and may be increased further.

- Payments banks can issue ATM cards or debit cards and provide online or mobile banking. These banks cannot issue loans and credit cards.
- Both current account and savings accounts can be operated by such banks. Payments banks can issue ATM cards or debit cards and provide online or mobile banking. Bharti Airtel set up India's first payments bank, Airtel Payments Bank.

Indian local currency government bonds (LCGBs) to be listed by JP Morgan

- In September 2023, J.P. Morgan unveiled its plan to include Indian local currency government bonds (LCGBs) in its Government Bond Index Emerging Markets (GBIEM) Global index suite, set to become effective from June 2024.
- This announcement heightened expectations across the Indian financial landscape, prompting anticipation from other influential index providers such as Bloomberg Barclays and FTSE Russell..
- Several observers have also pointed out that opening local bond markets would facilitate the financing of current account and fiscal deficits

by engaging institutional investors with long term investment horizons.

- Furthermore, it is argued that the cost of public borrowing would decline as the influx of funds into LCGBs lowers domestic interest rates.
- It is also expected that these funds would relieve the balance sheets of local financial institutions holding LCGBs, thereby increasing lending and private investment.
- A key benefit of opening local bond markets to foreign investors emphasised by the mainstream, relates to the so-called “original sin” problem that is, the inability of emerging economies to borrow internationally in their own currencies.
- Unlike local currency debt, external debt denominated in reserve currencies exposes debtors to the exchange rate risk.
- By opening bond markets and borrowing in local currency, the exchange rate risk is passed onto international lenders. However, this does not come free.
- It needs to be compensated. Furthermore, since these bonds are generally subject to domestic jurisdiction, lenders also face an additional default risk.
- This also needs to be compensated.

- Thus, local currency bonds need to offer higher returns than forex bonds issued under foreign jurisdiction in higher interest rates and/or capital gains.
- As the adage suggests, everyone is a long-term investor until they recognise the impending end.

Loss of autonomy, greater risks

- The internationalization of bond markets in emerging economies also entails a significant loss of autonomy in controlling long term rates and exposes them to greater interest rate risks.
- When global risk appetite and liquidity conditions deteriorate, and access to international capital markets is impaired, domestic bond markets too can get crippled due to adverse spillovers.
- There is a misconception among proponents that foreign portfolio inflows into local currency bond markets (LCBM) provide stable and long term funding.
- Unlike sovereign bonds of main reserve currency countries such as the U.S. Treasuries, local currency sovereign debt of emerging economies is not held by central banks as international reserves, but fickle investors, primarily money managers from advanced economies, holding liabilities in their home currencies.
- When apprehensions emerge regarding short-term capital losses, be it due to rising interest rates, local currency depreciation, or a combination of both, stability tends to dissipate swiftly.
- As per the October 2022 report from the IDG of the RBI, the opening of the LCBM to foreign investors and the inclusion of Indian LCGBs in global bond indices represent just one facet of the broader effort to internationalise the Indian rupee.
- Another crucial element involves permitting banking services in the rupee INR outside the country.
- The case of settling trade with Russia in the Indian rupee for crude oil resulted in an accumulation of the rupee in Russian banks.
- Additionally, as reported by Bloomberg, the RBI has granted authorization to 17 banks to settle trade in the Indian rupee across 18 countries and establish 65 offshore deposit accounts.
- This effectively creates an offshore INR market and introduces new avenues for speculation and potential instability, in addition to opening the LCBM to foreign investors.



SAURABH PANDEY

— CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

Ammonia from crops

- Based on machine learning, researchers have come up with detailed estimates of ammonia emissions from rice, wheat, and maize crops.
- The dataset enabled a crop land-specific assessment of the potential for emission reductions, which indicates that effective management of fertilizer in the growing of these crops could lower atmospheric ammonia emissions from farming by up to 38%.
- Atmospheric ammonia is a key environmental pollutant that affects ecosystems across the planet, as well as human health.
- Around 51-60% of anthropogenic ammonia emissions can be traced back to crop cultivation, and about half of these emissions are associated with three main staple crops: rice, wheat, and maize.
- However, quantifying any potential reductions in ammonia emissions related to specific croplands at high resolution is challenging and depends on details such as nitrogen inputs and local emission factors.
- The Hindu

AI and language

- A new machine learning model trained on video and audio recorded from the first-person perspective of one young child for over a year has provided insights into early language acquisition.
- Not only do the findings offer a valuable framework to understand how children learn words and concepts, but they could be critical in developing AI systems that can learn language in more human-like ways.
- The model provides a foundation for investigating how children acquire their first words.

The Hindu

Herbivores and ecosystem

- The effect of large herbivores on plant abundance and diversity depends more on their size and diet than whether they are native or introduced into their host ecosystems, as per a meta-analysis of over 200 studies.
- The findings counter the widely held notion that the impacts of introduced megafauna are distinct and more harmful than those of native megafauna and suggest that trait-based ecology provides better insight into mega herbivore plant

interactions than concepts of species origin.

Is there new evidence that Mars once had lakes and rivers?

- Ground penetrating radar on board NASA's Mars Perseverance rover has confirmed that the Jezero Crater, formed by an ancient meteor impact just north of the Martian equator, once harbored a vast lake and river delta.
- Over eons, sediment deposition and erosion within the crater shaped the geologic formations visible on the surface today.
- The discovery of lake sediments reinforces the hope that traces of life might be found in soil and rock samples collected by Perseverance.
- The crater filled with water has layers of sediments deposited on the crater floor.
- The lake subsequently shrank and sediments carried by the river that fed it formed an enormous delta.

The Hindu

Conjugate vaccine

- There are two conjugated typhoid vaccines the Typbar TCV typhoid vaccine manufactured by Bharat Biotech that received WHO prequalification in 2017,

- And Biological E's Vi-CRM197 conjugated typhoid vaccine, which received WHO prequalification in 2020.

What are conjugate vaccine?

- A conjugate vaccine is a type of subunit vaccine which combines a weak antigen with a strong antigen as a carrier so that the immune system has a stronger response to the weak antigen.

Subunit vaccines

- Subunit vaccines are composed of protein or glycoprotein components of a pathogen that are capable of inducing a protective immune response and may be produced by conventional biochemical or recombinant DNA technologies.
- Recombinant subunit vaccines have distinct advantages over live attenuated and inactivated vaccines since they are efficient in inducing humoral- and cell-mediated immunological responses, and the risks associated with handling the pathogen are eliminated.

humoral- and cell-mediated immunity

- Humoral immunity produces antigen-specific antibodies and is primarily driven by B cells.
- Cell-mediated immunity on the other hand does not depend on

antibodies for its adaptive immune functions and is primarily driven by mature T cells, macrophages and the release of cytokines in response to an antigen.

- Salmonella Typhi bacteria that causes typhoid could rebound in children aged 5 -15 years after being vaccinated due to waning protection by a single dose of the vaccine;
- The typhoid rebound in vaccinated children is based on a mathematical model of the transmission dynamics of the bacteria.

The Hindu

Fiscal consolidation

- Fiscal deficit refers to the shortfall in a government's revenue when compared to its expenditure.
- When a government's expenditure exceeds its revenues, the government will have to borrow money or sell assets to fund the deficit.
- Taxes are the most important source of revenue for any government.
- The fiscal deficit should not be confused with the national debt.
- The national debt is the total amount of money that the government of a country owes its lenders at a particular point in time.
- The national debt is usually the amount of debt that a government has accumulated over many years of running fiscal deficits and borrowing to bridge the deficits.
- The fiscal deficit is generally expressed as a percentage of a country's GDP since it is believed that the figure shows how easily the government will be able to pay its lenders.

How does the government fund its fiscal deficit?

- In order to fund its fiscal deficit, the government mainly borrows money from the bond market where lenders compete to lend to the government by purchasing bonds issued by the government.
- It should be remembered that central banks such as the Reserve Bank of India (RBI) are also major players in the credit market, although they may not always directly purchase government bonds.
- The RBI may still purchase government bonds in the secondary market, from private lenders who have already purchased bonds from the government.
- So, when a government borrows from the bond market, it not only borrows from private lenders but

also indirectly from the central bank.

- The RBI purchases these bonds through what are called 'open market operations' by creating fresh money, which in turn can lead to higher money supply and also higher prices in the wider economy over time.

Why does the fiscal deficit matter?

- The fiscal deficit matters for several reasons.
- For one, there is a strong direct relationship between the government's fiscal deficit and inflation in the country.
- When a country's government runs a persistently high fiscal deficit, this can eventually lead to higher inflation as the government will be forced to use fresh money issued by the central bank to fund its fiscal deficit.
- The fiscal deficit also signals to the market the degree of fiscal discipline maintained by the government.
- A lower fiscal deficit may thus help improve the ratings assigned to the Indian government's bonds.
- When the government is able to fund more of its spending through tax revenues and borrow less, this gives more confidence to lenders and

drives down the government's borrowing cost.

- A high fiscal deficit can also adversely affect the ability of the government to manage its overall public debt.

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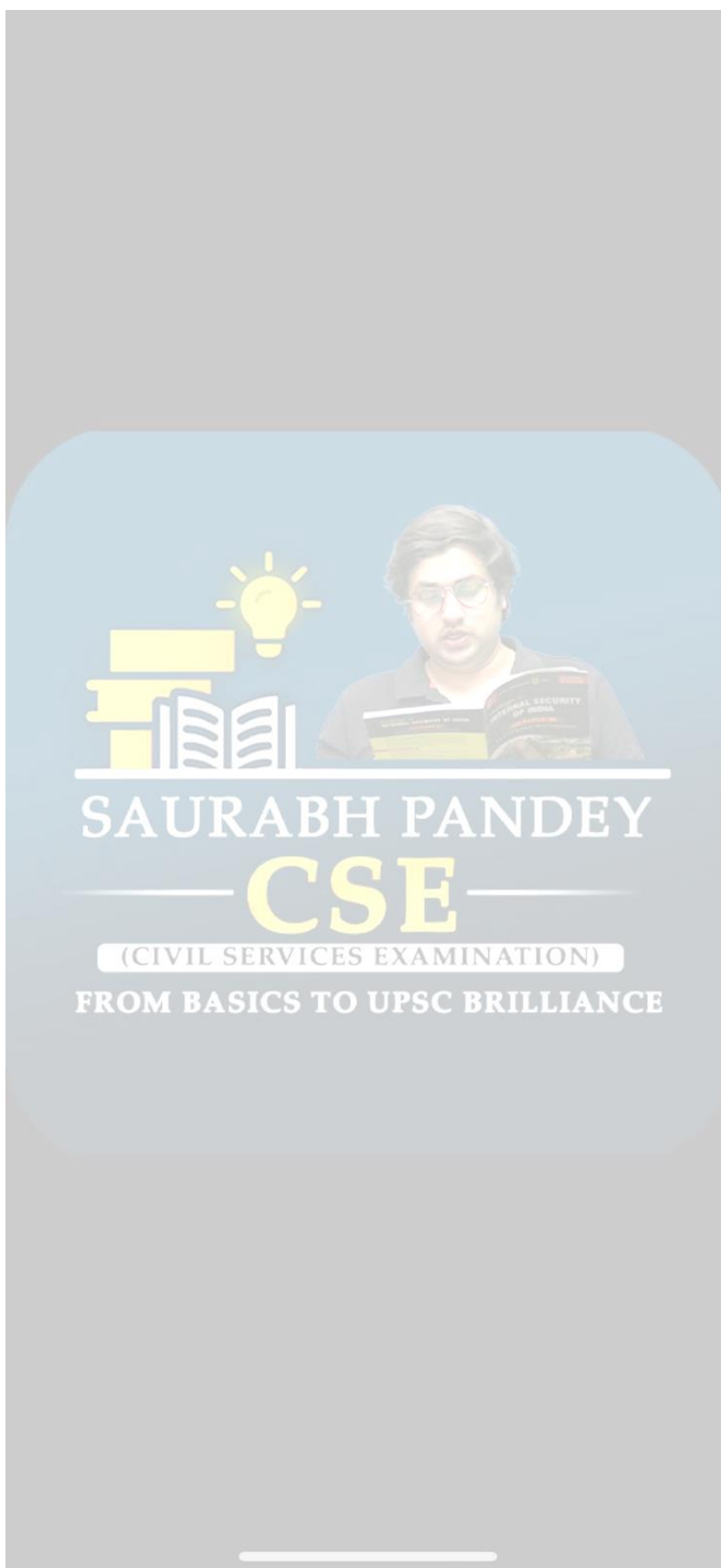
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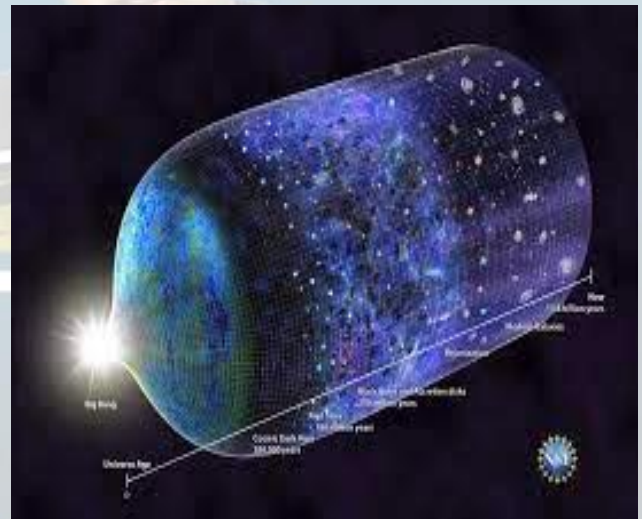
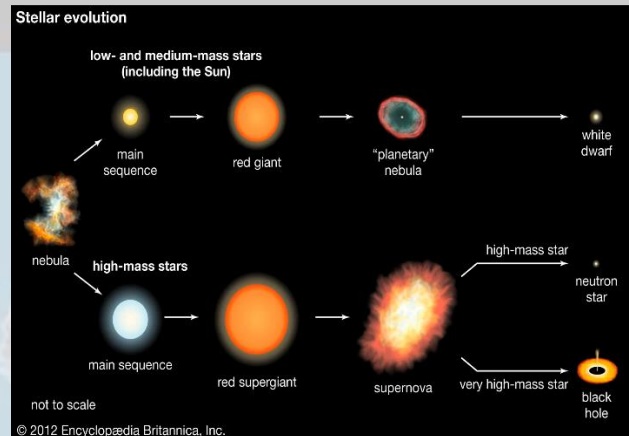
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Tachykinin



- Researchers found that a neurochemical called tachykinin activated aversion behaviour in flies
- Flies that had a mutation that deprived them of neurons that could release tachykinin didn't display the threat avoidance behaviour, even if they retained other visual and motor responses
- Neurons regulating aversion behaviour are in the visual region of the fly's brain, so scientists want to understand how visual information is transmitted to elicit the fear response.
- The Hindu

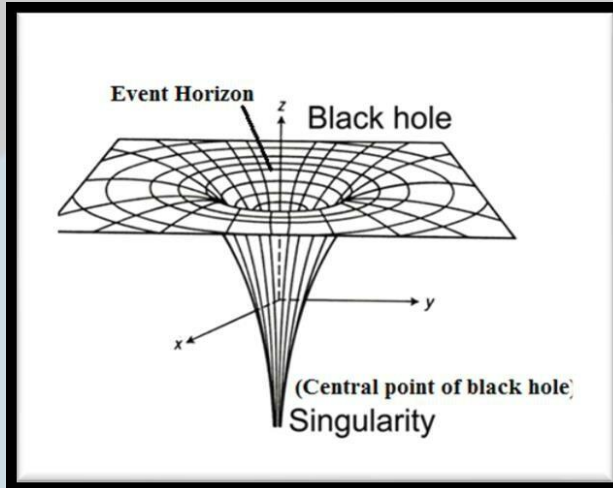
Ergosphere



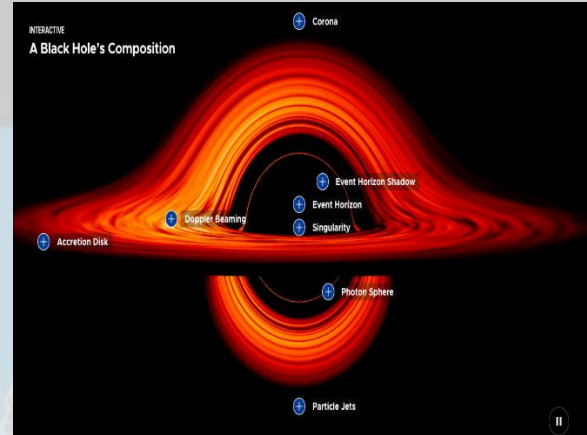
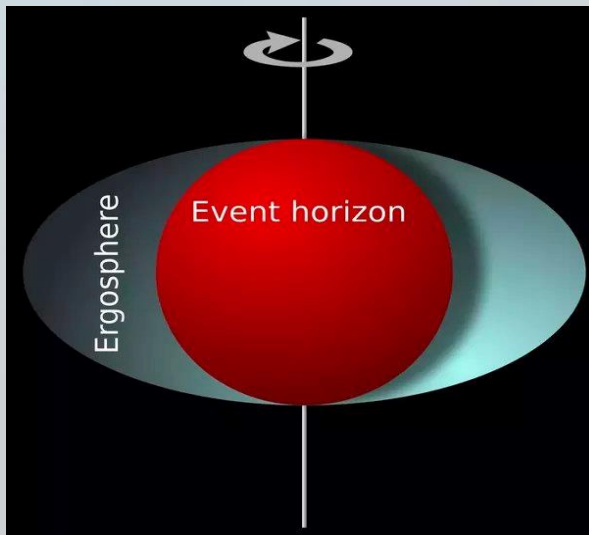
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Initial singularity

The **initial singularity** is a singularity predicted by some models of the Big Bang theory to have existed before the Big Bang and thought to have contained all the energy and spacetime of the Universe. The instant immediately following the initial singularity is part of the Planck epoch, the earliest period of time in the history of our universe.



- The event horizon is the spherical outer boundary of a black hole loosely considered to be its "surface."
- It is the point, according to NASA, that the gravitational influence of the black hole becomes so great that not even light is fast enough to escape it.



- Rotating black holes (a.k.a. Kerr black holes) have a unique feature: a region outside their outer event horizon called the ergosphere.
- A black hole is formed when a really massive star runs out of fuel to fuse, blows up, leaving its core to implode under its weight to form a black hole.
- The centre of a black hole is a gravitational singularity, a point where the general theory of relativity breaks down, i.e. where its predictions don't apply.
- A black hole's great gravitational pull emerges as if from the singularity.
- The event horizon describes a sphere around the singularity: when anything enters this sphere, it can't escape unless it travels faster than light (which is impossible).
- Just beyond this sphere, a rotating black hole will also have an ergosphere – a bigger sphere that an

Current Affairs 5th February 2024 by Saurabh Pandey

object can enter and then leave if it's moving fast enough, but still less than the speed of light.

- The label 'ergosphere' comes from 'ergon', the Greek word for 'work'.
- It is so named because it is possible to extract matter and energy from the ergosphere, but not from beyond the event horizon.

BIG SHOT



A resident flees an encroaching forest fire in Vina del Mar, Chile, on Saturday. Officials say intense forest fires burning around a densely populated area of central Chile have left several people dead and destroyed hundreds of homes. Chile's capital and other regions are also facing a heat wave, as meteorologists have warned extremely hot weather will become increasingly frequent in the country's austral summer. AP

- Viña del Mar meaning "Vineyard of the Sea") is a city and commune on central Chile's Pacific coast.
- Often referred to as *La Ciudad Jardín* ("The Garden City"), Viña del Mar is located within the Valparaíso Region, and it is Chile's fourth largest city with a population of 324,836 (according to the 2008 census).
- Viña del Mar is also part of the Greater Valparaíso area, the country's second largest metropolitan area (pop. 935,602,

2017 census), after the Metropolitan area of Santiago.

- The Hindu

Microcredentials

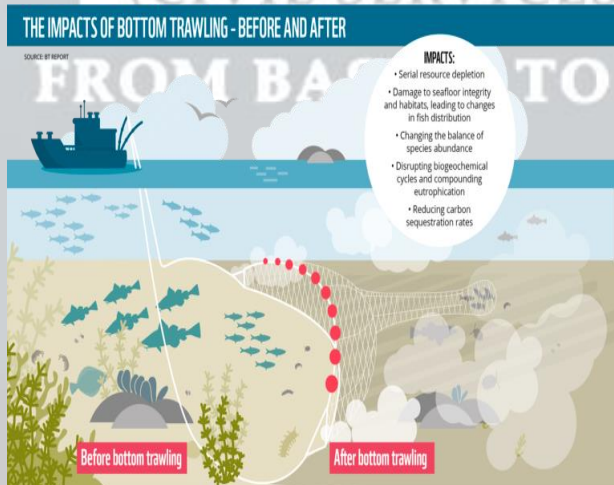
What are microcredentials?

- They are short duration learning activities with proof of specific learning outcomes that are validated through a standard and reliable assessment process.
- Microcredentials are offered in online, physical, or hybrid modes at various levels, such as beginning, intermediate, or advanced. In contrast to microcredentials, students must study for several years to obtain macro credentials such as undergraduate degrees.
- In addition, microcredentials can also be designed for lifelong learners, i.e., working professionals who may not be able to attend a formal degree programme in a university. Microcredentials, as a path to lifelong learning, are still developing.
- An obvious sign of this is how assorted terminologies, such as digital badges, micro master degrees, nanodegrees, and online certificates, are being used for this short duration learning.
- **Is there enough demand for micro-credentials in India?**

- With the focus of the National Education Policy 2020 on providing skilled education to students right from school to the higher levels, and with employers looking for young employees with adequate skills and competencies to boost productivity, learners are increasingly viewing micro credentials as a value added advantage.

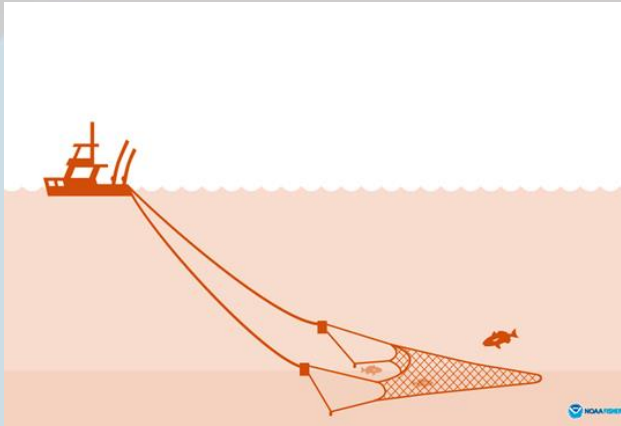
The Hindu

Bottom trawling



- Sri Lanka is under pressure from its northern province fishermen to act against Tamil Nadu fishermen, who they accuse of resorting to destructive bottom trawling, a practice banned by the country since July 2017.
- While India promised to end bottom trawling in the Palk Bay and incentivise fishermen to take to deep sea fishing under the Blue Revolution Scheme, bottom trawlers are still active.
- Fishermen also face a practical problem as under the Tamil Nadu Marine Fishing Regulation Act 1983, mechanized fishing boats are permitted to fish only beyond three nautical miles from the coast.
- Since the distance between Dhanushkodi and the International Maritime Boundary Line is only nine nautical miles, breaches do occur, a point the Sri Lankan Navy should not overlook.
- As Prime Minister Narendra Modi emphasized in 2015, the tensions over fishing must be handled as a “humanitarian concern”. Unfortunately, neither side has demonstrated consistency in the handling of the issue.
- **What is bottom trawling?**
- Bottom trawling is a fishing practice that herds and captures the target

species, like ground fish or crabs, by towing a net along the ocean floor.



- The Hindu

Genocide convention

- The Genocide Convention was the first human rights treaty adopted by the General Assembly of the United Nations on 9 December 1948 and signified the international community's commitment to 'never again' after the atrocities committed during the Second World War.
- According to the Genocide Convention, genocide is a crime that can take place both in times of war as well as in times of peace.
- The definition of the crime of genocide, as set out in the Convention, has been widely adopted at both national and international levels, including in the 1998 Rome Statute of the International Criminal Court (ICC)..

- Importantly, the Convention establishes on State Parties the obligation to take measures to prevent and to punish the crime of genocide, including by enacting relevant legislation and punishing perpetrators, "whether they are constitutionally responsible rulers, public officials or private individuals" (Article IV).

- That obligation, in addition to the prohibition not to commit genocide, have been considered as norms of international customary law and therefore, binding on all States, whether or not they have ratified the Genocide Convention.

States' obligations under the Genocide Convention

- Obligation not to commit genocide (Article I as interpreted by the ICJ)
- Obligation to prevent genocide (Article I) which, according to the ICJ, has an extraterritorial scope;
- Obligation to punish genocide (Article I);
- Obligation to enact the necessary legislation to give effect to the provisions of the Convention (Article V);
- Obligation to ensure that effective penalties are provided for persons found guilty of criminal conduct according to the Convention (Article V);

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- Obligation to try persons charged with genocide in a competent tribunal of the State in the territory of which the act was committed, or by an international penal tribunal with accepted jurisdiction (Article VI);
- Obligation to grant extradition when genocide charges are involved, in accordance with laws and treaties in force (Article VII).

International Day

- Every year on 9 December, the United Nations marks the adoption of the Genocide Convention, which is also the International Day of Commemoration and Dignity of the Victims of the Crime of Genocide and of the Prevention of this Crime.

The Hindu

• Uttarakhand uniform civil code

What changes can be expected?

- The draft UCC is set to focus on gender equality by introducing provisions that treat men and women equally, especially in matters pertaining to inheritance.
- It will also revoke practices governing marriage and divorce such as polygamy, iddat (mandatory period of waiting to be observed by women following the dissolution of a Muslim marriage) and triple talaq.

- The Code is also likely to extend an equal property share to Muslim women against the existing 25% share accorded under Muslim personal law.
- However, the minimum age for marriage for men and women is set to remain the same 18 years for women and 21 years for men.
- Other issues such as divorce, marriage registrations, adoption, and social security for ageing parents will also be covered under the law. T.

• What has the Supreme Court said?

- Over the years, the Supreme Court has deliberated upon the UCC in several judgments, but refused to issue any directive to the government since lawmaking falls within the exclusive domain of Parliament.
- In its 1985 judgment in the Shah Bano Begum case, the Court observed that “it is a matter of regret that Article 44 has remained a dead letter” and called for its implementation.
- Reviving the push for a UCC, six petitions were filed in the Supreme Court between 2021-2022 seeking uniformity in divorce, maintenance, and alimony laws on the ground that they discriminated against women, thereby violating Article 14 (right to

equality) and Article 15 (right against discrimination based on religion and gender) of the Constitution.

- In January last year, the Court dismissed a petition challenging the Uttarakhand government's move to set up an expert committee on the UCC by highlighting that Article 162 permits the exercise of such powers. "Article 162 of the Constitution indicates that the executive power of a State extends to matters with respect to which the Legislature of the State has power to make laws. .
- In view of the provisions of Entry 5 of the Concurrent List of the Seventh Schedule, the constitution of a Committee per se cannot be challenged as ultra vires," the order read.
- Entry 5 of the Concurrent List deals with "marriage and divorce; infants and minors; adoption; wills, intestacy, and succession; joint family and partition; all matters in respect of which parties in judicial proceedings were immediately before the commencement of this Constitution subject to their law."

What Law Commission has to say??

- 21st Law Commission headed by former Supreme Court Judge Justice Balbir Singh Chauhan submitted a 185-page consultation

paper on "Reforms of family law" wherein it observed that the "formulation of a Uniform Civil Code is neither necessary nor desirable at this stage".

- The report stated that a unified nation did not necessarily need "uniformity," adding that secularism could not contradict the plurality prevalent in the country.
- It, however, recommended that discriminatory practices and stereotypes within existing personal laws should be amended.

The Hindu

- **Personally Identifiable Information (PII)**

What is Personally Identifiable Information?

- Personally Identifiable Information (PII) is any data or information maintained by an organization or agency that can potentially be used to identify a specific individual.
- This could include information such as Aadhaar, PAN, voter identity, passport, date of birth, contact number, communication address, and biometric information.
- The constituents of PII vary depending on an individual's home country. However, non PII in tandem with additional information

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can be used to identify an individual.

- Non-PII information includes photographic images (especially of the face or other identifying characteristics), place of birth, religion, geographic indicators, employment information, educational qualifications, and medical records.
- All this information can be used to identify individuals accurately.
- And while access to one set of PII may be enough to compromise online security, access to multiple databases can be used to identify and target individuals.

What is the difference between sensitive and no sensitive PII?

- Non-sensitive PII is publicly available information and can be stored and transmitted unencrypted.
- This includes information such as zip code, race, gender, and religion.
- They cannot be used to accurately identify an individual.
- Sensitive PII, when exposed, can be used to identify individuals and potentially cause harm.
- Some of the most important components that constitute sensitive PII are stored by employers,

government organizations, banks, and other digital accounts used by individuals.

The Hindu

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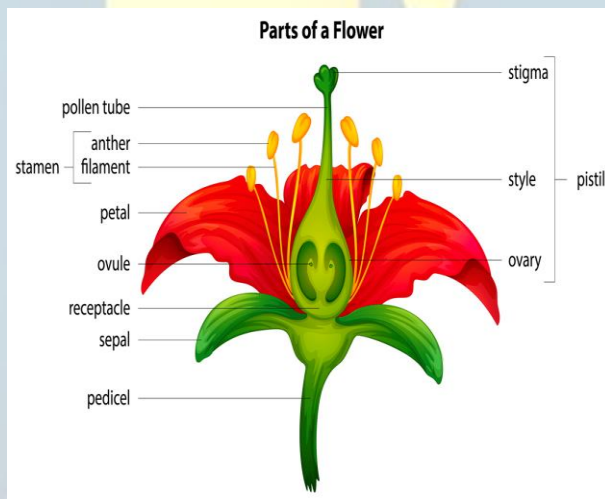
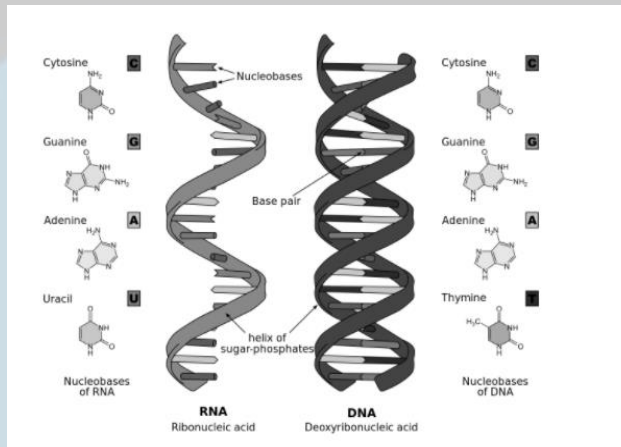
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Heterosis



Male Sterility

- Male sterility is characterized by nonfunctional pollen grains, while female gametes function normally.
- Inability to produce or to release viable or functional pollen as a result of failure of formation or development of functional stamens, microspores or gametes.
- Main reason is mutation.



HETEROSIS

Heterosis- refers to superiority of F_1 hybrids in one or more characters over its parents.

The term hybrid vigour is used as synonym for heterosis.

- Heterosis differs from luxuriance.
- Heterosis- as increase of F_1 over parents in general vigour, yield and adaptation.
- Luxuriance -as increase of F_1 over parents in vegetative growth but not in yield and adaptation.

- The males of plants as diverse as cabbage, cauliflower, broccoli, tomato, and rice can be made sterile by deleting a very small part of their genome's DNA.

- This is the take-home message of a paper published in the journal Nature Communications in October by researchers at the State Key Laboratory of Vegetable Biobreeding of the Chinese Academy of Agricultural Sciences, Beijing.

- Instead of loss, the researchers assure us of a gain: that the deletion could lead to an abundant harvest of these plants, thanks to a process called heterosis.

Genes and promoters

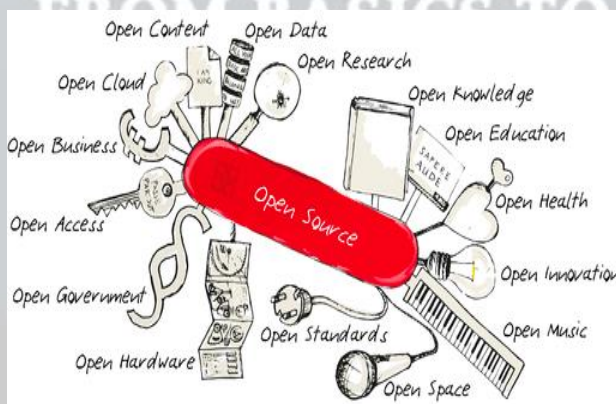
- The DNA molecule consists of two long strands. Each strand is composed of four compounds called nucleotide bases.

- They are designated A, C, G, and T for simplicity (for adenine, cytosine, guanine, and thymine respectively).
- An A on one strand makes chemical bonds, called hydrogen bonds, with a T on the other and a C on one strand makes hydrogen bonds with a G on the other.
- The bonds between As and Ts and the bonds between Gs and Cs hold the two DNA strands together.
- A base pair, or bp for short, is a single AT or GC pair between the two strands, with the dash denoting the bond.
- The genome of the cabbage plant (*Brassica oleracea*) consists of around 1.06 billion base pairs organised in 18 chromosomes, which every cell holds in nine pairs of two each.
- In each pair of two chromosomes, one chromosome comes from the pollen and the other comes from the egg.
- DNA and RNA are the master and working copies of a gene.
- The RNA is loaded into a cellular machinery called the ribosome.
- The ribosome uses the base sequence of RNA to specify the sequence in which amino acids are linked together to create the protein encoded by the gene.
- Pollen loss promotes heterosis
- Around 44 years ago, people found a cabbage plant that contained a natural mutation.
- As a result of this mutation, they found that the plant had lost the ability to make pollen.
- At first, scientists didn't know which particular gene in the plant had been mutated.
- They only named the altered gene, whichever it was, *Mscd1*.
- The mutation's effect was to make the plant male sterile, but they had no other defects.
- All the seeds from the mutant plants were the result of the plants' eggs being fertilized by pollen from plants of other strains a process called outcrossing.
- None of their seeds came from self-crossing.
- (In a self-cross, an egg is fertilized by the pollen of the same strain.)
- Outcross seeds which are also called hybrid seeds germinate to produce more robust plants than self-cross seeds.

- This is because of a phenomenon called hybrid vigor or, in technical terms, heterosis.
- Using an approach called genetic mapping, the researchers found that the only difference between a mutated Ms cd1 gene and a non-mutated Ms cd1 gene was that the promoter in the former was missing one DNA base pair.
- The Hindu

RISCV. (Reduced Instruction Set Computer)

- The People's Liberation Army's (PLA) Academy of Military Sciences had used an open source standard known as RISCV to reduce malfunctions in chips for cloud computing and smart cars, the patent filing shows.
- RISCV is an instruction set architecture, a computer language used to design anything from smartphone chips to advanced processors for artificial intelligence.



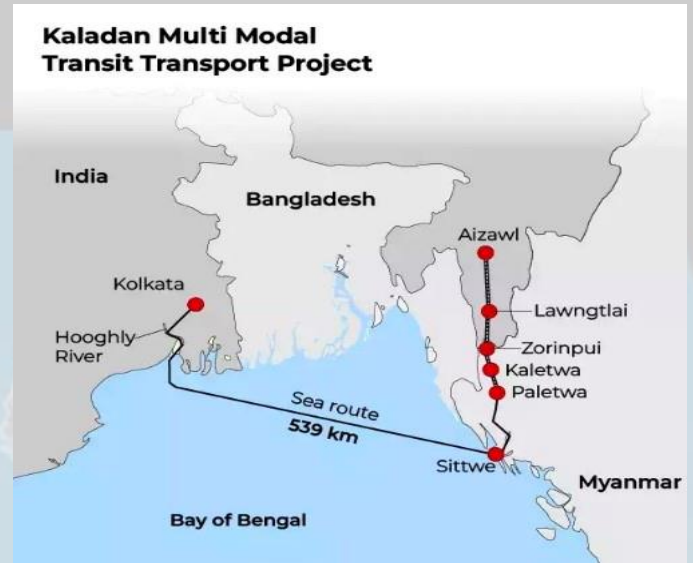
- The **RISC-V** (Reduced Instruction Set Computer) processor is a chip that is still in its infancy, but it's a chip that everyone should be supporting.
- The RISC-V architecture is great because it is the only processor that has a completely open source instruction set
- What's an open source instruction set?
- In layman's terms, it means that the way the processor moves around 1s and 0s is available for everyone to see.
- Another benefit of RISC-V is that it enables companies to develop a product that is tailored specifically to their workload, so they start with the RISC-V core and can add whatever it is they specifically need, saving both time and money.
- These savings can theoretically be passed on to the consumer either through a lower cost, or in the longterm by having a lower energy footprint.
- U.S. and UK export controls prevent the sale of only the most advanced x86 and Arm designs which produce the highest performance chips to clients in China.
- But as the U.S. widens restrictions on China's access to advanced semiconductors and chip-making

equipment, the open source nature of RISC-V has made it part of Beijing's plan to curb its dependence on Western technology, although the emerging architecture accounts for a fraction of the chip market.

- Recent RISC-V breakthroughs and applications in China, many with government funding, have raised Beijing's hopes that the open source standard could one day threaten the x86 Arm duopoly.
- RISC-V chips made by Chinese firms and research institutes can now power self-driving cars, artificial intelligence models, and data storage centers, according to two industry figures and the previously unreported documents.

The Hindu

- **MYANMAR CIVIL WAR AND INDIA'S INTEREST**



- The fall of the town of Paletwa has altered the dynamic between the Chin and the Arakan ethnic groups.

- A majority of Paletwa residents belong to the Chin ethnic community, and they see their town as an integral part of their homeland.
- On the other hand, some in the Rakhine State, previously known as Arakan, contend that the township was historically part of the Arakan Hill Tracts during colonial rule and should have been part of their province.
- to maintain peace and order, it is imperative that the Chin and Arakan groups agree on an inclusive framework for the governance of Paletwa and adjoining areas.

India's stake

- The developments in Paletwa will also impact the Indian government's Kaladan Multimodal Transit Transport Project (KMTTP) in Myanmar, which has already faced significant delays.
- The Kaladan project was aimed at addressing the geo-economics and geo-political challenges of northeast India.
- The partition of the subcontinent and the subsequent hardening of borders converted northeast India into a landlocked region.
- Transporting goods to and from northeast India via the narrow Siliguri

corridor is an expensive affair, and in a worst case scenario with China, there is a possibility of movement along the corridor being adversely affected.

- Therefore, the Kaladan project was conceptualized as an alternative route that gives northeast India access to the sea.
- India and Myanmar signed the framework agreement on the Kaladan project in 2008.
- The operationalization of the project was delayed because of rugged terrain, inadequate inter-departmental coordination, political instability and security challenges in Myanmar.
- While the Sittwe port and inland water terminal at Paletwa have been completed in the past few years, road construction is facing challenges due to the prevailing security situation in Myanmar.

China's investments in the region

- The Arakan Army, along with the Myanmar National Democratic Alliance Army and the Ta'ang National Liberation Army, is part of the Three Brotherhood alliance, which some claim has China's support.

- The alliance has pledged to protect Chinese investments in Myanmar.
- There are reports which suggest that the Arakan Army receives considerable funding and military equipment from China.
- The successful completion of the Kaladan not only competent technical personnel but also experts who can diligently monitor the fluid Chin Arakan ethnic relations, the changing contours of military EAO contestation, sectarian violence in the Rakhine state, and the growing Chinese footprint in Myanmar, specifically in the Rakhine state.

• The Hindu

GRAMMY AWARD

- Taylor Swift Won Album of the Year at the Grammy Awards for *Midnights*, breaking the record for most wins in the category with four.

India in Grammy

- Indian music struck a chord at the 2024 Grammy Awards with five musicians from the country, including tabla maestro Ustad Zakir Hussain and flautist Rakesh Chaurasia, winning the coveted prize in Los Angeles.

- While Mr. Hussain was India's big winner with three Grammys, Mr. Chaurasia picked up two awards.

- Singer Shankar Mahadevan, violinist Ganesh Rajagopalan, and percussionist Selvaganesh Vinayakram, Mr. Hussain's collaborators in the fusion group Shakti, won one Grammy

- Shakti won the 2024 Grammy Award for best global music album for *This Moment*.

- Besides his award for Shakti, Mr. Hussain won two other awards Best Global Music Performance for *Pashto* and best contemporary instrumental album for *as We Speak*.

The Hindu

Mistiness

- Mistiness is caused by tiny droplets of water that scatter light and make the glass opaque. Wiping the glass with a cloth that is soaked in a detergent leaves a residue that lowers the surface tension of the water droplets enough to allow them to spread as a thin film.

The Hindu

Zodiacal dust

- Zodiacal dust is most commonly known for Zodiacal light which is "a faint, roughly triangular, diffuse white glow seen in the night sky that appears to extend up from the vicinity of the Sun along the ecliptic or zodiac. It is caused by sunlight scattered by space dust in the zodiacal cloud."
- It is best seen just after sunset in spring, and just before sunrise in autumn, when the zodiac is at a steep angle to the horizon but is so faint that either moonlight or light pollution renders it invisible.

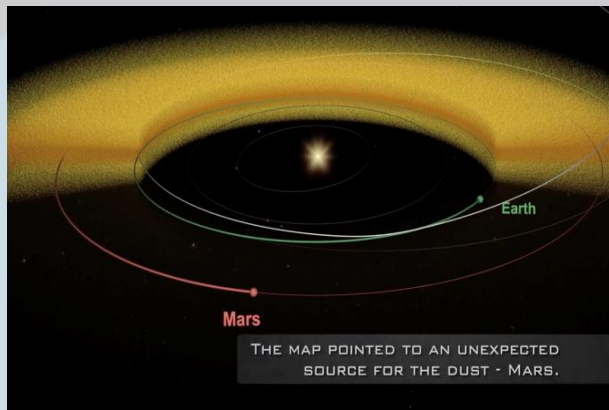


- Zodiacal dust is simply cosmic dust located mainly between the Sun and Jupiter. This dust is "10 and 300 micrometers in diameter, most with a mass around 150 micrograms."
- The light effect is caused due in part to the large collection of this dust in the aforementioned area and also in part to the Sun's reflection off of this dust.
- As far as why observing Zodiacal dust is so rare can be attributed to forward scattering.
- This type of light deflection makes the dust only "just after sunset in spring, and just before sunrise in autumn when the zodiac is at a steep angle to the horizon but is so faint that either moonlight or light pollution renders it invisible."

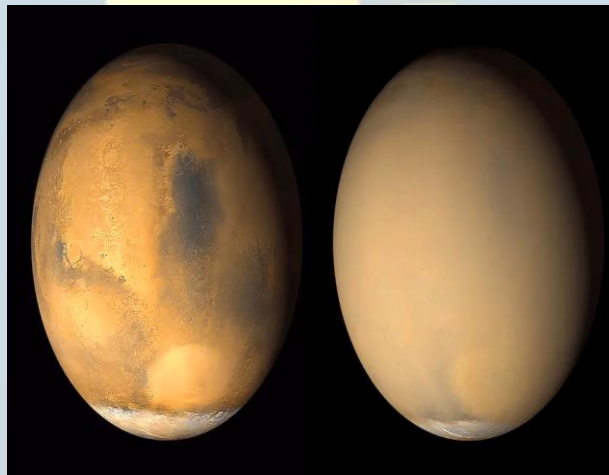
Recent study on Mars

- The study compared the flux of dust near Mars, and the number of particles escaping the two moons of Mars and concluded that these moons could be the dust source.
- No other phenomenon in the neighborhood was found that could release as much dust. The study incorporated the shapes of the two Martian moons along with the gravitational effects of Mars, incoming and outgoing dust particles, the effect of spacecraft ejecta, and

other parameters in models for the dust.



- From this the influx at Deimos and Phobos was estimated.
- This combined with observational data led to a mechanism that could explain how Deimos and Phobos could be contributing to the zodiacal dust
- These dust particles can easily escape Phobos and Deimos because of the moon's low gravity.
- The smaller of these particles escape into space whereas Mars's gravity pulls in the larger ones.
- The Hindu

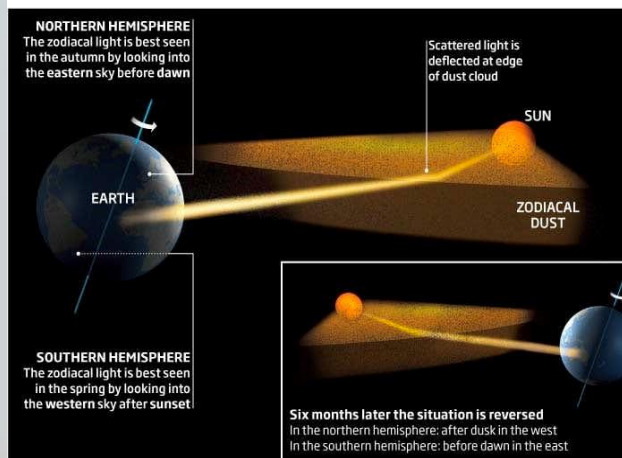


Zaporizhzhia

- The Zaporizhzhia Nuclear Power Station in southeastern [Ukraine](#) is the largest [nuclear power plant](#) in Europe and [among the 10 largest in the world](#).

How to see the zodiacal light

©NewScientist
Sunlight scattered by dust in the plane between Earth and the sun produces the faint night-time glow over the horizon. Here is the best way to see it



- It has been under [Russian](#) occupation since 2022. It was built by the [Soviet Union](#) near the city of Enerhodar, on the southern shore of the [Kakhovka Reservoir](#) on the [Dnieper](#) River.
- It is operated by [Energoatom](#), who operate Ukraine's other three nuclear power stations..



Human ashes on moon

Human ashes

- Among the payloads aboard a recent private moon mission by U.S. company Astrobotic which ultimately failed to reach the moon's surface were dozens of capsules of human ashes and a can of Japanese sports drink Pocari Sweat.
- The exact purpose of the can was unclear.
- Under U.S. law, those items and anything else can go to the moon, as long as the U.S. Federal Aviation Administration and other agencies certify a rocket payload's launch of Earth does not "jeopardise public health and safety."
- U.S. national security or international obligations of the United States."
- The issue will gain more attention as the National Aeronautics and Space Administration leans heavily on private companies to cut the costs of its trips to the moon.
- Lawyers with space-law expertise worry that the absence of regulations could pit U.S. companies against other countries operating on the lunar surface or spark international disputes over which private endeavors could be considered land



The Hindu

appropriation or claims of sovereignty.

The Hindu

Delimitation of constituencies

- The delimitation of constituencies for the Lok Sabha and State Legislative Assemblies is to be carried out on the basis of the first Census after 2026.
- The 2021 Census was originally postponed due to the COVID-19 pandemic and subsequently due to delays on the part of the Central government.

What is delimitation?

- Delimitation means the process of mixing the number of seats and boundaries of territorial constituencies in each State for the Lok Sabha and Legislative assemblies.
- It also includes determining the seats to be reserved for Scheduled Castes (SC) and Scheduled Tribes (ST) in these houses.
- Article 82 and 170 of the Constitution provide that the number of seats in the Lok Sabha and State Legislative assemblies as well as its division into territorial constituencies shall be readjusted after each Census.

- This 'delimitation process' is performed by the 'Delimitation Commission' that is set up under an act of Parliament.

- Such an exercise was carried out after the 1951, 1961, and 1971 Census.

What is the constitutional requirement?

- 'Democracy' means 'rule or government by the people'.
- It follows that the government is elected by a majority with the broad principle of 'one citizen-one vote-one value'.
- The number of seats in the Lok Sabha based on the 1951, 1961, and 1971 Census was Fixed at 494, 522, and 543 when the population was 36.1, 43.9, and 54.8 crores respectively.
- This broadly translated to an average population of 7.3, 8.4, and 10.1 lakh per seat respectively.
- However, it has been frozen as per the 1971 Census to encourage population control measures so that States with higher population growth do not end up having higher numbers of seats.
- This was done through the 42nd Amendment Act till the year 2000 and was extended by the 84th Amendment Act till 2026.

Current Affairs 7th February 2024 by Saurabh Pandey

- Hence, the population based on which the number of seats is allocated refers to the population as per the 1971 Census.
- This number will be re-adjusted based on the first Census after 2026.
- The boundaries of territorial constituencies were readjusted (without changing the number of seats) and seats for SC and ST were determined as per the 2001 Census and will again be carried out after 2026.
- In a normal course of events, the delimitation process for the number of seats, boundaries of territorial constituencies and determining the reserved seats for SC and ST would have happened based on the Census of 2031 as it would have been the first Census after 2026.
- However, with the 2021 Census now being postponed and the year 2026 nearing, there have been talks about the impending delimitation exercise.

What are the issues?

- The number of seats were frozen based on the 1971 Census in order to encourage population control measures.
- The population explosion that happened in our country during the last few decades has been uneven with some States like Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan having a greater increase than States like Kerala, Tamil Nadu, Karnataka and Andhra Pradesh.
- There are two options that are being discussed in the public domain with respect to the revised delimitation exercise based on the projected population of various States as of 2026.
- The Hindu

Price war -china vs Europe

- A flood of cheap Chinese solar panel imports is driving record solar energy installations.
- But those same imports are crushing Europe's few local solar manufacturers.
- EU measures already underway, including a law due to be Finalised which aims at fast tracking permits for local manufacturing and giving products made in the EU, such as panels, an advantage in future clean tech tenders.
- solar panel prices have climbed in the United States, which has duties on Chinese imports. “
- Europe is in a “price war” with China,

Current Affairs 7th February 2024 by Saurabh Pandey

India's inclusion in JPMorgan's bond index

- What India's inclusion in JPMorgan's bond index means for its markets

How large will the inflows be?

- JPMorgan said Indian bonds will eventually hold a weight of 10% in its index, following 1% additions to its weightage each month from next June.
- The inclusion could result in inflows of close to \$24 billion over this 10-month period, analysts estimate.
- This is significantly higher than the \$3.5 billion invested by foreign investors in Indian debt so far this calendar year. Foreign holdings of outstanding bonds could rise to 3.4% by April-May 2025, from 1.7% currently, analysts estimate.

- **What is the impact on bond yields, borrowing costs?**

- India's fiscal deficit remains high at a targeted 5.9% of GDP for the year ending March 31, 2024, which will result in the government borrowing a record 15 trillion rupees (about \$181 billion).

So far, banks, insurance companies and mutual funds have been the largest buyers of government debt. An additional source of funds will

help cap bond yields and the government's borrowing costs.

- Traders estimate the benchmark bond yield will fall 10-15 basis points to 7% over the next few months. Corporate borrowers will also benefit as their borrowing costs are benchmarked to government bonds.

However, increased foreign flows will also make the bond and currency markets more volatile and could push the government and central bank to intervene more actively.

- **What does it mean for the rupee?**

- Larger debt inflows from the next financial year will make it easier for India to finance its current account deficit and reduce the pressure on the rupee. Index inclusion-related inflows of close to \$24 billion will cover a material part of India's \$81 billion current account deficit, estimated for next financial by IDFC First Bank

- India will monitor flows of foreign funds after its inclusion into JPMorgan's emerging market debt index and take steps to avoid 'hot money' that can trigger volatility in currency and bond markets.

What is Hot Money?

- **"Hot money"** refers to funds that are controlled by investors who actively seek short-term returns. These investors scan the market for short-term, high-interest-rate investment opportunities
- Banks usually attract "hot money" by offering relatively short-term certificates of deposit that have above-average **interest rates**.
- **The Hindu**

Financial transfer to states

Determining State Finances

- According to Article 293(3) of the Constitution, the State has to obtain the consent of the Centre to raise 'any loan', if 'any part of the previous loan' extended by the Centre is outstanding.
- The imposition of the Net Borrowing Ceiling (NBC) is done by invoking the powers of the Centre under Article 293(3).
- On scrutiny, the Centre's decision to include extra-budgetary borrowings by state-owned enterprises in the total debt of the State is constitutionally suspect.
- The Union Finance Minister justified the decision by relying on the 15th Finance Commission Report, which says, "Governments at all tiers may observe strict discipline by resisting any further additions to the stock of o-budget transactions and contingent liabilities which is against the norms of Fiscal transparency and detrimental to fiscal sustainability."
- One very important purpose of our recommendation for higher borrowing limit to the Union and State Government is to foster transparency and to avoid build-up of non-transparent liabilities."
- Notably, the Finance Commission has not called for the inclusion of the debt of state-owned enterprises in the NBC.
- Parliament does not have the power to legislate upon the 'Public Debt of the State' as this finds place in Entry 43 of the State List of the Constitution.
- Therefore, the power to make laws on, administer, and determine aspects of the public debt of the State falls squarely on the State Legislature.
- The State government raises another crucial argument that the balances in the public account of the State should not be included in the NBC.
- The State relies upon Article 266(2) of the Constitution which indicates that the money collected by the Central or

State government, which do not pertain to the consolidated fund, can be brought under the head of 'public accounts'.

- Small savings, security deposits, provident funds, reserve funds and other treasury deposits constitute 'public accounts'.
- All activities related to public accounts fall within the domain of the State Legislature and the Centre has no power to include the withdrawals from public accounts in the NBC.

The Hindu



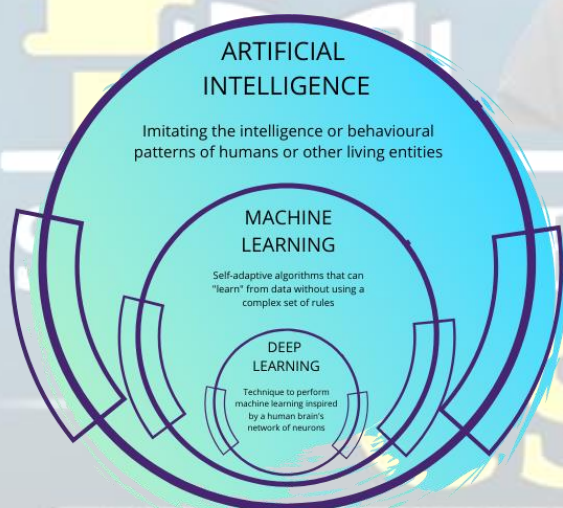
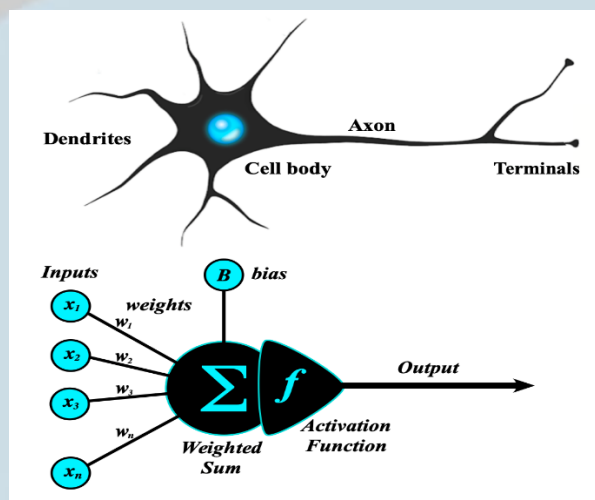
SAURABH PANDEY

CSE

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

Use of deep learning and antibiotic resistance



- Using these neural networks to make predictions has two steps: training and testing.
- In training, the network is provided with a large amount of annotated inputs.
- For example, if the network is being trained to identify pictures of cats, it is provided with many such pictures labeled "cat".
- If deep learning can identify potential antibiotics and also explain what substructures may contribute to their antibiotic activity, scientists can synthesize and test compounds with these substructures faster.

Against MRSA (methicillin-resistant Staphylococcus aureus) and VRE

- All artificial neural networks are made of artificial 'neurons'.
- These are algorithms that receive an input, perform a computation, and relay the output.
- Deep-learning neural networks have three or more layers of such 'neurons'.
- While determining the rationales for 380 compounds from the set of 3,646, the team found some that had not been previously reported and which the GNNs predicted could confer antibiotic properties to molecules.
- One such rationale was N-[2-(2-chlorophenoxy) ethyl aniline
- On further tests, two compounds containing this rationale were found to inhibit the growth of MRSA cultures by changing the concentration of hydrogen ions across the bacterial cell membrane.

- Notably, the compounds were also effective against vancomycin-resistant enterococci (VRE), a bacteria responsible for more than 5,400 deaths in the U.S. in 2017.

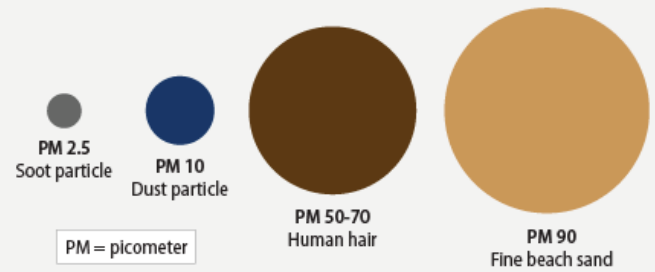
The Hindu

USA Steps against soot pollution

- The Biden administration is setting tougher standards for deadly soot pollution, saying that reducing fine particulate matter from tailpipes, smokestacks, and other industrial sources could prevent thousands of premature deaths a year.
- Environmental and public health groups hailed the new Environmental Protection Agency rule finalized as a major step in improving the health of Americans, including future generations.
- Industry groups warned it could lead to loss of manufacturing jobs and even shut down power plants or refineries.



FIGURE 1
How big is particle pollution?



Source: U.S. Environmental Protection Agency

- The rule sets an air quality level that states and counties must achieve in the coming years to reduce pollution from power plants, vehicles, industrial sites, and wildfires.

The Hindu

Northern Ireland vs Ireland



How did Northern Ireland come into being?

- Northern Ireland was the site of a 30-year civil war (1968-1998) known as

'The Troubles' between the Republicans and the Unionists, which killed over 3,500 people.

- It also had a religious aspect to it with the Republicans being mostly Catholic and the Unionists being largely Protestants.
- Northern Ireland was formerly part of the Ulster province, which lies to the north of modern-day Ireland.
- The religious war that was being waged in much of Europe at the time, between the Protestants and the Catholics, made its presence felt in Ulster as well.
- However, a much stronger resistance was brewing. Ireland at the time was under the rule of England.
- The growing resistance against the colonial English rule, especially after the Potato Famine of 1845 where over 1 million Irish people died due to disease and starvation, cemented these sectarian and religious differences.
- Finally, in 1916, in the middle of the First World War, during Easter week, Ireland rose in arms against colonial rule under the leadership of the Irish Republican Army (IRA).
- After a bloody war, it was able to gain independence from England with the Anglo-Irish Treaty of 1921.
- Finally, on April 10, 1998, the Good Friday Agreement was signed in Belfast bringing to an end the 30-year-old civil war in Northern Ireland.

What is the Good Friday Agreement?

- The Good Friday Agreement is a unique peace treaty in that it conceded to most of the demands from both sides of the conflict.
- The treaty had three main aspects that the Northern Ireland government would be formed on the sovereign wishes of both Republicans and the Unionists and that they would share governance equally;
- that the people of Northern Ireland could seek reunification with Ireland at any time subject to a referendum;
- and that the citizens of Northern Ireland can seek Irish or British nationality or both. It also abolished border checks
- and encouraged the freedom of movement of people across the U.K. and Ireland.

The Hindu

Derivative trading

- **What is the Meaning of Derivative Trading?**
- A derivative is a formal financial contract that allows an investor to

buy and sell an asset for a future date.

- The expiry date of a derivative contract is fixed and predetermined.
- Derivative trading in the share market is better than buying the underlying asset since the gains can be substantially inflated.
- Derivative contracts are of two types futures and options. In essence, both are the same since the investor, and the seller predict the price of the underlying asset for a specific future date.
- But, futures and options are different in that, in futures, both the buyer and seller are under the legal obligation to honor the contract on expiry.
- However, in the case of options, the buyer or seller can buy/sell before expiry by exercising their rights or letting the contract expire without any exercise of rights.
- Options are of two types - Call option and Put option. Investors buy a Call option when they are confident that the underlying asset will go up.
- In contrast, they buy a Put option when they feel certain that the price of the underlying asset will come down.

Types of Derivatives

- The Derivatives definition is a financial contract between two parties that derive its value from an underlying asset such as stocks, currencies, commodities, etc.
- There are four types of assets tradable in the derivatives market.

Options

Contract

An options contract gives the buyer the right but not the obligation to buy/sell the underlying securities to a different investor over a predetermined period, depending on the type of options contract. The security price in the options contract is known as the strike price, and the seller of the contract is called the option's writer.

- In an options contract, the buyer can pass on the exercise right as they are not obliged after paying the premium to the option's writer. There are two types of options contracts: A call option and a put option.

Futures

Contract

A futures contract in the derivatives meaning binds both parties legally to exercise the agreement within the predefined period.

- The involved parties set a quantity of the underlying assets and a price

payable by the buyer at a specific date in the future.

- Unlike options, the buyer or the seller of futures must exercise the contract before the expiry date. The futures contracts include currency futures, index futures, commodity futures, etc.

Forwards

They are financial contracts between two parties based on a predetermined quantity and price of the underlying securities to be executed before the expiry date.

- Like futures, forwards obligate both parties to exercise the contract before the expiry date.
- However, investors can only trade such contracts using an Over-The-Counter trading market rather than a supervised stock market exchange.

Swaps

These financial instruments allow two parties to swap or exchange their financial obligations or liabilities. Both parties set the cash flow within the contract based on a rate of interest.

- In this contract, one cash flow is usually fixed while the other varies per benchmark interest rate.

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The Hindu

Primary deficit

• What is a Primary Deficit?

- Primary Deficit is the difference between the current year's fiscal deficit (total income- total expenditure of the government) and the interest paid on the borrowings of the previous year.
- Once calculated, the primary deficit reflects the amount the Government needs to borrow to meet its current year's expenses.
- In other words, the primary deficit is the amount that reflects the total expenditure of the Government against its total income.

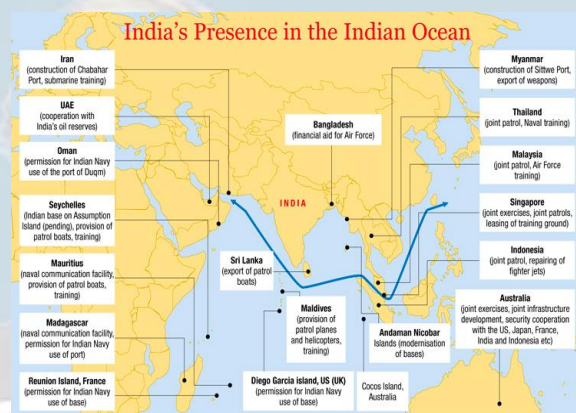
Primary Deficit Formula

- $\text{Primary deficit} = \text{Fiscal deficit} - \text{Interest payments}$
- $\text{Primary deficit} = \text{Total revenue earned} - \text{Expenses incurred excluding interest payments.}$
- The Hindu

Indian Ocean Conference

- External Affairs Minister S Jaishankar addresses the 7th Indian Ocean Conference in Australia's Perth that gets underway today with the theme "Towards a Stable and Sustainable Indian Ocean."

- The Indian Ocean Conference is a flagship consultative forum for countries in the Indian Ocean Region, organized annually by the Ministry of External Affairs, in association with the India Foundation.



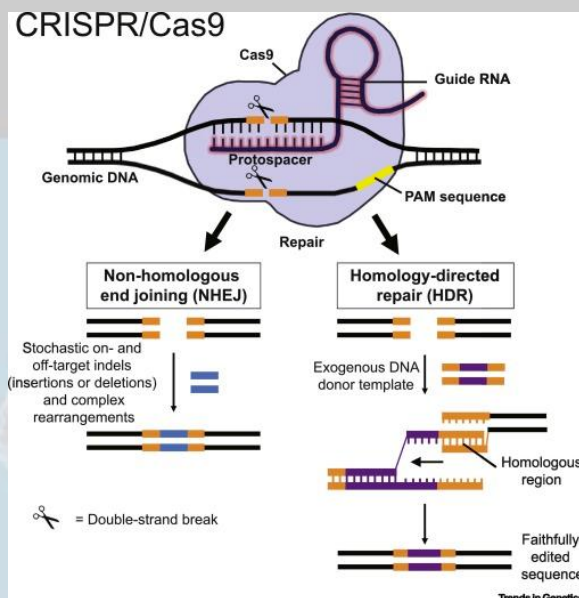
- The conference will be held in association with the Department of Foreign Affairs and Trade, Government of Australia, along with the S Rajaratnam School of International Studies, Singapore, and the Perth-US Asia Centre in Australia.
- According to the Ministry of External Affairs press release, "The theme of this edition of the conference is Towards a Stable and Sustainable Indian Ocean."

- Since its inception in 2016 in Singapore, the Indian Ocean Conference has been instrumental in fostering collaboration among nations and principal maritime partners in the region.

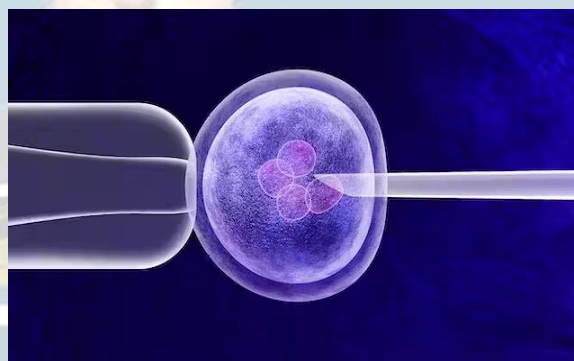
- Through its platform, the Conference endeavors to facilitate discourse on the prospects of regional cooperation for Security and Growth for All in the Region (SAGAR).
- The 7th Indian Ocean Conference stands as a testament to the collective commitment towards enhancing stability and sustainability across the Indian Ocean Region.
- The Hindu

CRISPER cas9 and sickle cell anemia

- Casgevy and Lyfgenia, the two cell-based gene therapies approved by the Food and Drug Administration (FDA) for sickle cell anemia treatment and beta-thalassemia utilize the Nobel-winning CRISPR/Cas 9 genome editing technology.
- Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR), a feature of the bacterial immune system, forms the basis for this technology.
- In a nutshell, the system in bacteria serves as a warehouse for past infections by storing a part of the viral genetic material and incorporating it into its own, so the next time it is attacked, the bacteria are capable of recognizing the virus and destroying it.
- The bacteria, in short, is immunized when it employs the CRISPR system. The CRISPR-Cas system is effective and easy to manipulate.
- Researchers have adapted it as a tool to cut, delete, or add DNA sequences at precise locations, opening different windows to treat genetic disorders, develop drought-resistant plants, modify food crops, or experiment with de-extinction projects involving the woolly mammoth and the dodo.
- Sickle-cell anemia (SCA) is an inherited disorder where red blood cells contort to a sickle or crescent shape because of defective hemoglobin, restricting its ability to carry oxygen. A.
- Casgevy costs \$ 2.2 million per patient to treat sickle-cell anemia.



- Indian researchers are working on indigenous treatment involving CRISPR genome editing to reduce the cost. “
- The tribal population which is affected the most has limited healthcare access for various reasons: one being that they live in remote areas where there is a scarcity of healthcare professionals. “
- The Sickle Cell Anemia Elimination Mission launched in India on 1st July 2023 aims to strengthen the existing healthcare system and improve primary, secondary, and tertiary healthcare teams.
- As of now, genome editing is restricted to somatic cells and there is a moratorium on germline editing.
- The gene editing technology has also raised concerns regarding it becoming a commodity that wealthy parents will exploit to improve the fate of their children not only for therapeutic purposes but for genetic enhancement. “.



Germline editing and CRISPR

- Apart from the health equity and disparities associated with CRISPR, one of the biggest controversies has been about germline editing.
- Most of the scientific community supports the use of CRISPR to treat monogenic diseases.

| | SOMATIC GENE EDITING | VS. | GERMLINE GENE EDITING |
|-----------------|---|-----|---|
| EDIT | Somatic therapies target genes in specific types of cells (blood cells, for example). | | Germline modifications are made so early in development that any change is copied into all of the new cells. |
| COPY | The edited gene is contained only in the target cell type. No other types of cells are affected. | | The edited gene is copied in every cell, including sperm or eggs. |
| RISKS | Any changes, including potential off-target effects, are limited to the treated individual. | | If the person has children, the edited gene is passed on to future generations. |
| NEXT GENERATION | The edited gene is not passed down to future generations. | | The edited gene is passed on to future generations. |
| CONSENSUS | Somatic cell therapies have been researched and tested for more than 20 years and are highly regulated. | | Human germline editing is new. Heritability of germline changes presents new legal and societal considerations. |

| Germline gene editing | Somatic gene editing |
|---|---|
| Examples of cells | |
| Sperm cell | Muscle cell |
| Ovum cell | Blood cell |
| Early embryo | Nerve cell |
| Modification and effects | |
| All cells undergo gene editing Edited gene is passed on to future generations | Only target cell undergo gene editing Edited gene is not passed to future generations |
| Issues | |
| <ul style="list-style-type: none"> Straightforward delivery of edited gene into reproductive cell All cells will have functioning gene Ethically controversial Inconsistent and variable guidelines and regulation Limited research/application permitted Manipulation passed to next generation, resulting in good or bad outcomes | <ul style="list-style-type: none"> Tricky delivery of edited gene into target cells Difficult to achieve gene functioning in the genome Therapy is short-lived and has to be repeated Regulations available to govern applications Research/application permitted as only actual person affected |

The Hindu

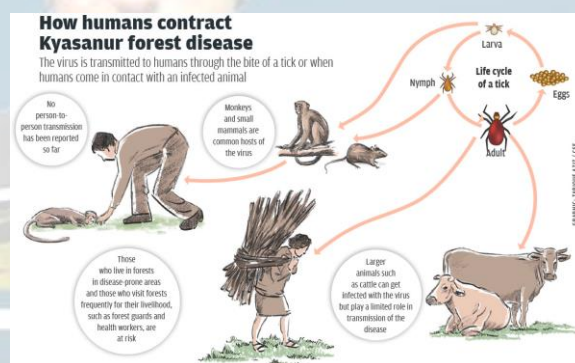
Kyasanur Forest disease (KFD)

- Kyasanur Forest disease (KFD) is caused by Kyasanur Forest disease virus (KFDV), a member of the virus family Flaviviridae.
- KFDV was identified in 1957 when it was isolated from a sick monkey in the Kyasanur Forest in Karnataka (formerly Mysore) State, India. Since then, between 400-500 human cases per year have been reported.
- Hard ticks (*Hemaphysalis spinigera*) are the reservoir of KFD virus and once infected, remain so for life. Rodents, shrews, and monkeys are common hosts for KFDV after being bitten by an infected tick.
- KFDV can cause epizootics with high fatality in primates.

Transmission

- Transmission to humans may occur after a tick bite or contact with an infected animal, most importantly a sick or recently dead monkey.
- No person-to-person transmission has been described.
- Large animals such as goats, cows, and sheep may become infected with KFD but play a limited role in the transmission of the disease.

- These animals provide the blood meals for ticks and it is possible for infected animals with viremia to infect other ticks, but transmission of KFDV to humans from these larger animals is extremely rare.
- Furthermore, there is no evidence of disease transmission via the unpasteurized milk of any of these animals.



Diagnosis

- Diagnosis can be made in the early stage of illness by molecular detection by PCR or virus isolation from blood.
- Later, serologic testing using enzyme-linked immunosorbent serologic assay (ELISA) can be performed.

Treatment

- There is no specific treatment for KFD, but early hospitalization and supportive therapy is important. Supportive therapy includes the maintenance of hydration and the

usual precautions for patients with bleeding disorders.

Prevention

- A vaccine does exist for KFD and is used in endemic areas of India. Additional preventative measures include insect repellents and wearing protective clothing in areas where ticks are endemic.
- The Hindu

Rice price

- The Indian government recently made it mandatory for all traders, wholesalers, retailers, and millers to declare their respective rice stocks.

What are the measures taken so far?

- The government has asked traders, wholesalers, retailers, chain retailers and millers to report the stocks online in the categories of broken rice, non-basmati white rice, par-boiled rice, basmati rice, and paddy.
- It has also launched the retail sale of 'Bharat Rice' to general consumers at ₹29 per kg.
- Moreover, in September 2022, the export of broken rice was banned, and a 20% duty was imposed on par-boiled rice.

- Non-basmati white rice exports were also put under the prohibited category from July 2023.

- The government has procured 600 lakh tonnes of paddy during the current Kharif marketing season, starting October 1, 2023.

- With this, the central pool has 525 lakh tonnes of rice as against the annual requirement of almost 400 lakh tonnes for welfare schemes.

- Till the end of January this year, the government has sold 1.66 lakh tonnes of rice in the open market.

Why are prices increasing?

- Traders and millers cite several reasons for the higher retail rice prices.

- The Minimum Support Price for rice has gone up in the last have years and the cost of transport, storage, etc. are also escalating.

- In rice consuming States, the varieties consumed in large quantities have seen a drop in production this year.

- Further, despite government measures, the export of non-basmati rice has seen a multi-fold jump during the last three years compared to the previous years.

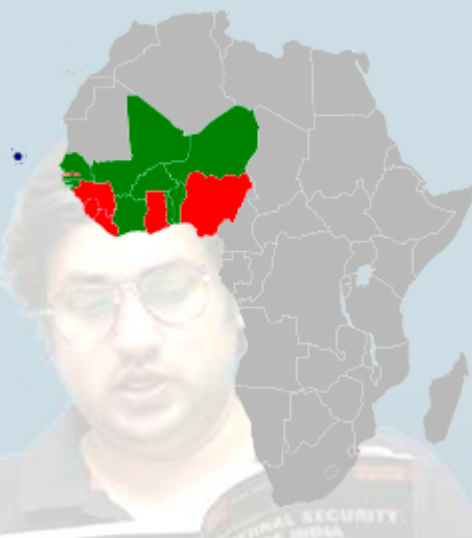
What should the government do?

- According to the millers in the northern States, there is a demand for rice for consumption, ethanol production, and cattle feed.
- The government should prioritise sale for consumption.
- The stock data collected by the government is expected to give an indication of the stock levels.
- It should look at capturing data for the most consumed varieties too before deciding the future course of action.
- The Hindu

ECOWAS

- The Heads of State and Government of fifteen West African Countries established the Economic Community of West African States (ECOWAS) when they signed the ECOWAS Treaty on the 28th of May 1975 in Lagos, Nigeria.
- The Treaty of Lagos was signed by the 15 Heads of State and government of Benin, Burkina Faso, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sierra Leone, Sénégal and Togo, with its stated mission to promote economic integration across the region. The Senegalese President

was represented by the Minister for Foreign Affairs. Cabo Verde joined the union in 1977.



- The only Arabic-speaking Member Mauritania withdrew in December 2000.
- Mauritania recently signed a new associate-membership agreement in August 2017.
- The ECOWAS region, which spans an area of 5.2 million square kilometres.

- The Member States are Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Sénégal and Togo.
- Considered one of the pillars of the African Economic Community, ECOWAS was set up to foster the ideal of collective self-sufficiency for its member states.
- As a trading union, it is also meant to create a single, large trading bloc through economic cooperation.
- Integrated economic activities as envisaged in the area that has a combined GDP of \$734.8 billion, revolve around but are not limited to industry, transport, telecommunications, energy, agriculture, natural resources, commerce, monetary and financial issues, social as well as cultural matters.
- In 2007, the ECOWAS Secretariat was transformed into a Commission.
- The Commission is headed by the President, assisted by a Vice President, thirteen Commissioners, and the Auditor-General of ECOWAS Institutions, comprising experienced bureaucrats who are providing the leadership in this new orientation.
- As part of this renewal process, ECOWAS is implementing critical and strategic programmes that will deepen cohesion and progressively eliminate identified barriers to full integration.
- In this way, the estimated 300 million citizens of the community can ultimately take ownership for the realization of the new vision of moving from an ECOWAS of States to an "ECOWAS of the People: Peace and Prosperity to All". by 2050.
- The headquarters of ECOWAS is in Abuja, Nigeria.

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4. Weekly Mock test

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The Hindu

SAURABH PANDEY — CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

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Cardiopulmonary resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) is a lifesaving technique that's useful in many emergencies in which someone's breathing or heartbeat has stopped.

- For example, when someone has a heart attack or nearly drowns.
- The American Heart Association recommends starting CPR with hard and fast chest compressions.



The Hindu

Weather forecast



Why weather forecasts still go wrong

IMD's forecasts have improved vastly in the last few years due to technological upgradation

- IMD currently operates only around 800 automatic weather stations, 1,500 automatic rain gauges, and 37 doppler weather radars
- Over 300,000 ground stations (either automatic weather stations or automatic rain gauges) and around 70 doppler weather radars are required for reliable weather forecast
- Several State governments and private companies together operate over 20,000 ground stations, many of which are not currently used by IMD
- New ground stations need to be installed by IMD and the available data need to be shared seamlessly with IMD to improve the accuracy of forecasts
- The Ministry of Agriculture & Farmers Welfare has initiated the WINDS system to generate long-term, hyperlocal weather data
- Under the WINDS programme, over 200,000 ground stations will be installed

Slips: Indian forecasts are not accurate especially during winter and summer monsoon

IMD GETS A HELPING HAND



FOR BETTER ACCURACY: Wind profiler installed in National Atmospheric Research Laboratory (NARL), Gadanki

- The India Meteorological Department will install wind profilers at nine locations in the country, including Chennai, Delhi, Mumbai and Kolkata
- The Indian Space Research Organisation will design and develop these wind profilers
- The wind profiler can measure wind speed, direction, temperature, and humidity up to troposphere (17km above sea level)
- The instrument uses microwave signals to measure the parameters at different altitudes up to the troposphere
- The data will help improve weather forecast accuracy and track the movement of cyclones
- Indigenous wind profilers will eventually replace imported radiosonde instruments attached to weather balloons
- Isro has a wind profiler installed in National Atmospheric Research Laboratory, Gadanki near Tirupati

- One of the major hurdles is the lack of weather monitoring ground stations

- Currently, most of the prediction software used in forecasting are based on the global forecasting system and weather research and forecasting models, both of which are not the most modern

- A promising step forward was that recently, the Department of Agriculture & Farmers Welfare and the Ministry of Agriculture & Farmers Welfare have initiated the weather information network and data system (WINDS) to generate long-term, hyper-local weather data.

- The system will also promote the data for wider applications in agriculture and other sectors, it will

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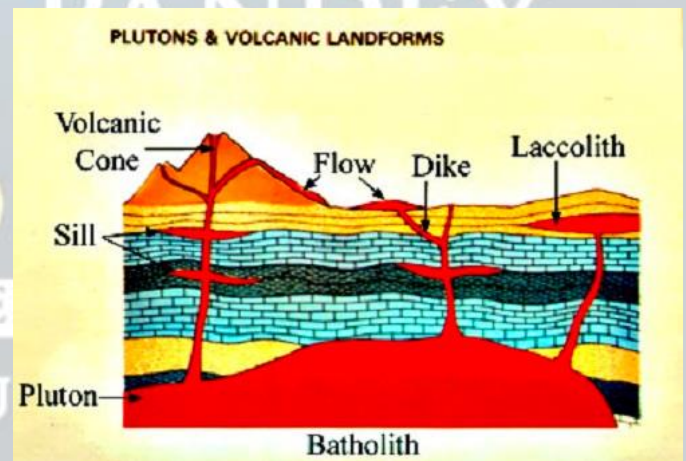
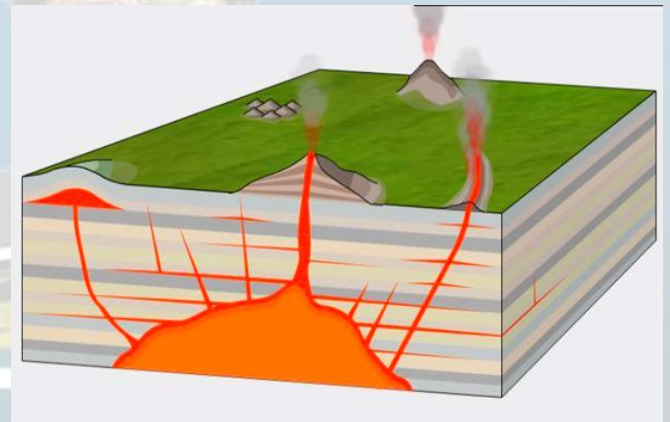
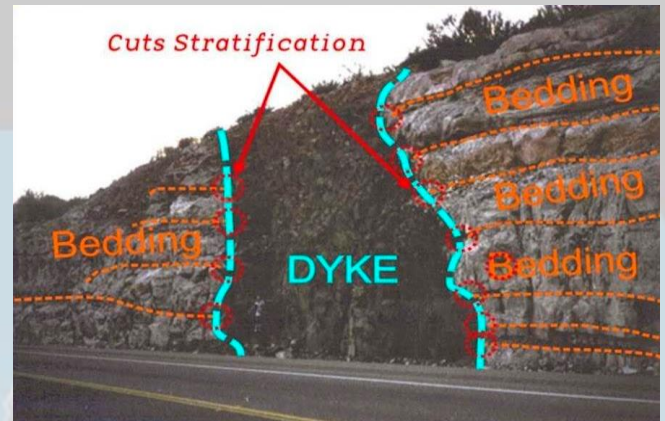
help in creating a national-level data base, and it will assist in establishing the protocols required to access the country-wide data by the various public and private concerns.

- Under this programme, more than 200,000 ground stations (AWS and ARG) will be installed, which can help in enhancing weather data utilization and thus in improving weather predictions and decision making.

• The Hindu

Dike & Grindavík, Iceland

- The 15-km-long magma dike that formed beneath Grindavík, Iceland, in November 2023 reached an unprecedented subsurface magma low rate of 7,400 cubic meters per second.
- The dike formation preceded the more recent Sundhnúkur eruptions in December 2023 and January 2024.
- The study shows how tectonic stress can drive magma low into dikes with only modest overpressure in the feeding magma body.
- The measurement of such low rates provides insight into the formation of major dikes.



Grindavík is a currently abandoned fishing town on the Southern Peninsula of Iceland.



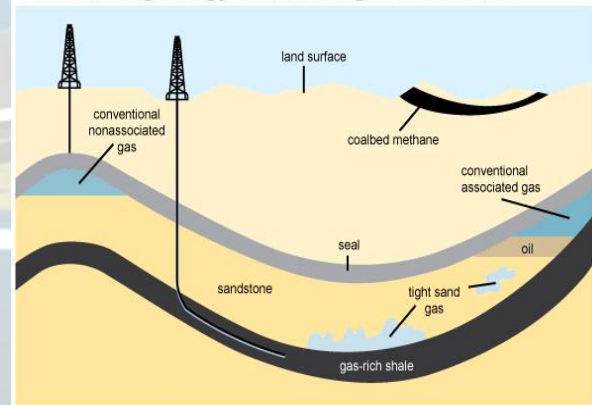
• The Hindu

Bulqizë chromium mine in Albania

- Direct measurements from deep within the Bulqizë chromium mine in Albania have revealed large quantities of outgassing natural hydrogen, researchers report, suggesting the presence of a faulted reservoir of the gas deeply rooted in the surrounding ophiolite massif.
- The Findings shed light on the geological contexts in which other natural hydrogen sources may be found.
- At least 200 tonnes of nearly pure hydrogen gas are released from the mine each year.



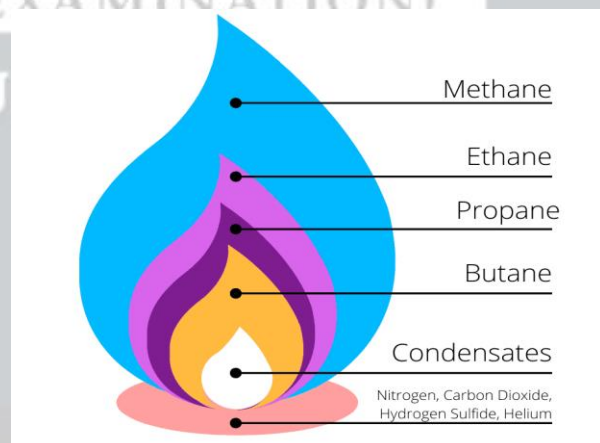
Schematic geology of natural gas resources



Source: Adapted from United States Geological Survey factsheet 0113-01 (public domain)

The Hindu

Natural gas composition



The Hindu

- **Human papillomavirus (HPV) and vaccine**

- The Cervavac vaccine is a quadrivalent vaccine that targets four HPV (Human papillomavirus) subtypes 6, 11, 16, and 18, and was compared with Gardasil vaccine which contains the same four HPV subtypes.
- Serum Institute of India's human papillomavirus (HPV) vaccine Cervavac.
- Merck's Gardasil vaccine
- GARDASIL 9 helps protect individuals ages 9 to 45 against the following diseases caused by 9 types of HPV

The Hindu

Sturtian glaciation & Rodinia

- Australian geologists have used plate tectonic modeling to determine what most likely caused an extreme ice-age climate in Earth's history, more than 700 million years ago.
- The researchers have proposed that all-time low volcanic carbon dioxide emissions triggered the 57 million year-long global 'Sturtian' ice age.
- The extended ice age stretched from 717 to 660 million years ago, a period well before the dinosaurs and complex plant life on land existed.

- The team went back to a plate tectonic model that shows the evolution of continents and ocean basins at a time after the breakup of the ancient supercontinent Rodinia.

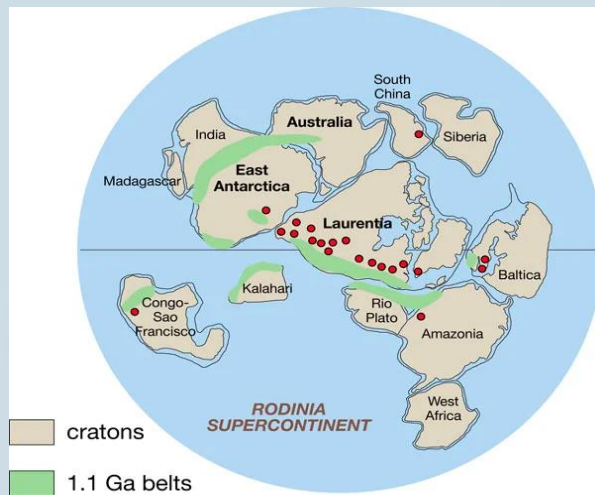
The Sturtian glaciation

- The Sturtian glaciation was a worldwide glaciation during the Cryogenian Period when the Earth experienced repeated large-scale glaciations.
- As of January 2023, the Sturtian glaciation is thought to have lasted from c. 717 Ma to c. 660 Ma, a period of approximately 57 million years.
- It is hypothesized to have been a Snowball Earth event, or contrastingly multiple regional glaciations, and is the longest and most severe known glacial event preserved in the geologic record, after the much earlier Huronian glaciation.

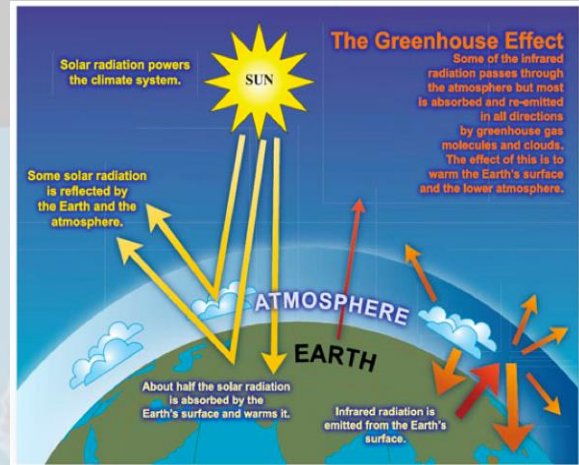
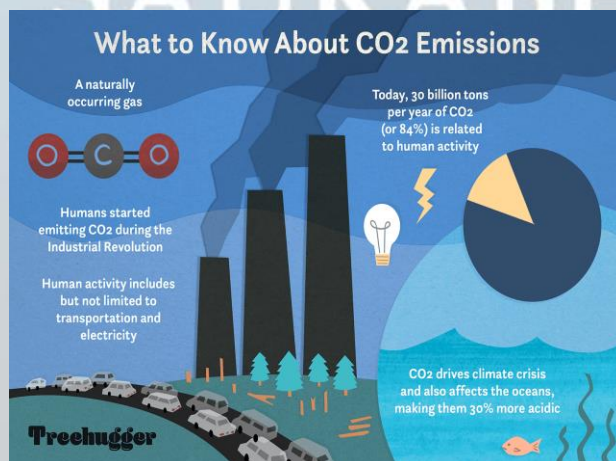
Rodinia

- Rodinia was a Mesoproterozoic and Neoproterozoic supercontinent that assembled 1.26–0.90 billion years ago and broke up 750–633 million years ago.
- Valentine & Moores 1970 were probably the first to recognise a Precambrian supercontinent, which they named 'Pangaea I'.

It was renamed 'Rodinia' by **McMenamin & McMenamin 1990** who also were the first to produce a reconstruction and propose a temporal framework for the supercontinent.



About co2



- **Water (Prevention and Control of Pollution) Amendment Act, 2024.**
- **The Lok Sabha this week passed the Water (Prevention and Control of Pollution) Amendment Act, 2024.**
- **The legislation, which was introduced and passed in the Rajya Sabha on February 5, makes important changes to the Water (Prevention and Control of Pollution) Act, 1974.**

What is the Water (Prevention and Control of Pollution) Act, 1974?

- **This Act was the first piece of legislation in independent India that identified the need to have an institutional structure to address contamination of water bodies.**
- **This led to the creation, in September 1974, of the Central Pollution Control Boards (CPCB) and State Pollution Control Boards (SPCB) that were charged with monitoring and preventing public water**

resources from getting contaminated by sewage and industrial effluents.

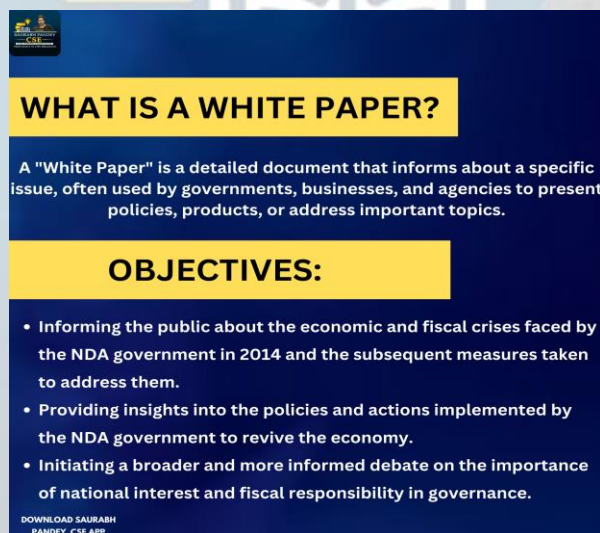
India having been imprisoned due to environmental violations.

- This Act made it mandatory for industrial units to get permission from their respective State boards before setting up factories and submitting themselves to checks on whether their manufacturing and other processes were complying with prescribed norms.
 - “The Parliament of India in its wisdom enacted the Water (Prevention and Control of Pollution) Act in 1974 with a view to maintaining and restoring wholesomeness of our water bodies.
 - One of the mandates of the Central Pollution Control Board (CPCB) is to collect, collate and disseminate technical and statistical data relating to water pollution,” the website of the CPCB notes.
 - While the CPCB is empowered to conduct checks and provide guidance on technical standards to be adhered to, the SPCB files cases and is expected to enforce compliance.
 - Violating the provisions of the Water Act can mean industries being shut down; monetary fines as well as imprisonment of up to six years.
 - That said, there have been no instances of companies or people in
- **What are the amendments?**
 - Water is a State subject, and the Centre cannot directly pass legislative laws influencing water management.
 - However, the Centre can create legislation, if two or more States demand it, and this can be made applicable by States over their territories if they adopt the legislation in their Assemblies.
 - The amended version of the Act, passed by both Houses of Parliament, will currently apply to Himachal Pradesh and Rajasthan and the Union territories.
 - The original Act, passed in 1974, is applicable in 25 States.
 - The most important change is that it removes the provisions of imprisonment for several violations, deemed “minor”, and replaces them with ones, to the tune of ₹10,000 extending up to ₹15 lakh.
 - As per the original Act, the SPCB’s permission is needed for establishing any industry or treatment plant, which could discharge sewage into a water body, sewer, or land.

- In the amendment, the Bill specifies that the Centre, "... in consultation with the CPCB, may exempt certain categories of industrial plants from obtaining such consent...."
- However, operating or establishing an industrial unit without SPCB consent can still land you in jail for six years along with a fine.
- The Bill also adds that the Centre may issue guidelines for the grant, refusal, or cancellation of consent granted by the SPCB.
- It also penalizes tampering with monitoring devices used in determining whether any industry or treatment plant can be set up.
- The penalty will be between ₹10,000 and ₹15 lakh.
- The amended Act also empowers the Centre to frame rules to select the chairpersons of SPCBs and frame guidelines that States can follow on matters for establishing industries and new operating processes.

The Hindu

White paper



The Hindu

Paleo proxies

- A new study, published on February 5 in Nature, has added fuel to there of the threshold-crossing controversy.
- Based on estimates of warming from palaeo-thermometry, scientists from

Australia and the U.S. have said that the earth's surface has already warmed by more than 1.5 degrees C on average over pre-industrial levels.

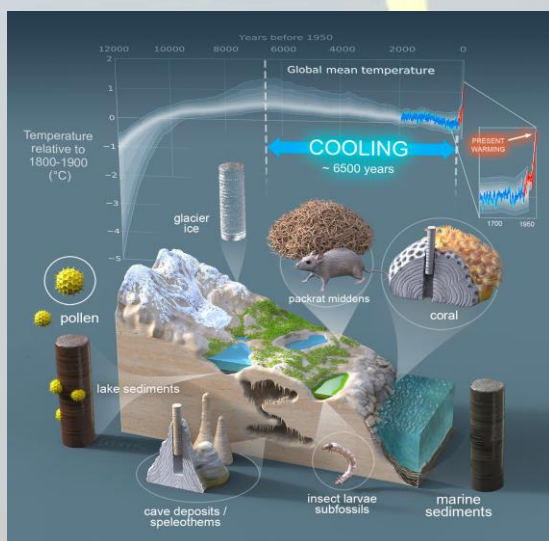
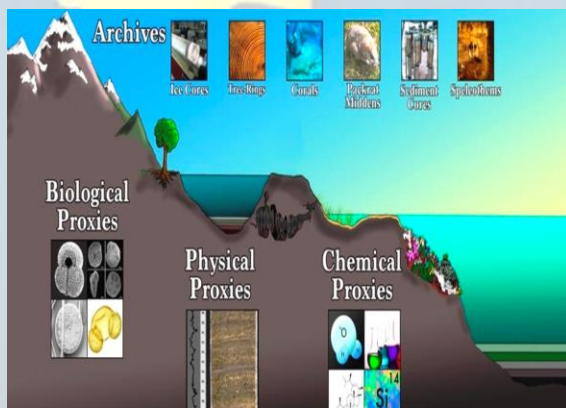
- A major caveat of the study is that the scientists have collected warming data from only one location and have extrapolated it to be indicative of the global mean temperature trend.
- This said, these so-called 'palaeo proxies' constitute an amazing technique that uses chemical evidence stored in various organic matter, such as corals, stalactites, and stalagmites, to approximate the temperature at some point in the past.
- But just as insightful as this chemical evidence can be, we should remember that it is still only indirect evidence of temperature changes with respect to a baseline temperature.
- The evidence can't measure the actual overall temperatures.

What are paleo proxies data?

- In [paleoclimatology](#), or the study of past climates, scientists use what is known as proxy data to [reconstruct past climate conditions](#).
- These proxy data are preserved physical characteristics of the

environment that can stand in for direct measurements.

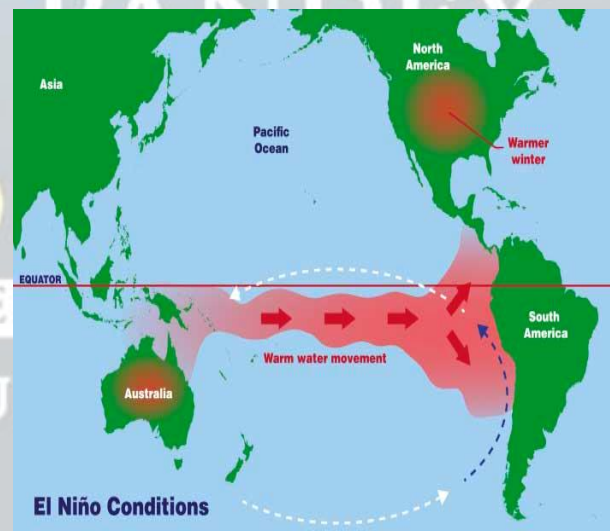
- Paleo climatologists gather proxy data from natural recorders of climate variability such as corals, pollen, ice cores, tree rings, caves, pack rat middens, ocean and lake sediments, and historical data. By analyzing records taken from these and other proxy sources, scientists can extend our understanding of climate far beyond the instrumental record.



The Hindu

El Niño as a warming paradigm

- The tropical Pacific Ocean keeps soaking up heat during normal and La Niña years and belches it out in an El Niño year.
- This causes a mini global warming, with consequences at distant locations the so-called teleconnections; the latter is what tells us that the pattern of warming really matters.
- Depending on whether warming due to an El Niño is in the eastern Pacific Ocean or closer to the international date line, the impacts on the monsoon and the other parts of the world can be very different.



- An added difficulty is that the El Niño teleconnections themselves also modify the warming pattern.
- As a result, droughts can have a stronger feedback that affects

temperature than floods in many instances.

- The massive deluges that California is experiencing this winter are driven by the El Niño but likely amplified by global warming.
- The amounts of rain and snow will subsequently feedback to local and global temperatures. These same processes work in the global warming regime as well.
- As human-made greenhouse gases initiate the warming, the warming pattern is applied in the Arctic and over the desert regions of the Middle East but damped over the eastern Pacific and the northern Atlantic oceans.
- These local warmings and coolings and their magnitudes determine the net effect of natural variability and global warming in a particular locality.

- The Hindu

Brumation

What is Brumation?

- This is the name to describe a period of dormancy or slowed activity in reptiles, much like hibernation in mammals.

- It typically occurs during colder months, when temperatures drop and food becomes scarce. Reptiles enter a state of brumation to conserve energy and survive these adverse environmental conditions.
- During brumation, reptiles may retreat to underground burrows, rock crevices or other sheltered areas where temperatures are relatively more stable.



- Their metabolism slows significantly, allowing them to go weeks or even months without eating.
- This period of reduced activity allows reptiles to conserve energy and minimise their resource requirements.
- Researchers have observed instances of brumation in various reptilian species across habitats.
- Such species include box turtles and painted turtles, which burrow into

the mud at the bottom of ponds or lakes.

- Snakes may seek refuge in underground dens or caves while lizards may hide under rocks or within vegetation.
- Brumation is crucial for reptiles to survive cold climes and endure challenging environmental conditions until they can reemerge to feed and reproduce in more favourable climes.



[Italy](#), [Luxembourg](#), the [Netherlands](#), [Norway](#), [Portugal](#), the [United Kingdom](#), and the [United States](#). Joining the original signatories were [Greece](#) and [Turkey](#) (1952); [West Germany](#) (1955; from 1990 as [Germany](#)); [Spain](#) (1982); the [Czech Republic](#), [Hungary](#), and [Poland](#) (1999); [Bulgaria](#), [Estonia](#), [Latvia](#), [Lithuania](#), [Romania](#), [Slovakia](#), and [Slovenia](#) (2004); [Albania](#) and [Croatia](#) (2009); [Montenegro](#) (2017); [North Macedonia](#) (2020); and [Finland](#) (2023). France withdrew from the [integrated](#) military command of NATO in 1966 but remained a member of the organization; it resumed its position in NATO's military command in 2009.

- The heart of NATO is expressed in Article 5 of the North Atlantic Treaty, in which the signatory members agree that

The Hindu

NATO

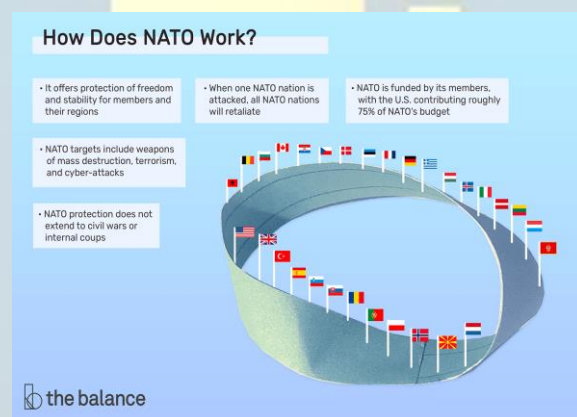
- North Atlantic Treaty Organization (NATO), a military alliance established by the North Atlantic Treaty (also called the Washington Treaty) of April 4, 1949, which sought to create a counterweight to [Soviet](#) armies stationed in central and eastern Europe after [World War II](#).
- Its original members were [Belgium](#), [Canada](#), [Denmark](#), [France](#), [Iceland](#),

- *An armed attack against one or more of them in Europe or [North America](#) shall be considered an attack against them all; and consequently they agree that, if such an armed attack occurs, each of them, in exercise of the right of individual or [collective](#) self-defense recognized by Article 51 of the Charter of the United Nations, will assist the Party or Parties so attacked by taking forthwith, individually and in concert with the other Parties, such action as it deems*

necessary, including the use of [armed force](#), to restore and maintain the security of the North Atlantic area.

mandate, alone or in cooperation with other countries and international organisations.

- NATO [invoked](#) Article 5 for the first time in [2001](#), after the [September 11 attacks](#) organized by exiled Saudi Arabian millionaire [Osama bin Laden](#) destroyed the [World Trade Center](#) in [New York City](#) and part of the [Pentagon](#) outside Washington, D.C., killing some 3,000 people...



- **POLITICAL** – NATO promotes democratic values and enables members to [consult](#) and cooperate on defence and security-related issues to solve problems, build trust and, in the long run, prevent conflict.
- **MILITARY** – NATO is committed to the peaceful resolution of disputes. If diplomatic efforts fail, it has the military power to undertake crisis-management operations. These are carried out under the collective defence clause of NATO's founding treaty [Article 5 of the Washington Treaty](#) or under a United Nations

The Hindu



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FROM BASICS TO UPSC BRILLIANCE

Governor customary address

Governor's Address to the State Legislature:

- **Article 176 of the Constitution**
 - At the commencement of the first session after each general election to the Legislative Assembly and at the commencement of the first session of each year, the Governor shall address the Legislative Assembly and inform the Legislature of the causes of its summons.
 - In the case of a State having a Legislative Council, both Houses assembled together.
 - Provision shall be made by the rules regulating the procedure of the House or either House for the allotment of time for discussion of the matters referred to in such address.
- The Governor's customary address to the legislature at the first session of every year is being increasingly politicised.
- Anyone who understands the Governor's role in a parliamentary democracy will know that it is the one declining to read out the address prepared by an elected government who reduces the address to a travesty.
- Governments are run by parties that contest elections on a political platform, and it is only to be expected that they would seek to trumpet their achievements, real or exaggerated, in policy statements.
- It is the role of the political opposition and the people to judge the content of the address and not that of the Governor.
- A simple test to ascertain the tenability of Mr. Ravi's claim that he declined to read out the customary address on factual and moral grounds.
- it is not constitutionally sustainable to claim that the Governor's address should contain no criticism of the Centre or make no policy pronouncements against the Centre's policies.
- The larger issue is still the propensity of Governors to act as political agents of the ruling party at the Centre.
- It is an unfortunate feature of India's constitutional system that the country is never short of grey eminences eager to occupy the gubernatorial office, but once appointed, they are equally eager to enter the political thicket.
- The Hindu

Delhi declaration on gender equality



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G. Gender Equality and Empowering All Women and Girls

63. The G20 reaffirms that gender equality is of fundamental importance, and that investing in the empowerment of all women and girls, has a multiplier effect in implementing the 2030 Agenda.

Enhancing Economic and Social Empowerment

64. We encourage women-led development and remain committed to enhancing women's full, equal, effective, and meaningful participation as decision makers for addressing global challenges inclusively and in contributing as active participants in all spheres of society, across all sectors and at all levels of the economy, which is not only crucial for achieving gender equality, but also for contributing to global GDP growth. To this end, we:

- Reaffirm our commitment to achieving the Brisbane Goal to reduce the gap in labour force participation and implementing the G20 Roadmap Towards and Beyond the Brisbane Goal '25 by 25' and ask the ILO and OECD to report progress annually.
- Ensure equal access to affordable, inclusive, equitable, safe and quality education from early childhood through higher education to lifelong learning and support the greater enrolment, participation and leadership of all women and girls, including those with disabilities, in STEM fields and in emerging digital technologies.
- Take steps to promote the full and meaningful participation of women in a transitioning world of work by enabling inclusive access to employment opportunities, with a focus on closing the gender pay gap and ensuring women's equal access to decent work and quality jobs.

- Promote investment in the availability and accessibility of social protection, and to affordable care infrastructure to address the unequal distribution in paid and unpaid care and domestic work and to promote the continued participation of women in education and employment.
- Commit to eliminate gender-based violence including sexual violence, harassment, discrimination and abuse against women and girls both online and offline, and ensure safe workplaces in this regard.
- Promote women's inclusion into the formal financial system by strengthening their access to economic resources, particularly through digital finance and microfinance.
- Eliminate gender stereotypes and biases, and change norms, attitudes and behaviours that perpetuate gender inequality.

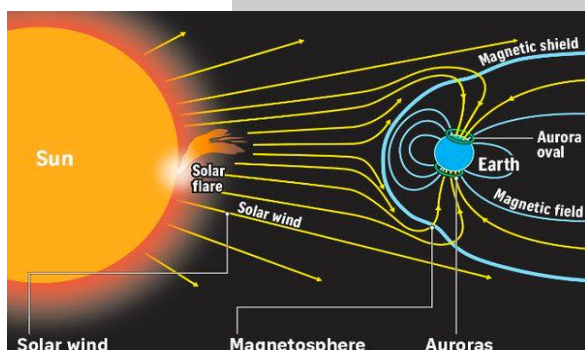
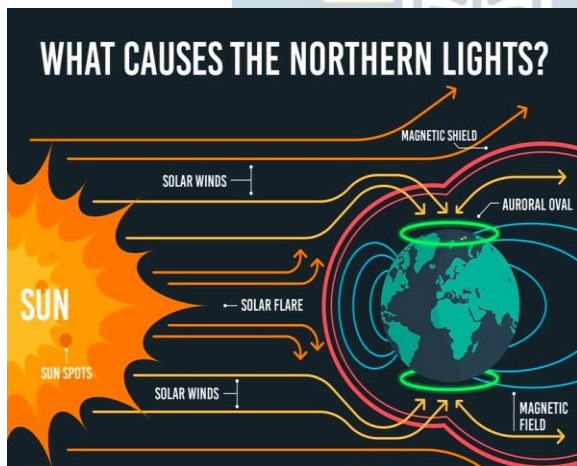
CES EXAMINATION)
TO UPSC BRILLIANCE

Auroras

Shades of the north



Vast canvas: Aurora borealis, commonly called the northern lights, illuminate the sky above the village of Akaslopolo in Kolari, beyond the Arctic Circle, in Finland on Sunday. AP



The Hindu

Event horizon telescope, event horizon, and Gravitational lensing



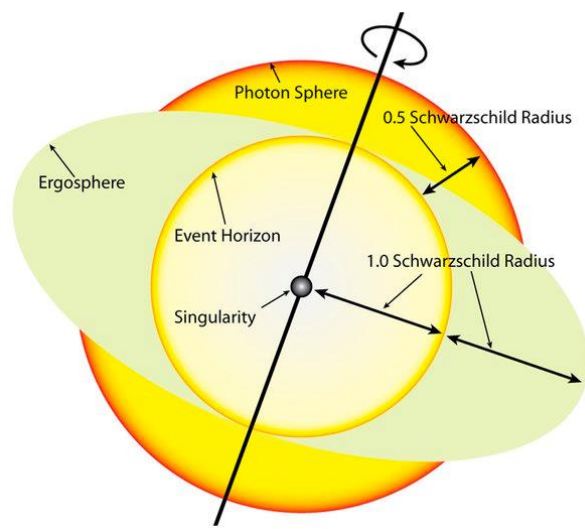
Event Horizon telescope

- The Event Horizon Telescope (EHT) Collaboration is a group of observatories united to image the emission around supermassive black holes.
- The Event Horizon Telescope (EHT) is a large [telescope array](#) consisting of a global network of [radio telescopes](#).
- The project's observational targets include the two [black holes](#) with the largest [angular diameter](#) as observed from Earth: the black hole at the center of the [supergiant elliptical galaxy Messier 87](#) and [Sagittarius A*](#) at [the center](#) of the [Milky Way](#)
- The Event Horizon Telescope project is an international collaboration that was launched in 2009 after a long period of theoretical and technical developments.

- The collaboration now comprises over 300 members, and 60 institutions, working in over 20 countries and regions.

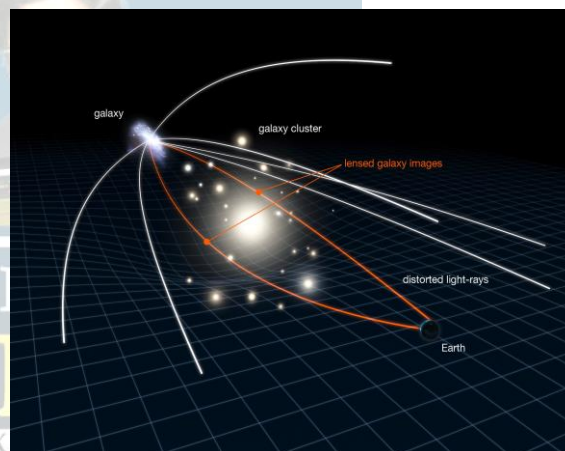
What is event Horizon?

- The event horizon is the spherical outer boundary of a black hole loosely considered to be its "surface."
- It is the point, according to NASA, that the gravitational influence of the black hole becomes so great that not even light is fast enough to escape it.
- As a result of the fact that Albert Einstein's theory of special relativity tells us that no signal can exceed the speed of light in a vacuum (c) humanity can never hope to obtain a signal from the one-way boundary that is an event horizon.



- **What is gravitational lensing??**

- It occurs when a massive celestial body, such as a galaxy cluster, causes a sufficient curvature of spacetime for the path of light around it to be visibly bent, as if by a lens.
- The body causing the light to curve is accordingly called a gravitational lens. An important consequence of this lensing distortion is magnification, allowing us to observe objects that would otherwise be too far away and too faint to be seen.



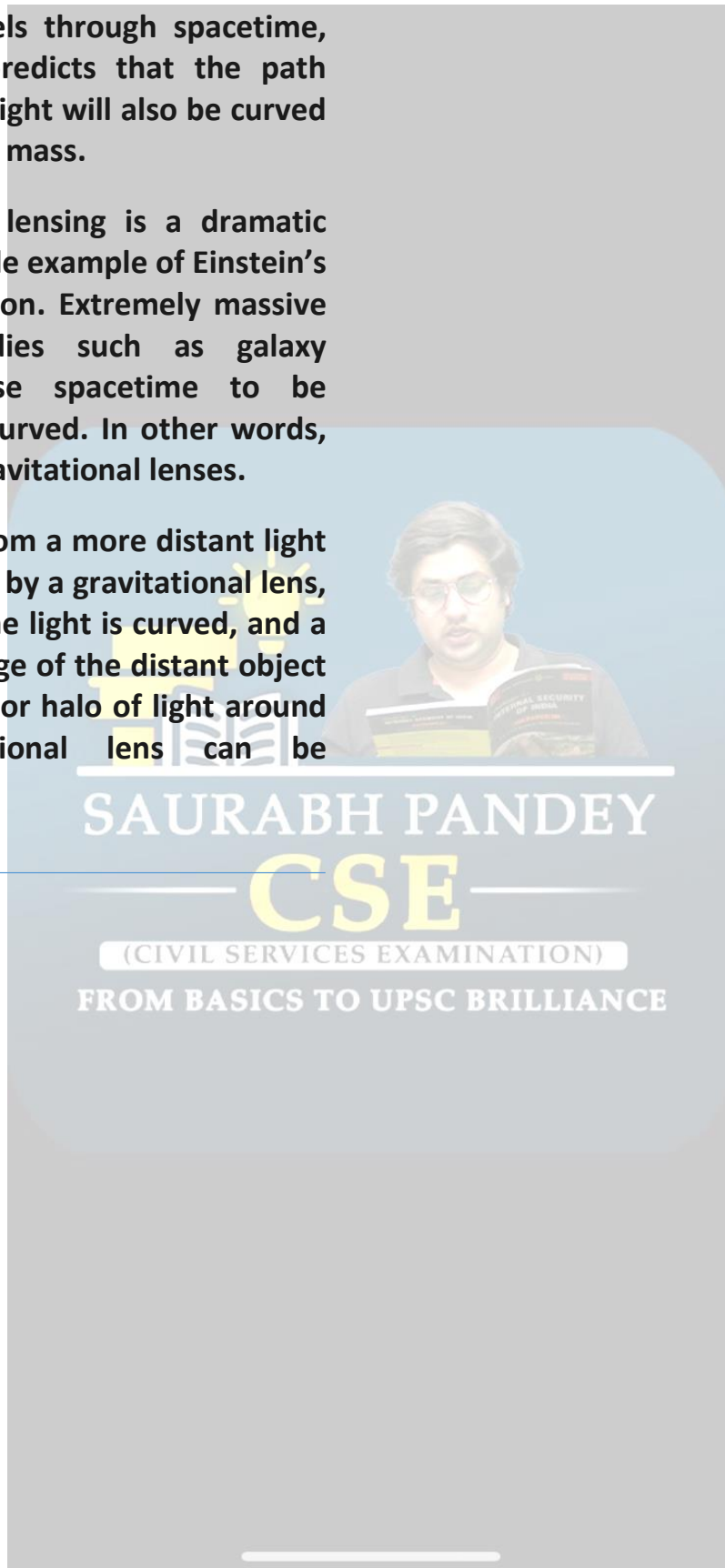
- a. Gravitational Lensing was first predicted in 1915 by Albert Einstein, which involves the bending of light by objects of great mass.
- b. According to Einstein's general theory of relativity, time and space are fused together in a quantity known as spacetime.
- c. Within this theory, massive objects cause spacetime to curve, and gravity is simply the curvature of spacetime.

As light travels through spacetime, the theory predicts that the path taken by the light will also be curved by an object's mass.

Gravitational lensing is a dramatic and observable example of Einstein's theory in action. Extremely massive celestial bodies such as galaxy clusters cause spacetime to be significantly curved. In other words, they act as gravitational lenses.

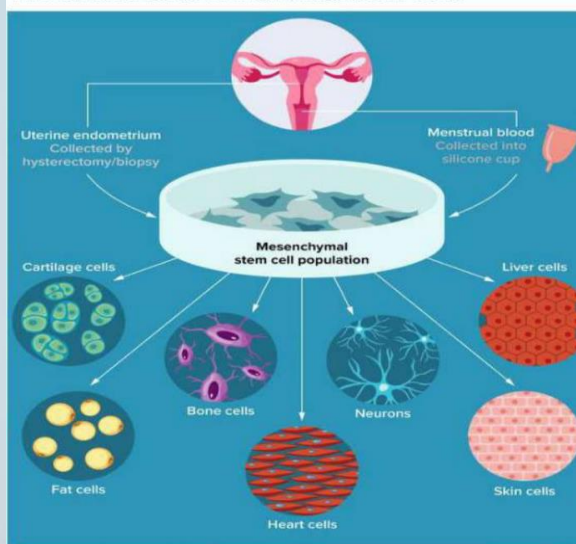
When light from a more distant light source passes by a gravitational lens, the path of the light is curved, and a distorted image of the distant object maybe a ring or halo of light around the gravitational lens can be observed.

The Hindu



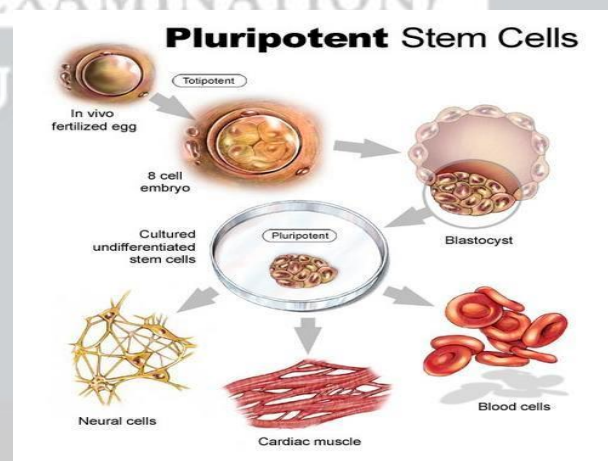
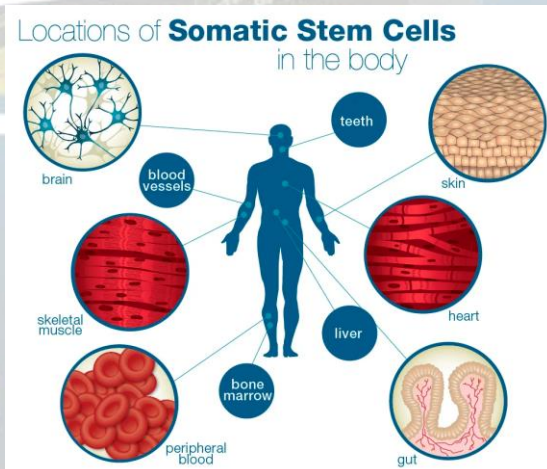
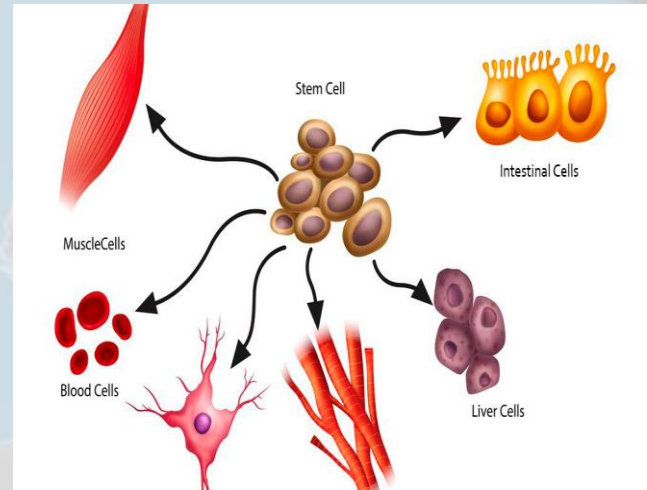
Endometrium

- The endometrium is the inner lining of your uterus. This tissue is what shed during a menstrual period.
- Think of endometrium as layers of tissue that build up along the inside lining of the uterus.
- When you have a period, these layers fall away from the walls of your uterus and leave your body.



- Researchers had long hypothesised that the endometrium contained stem cells, given its remarkable capacity to regrow itself each month.
- The tissue, which provides a site for an embryo to implant during pregnancy and is shed during menstruation, undergoes roughly 400 rounds of shedding and regrowth before a woman reaches menopause.
- Such cells are highly valued for their potential to repair damaged tissue and treat diseases such as cancer and heart failure.

- But they exist in low numbers throughout the body and can be tricky to obtain, requiring surgical biopsy, or extracting bone marrow with a needle.



Why autoimmune disease??

- Several factors can cause autoimmune disease such as environmental factors, genetics, hormonal imbalance and lifestyle habits.
- However, since women are more susceptible to these diseases, scientists previously thought that it could be related to sex hormones or faulty regulation of the X chromosome.
- Now, a group of scientists have found a molecular coating that is found in half of the X chromosomes in women might be the reason behind this phenomenon.
- Human females (and most mammals) contain two X chromosomes while the males of the species contain one X and one Y chromosome.
- The molecular coating of the X chromosome is a combination of RNA and proteins and is crucial to a process called X-chromosome inactivation which ensures that one set of X chromosomes is in.
- females remain active and functional in all the cells of the body while the other is muffled.

How is this achieved?

- The chromosome is wrapped in long strands of RNA called XIST that attract proteins and tamp down the expression of the gene inside.
- However, not all genes are muffled in this manner and the ones that escape the X inactivation process are thought to be the cause of autoimmune diseases.
- Not only this, the XIST molecule too has been known to elicit inflammatory immune responses.

FRA vs WLPA ACT

- In 1990, the Union Ministry of Environment and Forests (MoEF) had ordered that all forest villages be converted to revenue villages.
- The FRA, enacted 18 years ago, also required all forest villages to be converted to revenue villages.
- During conversion, “the actual land use of the village in its entirety, including lands required for current or future community uses, like schools, health facilities and public spaces,” were to be recorded as part of the revenue village.

What does the WLP Act 1972 provide?

- Sanctuaries and national parks are notified under the Wildlife (Protection) Act (WLPA) 1972.
- People inside sanctuaries continue to enjoy all their rights unless prohibited, but they don't in National Parks.
- No new rights are permitted once the notice of intent is issued.
- The Collector is to inquire into the rights of all persons, their nature and extent, in the proposed sanctuary or national park.
- Then, the Collector's office has to decide whether to admit the claims in sanctuaries and acquire all rights in national parks.
- The law mandates similar procedures when some land is initially notified as forest. But governments have not followed them.
- In 2006, the Indian government enacted the FRA to explicitly undo this “historical injustice” resulting from the inadequate recognition of “forest rights on ancestral

lands and their habitat in the consolidation of State forests during the colonial period as well as in independent India”.

- The FRA requires and authorises the gram sabhas to determine and recognise forest rights, and protect and preserve the forests, wildlife, and biodiversity within their customary and traditional boundaries, including inside Protected Areas. These responsibilities were earlier vested with the Forest Department.

Rights for the dwellers

What the Forest Rights Act, 2006, entails

- Tenurial security over the forestland under occupation prior to December 13, 2005
- Recognition of community right over forest and forest products
- Protection and conservation of community forest resources
- Conversion of all forest villages and habitation located inside the forestland into revenue villages
- In situ rehabilitation of displaced persons evicted without compensation prior to December 13, 2005
- Recognition of ancestral domain (habitat) right to



Residents of Gunduribadi village in Odisha's Nayagarh district get ready for mapping their land boundaries for the Forest Rights Act implementation. • SPECIAL ARRANGEMENT

Particularly Vulnerable Tribal Groups

- Conversion of all leases granted by erstwhile governments, zamindars and king into permanent land records
- Seasonal access to nomadic, pastoral and semi-nomadic communities over forestland

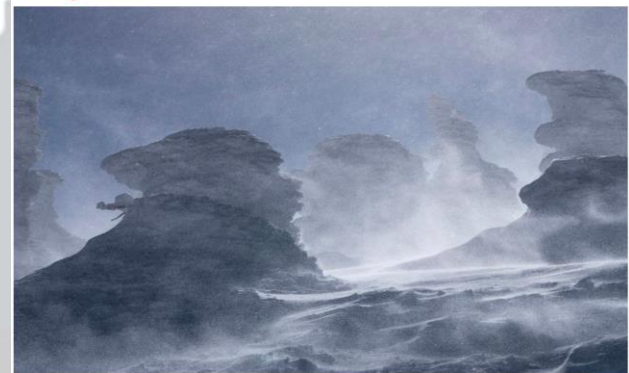
How do FRA and WLPA compare?

- Being a later law, the FRA overrides the WLPA. All provisions in the WLPA that contravene provisions in the FRA are null and void.
- As a result, when notifying a Protected Area under the WLPA, the government needs to determine rights under the FRA and acquire the consent of the gram sabhas.
- The government specifically incorporated these requirements in a 2006 amendment vis-à-vis the notification of tiger reserves.
- The FRA became operational when its Rules were notified in January 2008.

Armenia vs Azerbaijan



Beauty in the 'beast'



The Jufyo (snow monsters) on Mount Zao in Japan on Tuesday. A mix of snow, strong winds, and low temperatures traps trees in layers of snow and ice, forming the shape of snow-covered trees. The distribution of 'snow monsters' is shrinking due to global warming. GETTY IMAGES

The Juhyo (snow monsters) on Mount Zao in Japan on Tuesday. A mix of snow, strong winds, and low temperatures traps trees in layers of snow and ice, forming the shape of snow-covered trees. The distribution of 'snow monsters' is shrinking due to global warming. GETTY IMAGES

- Winter conditions at the summit of Mount Zao, a volcano standing between Japan's Yamagata and Miyagi prefectures, can conjure up "creatures" of snow and ice, built up over tree trunks and branches.
- Windblown ice is covered by snow in repeated cycles, building hulking shapes on the mountain slopes.
- These famous *Juhyo*, or "snow monsters," attract visitors to Mount Zao from the end of January through mid-March.
- The Sri Lankan Cabinet has decided to amend the Online Safety Act after it came under attack for stifling dissent and harming the potential growth of the country's digital economy.
- However, when it was decided yesterday to go for an amendment, it was not stated which clauses of the Act would be amended,
- The legislation, accepted in January, would have led to the establishment of the Online Safety Commission, which would have been empowered to make punitive rulings on offenses.
- A false statement online would be liable, if convicted, to imprisonment for a term not exceeding five years or to a fine not exceeding five hundred thousand Sri Lankan rupees.

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Constraint for industrialization in India

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The constraint for industrialization India??


- First, employment elasticity of services-led growth is poor.
- Second, early investments in higher education contributed to the near abandonment (act of abandoning something) of mass school education
- Third, the returns to education differ across classes and social groups.
- A culture of growth also requires the revaluation of labour, production, and technology.
- Certain skills are not valued even if they command higher wages. Artisanal knowledge doesn't enjoy as much social respect as scholasticism or metaphysical abstraction.
- Increasing returns and efficiency come from innovation and its diffusion, which

The Hindu 14th February 2024 by SP Sir

are based on mass education and collective absorptive capacity.

- India needs deep industrialization, not just the service sector, that has the power of changing the foundations of society.

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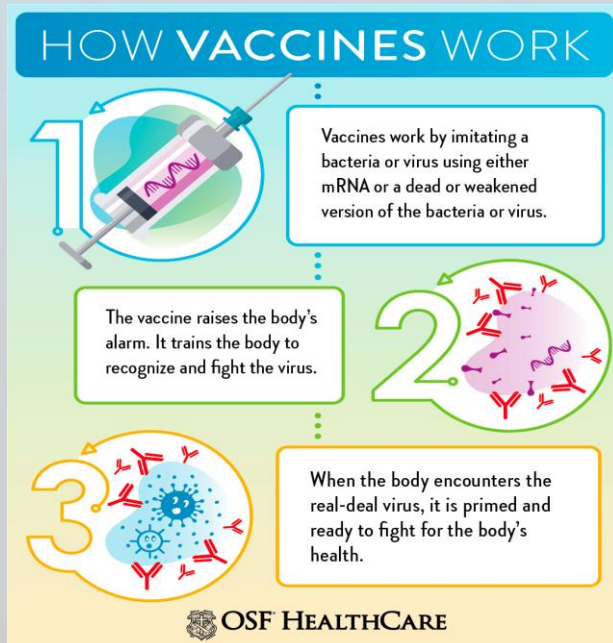
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FROM BASICS TO UPSC BRILLIANCE

Vaccine efficacy

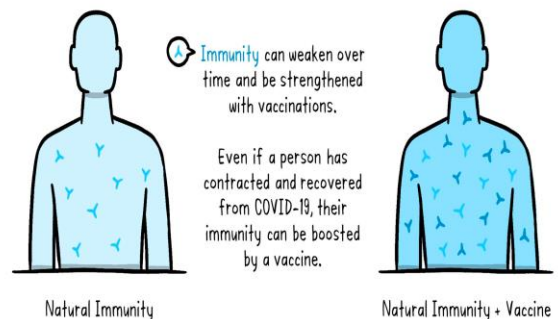
- Researchers update the composition of influenza vaccines every six months to match the strains of the virus that are circulating in the wild, so that the shots may provide protective immunity against the flu.
- But despite their best efforts, researchers rarely perfectly match the strains loaded in the vaccine with the strains circulating by the time the vaccines reach the market.
- The reason for this is the long gestation period usually at least six months between identifying the circulating strain and the development, manufacturing, and distribution of the vaccines.



- By the time the updated flu vaccine is available, the circulating strain may have drifted from the one contained in the vaccine, thanks to the high mutational rates of influenza viruses.
- The 'match' between strains included in the vaccine and strains in circulation is the most important factor controlling the vaccine effectiveness (VE) of flu vaccines.

| Types of Vaccines | | | | |
|--|--|---|--|---|
| Live Attenuated (LAV) | Inactivated (Killed Antigen) | Subunit (Purified Antigen) | Toxoid (Inactivated Toxins) | RNA-Based |
| Tuberculosis Oral polio vaccine (OPV) Measles Rotavirus Yellow fever | Whole-cell pertussis (wP) Inactivated polio virus (IPV) | Acellular pertussis (aP) Haemophilus influenzae type B (Hib) Pneumococcal (PCV-7, PCV-10, PCV-13) Hepatitis B (HepB) | Tetanus toxoid (TT) Diphtheria toxoid | Non-replicating In vivo self-replicating In vivo dendritic cell non-replicating |
| Approved vaccines according to WHO | | | | Next-generation vaccines |

Do people who've already had the virus still need to be vaccinated?



Horseshoe crab

- Environmental groups petitioned the U.S. government seeking endangered species protection for the American horseshoe crab, a “living fossil” under threat from commercial harvests for bait and biomedical use as well as from habitat loss and climate change.
- These spine-tailed sea creatures, named for the shape of their body hells, were once a familiar sight to summer beachgoers along the U.S. mid-Atlantic and Gulf Coasts.
- But populations have crashed in recent decades, with spawning numbers down two-thirds from 1990 in the Delaware Bay estuary that was once their biggest stronghold, according to conservation groups.
- Research also shows their egg densities have fallen more than 80% in the past four decades.
- Those trends are tied to stress on other marine species that feed on their larvae and eggs, including the rufa red knot, a migratory shorebird whose own 2014 threatened-species listing cited horseshoe crab harvests as a contributing factor.
- Classified not as true crabs but as marine arthropods more closely related to spiders and scorpions, horseshoe crabs are among the

oldest living creatures on the earth, with fossils of their ancestors.



About Horseshoe crabs

- Horseshoe crabs have been around for more than 300 million years, making them even older than dinosaurs.
- They look like prehistoric crabs, but are actually more closely related to scorpions and spiders. The horseshoe crab has a hard exoskeleton and 10 legs, which it uses for walking along the seafloor.
- The body of the horseshoe crab is divided into three sections.
- Female horseshoe crabs are about one-third larger than the males. They can grow to be 18 to 19 inches (46 to 48 centimeters) from head to tail, while the males are approximately 14 to 15 inches (36 to 38 centimeters).
- The horseshoe crab species found around the United States (*Limulus polyphemus*) lives in the Atlantic

The Hindu 15th February 2024 SP Sir

Ocean along the North American coastline.

- Horseshoe crabs can also be seen along the East and Gulf coasts of the United States and Mexico.
- There are three other species of horseshoe crab worldwide, which are located in the Indian Ocean and in the Pacific Ocean along the coast of Asia.
- Horseshoe crabs utilize different habitats depending on their stage of development. The eggs are laid on coastal beaches in late spring and summer.
- After hatching, the juvenile horseshoe crabs can be found offshore on the sandy ocean floor of tidal flats.
- Threats to horseshoe crabs include habitat loss and overharvesting.
- Beach developments hinder horseshoe crab breeding. *Limulus polyphemus* is internationally listed as vulnerable.
- Boroujen also known as *Urjen*, or *Oorjen*) is a city in the Central District of Borujen County, Chaharmahal and Bakhtiari Province, Iran, and serves as capital of the county.
- The city is populated by Persians with a minority of Lurs and Turkic peoples.

- Borujen is well known for its extremely cold weather, usually mentioned as one of the coldest Iranian cities in national weather forecasts

• MSP advantages and disadvantages

• Disadvantages

MSP is devoid of any legal backing. Access to it, isn't an entitlement for farmers. They cannot demand it as a matter of right. The government can procure at the MSPs if it wants to. The only crop where MSP payment has some statutory element is sugarcane.

MSP has not increased in proportion to the cost of production.

CACP is just "an attached office of the Ministry of Agriculture and Farmers Welfare". It can recommend MSPs, but the decision on fixing and enforcement rests finally with the government.

Though government announces MSP for 23 crops, it procures only 1/3rd of those.

There is lack of awareness amongst farmers and there is regional variation in implementation.

It kills competition and puts pressure on government finances.

The system has been often criticised at WTO platform.

• Advantages

The minimum support prices are a guarantee price for their produce from the Government.

MSP is announced before the sowing season so that the farmers can make an informed decision.

The major objectives are to support the farmers from distress sales and to procure food grains for public distribution.

It ensures adequate food grain production in the country.

In case the market price for the commodity falls below the announced minimum price due to bumper production and glut in the market, government agencies purchase the entire quantity offered by the farmers at the announced minimum price.

MSP thus increases the farmers' income which they can invest in new technology.

It also helps in achieving the Government's goal of doubling farmers income by the year 2022.

EXPRESS explained. | **HOW ARE MSPs DETERMINED?**

The Centre fixes MSPs for every kharif and rabi cropping season based on recommendations of the Commission for Agricultural Costs and Prices (CACP)

● When a farmer grows a crop, he incurs costs, some of it explicit and some implicit or unpaid. The CACP considers the following costs:

| 1 | 2 | 3 |
|--|--|---|
| A2 | A2+FL | C2 |
| Covers all cash and in kind expenses incurred by farmers on seeds, fertilisers, chemicals, hired labour, fuel, irrigation, etc | Actual costs plus an imputed value of unpaid family labour | Includes 'A2+FL' along with revenues forgone on owned land (rent) and fixed capital assets (interest) |

#QUIXPLAINED

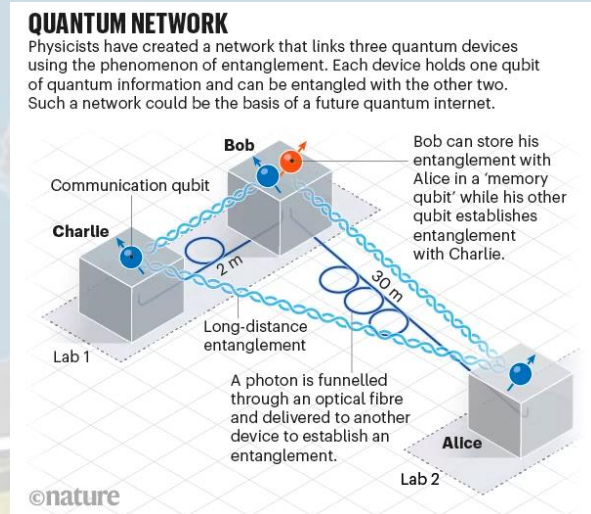
The Hindu

Gas flaring

- Gas flaring is the burning of the natural gas associated with oil extraction. The practice has persisted from the beginning of oil production over 160 years ago. It takes place due to a range of issues, from market and economic constraints, to a lack of appropriate regulation and political will.
- Flaring and venting are a waste of a valuable natural resource that should either be used for productive purposes, such as generating power, or conserved. For instance, the amount of gas currently flared each year about 139 billion cubic meters could power the whole of sub-Saharan Africa.

WHAT IS THE QUANTUM INTERNET?

- The quantum internet is a network that will let quantum devices exchange some information within an environment that harnesses the weird laws of quantum mechanics.



- Quantum entanglement is the phenomenon that occurs when a duet of particles are generated, interact, or share spatial proximity in such a way 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.

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Que-1 What is the Fujiwhara Effect?

- This is a phenomenon that occurs when two nearby cyclonic vortices move around each other and close the distance between the circulations of their corresponding low-pressure areas.
- The effect is named after Sakuhei Fujiwhara, the Japanese meteorologist who initially described the effect.
- There are two different ways in which Fujiwhara Effect can take place.

Which of the following given above is/are correct

a) 1 and 2 only b) 1 only
c) 1, 2 and 3 d) 2 and 3 only

Que-2 Consider the following statements about SHAKTI Policy

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Ladakh demand

- The protests were jointly organized by the Leh Apex Body (LAB) and Kargil Democratic Alliance (KDA), and saw men and women marching through the main city of Leh despite freezing temperatures.
- The LAB and KDA, representing the two regions of Ladakh, have been advocating for statehood and Sixth Schedule status since its conversion into a Union Territory.
- Protestors raised slogans calling for Ladakh's statehood, the implementation of the sixth schedule of the Constitution, and the establishment of separate parliamentary seats for Leh and Kargil districts.
- Ladakh transitioned into a Union Territory without a legislature following the abrogation of Articles 370 and 35A, leading to the bifurcation of Jammu and Kashmir into two Union territories on August 5, 2019.
- Residents of Ladakh have expressed dissatisfaction with prolonged bureaucratic rule in the Union Territory and assert that only full statehood, enabling them to elect their representatives to govern the region, can meet their demands.

THE CONSTITUTION OF INDIA (SCHEDULE – VI)

SIXTH SCHEDULE

[Articles 244(2) and 275(1)]

Provisions as to the Administration of Tribal Areas in 1[the States of Assam, Meghalaya, Tripura and Mizoram]

1. **Autonomous districts and autonomous regions.**—(1) Subject to the provisions of this paragraph, the tribal areas in each item of 3[4[Parts I, II and IIA] and in Part III] of the table appended to paragraph 20 of this Schedule shall be an autonomous district.
2. **Constitution of District Councils and Regional Councils.**—2[(1) There shall be a District Council for each autonomous district consisting of not more than thirty members, of whom not more than four persons shall be nominated by the Governor and the rest shall be elected on the basis of adult suffrage.]
(2) There shall be a separate Regional Council for each area constituted in an autonomous region under sub-paragraph (2) of paragraph 1 of this Schedule.
(3) Each District Council and each Regional Council shall be a body corporate by the name respectively of “the District Council of (name of district)” and “the regional Council of (name of region)”, shall have perpetual succession and a common seal and shall by the said name sue and be sued.

The Hindu

Kosovo and Schengen



Schengen Agreement



- Schengen Agreement signed on 14 June 1985, near the town of Schengen, Luxembourg.
- This treaty that led most of the European countries towards abolishment of their national borders, to build a Europe without borders known as “Schengen Area”
- Initially there were five European countries France, Germany, Belgium, Luxembourg, and Netherlands and now it increased to 26.
- Liechtenstein was the 26th and the last country so far to sign the Schengen Agreement and become part of the Schengen Area.



Why was Kosovo's application kept pending for years?

- The case of Kosovo is egregious given that the European Commission had in 2018 cleared Pristina's preparedness to tackle illegal migration and corruption, preconditions for entry.
- Arguably, the single biggest obstacle to the country's Schengen visa waiver was strong opposition from several EU members, who do not recognize the 2008 unilateral declaration of independence by the breakaway state from Serbia.
- Kosovo has not been accorded legal statehood by the UN and denied recognition by Russia and China.

Is admission to Schengen mandatory for EU members?

Yes and no.

- When the Schengen agreement took effect in 1995, only seven of the entire

15-member union at the time joined the passport-free area. Today, 23 of the 27 EU states are part of the passport-free zone, excluding Cyprus, Romania, Bulgaria and Ireland.

- But then, the Schengen area comprises 27 countries, including four non-EU members: Iceland, Liechtenstein, Switzerland and Norway.

The Hindu

Technical recession

What is a Technical Recession?

When the overall output of goods and services, as measured by GDP, falls from 1 quarter to the next, the economy is said to be in a technical recession.

Difference between Recession and Technical Recession

| Recession | Technical Recession |
|---|--|
| 1. If the recessionary phase lasts for an extended period of time, the economy is said to be in recession. | 1.If the GDP declines for two successive quarters, the economy is said to be in a technical recession. |
| 2. It lasts for a longer time period. | 2.It only lasts for a short time. |
| 3. To reach the state of recession, all aspects of the economy, including GDP, employment, and so on, are measured. | 3.Only GDP is used to assess technical recession. |

The Hindu

SC on electoral bond

- The Supreme Court pronounced its verdict on a batch of petitions challenging the validity of the

Electoral Bond scheme, which allows for anonymous funding to political parties.

- **1. SC strikes down electoral bonds scheme:**

- The top court struck down the electoral bonds scheme calling it unconstitutional.

- **2. Not the only means to curb black money in electoral financing:**

- The Supreme Court said infringement to the Right to Information is not justified for the purpose of curbing black money.

- "There are other alternatives which substantially fulfill the purpose and impact the right to information minimally when compared to the impact of electoral bonds on the right to information," SC said.

- **3. Electoral bond scheme volatile of freedom of speech and expression:**

- Pronouncing the verdict, the CJI said the scheme is violative of freedom of speech and expression under Article 19(1)(a) of the Constitution.

- The bench said the fundamental right to privacy includes citizens' right to political privacy and affiliation.

- **4. Advantage for party in power:**

- The Constitution bench held that the Electoral Bonds scheme will help the party in power to gain an advantage.

- "There is also a legitimate possibility that financial contributions to a political party would lead to a quid pro quo arrangement because of the close nexus between money and politics, SC said.

- **5. SBI ordered to stop issuing Electoral bonds immediately:** SC ordered the State Bank of India (SBI) to stop issuing Electoral Bonds immediately.

- The top court asked the SBI to furnish details of the political parties that received Electoral Bonds since April 12, 2019, and all the particulars received and submit them to the Election Commission of India by March 6.

What is an electoral bond?

- An Electoral Bond is an instrument like a promissory note or bearer bond which can be purchased by any individual, company, firm or association of persons provided the person or body is a citizen of India or incorporated or established in India.

- The bonds are issued specifically for the purpose of contribution of funds to political parties.

- Only the political parties registered under Section 29A of the Representation of the People Act, 1951 and which secured not less than 1 percent of the votes polled in the last elections to the Lok Sabha or a state legislative assembly are eligible to receive electoral bonds.

• Why food insecurity in Nigeria?



- With over 220 million people, Nigeria is the most populated country in Africa and the sixth in the world.
- It is the tenth-largest producer of crude oil in the world and achieved lower-middle-income status in 2014. However, around 84 million Nigerians, representing about 37 percent of the total population, live below the poverty line.
- Conflict and insecurity, rising inflation, and the impact of the climate crisis continue to drive hunger in Nigeria with 26.5 million

people across the country projected to face acute hunger in the June-August 2024 lean season.

- This is a staggering increase from the 18.6 million people food insecure at the end of 2023.
- Conflict in the North East region has displaced 2.2 million people and left another 4.4 million foods insecure in Borno, Adamawa, and Yobe states.
- Insurgent activities have added pressure to a fragile resource environment, deepened insecurity, hampered development, and heightened the food and nutrition insecurity of vulnerable women and children.

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Resolve Tibet act

- The House of Representatives has passed a Bill that will strengthen the efforts of the United States to push the Chinese government to resolve the longstanding Tibet-China dispute through dialogue with Tibetan leaders.
- It aims to pressure the Chinese government to resume negotiations with the Dalai Lama's envoys.



- The House of Representatives has passed a bill that aims to resolve the Tibet-China dispute through dialogue with Tibetan leaders.
- The bipartisan 'Promoting a Resolution to the Tibet-China Dispute Act', also known as Resolve Tibet Act, pressures China to resume negotiations with the Dalai Lama's envoys or democratically elected leaders of the Tibetan people.
- The bill dismisses China's claim that Tibet has always been part of China and empowers the State Department to counter China's disinformation about Tibetan history, people, and institutions.

The Hindu

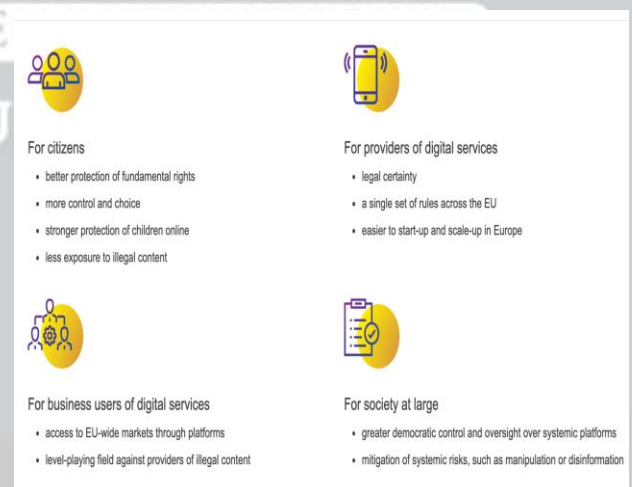
EU digital service act

Digital Services Act (DSA) overview

- The DSA regulates online intermediaries and platforms such as marketplaces, social networks, content-sharing platforms, app stores, and online travel and accommodation platforms. Its main goal is to prevent illegal and harmful activities online and the spread of disinformation.
- It ensures user safety, protects fundamental rights, and creates a fair and open online platform environment.

What are the key goals of the Digital Services Act?

- The DSA protects consumers and their fundamental rights online by setting clear and proportionate rules.
- It fosters innovation, growth and competitiveness, and facilitates the scaling up of smaller platforms, SMEs and start-ups.
- The roles of users, platforms, and public authorities are rebalanced according to European values, placing citizens at the centre.



SC on electoral bond critical analysis

- the world over, this amount is limited to prevent undue influence on the government.
- We had such a provision in India before electoral bonds were introduced.
- The judgment says: “The chief reason for corporate funding of political parties is to influence the political process which may in turn improve the company’s business performance....”
- Electoral bonds also removed the earlier limits on how much of its profits a company could donate to political parties.
- The scheme even allowed loss-making companies to make donations.
- This could have opened the door for shell companies to be formed with the purpose of channeling funds to political parties.
- Democracies went through a phase of crony capitalism, where big money funded political parties.
- In return, laws, policies, schemes and incentives were made for the benefit of the donors.
- In a limited way, the Supreme Court’s judgment prevents this from happening in India.
- There was an Amendment to the Finance Bill. In any country, the central bank alone has the authority to issue currency such as notes and bonds.
- Section 31 of the Reserve Bank of India (RBI) Act says “only the RBI or the Central Government authorized by the

RBI Act shall draw, accept, make or issue any bill of exchange or promissory note for the payment of money to the bearers of the note or bond”.

- The Government amended the RBI Act using a Finance Act, and allowed under a new clause 31(3), the central government to authorize any scheduled bank to issue electoral bonds.
- This amendment to the Finance Act too has been struck down.
- A number of laws were amended to introduce electoral bonds such as the RBI Act 1934, the Representation of the People Act (RPA), 1951, the Income Tax Act 1961, and the Companies Act 2013.

The essence of the judgment

- The Supreme Court judgment can be summarized as follows.
- The electoral bonds scheme has been struck down.
- All Amendments to the RPA Act, the Finance Act 2017, and the Companies Act 2013 are violative of Articles 19 and 14 of the Constitution.
- Article 19 refers to the right to information, and Article 14 to the right to equality, where arbitrariness in law is not permissible.
- These Articles are part of the Fundamental Rights in the Indian Constitution, and cannot be violated.
- The Supreme Court has directed the State Bank of India (SBI), the sole bank receiving funds in exchange for electoral bonds, to stop issuing them.

- The SBI has to submit the full details of all electoral bonds that have been issued so far, to the Election Commission of India (ECI) by March 6, 2024.
- In turn, the ECI has to publish this information on its website within two weeks.
- We need to note that two constitutional bodies, the ECI and the Supreme Court, have acted in favor of democracy.
- The power of judicial review of laws passed by Parliament based on the Constitution is precious.
- The DAC has approved amendments in the DAP 2020 with respect to benchmarking and cost computation, payment schedule and procurement quantity.
- The DAC also cleared the AoN for sustainment support through repair replenishment for the 24 MH-60R multi-role helicopters procured by the Navy from the U.S. under the foreign military sale route.

The Hindu

DAP 2020 & Acceptance of necessity

- The Defence Acquisition Council (DAC) on Friday accorded Acceptance of Necessity (AoN), the first step in the procurement process, for proposals worth ₹84,560 crores.
- The proposals include some long-pending deals such as for heavy-weight torpedoes (HWT) for the Navy's Scorpene-class submarines and fight refueller aircraft (FRA) for the Indian Air Force (IAF) beginning afresh.

What is Acceptance of Necessity (AoN) ?

- The approval, termed Acceptance of Necessity (AoN), is the first step toward procurement of any military equipment and hardware under India's defence acquisition norm.
- The tendering and contracting process is undertaken only after the grant of AoN.

The Hindu

'DAP 2020'

- The procurement of a new generation of anti-tank mines having seismic sensors and the provision of remote deactivation with additional safety features has been approved under the Buy (Indigenously Designed, Developed and Manufactured category of Defence Acquisition Procedure (DAP) 2020.

Cytomegalovirus

- Cytomegalovirus , or CMV, is a common virus that infects people of all ages.
- Over half of adults have been infected with CMV by age 40. Most people infected with CMV show no signs or symptoms.
- When a baby is born with cytomegalovirus (CMV) infection, it is called congenital CMV.
- About one out of every 200 babies is born with congenital CMV infection.
- About one in five babies with congenital CMV infection will have long-term health problems.
- Pregnant with immune system is weakened, CMV is cause for concern.
- Women who develop an active CMV infection during pregnancy can pass the virus to their babies, who might then experience symptoms.
- For people who have weakened immune systems, especially people who have had an organ, stem cell or bone marrow transplant, CMV infection can be fatal.

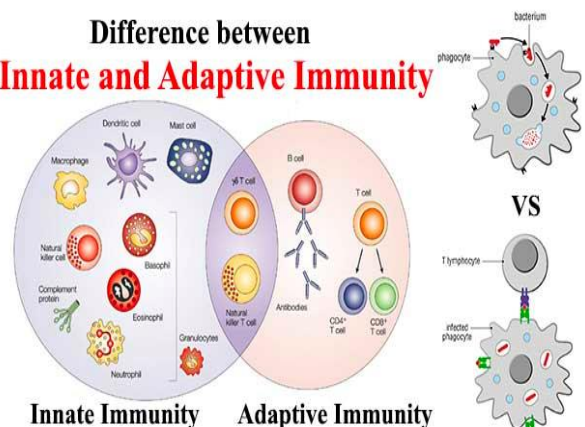
- CMV spreads from person to person through body fluids, such as blood, saliva, urine, semen and breast milk.
- There is no cure, but there are medications that can help treat the symptoms.

Innate and adaptive immunity

Differences b/w innate and adaptive immunity

| Characteristics | Innate Immunity | Adaptive immunity |
|-------------------|---|--|
| Presence | Innate immunity is something already present in the body. | Adaptive immunity is created in response to exposure to a foreign substance. |
| Specificity | Non-Specific | Specific |
| Response | Rapid | Slow (1-2 weeks) |
| Potency | Limited and Lower potency | High potency |
| Memory | No memory | Long term memory |
| Allergic Reaction | None | Immediate and Delay hypersensitivity |

Difference between Innate and Adaptive Immunity



Innate & adaptive immunity

- Researchers have finally unravelled a longstanding question on why Serengeti zebra, wildebeest, and gazelle, which share limited food resources, follow the same migratory routes, in a body size dependent way.

- The researchers used novel data to show how a balance of species interactions and ecological factors regulate this process.
- They say competition pushes zebra ahead of wildebeest, and wildebeest then eats plants in a way that facilitates the development of newer growth for the trailing gazelle.



The Hindu

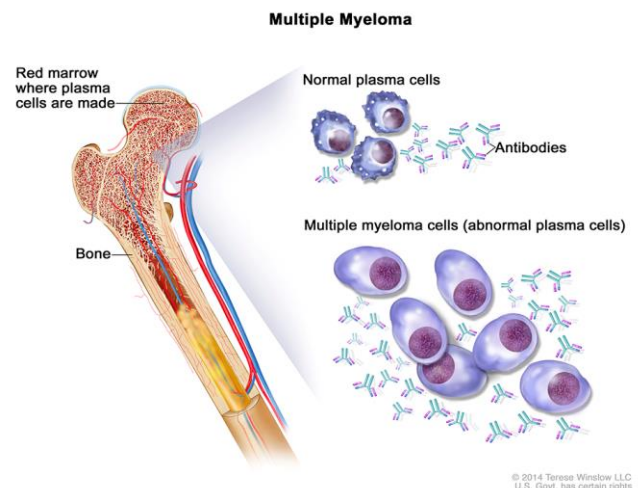
Myeloma cancer

- Scientists have engineered a new variant of cancer-fighting T cells that can suppress multiple myeloma tumours in mice while showing superior persistence and endurance compared with standard CAR T cell designs.
- The new cells' promising effects and durability suggest they could grant badly needed treatment options to patients with refractory or relapsed multiple myeloma.

Multiple myeloma is the second most common type of blood cancer in adults.

Myeloma cancer

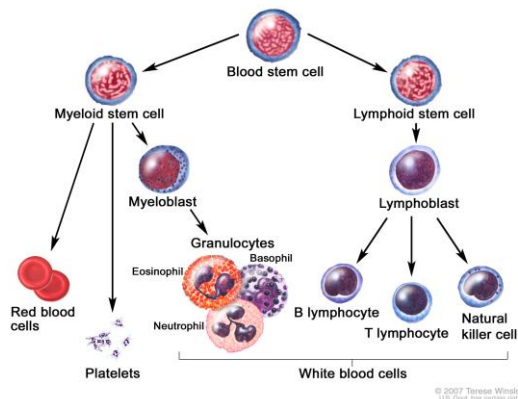
- Myeloma is a type of blood cancer that develops from plasma cells in the bone marrow.
- Myeloma is often called multiple myeloma because most people (90%) have multiple bone lesions at the time it is diagnosed. Plasma cells are a type of white blood cell found in the bone marrow.



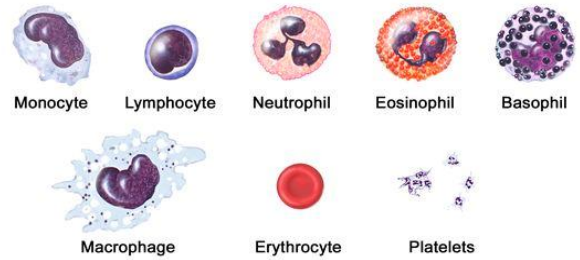
About T Cell

- A type of white blood cell.
- T cells are part of the immune system and develop from stem cells in the bone marrow.
- They help protect the body from infection and may help fight cancer.

- Also called T lymphocyte and thymocyte.



Blood Cells



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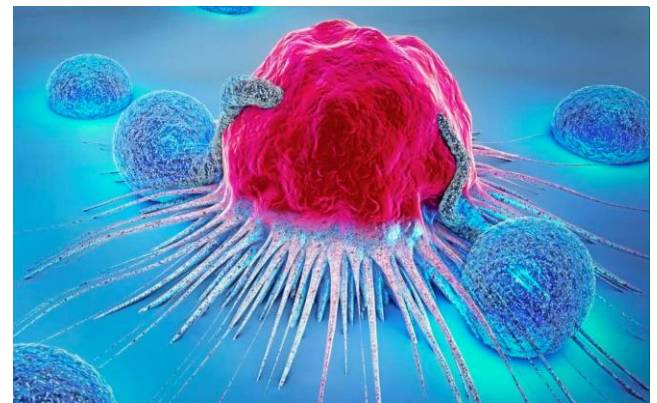
The Hindu

Macrophage

- It was long thought that the fluid-filled sac around our lungs functions merely as a cushion from external damage.
- Turns out, it also houses potent virus-eating cells that rush into the lungs during flu infections.
- These cells are macrophages, which are immune cells produced in the body, and go into the lungs when there's an infection.

About Macrophage

- A type of white blood cell that surrounds and kills microorganisms, removes dead cells, and stimulates the action of other immune system cells.



The Hindu

Rheumatoid arthritis

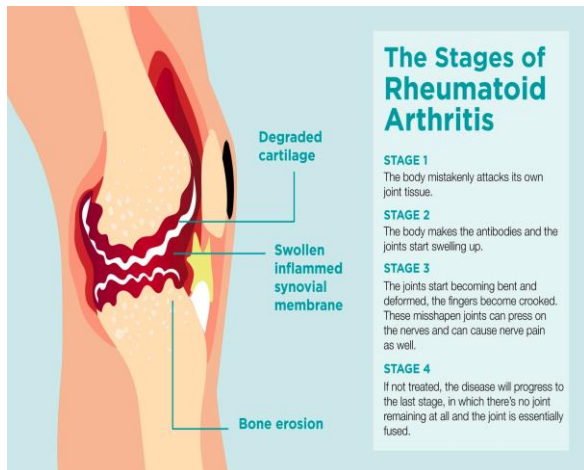
The Lancet published the results of a study that proposed to repurpose an existing drug to treat rheumatoid arthritis as prophylaxis, to prevent disease.

- Prophylaxis requires daily administration of anti-migraine compounds, whether or not a migraine attack is occurring.

- All the drugs used for migraine prevention have potential and often relevant adverse events or contraindications, and may also interfere with other concurrent

conditions and treatments.

The results of the study showed that “rheumatoid arthritis prevention trials are feasible and targeting the adaptive immunity of such individuals at an early stage, can prevent the onset of rheumatoid arthritis.”



What is rheumatoid arthritis?

It is a chronic, autoimmune condition that mostly affects the joints.

Scientists have not yet understood why an autoimmune condition occurs, allowing the immune system that protects the body, to attack itself.

A patient experiences pain, swelling of joints, and loss of function and mobility as a result of stiffness.

As can be expected, this is likely to significantly lower a patient's quality of life.

As per the National Institute of Arthritis and Musculoskeletal and Skin Diseases, of the National Institutes of Health, U.S., rheumatoid arthritis affects the lining of the joints, and damages the tissue that covers the ends of the bones in a joint.

It often occurs in a symmetrical pattern, meaning that if one knee or hand has the condition, the other hand or knee is also often affected.

Fatigue, occasional fevers, and a loss of appetite are to be expected, and there is a possibility that it may cause medical problems outside of the joints including in the heart, lungs, blood nerves, eyes and skin.

The Hindu

ASAT

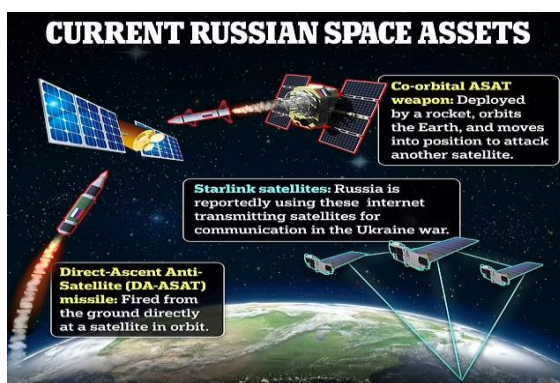
What are anti-satellite weapons?

Anti-satellite (ASAT) weapons are designed to debilitate and/or destroy satellites that are already in orbit and operational.

ASAT weapons violate the OST through the latter's Article VII, which holds parties to the treaty liable for damaging satellites

belonging to other parties, and Article IX, which asks parties to refrain from the “harmful contamination” of space.

- Russia, in the form of the erstwhile Soviet Union, has had ASAT capabilities since at least 1968.
- While the Cold War motivated ASAT weapon tests on either side of the Atlantic, the respective programmes refused to dwindle once relations thawed.
- Most of these weapons are kinetic, meaning they destroy satellites in orbit by rocketing into them or detonating an explosive near them, and blowing them to pieces.
- Because of the low gravity and lack of an atmosphere, the resulting debris can stay in orbit for a long time depending on their size. This result violates Article IX of the OST...



Detailed course on 2yrs current affairs for prelims 2024

sample class notes

- Attappady Thuvara has seeds with white coat.
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The Tamakoshi River

- The Tamakoshi River is part of the Koshi or Sapta Koshi river system in Nepalese Himalayas.
- It originates from the Rongshar Chu and Lapchi Gang rivers close to the Nepal-Tibet border.
- It flows in a southern direction through Bagmati Province in Nepal, namely through Dolakha District and Ramechhap District.

By saurabh pandey sir

Topic- aDNA Application

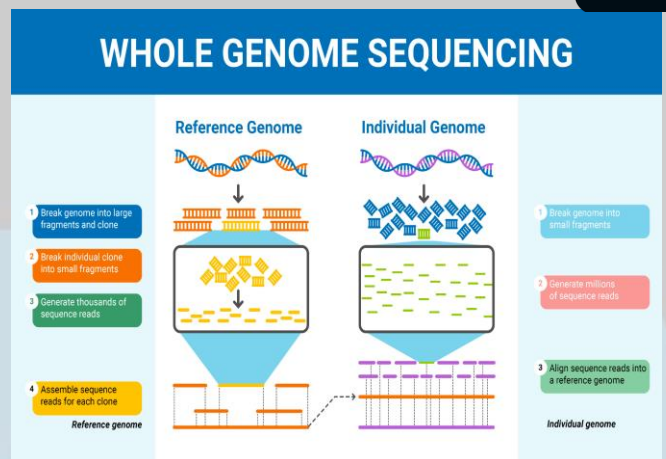
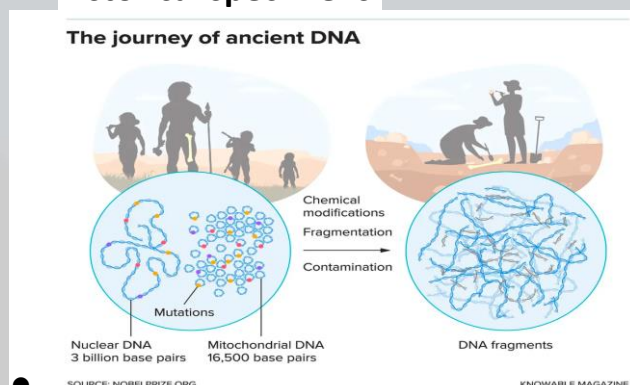
Scientists are using whole-genome sequencing data from fragmented or degraded DNA to understand chromosomal abnormalities.

These approaches are now used to study chromosomal abnormalities in aDNA as well

- There is some evidence that ancient humans extensively used birch pitch to repair tools.
- Microbes from the pitch sample can reveal information about the oral health of the individuals who chewed it Sequencing was used to determine the origin of tools found in the 1930s at a site where humans, neanderthals, and denisovans coexisted.
- Archaeologists re-excavated the cave recently and found bone remains.
- Genetic material unequivocally pointed to Homo sapiens and they were dated to be 45,000 years old.

What is aDNA (Ancient DNA)

- Ancient DNA (aDNA) is that recovered from any post-mortem material such as archaeological or historical specimens.

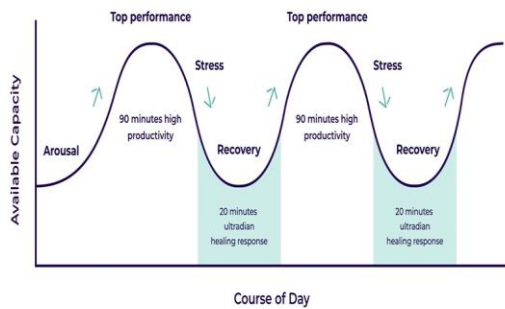


What else can ancestral DNA reveal?

- Studies of aDNA could also provide big clues about the creation and development of stone tools.
- In the 1930s, for instance, researchers dug a cave in Ranis, Germany, where they identified a number of ancient stone tools.
- The Hindu

Ultradian rhythm

- Ultradian rhythm is a recurrent period or cycle repeated throughout a 24-hour day.
- In contrast, **circadian rhythms** complete one cycle daily, while **infradian rhythms** such as the **menstrual cycle** have periods longer than a day.
- Ultradian rhythms include **blood circulation**, **blinking**, **pulse**, **hormonal secretions** such as **growth hormone**, **heart rate**, **thermoregulation**, **micturition**.

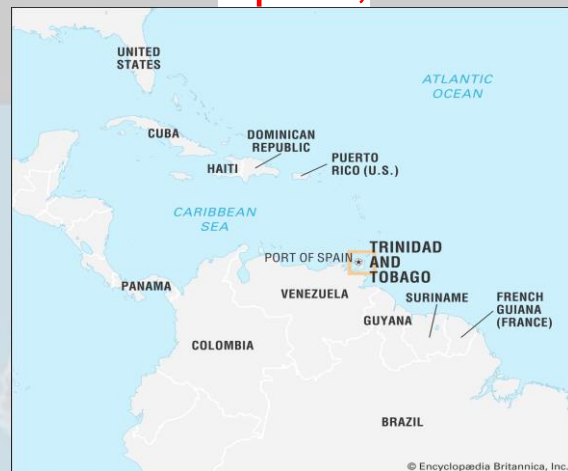


-
- Through the night, individuals cycle through these stages multiple times, with each cycle typically lasting around 90 minutes.
- During REM sleep, the individual dreams, while non-REM sleep is crucial for the individual to restore themselves physically and consolidate their memories.
- Ultradian rhythms also influence patterns of hormone release, such as the pulsatile secretion of growth hormone, cortisol, and insulin.
- The Hindu

Tobago Island, Trinidad and Tobago

-
- The country is considering declaring an international emergency to deal with the spill, which has stained kilometers of its shores and threatens to spread to its Caribbean neighbors.
- Trinidad is the largest island in the nation of Trinidad and Tobago, off Venezuela's coast in the southern Caribbean.

The capital, Port of Spain,



AI as a disruptive factor

- introducing Artificial Intelligence (AI) into this equation completely complicates the idea of reforming meritocracy.
- First, by its very nature, AI questions the basis of human merit by introducing a non-human entity capable of performing tasks, making decisions, and even 'creating' at levels that can surpass human abilities.
- Second, the advent of AI challenges the traditional notion of individual merit by prioritizing access to technology.
- Third, AI systems trained on historical data can perpetuate and even exacerbate biases present in that data, leading to discriminatory outcomes in areas such as hiring, law enforcement, and lending.
- Fourth, a recent paper published in Nature Medicine showed that an AI tool can predict pancreatic cancer in a patient three years before radiologists can make the diagnosis.

The Hindu 19th February 2024 SP sir

Capabilities such as this can lead to the displacement of jobs that involve routine, predictable tasks

- Fifth, the opaque nature of many AI algorithms, coupled with the concentration of power in a few tech giants, poses significant challenges to accountability.
- Sixth, at the organizational level, the core of AI's power lies in data and algorithms that process this data. Tech giants with access to unprecedented volumes of data have a distinct advantage in training more sophisticated and accurate AI models.

The Hindu

AR6 (IPCC)

- Three reports from the IPCC's sixth assessment cycle (AR6) were published in 2021-2022.
- These documents examine the consequences, adaptation, and vulnerability as well as the mitigation aspects of climate change.
- The Sixth Assessment Report (AR6) warned that the time to limit the rise of the world's average surface temperature to 1.5 degrees Celsius from the pre-industrial era as agreed in the Paris Agreement is running out and that we are close to breaching adaptation limits.
- To assess the world's progress towards the goals of the Paris Agreement, UNFCCC countries conduct a 'global stocktake' (GST) every five years

- After the AR6 synthesis report, the IPCC initiated its seventh cycle (AR7) by electing an IPCC bureau.

What is meant by 'global stocktake'?

- To assess the world's progress towards the goals of the Paris Agreement, UNFCCC countries conduct a 'global stocktake' (GST) every five years.
- The GST is a mechanism to measure collective progress, identify gaps, and chart a better course of climate action.
- The first GST started in 2022 and ended at the 28th session of the Conference of the Parties (COP28) to the UNFCCC in 2023.
- The first GST text, to which member countries agreed at the COP28 in Dubai last year, requested the IPCC to consider ways in which its work can be aligned with subsequent stocktake.
- The second GST is due in 2028, and member countries have requested the IPCC to publish its AR7 assessment reports before so that countries could measure their progress against the state of the planet.

The Hindu

Sominsai

- One of the strangest Japanese festivals
- Men cleanse their bodies in a river during the Sominsai Festival at Kokuseki-ji Temple in Oshu, with aggressive jostling ensues as participants vie for wooden charms, symbolising the fervour and

The Hindu 19th February 2024 SP sir
intensity of the ancient ritual's
climax and communal spirit.
The Hindu

Target UPSC Mains

- Q What is the role of culture in the modern era??

Q आधुनिक युग में संस्कृति की क्या भूमिका है??

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COURSE MUST FOR UPSC PRELIMS 2024
Comprehensive course on two Years Current affairs for prelims 2024

Detailed course on 2yrs current affairs for prelims 2024

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sample class notes

By saurabh pandey sir

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2. Browse through the Popular Courses section

3. Click on the Comprehensive course on two Years Current affairs for prelims 2024

How to join???

Prelims test series on advanced current affairs (total 50 tests)
[Saurabh Pandey UPSC: Home](https://saurabhpandeyupsc.com)

Satyendra Nath Bose

- Bose, a graduate of the [University of Calcutta](#), taught at the University of Dacca (1921–45) and then at Calcutta (1945–56).
- Bose's numerous scientific papers (published from 1918 to 1956) contributed to [statistical mechanics](#),
- the electromagnetic properties of the [ionosphere](#), the theories of [X-ray crystallography](#) and [thermoluminescence](#), and [unified field theory](#).
- Bose's *Planck's Law and the Hypothesis of Light Quanta* (1924) led Einstein to seek him out for collaboration.

Terms

- **Ionosphere** and magnetosphere, regions of [Earth's atmosphere](#) in which the number of electrically charged particles ions and [electrons](#)—are large enough to affect the [propagation](#) of [radio waves](#).
- The charged particles are created by the action of extraterrestrial [radiation](#) (mainly from the [Sun](#)) on neutral atoms and [molecules](#) of [air](#).
- The ionosphere begins at a height of about 50 km (30 miles) above the surface,

but it is most distinct and important above 80 km (50 miles).

- **Crystallography**, a branch of [science](#) that deals with [discerning](#) the arrangement and bonding of [atoms](#) in crystalline [solids](#) and with the geometric structure of [crystal](#) lattices. Classically, the optical properties of [crystals](#) were of value in [mineralogy](#) and [chemistry](#) for the identification of substances. Modern crystallography is largely based on the analysis of the [diffraction](#) of [X-rays](#) by [crystals](#) acting as optical gratings

Thermoluminescence is, emission of [light](#) from some minerals and certain other crystalline materials.

- The light energy released is derived from electron displacements within the crystal lattice of such a substance caused by previous exposure to high-energy radiation

Mimas

- Astronomers believe Mimas, the smallest of the major moons of Saturn, known as the “big seven” or the “inner moons”, may have a liquid ocean around 20-30 km under its heavily cratered ice shell.

- Nicknamed “Death Star” for the resemblance of its cratered surface to a space station in the Star Wars franchise, Mimas was an unlikely candidate to host an ocean because the presence of these water bodies is generally marked by modifications of the surface by internal dynamics.

The Hindu

India and Greece

- Greece and India are in many ways ‘prisoners’ of geography.
- They are located in areas strategically important to the global system but are areas that are at the same time geopolitically volatile.
- As recent events in the Red Sea have shown, the security, stability and prosperity of the East Mediterranean region, where Greece is situated, is vitally dependent on the security, stability and prosperity of the Indian Ocean region.
- More than ever before, the political leadership in India and Greece is aware of the compelling strategic reasons and

urgency to build a strategic relationship between the two countries.

- Cooperation at various levels Bilateral strategic, military and business cooperation has been moving along over the years, but at a slow and unhurried pace.
- The Indian Navy and Indian Air Force have been participating in joint exercises with the Greek armed forces and reciprocal exercises are planned from time to time.
- Businesses have also been looking at each other. An Indian construction company, for example, is involved with a major Greek Construction company in the building of a new airport on the island of Crete.
- A well-known Indian business family has made major investments in several companies in the food business in Greece.
- A mid-sized Indian shipping company has already opened a brokerage firm in Athens and looks to become a key player in the trans-Atlantic shipping market.

- A large systemic bank in Greece has tied up with a major Indian financial institution to sell mutual fund products globally.
- It is also interesting to note that Greece's most important long-term foreign investor is Indian-Canadian billionaire Prem Watsa, founder and CEO of Fairfax Financial Holdings
- Greece positions itself as the reliable eastern flank of the European Union (EU) and the North Atlantic Treaty Organization in the Eastern Mediterranean, also building its defence industry, the idea of constructing the India-Middle East-Europe Economic Corridor (IMEEC) is gaining in salience
- Greece has been a strong supporter of deeper EU-India relations and is now working to ensure the EU-India bilateral trade and investment agreement (BTIA) is rapidly concluded, which would be a further catalyst to bilateral economic ties.
- There need to be more university student exchange programmes, more cultural exchanges and more media cooperation.

Topic- Report on Fintech

The Standing Committee on Communications and Information Technology has raised concerns about the dominance of fintech apps owned by foreign entities in the Indian ecosystem and recommended that local players be promoted.

- It noted that it will be more 'feasible' for regulatory bodies such as the RBI and the NPCI to control local apps, as compared with foreign apps, which operate in multiple jurisdictions.
- Vijay Mani and Munjal Kamdar, Partners at Deloitte India, pointed to local fintech players having a "natural advantage" when it comes to understanding the customer, various ecosystem.
- The Hindu

Human Animal Conflict

What are the reasons for the increase in human-wildlife conflict?

- Experts cite increased area under cultivation around wildlife habitats, changing cropping pattern, significant increase in the population of animals like elephants and tigers due to conservation efforts, and movement of livestock and

humans in wildlife habitats during odd hours as the main reasons for the rise in human-wildlife conflict incidents.

- There has also been a substantial increase in the population of prolific breeders like wild boars and peacocks.
- However, an increased number of incidents involving elephants are due to habitat depletion and fragmentation caused by human activities.
- Moreover, invasive alien species have reduced the availability of food and water.
- Monoculture of species such as eucalyptus and acacia has also adversely affected plant biodiversity.

What are the proposed solutions and why are they not effective?

- Elephant-proof trenches and solar power fences are widely used in Kerala, and they are considered largely effective, provided they are properly maintained.
- As part of the State government's new eco-restoration policy, the Forest department is aiming to plant suitable indigenous plants (wild mango, wild gooseberry, and wild jackfruit) in the forest to ensure wild animals' food

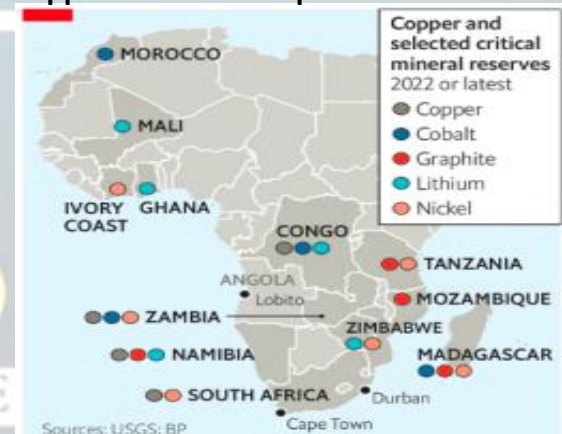
security and dissuade them from entering agricultural lands.

- Such measures need to be supplemented by creating early warning systems that can track the movement of elephants and other dangerous animals using drones and watchers.

The Hindu

Critical minerals in Africa

The Copper belt straddling northern Zambia and the southern part of the Congo still contains some of the richest copper and cobalt deposits in the world.



The Economist

Critical Minerals

- Critical minerals, also known as **strategic minerals or critical raw materials**, are natural resources that play a crucial role in various industrial sectors due to their **unique properties and applications**.
- These minerals are essential for the functioning of **modern economies, technologies, and national security**.
- They are characterized by their **scarcity, high economic value, and significance in strategic industries**.
- Some commonly recognized critical minerals include: **Cobalt, Lithium, Nickel, Iridium** etc.

THE HINDU ANALYSIS PDF BY SAURABH PANDEY SIR

Q "Human animal conflict is due to both non-human and human related factor"

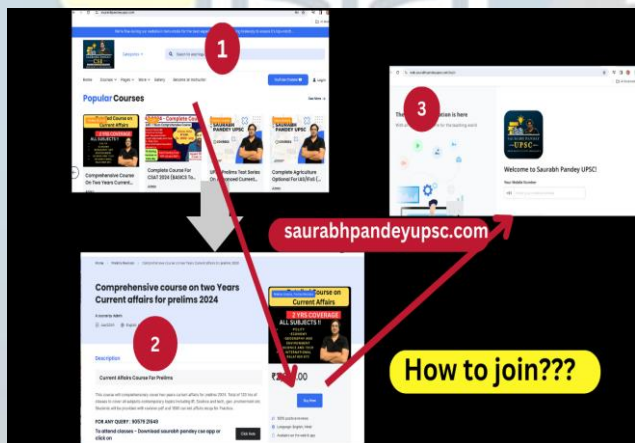
Explain

प्रश्न "मानव-पशु संघर्ष गैर-मानवीय और मानव-संबंधी दोनों कारकों के कारण होता है" स्पष्ट करें

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SAURABH PANDEY

— CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

WHAT TN WANTS

➤ Tamil Nadu had sought a direction to Karnataka to release 50.5 tmc feet of Cauvery water to save 40k acres of samba crop

➤ It also sought court help to ensure Karnataka stuck to the water releases in keeping with the 2007 order of Cauvery Water Disputes Tribunal

The Cauvery basin reservoirs — Kabini, Hemavathy, Harangi and KRS — have combined storage of 51 tmc ft

starting Aug 20 in irrigation year 2016-17

➤ TN says K'taka is **diverting water meant for farmers in distress for undeclared projects**, violating the tribunal's orders

A century-old wrangle

Cauvery stretches over **802km** with origin at Tala-cauvery of Karnataka's Kodagu district

KARNATAKA

Madikeri

Mandya

Mysuru

Salem

Erode

Coimbatore

Tiruvapur

TAMIL NADU

KERALA

Cauvery Basin (sqkm)

Tamil Nadu 44,000

Karnataka 32,000

Agreement between princely state of Mysuru and Madras Presidency in 1892 and 1924 over sharing water entitling lion's share to TN

Dispute continued after Independence, finally **Cauvery Water Disputes Tribunal** formed in 1990

In 2007, after 16 years, water court **validated** the agreements of 1892 and 1924 executed between government of Madras and Mysore

THE WATER COURT SAID

Tamil Nadu **419 TMC** (which had demanded 512 TMC)

Karnataka **270 TMC** (which had demanded 465 TMC)

Kerala **30 TMC**
Puducherry **7 TMC**

WHAT KARNATAKA SAYS

➤ Karnataka says it is facing a 'severe distress year' and has a **deficit of 80 tmc feet in its four reservoirs**

➤ Karnataka CM says at least 40 tmc ft is required to meet the drinking water needs of Bengaluru, Mysuru and other cities, and villages and remaining standing crops

➤ F S Nariman, fighting for Karnataka, said there were recent "rain deficit months" and it was difficult to release the water due to TN



WATER WAR: A protest in on the Mysore-Bangalore highway in Mandya on Tuesday

DECIDE MATTER IN 10 DAYS, WATER COMMITTEE TOLD

➤ Supreme Court directed Karnataka to release **15,000 cusecs of Cauvery water per day to TN for next 10 days**

➤ Noting TN's samba crop would be adversely affected, SC directed Karnataka to ensure TN is supplied water

➤ SC directed TN to approach supervisory committee within three days for release of Cauvery water as per the final order of the Cauvery Water Disputes Tribunal

➤ The court asked the committee to decide on TN's plea in ten days from Monday

Other major inter-state river disputes

Ravi & Beas
States fighting
Punjab, Haryana, Rajasthan

Narmada
MP, Gujarat, Maharashtra, Rajasthan

Krishna
Maharashtra, Andhra, Karnataka



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**SC on Proposed amendment to
Forest Act**

The Supreme Court of India has put on pause an ambitious effort by the Centre to amend India's Forest (Conservation) Act, 1980, that was brought in to check the wanton razing of forests for 'non-forestry uses'.

- According to the Centre, an estimated four million hectares of forest land had been diverted from 1951-75. Under the provisions of the Act, forests could no longer be diverted without adhering to a regulatory mechanism by the Centre.
- As a measure of its success, the Centre calculates that from 1981-2022, the average annual diversion of the forest had reduced to about 22,000 hectares or about a tenth of what it was from 1951-75.
- the provisions of this piece of legislation largely applied to forest


tracts recognized as such by the India Forest Act, or any other State legislation.

- Illegal timber felling in Gudalur, Tamil Nadu, triggered the landmark T.N. Godavarman
- Thirumulpad judgment that saw the Court take an expanded view of forest tracts worthy of protection.
- It also said that forests had to be protected irrespective of how they were classified and who owned them.
- This brought in the concept of 'deemed forests,' or tracts that were not usually classified as such in government or revenue records. States were asked to constitute expert committees to identify such 'deemed forests.'
- The Centre's attempt to amend the Forest (Conservation) Act was ostensibly to bring "clarity" as there were large tracts of recorded forest land that had already been

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put to non-forestry uses, with the permission of State governments.

- There is apparently, the Centre says, a reluctance among private citizens to cultivate private plantations and orchards, despite their significant ecological benefits, for fear that they would be classified as ‘forest’ (and thus render their ownership void).



Understanding the forest bill

1 Contentious clauses
Covers land declared forest under the Indian Forest Act, 1927 or any other law; those not recorded under the laws but notified as forest in govt records as on or after Oct 25, 1980, except such land whose land use was changed from forest to non-forest purpose on or before Dec 12, 1996, also to be covered

2 No prior forest clearance required in cases where:
a) Forest land within 100km of IB, and used for construction of projects of national importance
b) For work on strip forests alongside a rail line
c) For activity in up to 5 ha in LWE areas

Potential impact of bill
• Northeast states worry that exempting nod for work along international borders would subject ecologically fragile forest areas to a change in land use
• Dilution of SC's 1996 Godavarman judgment that widened the scope of Forest Conservation Act
• Experts say bill violates Forest Rights Act – a claim dismissed by Centre

Centre's defence on exemptions
• Unclear government records
• Need to provide connectivity to roadside amenities, habitation, railway lines
• Plantation on non-forest land
• Security-related projects of national importance

- India's ambitions to create a carbon sink of 2.5 billion-3 billion tonnes, to meet its net zero goals have required forest laws to be “dynamic” and, therefore, the rules have sought to remove ‘deemed forest,’ not already recorded as such, from the ambit of protection.

- This has triggered a slew of public interest petitions as, on the face of it, the amendments appear as an assault on the Act's ambition of forest protection.

- While a final judgment is pending, the Court's order to the Centre to compile and make public, by April, States' efforts at recording the extent of deemed forests is welcome

Panchayati Raj institutions

Three decades have passed since the 73rd and 74th Constitutional Amendments Acts came into effect, which envisaged that local bodies

in India would function as institutions of local self-government. As a follow-up, the Ministry of Panchayati Raj was constituted in 2004 to strengthen rural local governments.

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- When it comes to analyzing the status of devolution, it is evident that some States have forged ahead while many lag behind.
- The commitment of State governments towards decentralization has been vital in making Panchayati raj institutions an effective local governance mechanism at the grass-roots level.
- Participatory planning and budgeting were the end result of such interventions by the Ministry.
- Panchayats earn only 1% of the revenue through taxes'', with the rest being raised as grants from the State and Centre.
- Property tax, cess on land revenue, surcharge on additional stamp duty, tolls, tax on profession, advertisement, user charges for water and sanitation, and lighting are the major OSRs (own source of revenue) where panchayats can earn maximum income.

Generating own revenues

- The constitutional amendment has set forth specific details on scale devolution which includes the generation of own revenues.
- Emanating from the Central Act, various State's Panchayati Raj Acts have made provisions for taxation and collection.
- Based on the provisions of these Acts, panchayats have made efforts to generate their own resources to the maximum extent.
- Panchayats are expected to establish a conducive environment for taxation by implementing appropriate financial regulations.
- This includes making decisions regarding the tax and non-tax bases, determining their rates, establishing provisions for periodic revisions, defining exemption areas, and enacting effective tax

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management and enforcement laws for collection.

- The huge potential for non-tax revenue includes fees, rent, and income from investment sales and hires charges and receipts.

The role of gram sabhas

- Gram sabhas have a significant role in fostering self-sufficiency and sustainable development at the grass-roots level by leveraging local resources for revenue generation.
- They can be engaged in planning, decision-making, and implementation of revenue-generating initiatives that range from agriculture and tourism to small-scale industries.
- They have the authority to impose taxes, fees, and levies, directing the funds towards local development projects, public services, and social welfare programs.

• Through transparent financial management and inclusive participation, gram sabhas ensure accountability and foster community trust, ultimately empowering villages to become economically independent and resilient.

- gram sabhas need to promote entrepreneurship, and foster partnerships with external stakeholders to enhance the effectiveness of revenue generation efforts
- In several States, gram panchayats lack the authority to collect taxes, while in numerous others, intermediate and district panchayats are not delegated the responsibility of tax collection

Conclusion

- Despite every enabling factor to raise revenue, panchayats confront several impediments in resource mobilisation: the 'freebie culture'

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rampant in society is the cause for the antipathy in paying taxes.

automated algorithm to identify plastics.

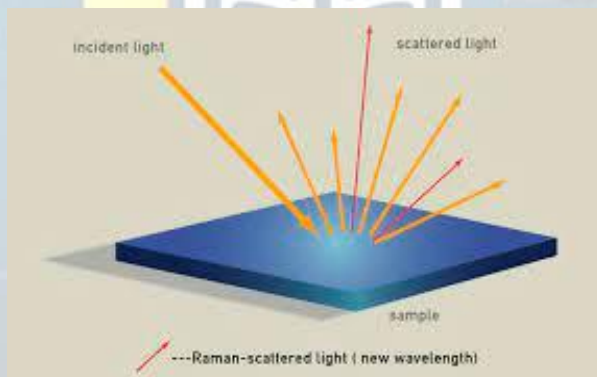
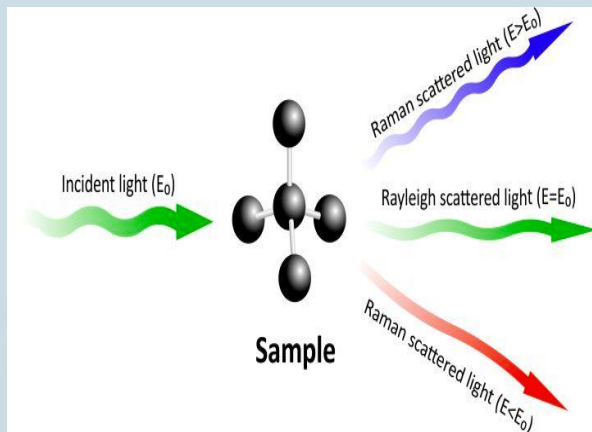
- Elected representatives feel that imposing taxes would alter their popularity adversely. Here, the answer is clear.
- There is a need to educate elected representatives and the public on the significance of raising revenue to develop panchayats as self-governing institutions.
- Ultimately, the dependency syndrome for grants has to be minimized and in due course, panchayats will be able to survive on their resources.
- The Hindu
- Nano plastics are difficult to analyze due to their size and also due to the inability of different diagnostic techniques to identify them. Researchers used a SRS imaging platform along with an
- The algorithm extracted detailed information about the chemical makeup from data produced by the SRS (Raman scattering imaging) platform
- Studies have found that plastic items can break down into sub-micrometre pieces, meaning they can breach biological barriers and enter different parts of the bodies of living beings.
- the presence of plastics in bottled water could spot following the types: polyamide 66, polypropylene (PP), polyethylene, polymethyl methacrylate, polyvinyl chloride (PVC), polystyrene, and polyethylene terephthalate (PET).

What is Raman scattering imaging??

- Raman scattering is an optical process where incoming excitation

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light interacting with a sample produces scattered light that is lessened in energy by the vibrational modes of the chemical bonds of the specimen.



confirmed population (fewer than 200 individuals) was in neighbouring China.

- But in a new study, researchers confirmed Myanmar has the largest known population of Skywalker gibbons in a single location.



- The Skywalker hoolock gibbon or Gaoligong hoolock gibbon

(*Hoolock tianxing*) is an arboreal primate in the gibbon family, Hylobatidae.

The Hindu

Skywalker hoolock gibbon

- Skywalker hoolock gibbon in Myanmar. When the Skywalker hoolock gibbon was first discovered in 2017 by a group of Star Wars-loving scientists, its only

- It is one of three species of hoolock gibbon and was first described in January 2017 in the *American Journal of Primatology*.

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- The Skywalker hoolock gibbon can be found in the **montane** forests of eastern **Myanmar** and southwestern **China** in the Mt. **Gaoligong** region, located between the **Salween River** and the Nmai tributary of the **Irrawaddy River**.

- **Hoolocks** were first recorded in this region in 1917, and this is the easternmost habitat of any hoolock species

Q "Third tier of government without financial autonomy cannot bring democratic decentralisation" Discuss

"वित्तीय स्वायत्तता के बिना सरकार का तीसरा स्तर लोकतांत्रिक विकेंद्रीकरण नहीं ला सकता" चर्चा करें

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- Attappady Thuvana has seeds with white coat.
- These are bigger and have higher seed weight than the regular variety.
- Compared to the garlic produced in other areas, the garlic from the Kanthalloor Vattavada area of Devikulam block panchayat in Idukki contains higher amount of sulphides, flavonoids, and proteins.
- Onattukara Eilu and its oil are famous for its unique health benefits.
- Relatively higher antioxidant content in Onattukara Eilu helps in fighting the free radicals which destroy the body cells.
- Kodungalloor Pottuvettari cultivated in Kodungalloor and parts of Ernakulam is consumed as juice and in other forms.
- This snap melon, which is harvested in summer, is excellent for quenching thirst

The Tamakoshi River

- The Tamakoshi River is part of the Koshi or Sapta Koshi river system in Nepalese Himalayas.
- It originates from the Rongshar Chu and Lapchi Gang rivers close to the Nepal-Tibet border.
- It flows in a southern direction through Bagmati Province in Nepal, namely through Dolakha District and Ramechhap District.

sample class notes



By saurabh pandey sir

HOW TO JOIN ALL COURSES??

- **Prelims test series on advanced current affairs (total 50 tests) Saurabh Pandey UPSC: Home (Every Thursday and saturday)**

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FROM BASICS TO UPSC BRILLIANCE



THE HINDU ANALYSIS

22nd Feb 2024

by saurabh
pandey



Topic

Peeling of stars

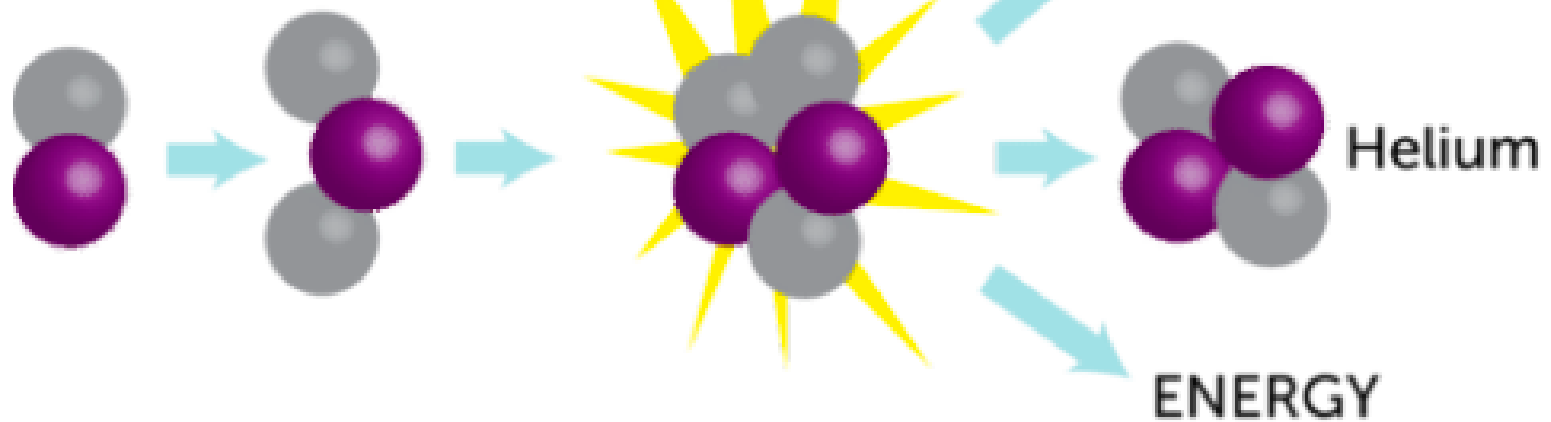
- When a star no longer fuses material and allows gravity to gain the upper hand, it blows up in an explosion called a supernova if it's heavy enough. Scientists have extensively studied the light from many supernovae.
- The light contains signatures of the various elements it has passed through near the dying star's surface. Scientists have observed that some supernovae have shown no signs of hydrogen.

- **Mechanism happens if the star is part of a binary system – i.e. as one of two stars that are orbiting each other.**
- **(Most stars heavier than the Sun are in such binaries.)**
- **The gravitational attraction of one star can peel away the hydrogen layer of the other, leaving an exposed surface of helium.**



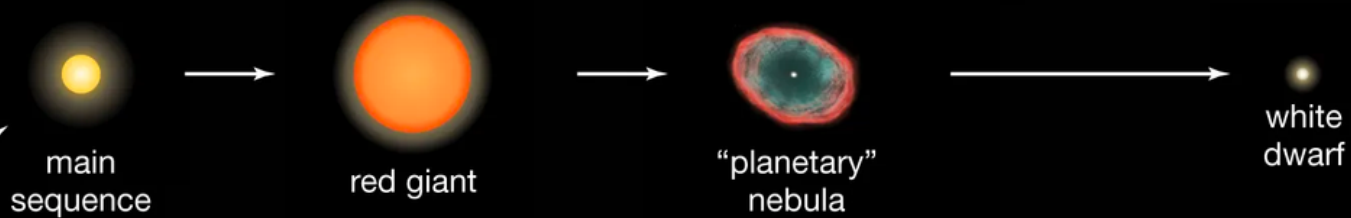
Nuclear Fusion

Deuterium & Tritium (isotopes of hydrogen)



Stellar evolution

low- and medium-mass stars
(including the Sun)



high-mass stars

main sequence

red supergiant

supernova

high-mass star

neutron star

very high-mass star

black hole

not to scale



Topic -2

Nusantara 2

- When a Chinese rocket malfunctioned shortly after launch in April 2020, destroying Indonesia's \$220 million Nusantara-2 satellite, it was a blow to the archipelago's efforts to strengthen its communication networks.
- But it presented an opportunity for one man



GLOBAL HOUSING CHALLENGE

Home solution

The Global Housing Technology Challenge is aimed at introducing best technologies to construct houses quickly and at a lower cost



- 6 winners will design and build projects of 1,000 housing units each
- The State and the Centre each will provide assistance of ₹1.5 lakh

- The Centre will give an additional technology grant of ₹2.5 lakh for each house
- Incubation facilities will be provided to develop building technologies with support from four IITs

- The approved technologies will be displayed by Central Public Works Department along with the rates



About Global House challenge

- **The Ministry of Housing and Urban Affairs has conceptualized a Global Housing Technology Challenge - India (GHTC-India) which aims to identify and mainstream a basket of innovative technologies from across the globe for the housing construction sector that are sustainable, eco-friendly and disaster-resilient.**
- **The Prime Minister declared the year 2019-20 as 'Construction Technology Year' while inaugurating GHTC-India in March 2019.**



3 Components of GHTC-India

- **Grand Expo and Conference**
- **Proven Demonstrable Technologies for the Construction of Lighthouse Projects**
- **Potential Future Technologies for Incubation and Acceleration Support:**

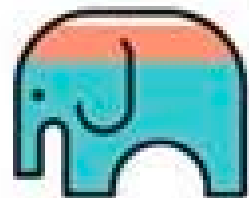


What is happening in **WAYANAD??**



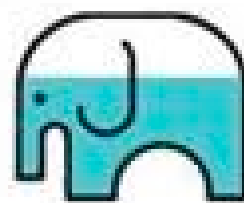
DEADLY PASSAGE

There are 110 elephant corridors in India, spread across



But only about **70%** of the corridors are used regularly. **25%** are used occasionally

29% of corridors now encroached upon



66% of the corridors have highways passing through them

22 corridors already have railway lines passing through them

4 corridors will have new railway lines

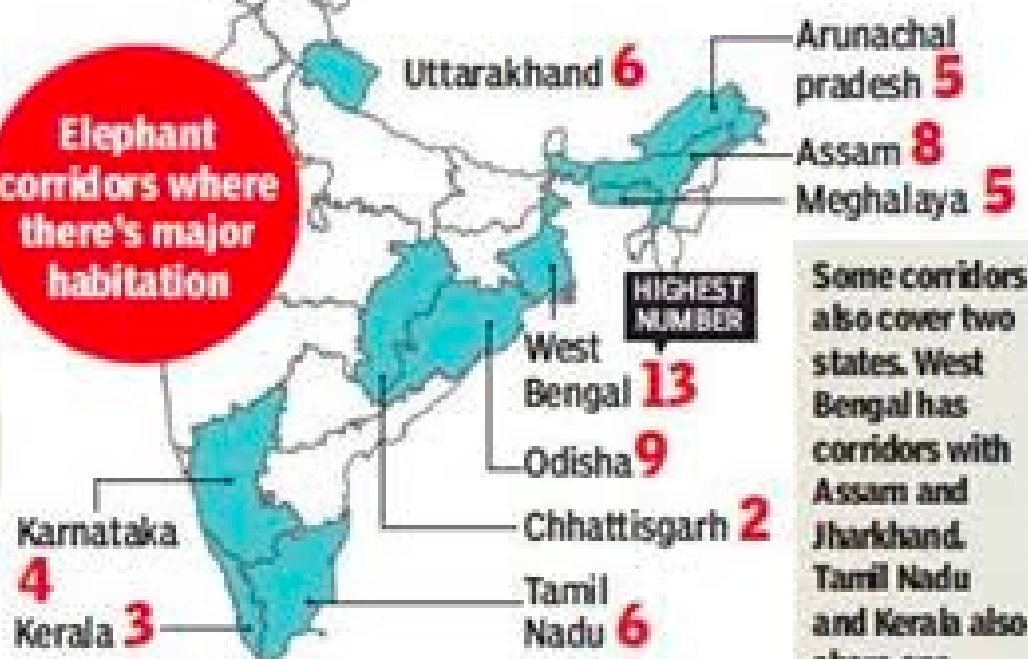
BETWEEN 1987 AND JUNE 2017, APPROXIMATELY

265

ELEPHANTS WERE KILLED BY TRAIN ACCIDENTS IN DIFFERENT PART OF THE COUNTRY



Elephant corridors where there's major habitation



Some corridors also cover two states. West Bengal has corridors with Assam and Jharkhand. Tamil Nadu and Kerala also share one

HUMAN-ELEPHANT CONFLICT

What's the problem?

Human-elephant conflict is a major issue for Asian elephants as human populations expand and elephants' habitats continue to decrease and fragment. Due to infrastructure such as railroads, disrupted migratory routes and lack of food they are increasingly forced into villages and farmland. As a result both humans and elephants are being injured and killed.

Solutions

- Keep protected forest areas for elephants
- Build elephant corridors to allow their natural migrations
- Use non-violent deterrents such as flashing lights
- Beehive fences have been successful in accordance with the elephant's natural fear of bees



What's happening

When elephants eat crops they can damage poor farmers livelihoods. Increased contact is also causing more human deaths. This leads to anger and violence towards wild elephant populations. Conflict with humans is now a leading cause of death for Asian elephants.

Techniques used against elephants

- Electric fences
- Trenches
- Poisoning
- Snares
- Shooting
- Setting off firecrackers
- Throwing firebombs
- Spears dipped in kerosine



Specific to WAYANAD

- **The trend of monoculture plantations and the usage of pesticides and insecticides depleted the soil.**
- **The tourism industry has expanded to bustling destinations towards the forest edges and wildlife corridors. The connectivity with the nearby cities of Bengaluru and Mysuru and the post lockdown induced revenge tourism have aggravated this steep climb in tourist arrivals**



- **the peaks, lakes, waterfalls, sanctuaries, dams, and plantations are all converted as tourism products to make human activities appear harmless without sufficient studies on their several impacts.**
- **non-native trees planted inside the forests have denied food and water for the animals which is resulting in the evacuation of animals from the forest areas as the interiors are turning to barren lands.**



Topic

Financial devolution of states

What is divisible pool of taxes?

- **Article 270 of the Constitution provides for the scheme of distribution of net tax proceeds collected by the Union government between the Centre and the States.**
- **The taxes that are shared between the Centre and the States include corporation tax, personal income tax, Central GST, the Centre's share of the Integrated Goods and Services Tax (IGST) etc.**
- **This division is based on the recommendation of the Finance Commission (FC) that is constituted every five years as per the terms of Article 280.**



- **Apart from the share of taxes, States are also provided grants-in-aid as per the recommendation of the FC.**
- **The divisible pool, however, does not include cess and surcharge that are levied by the Centre.**



How is the Finance Commission constituted?

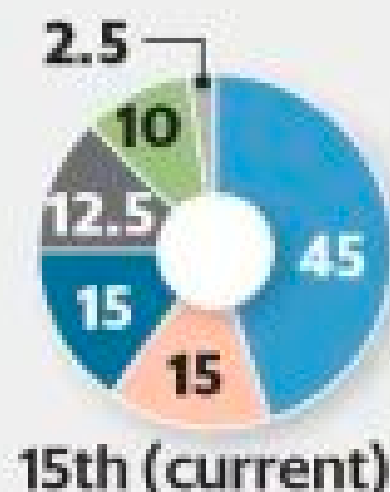
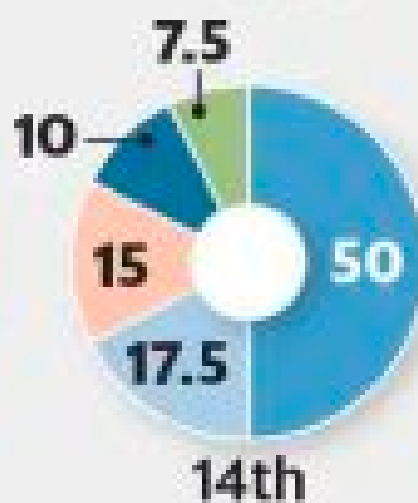
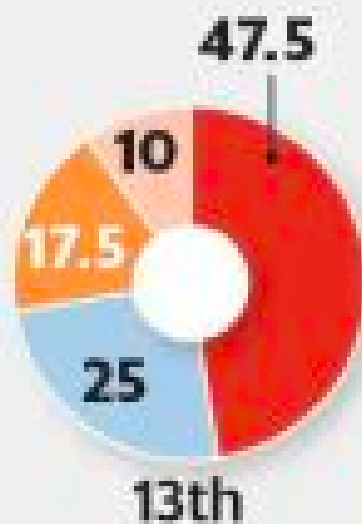
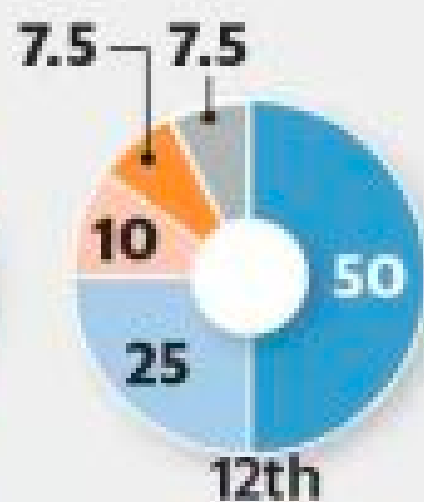
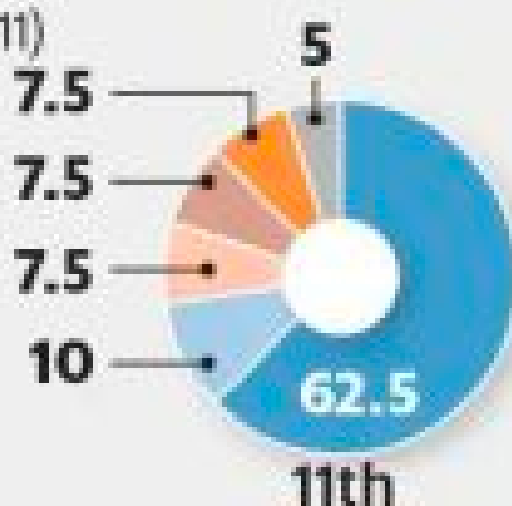
- The FC is constituted every five years and is a body that is exclusively constituted by the Union Government. It consists of a chairman and four other members who are appointed by the President.**
- The Finance Commission (Miscellaneous Provisions) Act, 1951, has specified the qualifications for chairman and other members of the commission.**
- The Union government has notified the constitution of the 16th Finance Commission under the chairmanship of Dr. Arvind Panagariya for making its recommendations for the period of 2026-31.**

| Criteria | 14 th Finance Commission Weightage (2015-20) | 15 th Finance Commission Weightage (2021-26) |
|----------------------------|--|--|
| Income Distance | 50.0 | 45.0 |
| Population - 1971 | 17.5 | ----- |
| Population - 2011 | 10.0 | 15.0 |
| Area | 15.0 | 15.0 |
| Forest Cover | 7.5 | ----- |
| Forest & Ecology | ----- | 10.0 |
| Demographic Performance | ----- | 12.5 |
| Tax Effort | ----- | 2.5 |
| Total | 100.00 | 100.00 |

What finance commissions considered to determine what each state receives

Weightage under different finance commissions (in %)

■ Income distance ■ Population (1971) ■ Area
 ■ Index of infrastructure ■ Fiscal discipline ■ Tax effort
 ■ Fiscal capacity distance
 ■ Population (2011)
 ■ Forest cover
 ■ Demographic performance





What are the issues?

- **Firstly, cess and surcharge collected by the Union government is estimated at around 23% of its gross tax receipts for 2024-25, which does not form part of the divisible pool and hence not shared with the States.**
- **Secondly, the amount each State gets back for every rupee they contribute to Central taxes shows steep variation.**
- **Third, the percentage share in the divisible pool of taxes has been reducing for southern States over the last six FCs**



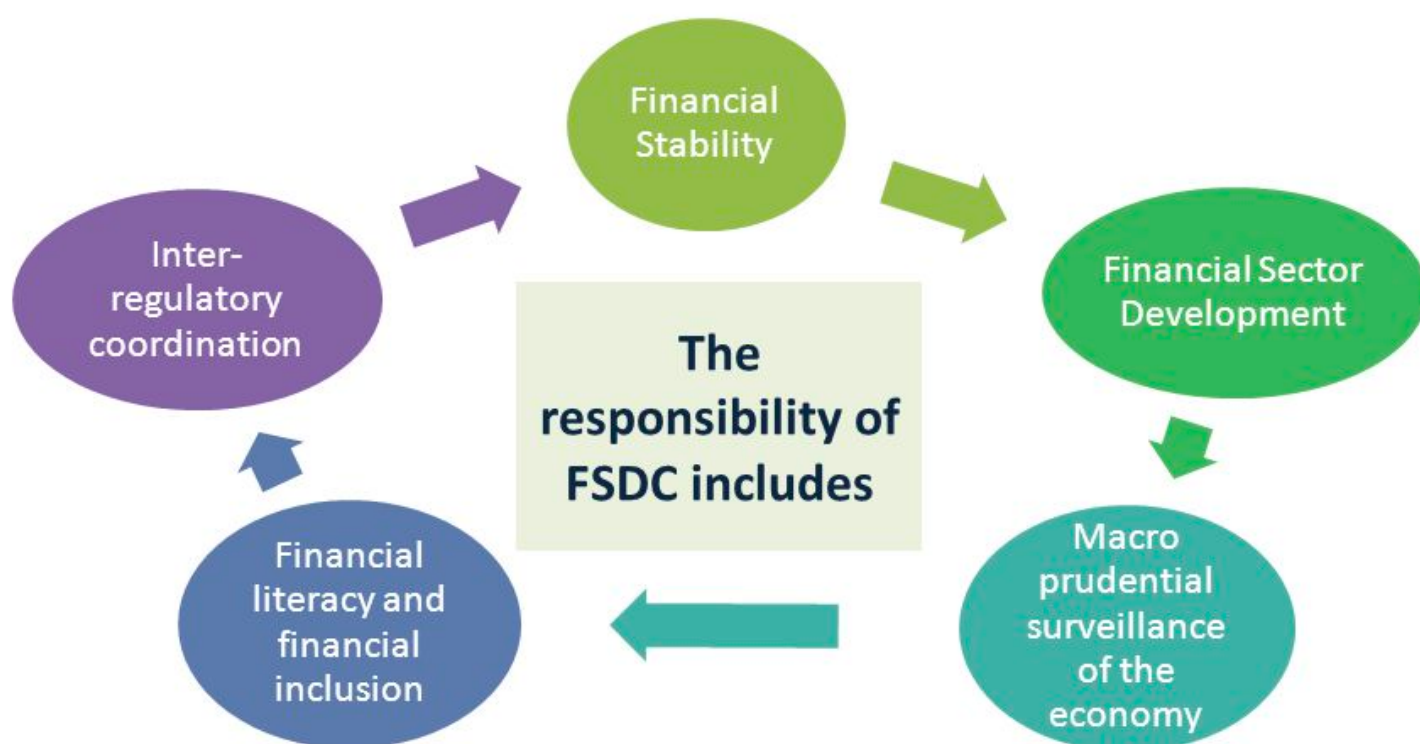
What can be the way forward?

- Firstly, the divisible pool can be enlarged by including some portion of cess and surcharge in it.
- The Centre should also gradually discontinue various cesses and surcharges it imposes by suitably rationalising the tax slabs.
- Secondly, the weightage for efficiency criteria in horizontal devolution should be increased.
- GST being a consumption-based destination tax that is equally divided between the Union and the State means that State GST accrual (inclusive of Integrated GST settlement on inter-state sales) should be the same as the Central GST accrual from a State.
- Finally, similar to the GST council, a more formal arrangement for the participation of States in the constitution and the working of the FC should be considered

ECONOMY IN NEWS

Financial Stability and Development Council

The FSDC, set up in 2010, is a body consisting all regulators and the Ministry of Finance. It is the highest forum in matters relating to financial stability. The Council is chaired by the Union Finance Minister





Target Mains 2024

Q What role finance commission has on maintaining fiscal federalism??

Q राजकोषीय संघवाद को बनाए रखने में वित्त आयोग की क्या भूमिका है??

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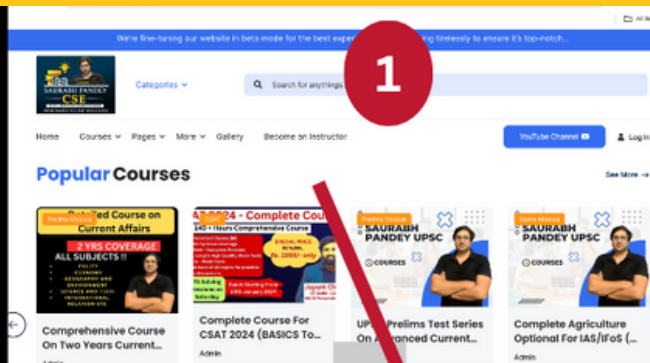


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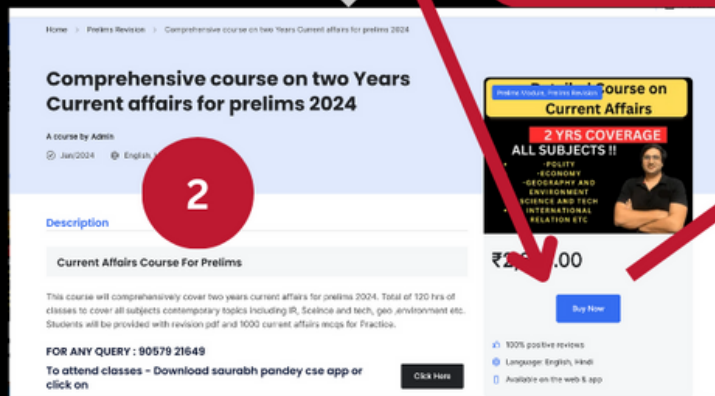
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THE HINDU ANALYSIS

23rd Feb 2024

by saurabh
pandey



Topic

Guinea worm disease

- Guinea worm disease, a neglected tropical disease (NTD), is caused by the parasite *Dracunculus medinensis*.
- The disease affects poor communities in remote parts of Africa that do not have safe water to drink.
- There is neither a drug treatment for Guinea worm disease nor a vaccine to prevent it.

- A parasite is an organism that feeds off another organism to survive.
- GWD is spread by drinking water containing Guinea worm larvae.
- Larvae are immature forms of the worm



The Life Cycle of Guinea Worm Disease

1 The cycle starts...

Seeking relief from pain, sufferer soaks a blister with exposed worm in nearby water source. On contact with water, the worm bursts, releasing hundreds of thousands of immature first-stage larvae into the water.

3 Another person drinks the water containing the water fleas with the infective larvae. The water fleas are digested, releasing the larvae in the stomach.

7 The cycle continues...

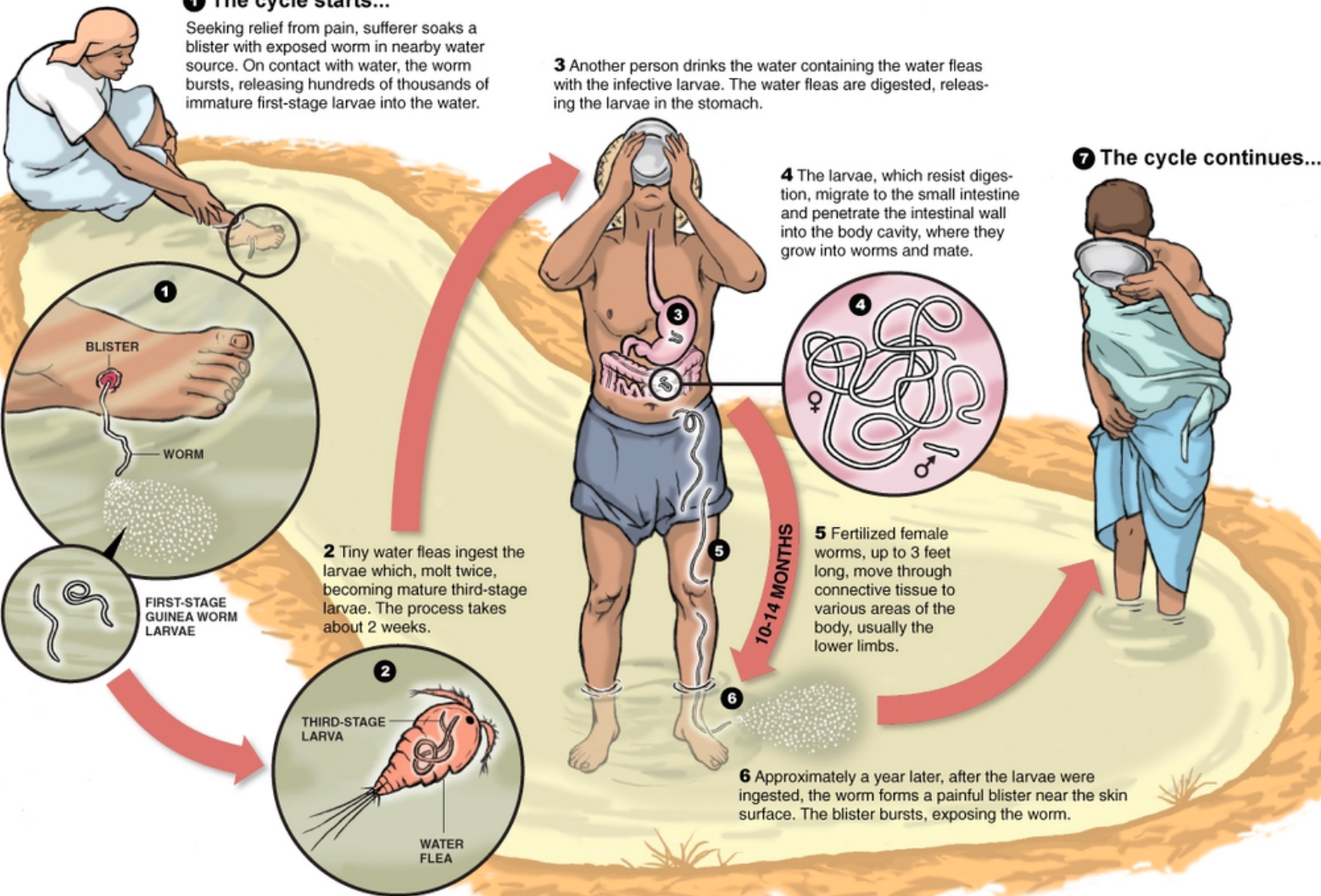
4 The larvae, which resist digestion, migrate to the small intestine and penetrate the intestinal wall into the body cavity, where they grow into worms and mate.

5 Fertilized female worms, up to 3 feet long, move through connective tissue to various areas of the body, usually the lower limbs.

6 Approximately a year later, after the larvae were ingested, the worm forms a painful blister near the skin surface. The blister bursts, exposing the worm.

2 Tiny water fleas ingest the larvae which, molt twice, becoming mature third-stage larvae. The process takes about 2 weeks.

10-14 MONTHS





Topic -2

India UK relationship

- separated by thousands of miles, we are inherently connected by the ocean, the world's great global commons.
- Trade in food and goods underwrites our mutual prosperity, supporting the lives and livelihoods of so many.
- Global trade is predominantly a maritime activity, and this remains a fundamental truth in the Information Age too.
- But, today, our reliance on the maritime is only increasing, with the recognition that the data supporting online banking and capital flows also moves via underwater cables.



- the global lifelines of goods and resource that [x]flow across the seas and on which our economies rely.
- But the norms of behaviour upon the seas — norms which have enabled globalisation to [x]flourish, and the wider rules-based International Order of which they are a part — are all increasingly under threat, from the Black Sea to the Red Sea to the South China Sea.
- the United Kingdom, the United States and other partners joined in Operation Prosperity Guardian to defend and protect commercial shipping in the Red Sea and Gulf of Aden.
- The Houthi attacks are indiscriminate and putting at risk the lives of innocent seafarers who seek to make their livelihood at sea



- Our defence industrial partnership is, similarly, going from strength to strength. From electric warship propulsion to complex weaponry to jet engines.





Topic -3-Regulation of space sector

- **Space technologies and space flight are expensive, risky endeavours that only national agencies were suited to engage in for decades.**
- **This is no longer true as private sector players are increasingly expected to complement, augment, and/or lead the way by identifying market opportunities and innovating rapidly.**
- **India started on this path in 2020 with state-led reforms that opened its space sector to private companies, then releasing the ‘Geospatial Guidelines’ and later the ‘Indian Space Policy’, creating the Indian National Space Promotion and Authorisation Centre (IN-SPACe), and passing the Telecommunications Act 2023 that, among other departures from the Indian Telegraph Act, 1885, provided for satellite broadband services.**



- **.On February 21, the government opened the door to 100% foreign direct investments (FDI) in the “manufacturing of components and systems/sub-systems for satellites, ground segment and user segment” — up to 74% in satellite-manufacturing, operations, and data products; and up to 49% in launch vehicles, space ports, and their corresponding systems.**
- **As such, by stepping out of the way and allowing substantial FDI via the automatic route, the government has taken the logical next step in spurring the contributions of private space □flight operators, technology-developers, and application designers to the national space economy, in line with ambitions outlined in the Space Policy.**

- According to IN-SPACe chairman Pawan K. Goenka, a “significant” slice of the \$37.1 billion that the space sector raised worldwide in 2021-23 went to space start-ups.
- new investments can add to India’s space economy by improving start-ups’ access to talent and capital; effecting a better balance between upstream and downstream opportunities, versus the current skew in favour of the former; boosting local manufacturing; and improving investor confidence.



About IN-SPACe

Indian National Space Promotion and Authorization Centre (IN-SPACe):

- It is an autonomous agency in the Department of Space, promoting, enabling, and supervising non-government entities in the space sector.
- It acts as a single-point interface between ISRO and private industries.
- It is headquartered at Bopal, Ahmedabad.



Topic -4 Economy vs Human rights

- **German companies face the challenge of balancing business in China with growing human rights concerns. □**
- **Allegations of forced labour impact major firms like VW, BASF, and Apple, prompting varied responses. □**
- **The U.S. 2021 Uyghur Forced Labour Prevention Act tightens regulations on Xinjiang-related imports. □**



- **China denies internment camp claims, shifts detainees, and enforces restrictions. □**
- **The EU considers comprehensive legislation targeting forced labour, while Germany grapples with national and EU supply chain sustainability proposals. □**
- **VW's current challenges highlight the global debate on corporate accountability and governance standards.**



What is the status of the EU legislation?

- **Unlike the U.S. ban's focus on imports from Xinjiang, the European Union (EU) has proposed a more comprehensive law targeting all products reliant on forced labour, including those made within the 27-member bloc.**
- **There is concern that country-focused bans could be viewed as discriminatory measures under World Trade Organization (WTO) rules.**
- **The law aims to apply the International Labour Organisation (ILO)'s definition of forced labour and concentrate enforcement on large companies.**



- **The EU trade officials are sceptical that a ban on imports is the best way to prevent rights abuses.**
- **Meanwhile, a separate EU-wide Corporate Sustainability**
- **Due Diligence Directive, targeting social, environmental and human rights abuses in supply chains, has also stalled since 2022.**



Topic -5-Interpol and Issues

- **The International Criminal Police Organization, more commonly known as Interpol, comprising 194 member countries, plays a crucial role as an information-sharing network to enable national police forces to combat transnational crimes.**
- **Concerns have been raised about the misuse of Interpol's notice system, especially the issuance of blue corner notices, which are less scrutinised than their red corner notices**

What is a “blue corner” notice?

- **There are seven types of notices issued by Interpol — Red Notice, Yellow Notice, Blue Notice, Black Notice, Green Notice, Orange Notice, and Purple Notice.**
- **A blue corner notice also known as an “enquiry notice” allows police forces in member states to share critical crime-related information such as obtaining a person’s criminal record, and location and, having his or her identity verified among others**

How does it differ from a “red corner” notice?

- A red corner notice is issued by a member state to arrest a wanted criminal through extradition or any other similar lawful action.
- Such notices are issued against persons wanted by national jurisdictions for prosecution or to serve a sentence based on an arrest warrant or a court decision.
- The country issuing the request need not be the home country of the fugitive, Interpol acts even on the request of a country where the alleged crime has been committed.

- While blue corner notices are issued prior to the filing of criminal charges, red corner notices generally follow criminal convictions.
- The concerned individual can be stopped and arrested while travelling through a member state.
- There will also be other detrimental consequences such as the closure of bank accounts.
- However, Interpol cannot compel law enforcement authorities in any country to arrest the subject of a red corner notice as the exercise of such powers is entirely discretionary

TYPES OF INTERPOL NOTICES



RED NOTICE: To seek the location and arrest of wanted persons with a view to extradition or similar lawful action.



YELLOW NOTICE: To help locate missing persons, often minors, or to help identify persons who are unable to identify themselves.



BLUE NOTICE: To collect additional information about a person's identity, location or activities in relation to a crime.



BLACK NOTICE: To seek information on unidentified bodies.



GREEN NOTICE: To provide warnings and intelligence about persons who have committed criminal offences and are likely to repeat these crimes in other countries.



ORANGE NOTICE: To warn of an event, a person, an object or a process representing a serious and imminent threat to public safety.



INTERPOL-UN SECURITY COUNCIL SPECIAL NOTICE: Issued for groups and individuals who are the targets of UN Security Council sanctions committees.



PURPLE NOTICE: To seek or provide information on modus operandi, objects, devices and concealment methods used by criminals.

Topic -6-Raisina Dialogue

The Raisina Dialogue is India's flagship conference on geopolitics and geo-economics, committed to addressing the most challenging issues facing the international community.

2. The 9th edition of the Raisina Dialogue will be held from 21-23 February, 2024.

3. Prime Minister Shri Narendra Modi will inaugurate the Dialogue on 21 February. Prime Minister of the Hellenic Republic (Greece), H.E. Mr. Kyriakos Mitsotakis, will join the inaugural session as the Chief Guest, and deliver the keynote address.

4. The 9th Raisina Dialogue will witness participation of representatives from over 100 countries including Ministers, former Heads of State and Heads of Government, Military Commanders, Captains of Industry, Technology Leaders, Academics, Journalists, Scholars on Strategic Affairs, Experts from leading Think Tanks, and Youth.



Raisina Dialogue

5. The theme of the 2024 edition is "Chaturanga: Conflict, Contest, Cooperate, Create". Over the course of three days, decision makers and thought leaders of the world will engage each other across conversations in various formats, over six thematic pillars: (i) Tech Frontiers: Regulations & Realities; (ii) Peace with the Planet: Invest & Innovate; (iii) War & Peace: Armouries & Asymmetries; (iv) Decolonising Multilateralism: Institutions & Inclusion; (v) The Post 2030 Agenda: People & Progress; and (vi) Defending Democracy: Society & Sovereignty.

Mapping





Target Mains 2024

Q Security and technology are new themes in maintaining international relations. Discuss

Q अंतरराष्ट्रीय संबंधों को बनाए रखने में सुरक्षा और प्रौद्योगिकी नए विषय हैं। चर्चा करना

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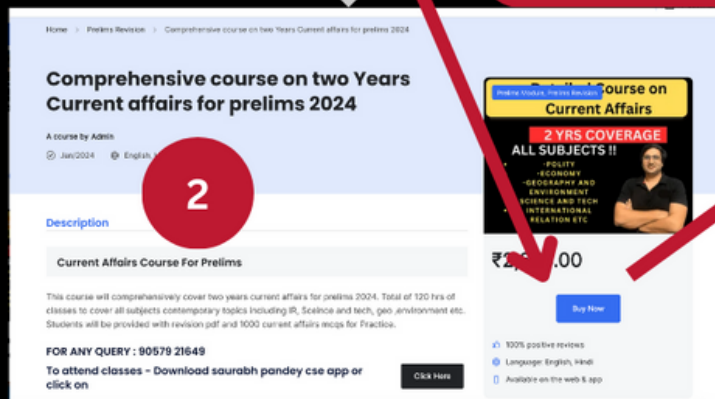
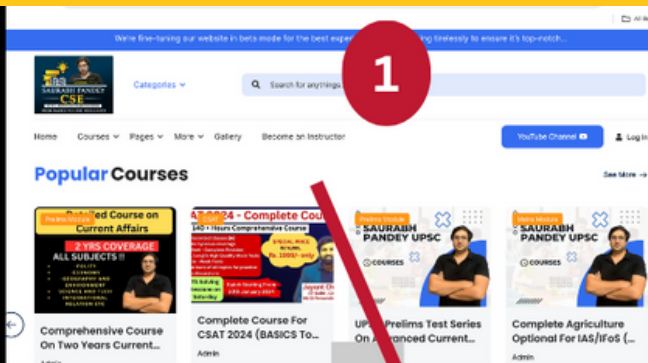
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THE HINDU ANALYSIS

24th Feb 2024

by saurabh
pandey



Topic

What is greyzone conflict??

| Gray zone technique | Details | Purpose | Example(s) |
|--|---|--|--|
| Information warfare | Dissemination of misleading information and propaganda; appeal to diaspora and ethnic ties. | Erosion of political peace and unity within an opponent's domestic political environment. | Conflicting representations of the Maidan activists by Russian and Ukrainian media. |
| Economic pressure | State-level economic sanctions and blackmail; significant in cases of asymmetric economic interdependence. | Erosion of the opponent's key economic sectors. | Sanctions regimes between Russia and West; breakdown of Russian–Ukrainian energy sector ties. |
| Material support to sub-state entities | Material and political support for rebels and local elites through supplies of war materiel. | States' desire to insulate themselves from responsibility domestically and internationally; insulation from war casualties. | Russia's material support for the rebels of Luhansk and Donetsk; Ukrainian support for volunteer battalions. |
| Gradualism | States utilize hybrid warfare techniques in a gradual manner with only short-term tactical objectives being relatively overt. | Making the final point of victory in the conflict by all parties ambiguous for the opponent; revision of the order of alliances and international norms. | Use of cyber space by Russia to gradually erode the integrity of military and civilian infrastructure in Ukraine; “special” bilateral relations between Russia and individual EU states and policymakers (i.e. Italy and Hungary). |

What does hybrid warfare entail?



Source: MSC

HYBRID WARFARE



Topic -2

PAPA Detect CMEs

- The Indian Space Research Organisation (ISRO) on Friday said that the Plasma Analyser Package for Aditya (PAPA) payload onboard the Aditya-L1 has detected the impact of coronal mass ejections (CMEs).
- PAPA is an energy and mass analyser designed for in-situ measurements of solar wind electrons and ions in the low energy range. It has two sensors: the Solar Wind Electron Energy Probe (SWEEP, measuring electrons in the energy range of 10 eV to 3 keV) and the Solar Wind Ion Composition Analyser



- **The SWEEP and SWICAR sensors on PAPA-Aditya-L1 are currently making continuous observations of solar wind electrons and ions in the default mode, demonstrating that they are performing as per the design in all modes of operations**

ADITYA-L1 MISSION

- The first Indian space-based observatory-class solar mission
- To be launched by ISRO's PSLV XL rocket from Satish Dhawan Space Centre SHAR (SDSC-SHAR), Sriharikota
- Has to be deployed at L1 point where it can view the sun without any eclipse. L1 lies between Sun-Earth line

LAUNCH
DATE:

2 Sep, 2023

TOI

DISTANCE:

1.5 mn km
(from earth)

COST:

378.53 cr

TIME:

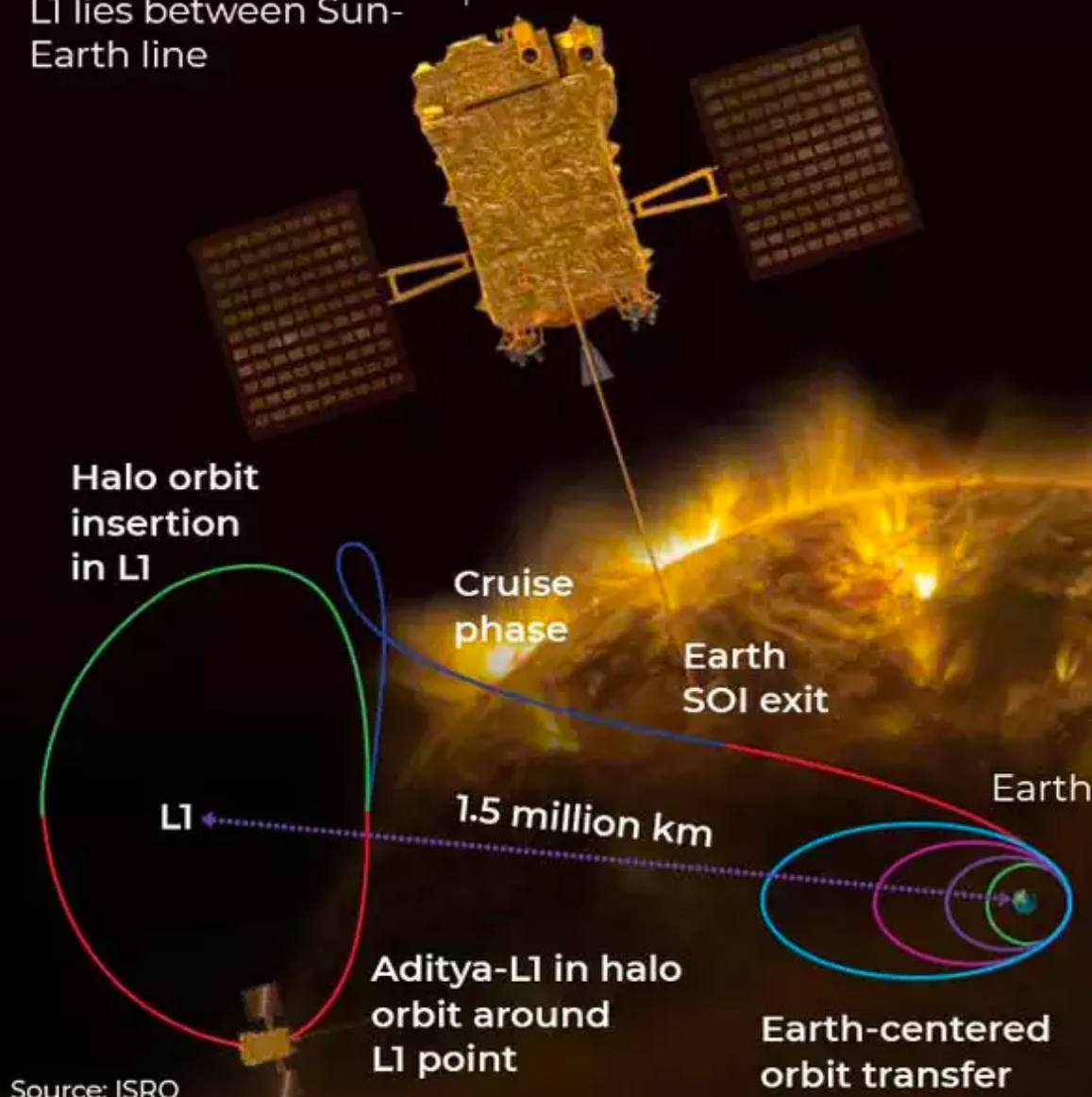
4 months

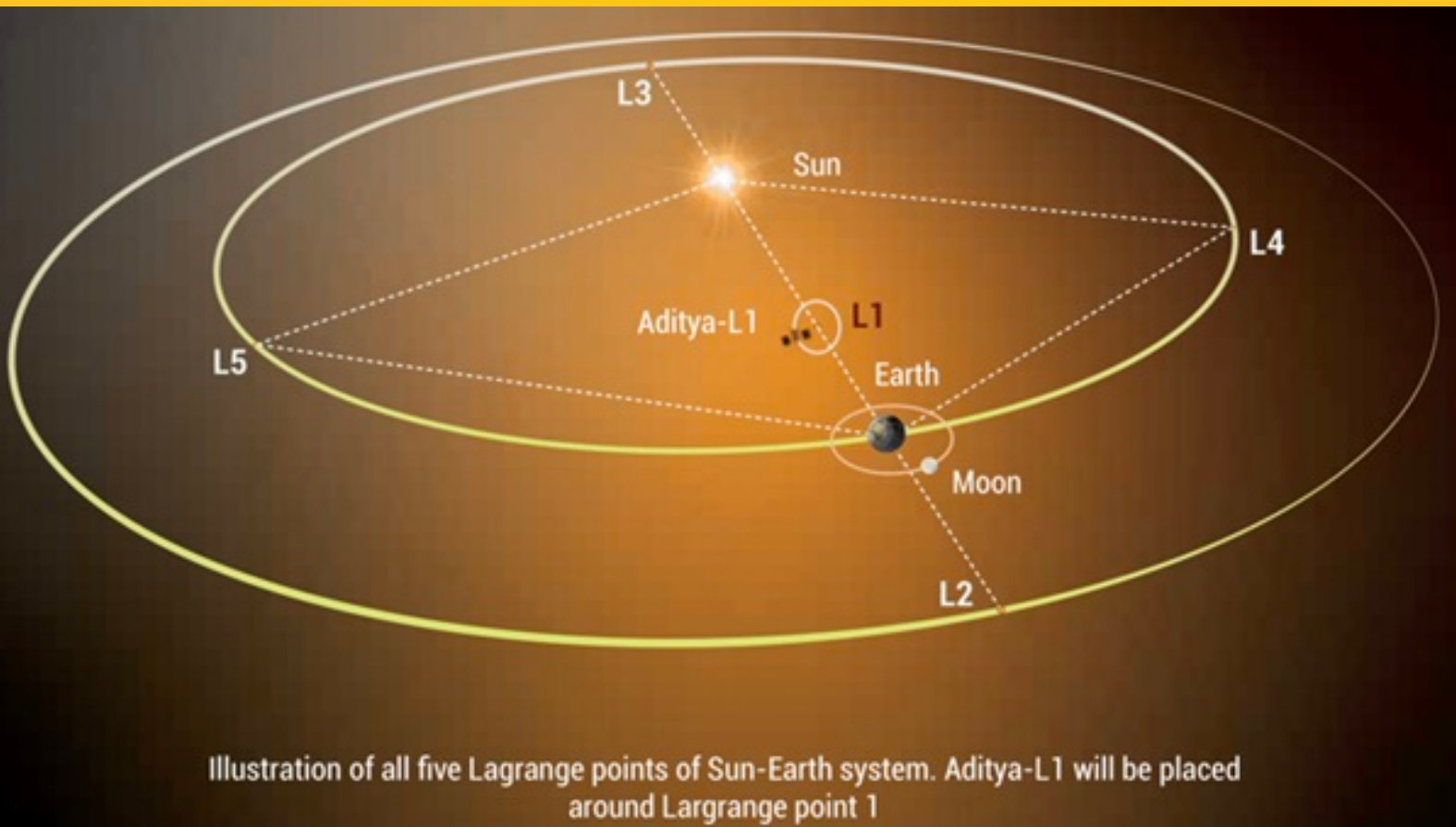
PAYLOADS:

7 (VELC, SUIT, SoLEXS, HELIOS, ASPEX, PAPA, Digital Magnetometers)

MAJOR OBJECTIVES:

To understand corona, solar wind, solar atmosphere, sun flares, and near-earth space weather





PAYLOADS

The spacecraft carries seven scientific payloads for systematic study of the Sun. All payloads are indigenously developed in collaboration with various ISRO Centres and Scientific Institutes.

VELC

Corona / Imaging, Spectropolarimetry & Spectroscopy, IIA, LEOS, URSC, IISU, SAC

SUIT

Photosphere and Chromosphere / Imaging, IUCAA, LEOS, URSC, IISU

SoLEXS

Soft X-ray spectrometer, URSC

HEL10S

Hard X-ray spectrometer, URSC

ASPEX

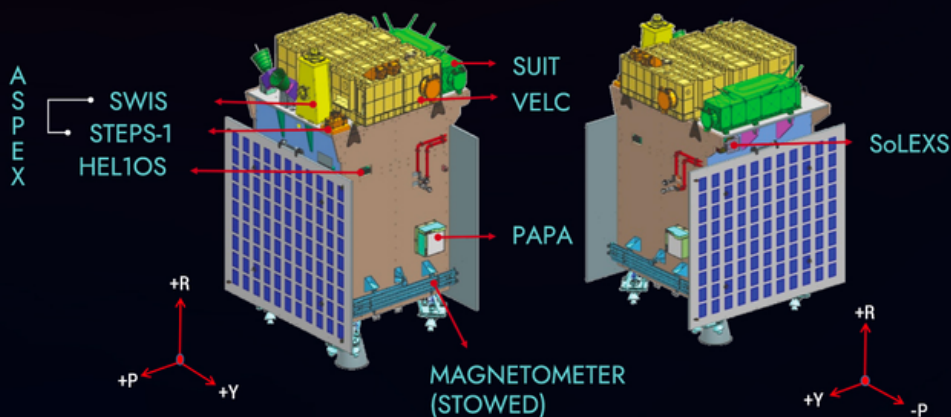
Solar wind / Particle Analyzer/ In-situ measurement, PRL (SAC)

PAPA

Solar wind / Particle Analyzer/ In-situ measurement, VSSC

MAG

Measure Magnetic Field / In-situ measurement, LEOS

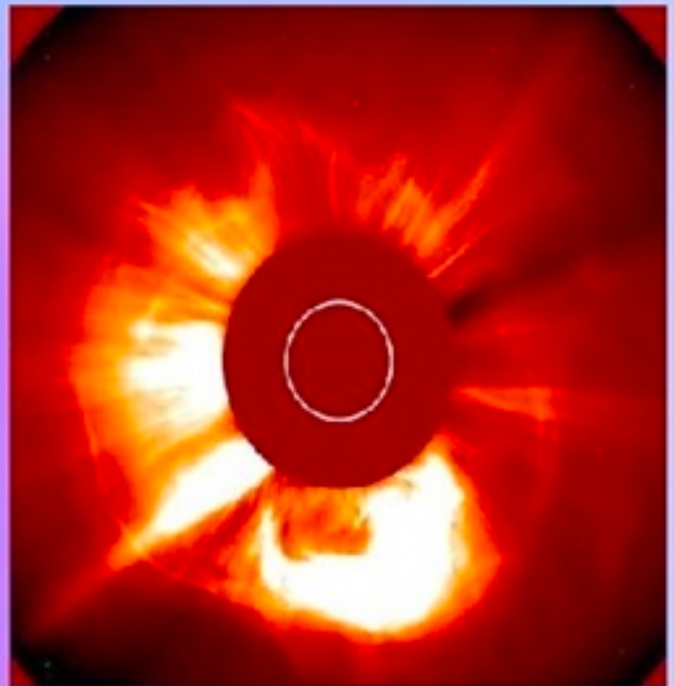


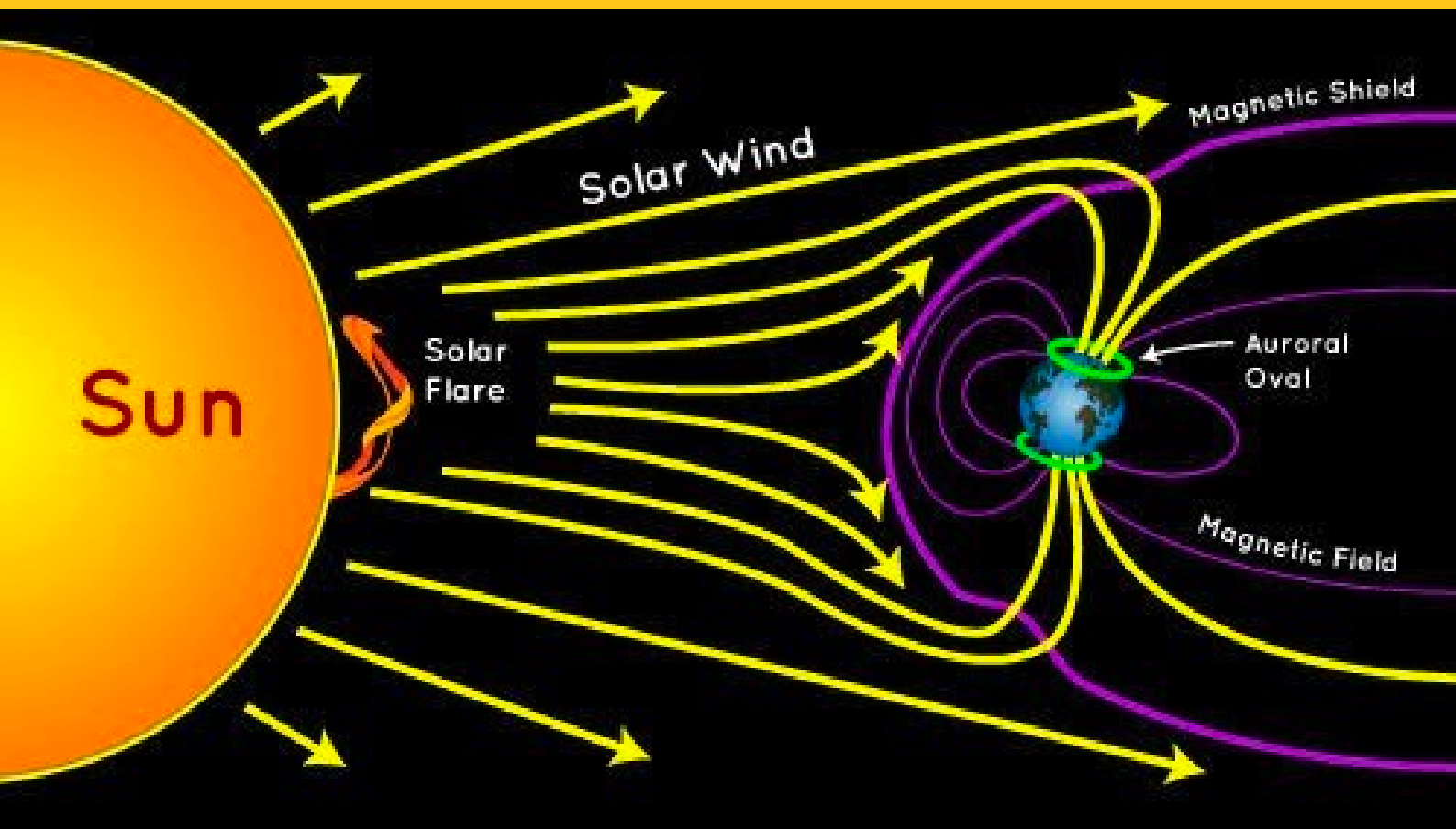
The location of all seven payloads.

R, P, and Y indicate the Raw, Pitch, and Roll axis of the spacecraft.

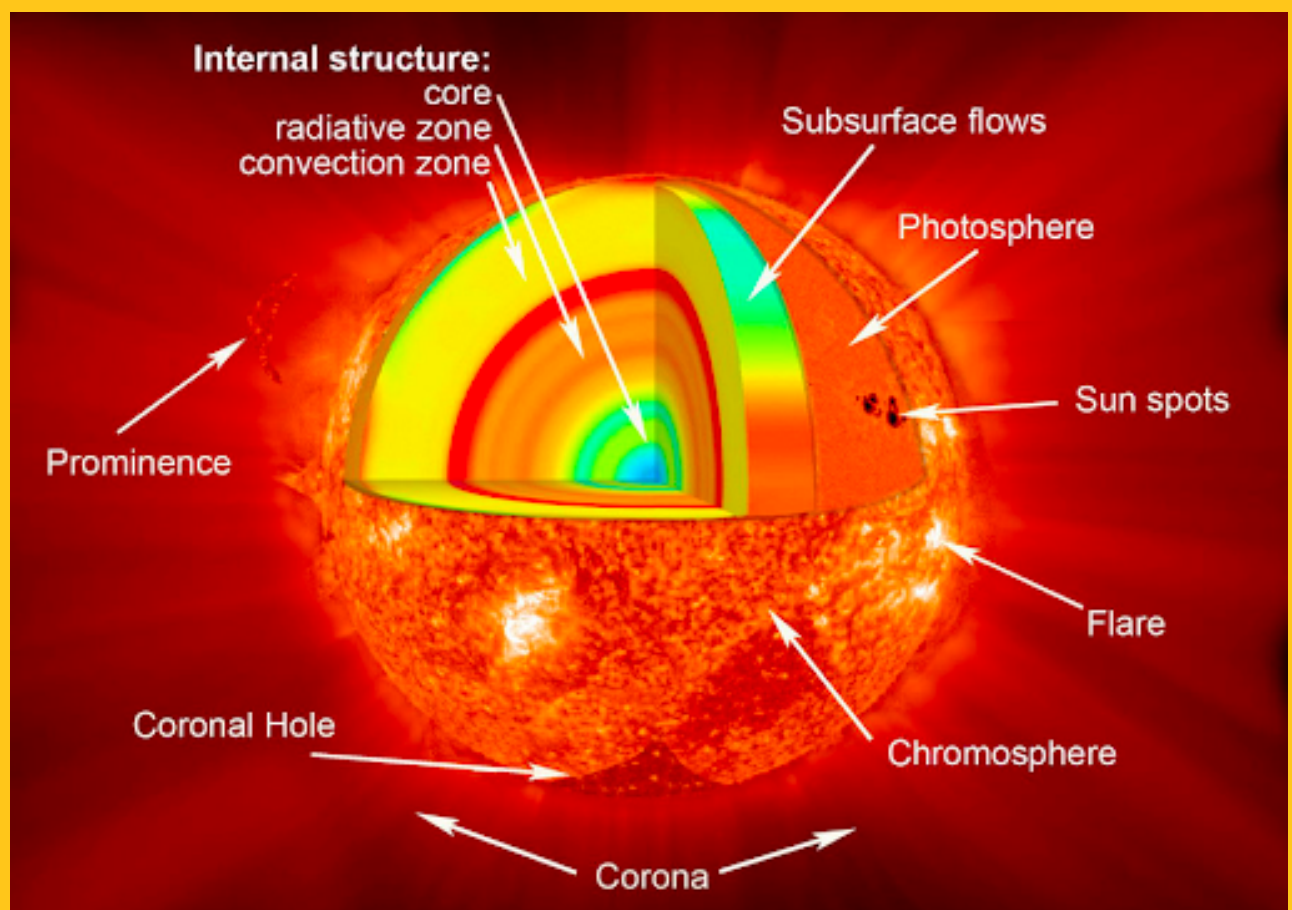
Coronal Mass Ejection

- Also known as CME
- CMEs are huge bubbles of gas within magnetic field lines that are ejected from the Sun over the course of several hours





Coronal mass ejection



Topic -About Avalanche

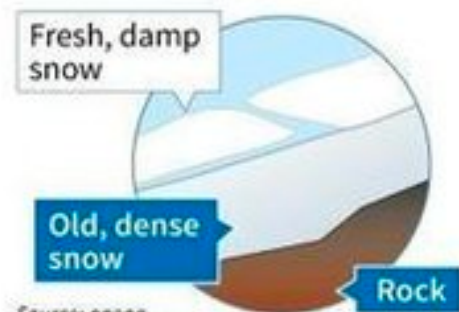
Avalanches

Slab avalanche

Speed up to 140 kph
High density



- Fresh, damp snow, or old and brittle snow breaks away in slabs. Often set off by skiers

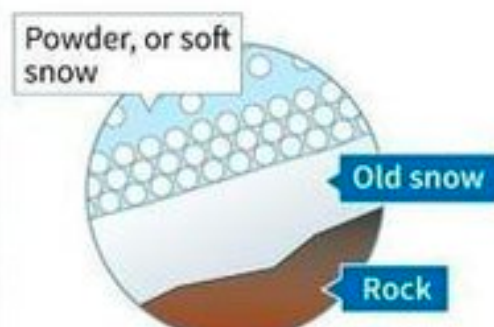


Powder snow avalanche

Speed up to 300 kph
Low density

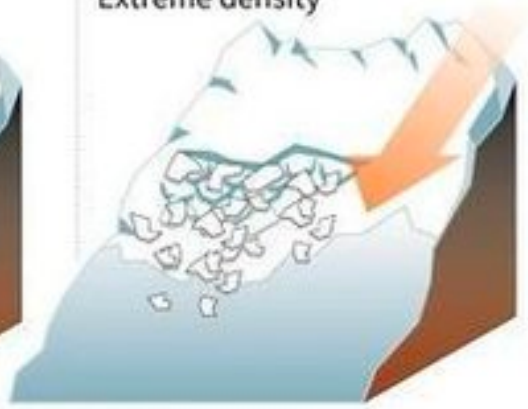


- Fresh powder snow fails to find traction on an older layer of snow

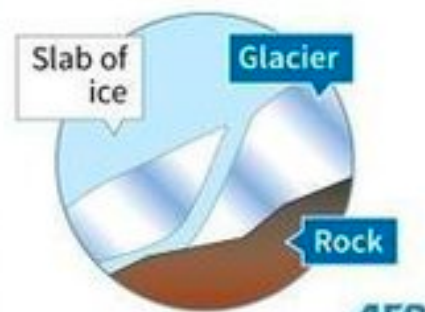


Glacier avalanche

Very high speed
Extreme density

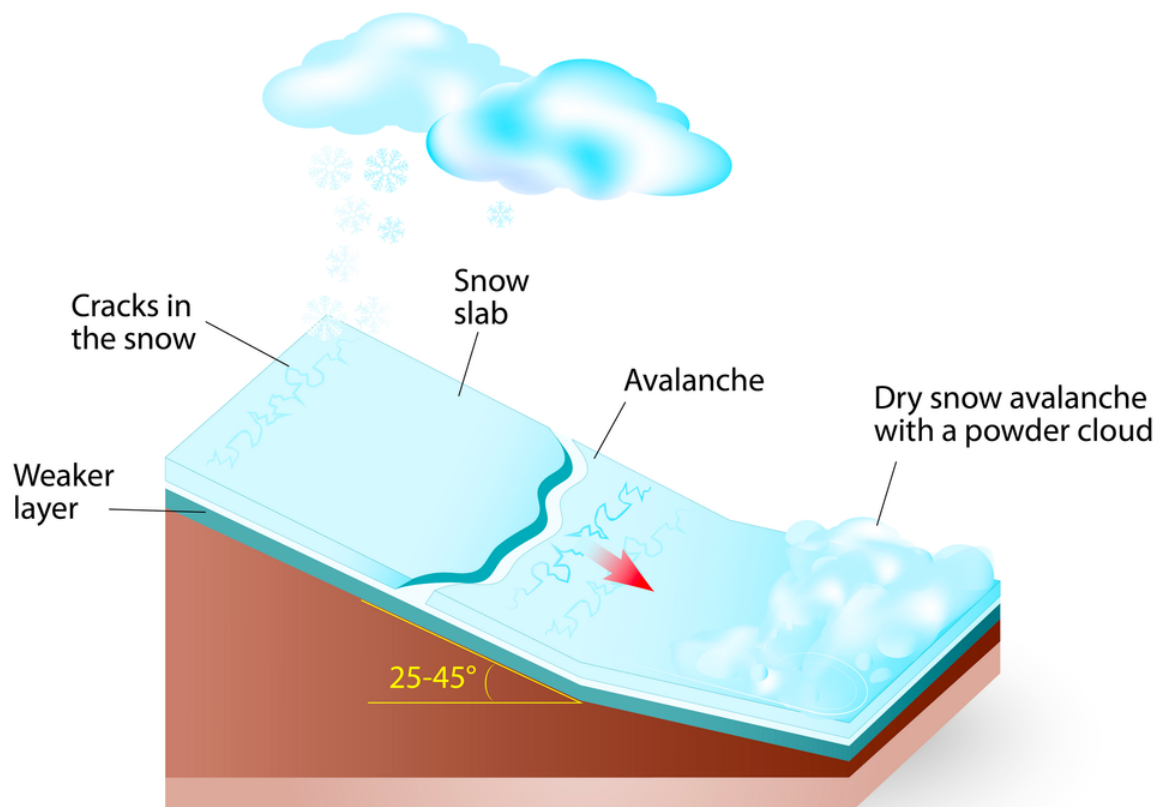
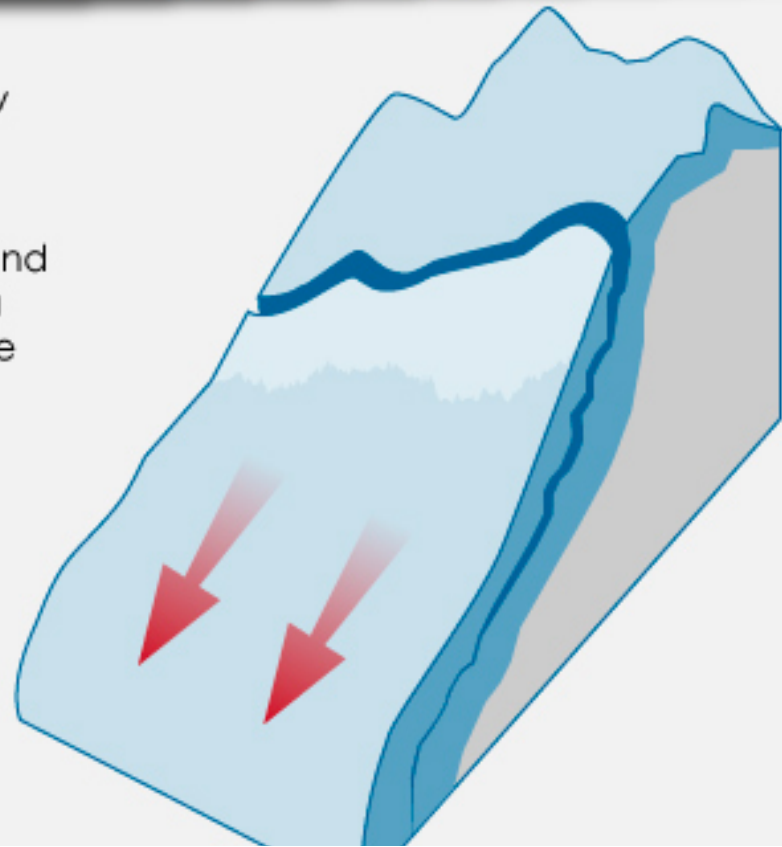


- Sections on the edges of a glacier break away and cause an avalanche



HOW AN AVALANCHE IS FORMED

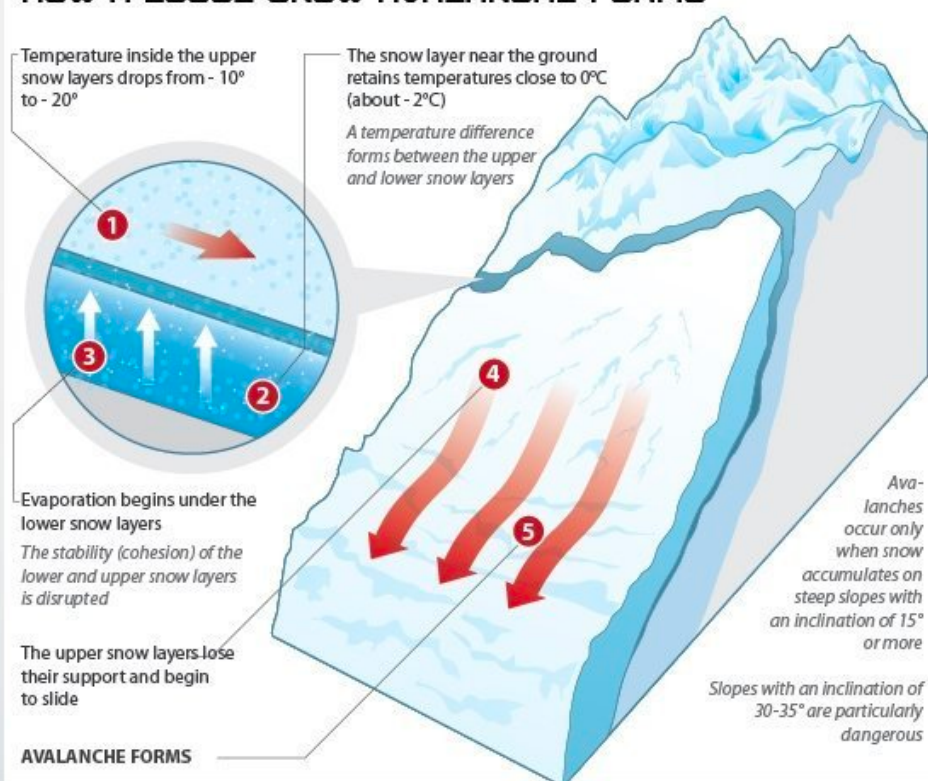
- 1** Temperature in the top layer of snow decreases
- 2** The layer of snow closest to the ground maintains its temperature, causing a temperature difference between the upper & lower layers of snow
- 3** Evaporation begins to occur in the lower layers disrupting the stability of the snow above
- 4** The upper layers of snow lose grip and begin to slide, causing an avalanche



CAUSES OF AVALANCHES

An avalanche is a mass of snow falling or sliding down from large mountain slopes. It resembles a landslide. As it moves, the avalanche creates a shock wave facilitating the greatest destruction

HOW A LOOSE SNOW AVALANCHE FORMS



SPEED OF AVALANCHES AND SNOW DENSITY

As a rule, dry avalanches move at 20-70 meters per second and up to 125 meters per second, with snow density being $0.02-0.3 \text{ g/cm}^3$

Wet avalanches move at 10-20 meters per second and up to 40 meters per second, with snow density being $0.3-0.4 \text{ g/cm}^3$

The speed of avalanches depends on the ground where the snow is lying, on the slope inclination and on the condition and size of the snow mass. The average speed of avalanches is about 20-30 meters per second

TYPES OF AVALANCHES

INTERESTING FACTS

Loose snow avalanches

They slide down the entire surface of the slope outside specific channels

* Loose snow avalanches

"Trough" type avalanches

move down narrow gullies, ravines and erosion furrows

"Jumping" avalanches

These free-falling avalanches move along ledges

The first snow avalanche was mentioned in 1129. A historical document records the death of people from the entourage of Bishop Rudolf who was headed for Rome via the Great St. Bernard Pass in the Swiss Alps.

On January 10, 1962, a huge avalanche, called by some experts the largest in the history of recorded observations, wiped out an entire city in Peru. The 1,000 meter long avalanche edge rushed along at a speed of 150 kilometers per hour.



Topic-Amendment in surrogacy rules

- The Union government has modified the Surrogacy (Regulation) Rules, 2022 and notified that both gametes need not come from a married couple in case they are certified as suffering from a medical condition.**
- As per the latest amendment, the couple can have a child born through surrogacy but must have at least one gamete from the intending couple. Also, single women (widow or divorcee) undergoing surrogacy must use self-eggs and donor sperm to avail surrogacy procedures.**



Topic- NB8 ROLE

- **□ In this year's Raisina Dialogue in New Delhi, we, the eight Nordic-Baltic countries, are participating in it together as representatives of the Nordic-Baltic cooperation, the NB8.**
- **Our message is clear: in times of turmoil and conflict, the world needs more trust, dialogue and cooperation.**
- **join forces to protect and defend peace and stability, to oppose aggression, to maintain a rules-based world order, and to strengthen a world economy based on free trade, sustainability and long-term partnerships**

About NB8



- ➡ The Nordic-Baltic (NB8) countries encompass a coalition of eight nations in Northern Europe, consisting of the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) and the Baltic states (Estonia, Latvia, and Lithuania).
- ➡ This alliance collaborates on a range of economic, diplomatic, and strategic endeavors aimed at fostering regional cooperation and tackling mutual challenges.
- ➡ Marked by their tight geographical proximity and intertwined historical, cultural, and economic connections, this region functions as a nexus for cooperative efforts and alliances among these countries. Key areas of collaboration include trade, innovation, and diplomatic relations.



About NB8

- Represent the governments of eight countries of the north: Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden.
- linked geographically, and we share deep historical, social, economic and cultural ties.
- Our advanced economies are outward-looking, innovation-driven, complementary and fully integrated into the world's largest single market area, the European Common Market.
- Taken together, the size of the Nordic-Baltic economies would qualify not only for the G-20 but also the G-10.
- countries share a commitment to democracy and human rights.
- We are all champions of an international order based on multilateralism and international law



- **Diverse links with India**
- **The Nordic-Baltic cooperation with India spans fields as diverse as innovation, green transition, maritime, health, intellectual property rights, new technologies, space cooperation and artificial intelligence, student exchanges, culture and tourism.**
- **Trade and investment figures between our region and India are steadily increasing.**
- **Jointly, India and the Nordic-Baltic countries are coming together in pursuit of common goals.**
- **In a time of geopolitical shifts, the security of the Nordic-Baltic region and the Indo-Pacific is interlinked.**



- **Today, it is more essential than ever to work together to uphold international law, and to build capacity to tackle both traditional and non-traditional security threats, be it in India's neighbourhood or in our own.**
- **We recognise India's increasingly important role in international politics.**
- **India has taken on important global responsibilities.**
- **Indian leadership, as illustrated not least through the successfully concluded G-20 presidency, is increasingly important for global security and prosperity.**



- **Our objective for coming to India is clear: in a more interconnected world, challenges are shared and require us to work together.**
- **In recent years, we have all experienced global health, climate-related and geopolitical shocks that have caused significant strain to our peoples, the international system and indeed on our common planet.**
- **We see an urgent need to get back to a more positive agenda for global cooperation.**
- **This is an ambition that we share with India, and one where our enhanced cooperation can make a difference**



Target Mains 2024

**Essay topic- “The spirit is beyond destruction. No one can bring an end to spirit which is everlasting
“आत्मा विनाश से परे है। कोई भी उस आत्मा का अंत नहीं कर सकता जो शाश्वत है**

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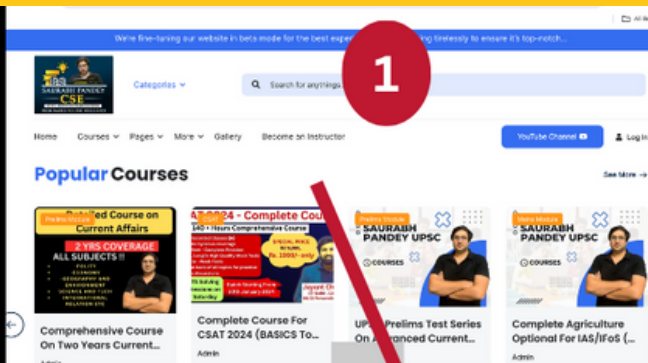


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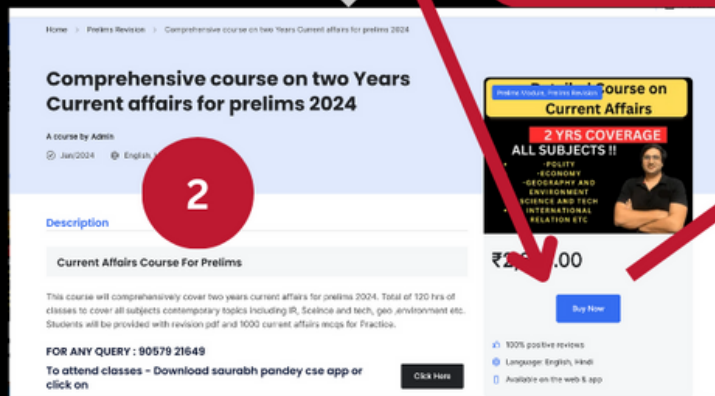
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THE HINDU ANALYSIS

25th Feb 2024

by saurabh
pandey



PRELIMS TEST 20

Advanced current affairs

SCHEDULED
Today - 9PM



Link IN description

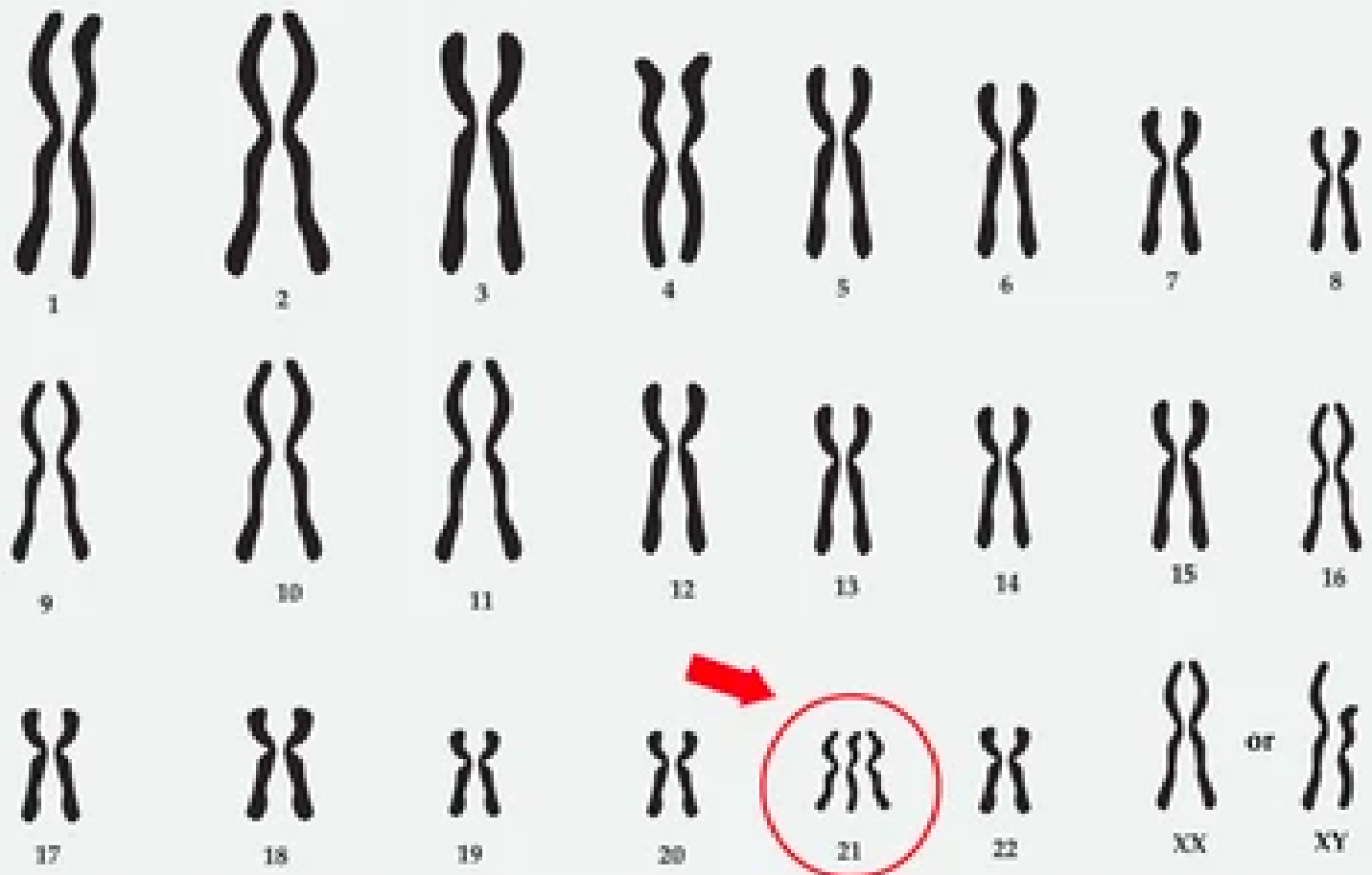


Topic-Edward syndrome

- Add Researchers have reported chromosomal disorders discovered from prehistoric skeletal remains, dating up to approximately 5,500 years old – including six cases of Down syndrome and one case of Edwards syndrome subheading
- Individuals with chromosomal trisomy carry three copies of a chromosome in their cells, instead of two. Trisomy of chromosomes number 21 or 18 results in Down syndrome and Edwards syndrome, respectively

The hindu analysis by saurabh
pandey sir

Down syndrome - Trisomy 21



The hindu analysis by saurabh
pandey sir

Edwards Syndrome (Trisomy 18)

- Kidney, Heart, CNS malformations
- Many die in utero
- Half of those born don't survive past 1st week.
- Can be diagnosed in utero via ultrasound and maternal serum markers like α -fetoprotein.



Topic- kerala implements H1 Rule on Antimicrobial resistance

- In 2011, the Indian government introduced the H1 rule to prohibit the over-the-counter (OTC) sales of antibiotics without a prescription, responding to the growing concern over antimicrobial resistance (AMR).

•

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pandey sir



REGIONAL OFFICE FOR

World Health
Organization

Europe

Antimicrobial resistance (AMR)

is the ability of a microorganism to survive and resist exposure to antimicrobial drugs, threatening the effectiveness of successful treatment of infection.

There are **different types of antimicrobials** which work against **different types of microorganisms**, e.g. antibacterials or antibiotics against bacteria, antivirals against viruses, antifungals against fungi, etc.

#AMR #antimicrobialresistance

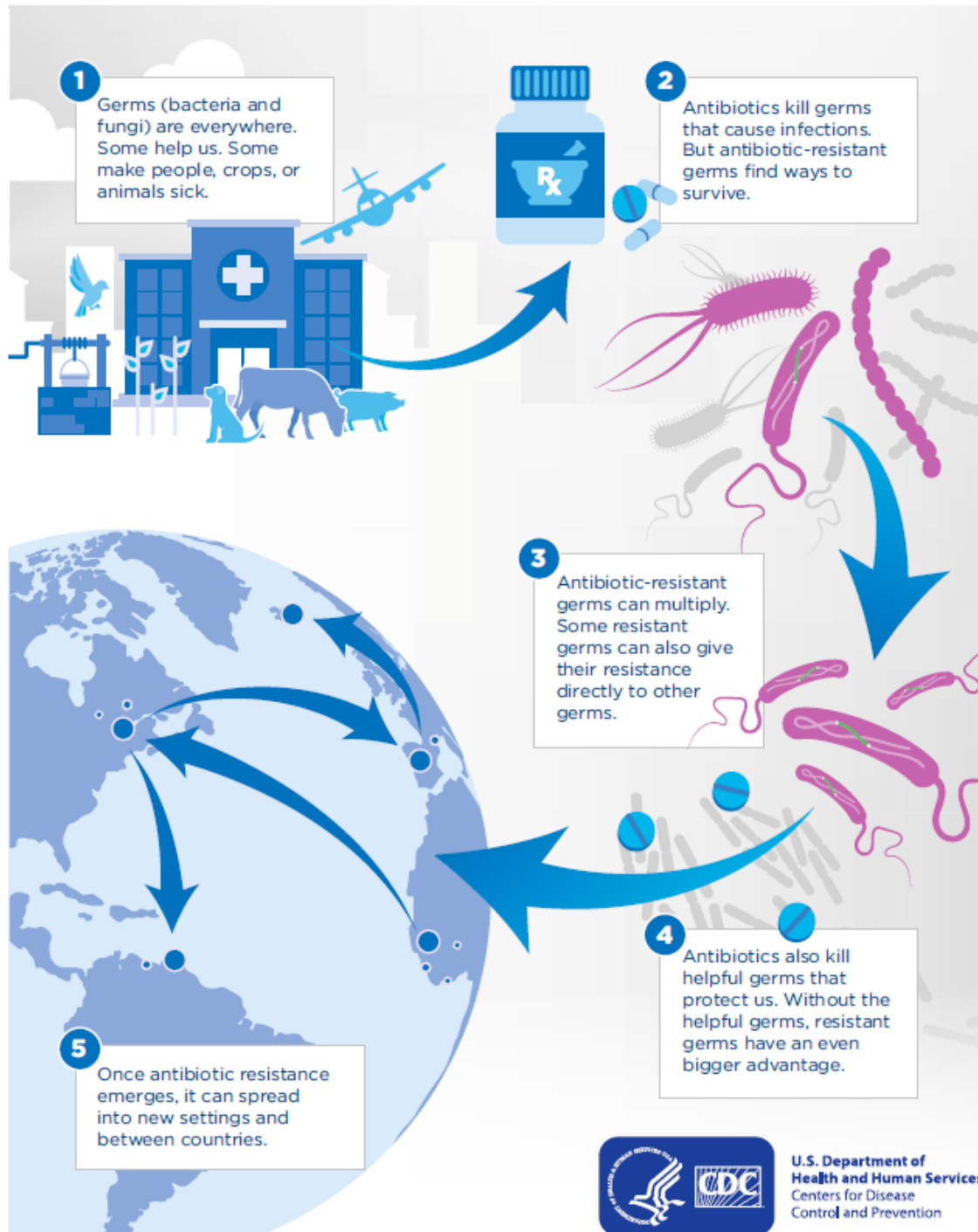


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pandey sir



THE HINDU

How Antibiotic Resistance Spreads



The hindu analysis by saurabh
 pandey sir

No prescription, no antibiotics

Kerala's Operation AMRITH prohibits over-the-counter (OTC) sales of antibiotics without a prescription

- Kerala has implemented the 2011 H1 rule that prohibits OTC sales of all classes of antibiotics
- Kerala's high doctor-patient ratio even in villages may help in enforcing the H1 rule
- Over 50-70% of antibiotic prescriptions by doctors are deemed unnecessary and irrational
- Reducing the incidence of hospital-acquired infections will sharply and quickly reduce the demand for antibiotics
- All hospitals should be made to report rates of hospital-acquired infections to the State government
- Rationalising antibiotic use in hospitals, and banning growth-promotional use of antibiotics in poultry and fish farms, and agriculture will have a big impact
- Curbing antimicrobial resistance requires a multipronged approach. Enforcing the OTC regulation alone will not be sufficient

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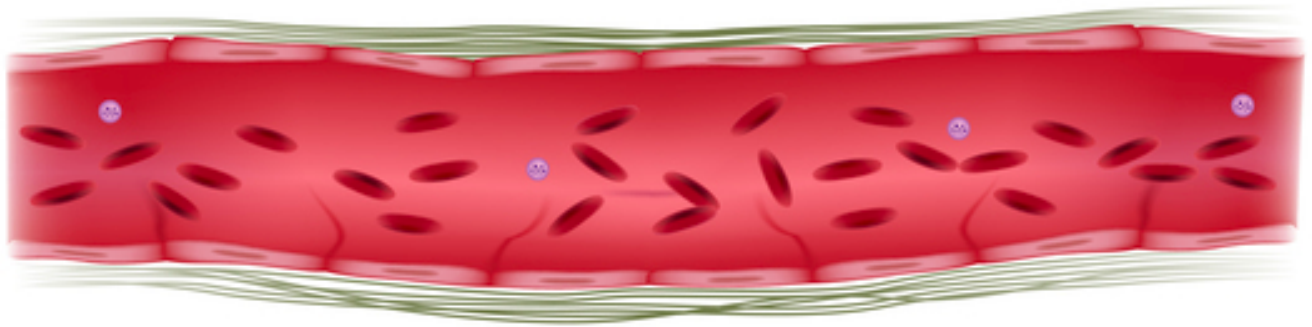
Topic

Nanotechnology to treat Haemophilia

- A team of scientists has engineered nanoparticles that can treat haemophilia — a disorder in which patients lack a coagulation factor and cannot properly form blood clots leading to spontaneous bleeding — in animals by counteracting an enzyme that breaks down blood clots and whose effects last longer compared with current drugs.

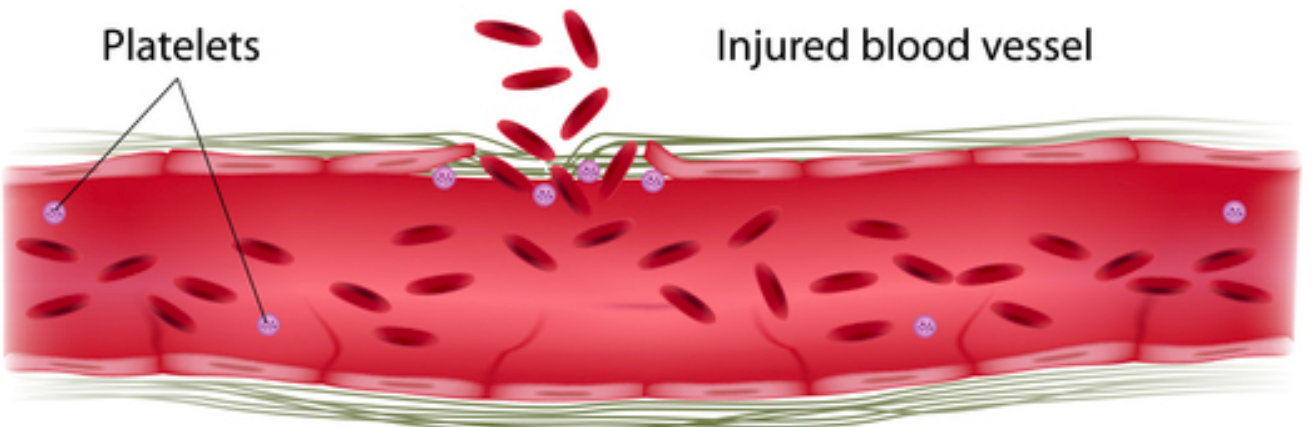
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Normal blood vessel



Platelets

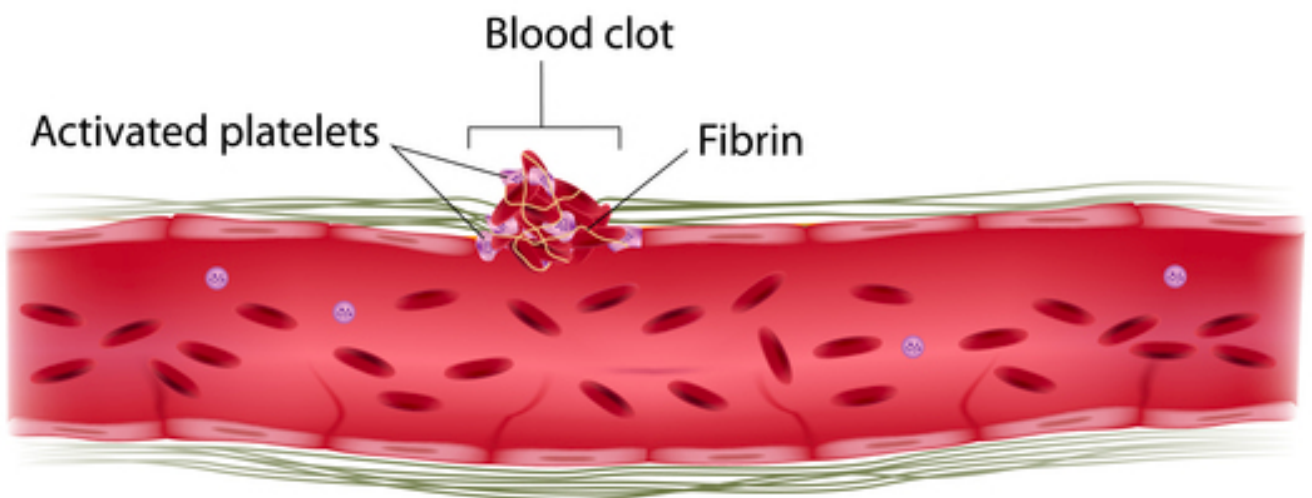
Injured blood vessel



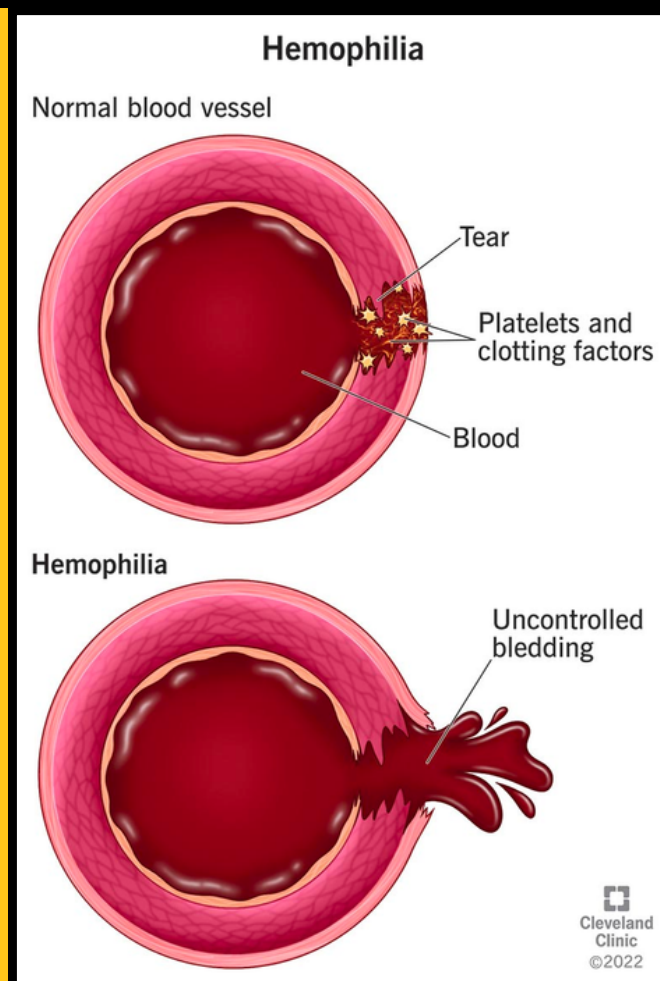
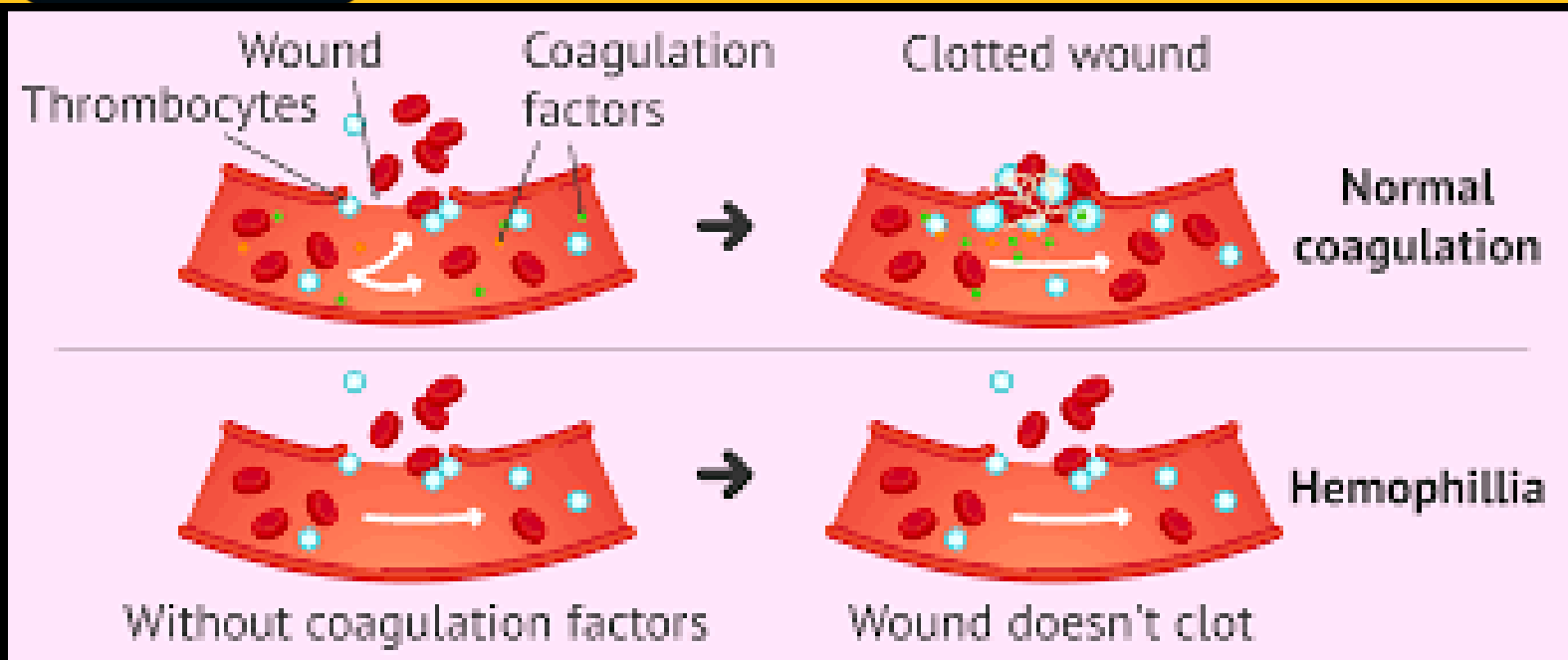
Blood clot

Activated platelets

Fibrin



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 pandey sir

Topic

Compound that kill *Mycobacterium abscessus*

- Scientists have isolated an antibacterial compound that can kill *Mycobacterium abscessus*, a relative of the bacteria that cause tuberculosis, without generating any signs of bacterial drug resistance in infected mice.
- The safety profile and efficacy suggest that it can be used for treating people infected with *M. abscessus*, which is very hardy and frequently shrugs off standard antibiotic protocols.
- *M. abscessus* is growing more common worldwide and can cause severe lung infections.

The hindu analysis by saurabh
pandey sir



Topic-Interferon gamma linked to Long COVID patients

- An analysis of blood samples from 55 patients diagnosed with Long COVID has revealed that they experienced prolonged elevated levels of an anti-viral protein interferon gamma, which persisted for 180 days post-infection.**
- This effect was induced by CD8 “killer” T cells in response to antigens present in the patients’ CD14 cells.**
- The findings highlight an immune response to SARS-CoV-2 infection associated with long COVID’s debilitating symptoms.**

**The hindu analysis by saurabh
pandey sir - 25th Feb 2024**



What are Interferons?

- Naturally occurring proteins and glycoproteins.
- Secreted by eukaryotic cells in response to viral infections, tumors, and other biological inducers.
- Produce clinical benefits for disease states such as hepatitis, various cancers, multiple sclerosis, and many other diseases.

Topic

Did neanderthals use glue to create stone tools?

- Neanderthals created stone tools held together by a multi-component adhesive, a team of scientists has discovered.
- The well-preserved tools showcase a technical solution broadly similar to examples of tools made by early modern humans in Africa.
- Its findings, which are the earliest evidence of a complex adhesive in Europe, suggest these predecessors to modern humans had a higher level of cognition and cultural development.

The hindu analysis by saurabh
pandey sir - 25th feb 2024 →

- The researchers discovered traces of a mixture of ochre (over 50%) and bitumen on several stone tools.
- Using liquid bitumen with 55% ochre, researchers were able to produce a mixture that was sticky enough for a stone tool to remain together but without adhering to hands.



The hindu analysis by saurabh
pandey sir -25th feb 2024

Topic

SC on Forest conservation act

- the Supreme Court ordered the government to continue following the all-encompassing “dictionary meaning” of forest as upheld in a 1996 Supreme Court decision in the T.N. Godavarman Thirumulpad case till a final verdict is handed out on a petition challenging the amended Forest Conservation Act of 2023.

The hindu analysis by saurabh
pandey sir



What is the Forest Conservation Act?

- **The Forest Conservation Act, which came into force in 1980, was conceived to stop the razing of forests.**
- **An estimated four million hectares of forest land had been diverted from 1951-75 and once the Act came into force, the average annual rate of diversion dropped to about 22,000 hectares — or about a tenth — going by figures cited by the Centre to a parliamentary panel to demonstrate the effectiveness of the legislation.**



- However, the provisions of this legislation predominantly applied to tracts of forest land recognised as such by the Indian Forest Act, or by States in their records since 1980.
- Illegal timber-felling at Gudalur in Tamil Nadu led the Supreme Court to deliver the landmark Godavarman Thirumulpad judgment in 1996.
- It decreed that forests had to be protected irrespective of how they were classified and who owned them.
- This brought in the concept of ‘deemed forests,’ or forest-like tracts that weren’t officially classified as such in government or revenue records but looked like them.
- In the 28 years that have passed since the judgment, States — based on surveys and reports by expert committees — have interpreted ‘forests’ differently.
- This is natural, given the wide variety of forests and constituent plants in India.



- The Centre's recent attempt to amend the Forest Conservation Act was ostensibly to bring "clarity" as there were large tracts of recorded-forest land that had already been legally put to non-forestry uses, but conformed to a State's criteria of a 'deemed forest.'
- This posed challenges to the use and ownership of such land.
- Such ambiguity also bred a reluctance among private citizens to cultivate private plantations and orchards, despite their significant ecological benefits, for fear that they would be classified as 'forest' (and thus render their ownership void).
- India's ambitions to create a carbon sink of 2.5-3 billion tonnes, to meet its net-zero goals required forest laws to be "dynamic", and the rules sought to remove 'deemed forest,' not already recorded as such, from the ambit of protection



What did the amendments deal with?

- The amendments also put beyond the pale of protection forest land situated alongside a rail line or a road, necessary to provide access to a habitation, up to a maximum size of 0.10 hectare. Forest land situated within a distance of 100 kilometres along international borders or the Line of Control or Line of Actual Control, and which needed to be cleared to construct strategic linear projects of national importance would also be exempt from the Act.
- Any ten hectares in a forest, regarded necessary for use in constructing security related infrastructure or five hectares in forest land affected by 'left wing extremism' too would be bereft of protection.
- The government rationale is that these exemptions are necessary to facilitate basic infrastructure in tribal areas.
- Moreover, the proper protection and conservation of forests by local communities, the Centre argued, requires creating livelihood opportunities through the promotion of ecotourism, zoos and safaris.



Topic- NB8 ROLE

- **□ In this year's Raisina Dialogue in New Delhi, we, the eight Nordic-Baltic countries, are participating in it together as representatives of the Nordic-Baltic cooperation, the NB8.**
- **Our message is clear: in times of turmoil and conflict, the world needs more trust, dialogue and cooperation.**
- **join forces to protect and defend peace and stability, to oppose aggression, to maintain a rules-based world order, and to strengthen a world economy based on free trade, sustainability and long-term partnerships**



Target Mains 2024

**Essay topic- “The spirit is beyond destruction. No one can bring an end to spirit which is everlasting
“आत्मा विनाश से परे है। कोई भी उस आत्मा का अंत नहीं कर सकता जो शाश्वत है**

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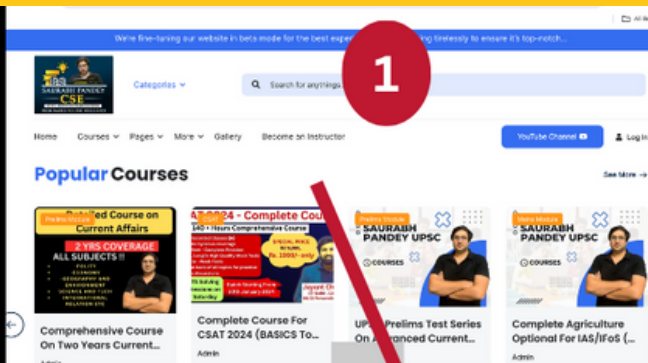


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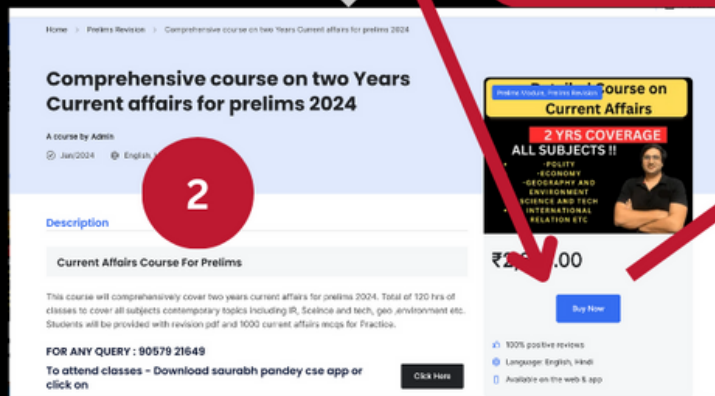
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THE HINDU ANALYSIS

26th Feb 2024

by saurabh
pandey



Topic-ISRO CE-20 Engine

- , the Indian Space Research Organisation (ISRO) reported it had successfully completed human-rating the CE-20 rocket engine ahead of its use in an important test flight later this year of the country's mission to launch an Indian astronaut to space onboard an Indian rocket.
- The CE-20 is an indigenous cryogenic engine ISRO developed to use with the GSLV Mk III, now called the LVM-3, launch vehicle.
- It represents an improvement on the CE-7.5 cryogenic engine and is instrumental to ISRO successfully realising its human spaceflight, a.k.a. Gaganyaan, mission.

The hindu analysis by saurabh
pandey sir

- Engineers prefer to use liquid fuels for rocket motors because they are less bulky and flow better than solid fuels. Using hydrogen as fuel is also desirable because when it is combusted, it generates the highest exhaust velocity.
- For example, combusting hydrogen with oxygen as the oxidiser results in an exhaust velocity of 4.5 km/s whereas that produced by unsymmetrical dimethylhydrazine and nitrogen tetroxide – the combination used by the second stage of the PSLV rocket, e.g. – is around 3.4 km/s.
- This is why hydrogen is a desirable fuel for rocket motors.

Working of CE ENGINE

- The operation of a cryogenic engine requires a cryopump, a device to trap and cool the hydrogen and oxygen to liquid form; special storage tanks; and turbopumps to move the cooled fuel and oxidiser to the engine.
- The CE-7.5 engine uses the staged-combustion cycle.
- Here, a small amount of the fuel is combusted in a pre-burner. The resulting heat is used to drive the turbine that powers the turbopump

The hindu analysis by saurabh
pandey sir

- **.The CE-20 engine uses the gas-generator cycle, which discards the exhaust from the pre-burner instead of sending it to the combustion chamber.**
- **This reduces fuel efficiency but, importantly for ISRO, makes the CE-20 engine easier to build and test.**

**The hindu analysis by saurabh
pandey sir** →

- .What is Human rating??

Rockets (and engines) that carry humans to space need to be tested more intensively — an exercise called ‘human-rating’.

Broadly speaking, human-rating entails processes to verify particular errors, like the failure of a particular component, happen at less than a particular rate

The hindu analysis by saurabh
pandey sir

TRIAL BY FIRE

India is the sixth space power to develop own cryogenic engine after US, Russia, China, Japan and European Space Agency



What it is

CE-20 is a high-thrust indigenous cryogenic engine to be **used for launching heavy satellites** on board GSLV-MarkIII

How it works

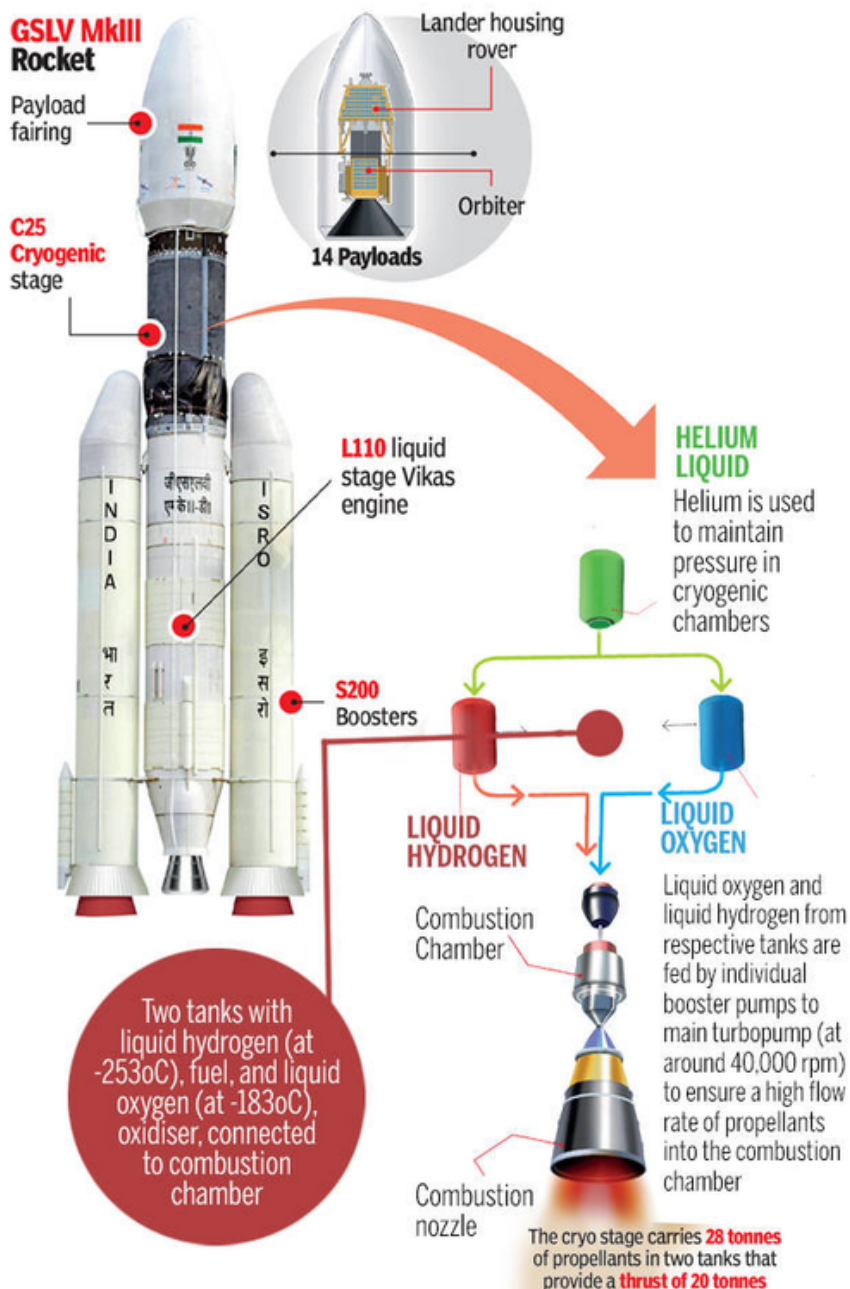
With an engine thrust of 19 tonnes against its predecessor's 7.5-tonne thrust, **CE-20 can propel to space payloads up to 4 tonnes**

What it means for India

This means India can take up heavy communication satellite launches for itself, besides **earning foreign exchange through commercial launches** for other countries. It can also power India's manned space missions

The hindu analysis by saurabh
pandey sir

THE ABC OF CRYOGENIC UPPER STAGE



- 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

GAGANYAAN MISSION

INDIA'S FIRST MANNED FLIGHT TO SPACE

The project was first approved by **PM Narendra Modi** on **August 15, 2018**

It will send the three member crew to space for at least **seven days by 2022**.

ISRO hopes to deploy its biggest rocket, **GSLV MK III**, for this project.



It would be one of the cheapest manned spaceflights in world, with the estimated cost of not more than **Rs 10000 crore**.

India plans to call its astronauts "**vyomnauts**" since '**vyom**' in Sanskrit means '**Space**'.

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What are planet??

- planets, as are all planets that orbit not stars but black holes.
- In 2019, a handful of scientists in Japan theorised that planets could form in the massive dust and gas clouds that astronomers have observed near supermassive black holes.
- However, these planets aren't expected to be anything like the earth.
- By observing black holes and their effects on their surroundings, we know they're surrounded by a colossal disc of gas and dust that the black hole is swinging around, pulling in, and heating up.

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- **Scientists think there is reason to believe almost every galaxy has a black hole at its centre, a seed around which the stars in the galaxy organise themselves.**
- **We also know planets are formed when the dust and gas swirling around a young star collide and clump together.**
- **A similar process could be in play near supermassive black holes, where planets take shape inside the disc and eventually become planets**

The hindu analysis by saurabh
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Red sea crisis & IMEC

Why is the Red Sea route important?

- **The Red Sea owes its strategic importance for global trade to the Bab el-Mandab Strait which lies between Yemen and Djibouti.**
- **It is one of the world's busiest cargo and oil transit points with almost 12% of international merchandise trade passing through it.**
- **An immediate consequence of the Red Sea conflict has been that major container and oil carriers have been forced to re-route shipments via the Cape of Good Hope.**
- **The re-routing has led to rising ocean freight, inflated insurance costs, and longer voyage times leading to delays and shortage of products. It has also driven up transportation costs.**
- **The higher shipping costs will be passed onto consumers in the form of increased commodity prices.**

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Alternative shipping route avoiding Red Sea



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Impact of Red Sea crisis

War risk premiums higher by around Rs 10-15 lakh

Over **30%** increase in container freight rates

Avg 2-week increase in ship-ping time

About **20%** of India's exports pass through the Red Sea-Suez route

10 navies come together to address security challenges in the southern Red Sea



Red Sea route

Alternative route: Cape of Good Hope, joining Eastern Asia and Europe through southern parts of Africa

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How has it affected India?

- India's trade with European and North African countries flows entirely through the Red Sea route which is almost 24% of its exports and 14% of its imports.
- As global supply chains are battling delayed shipments and rising costs, China is actively projecting China-Europe freight trains, which are part of the Belt and Road Initiative (BRI), as an alternate route.

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What about the IMEC?

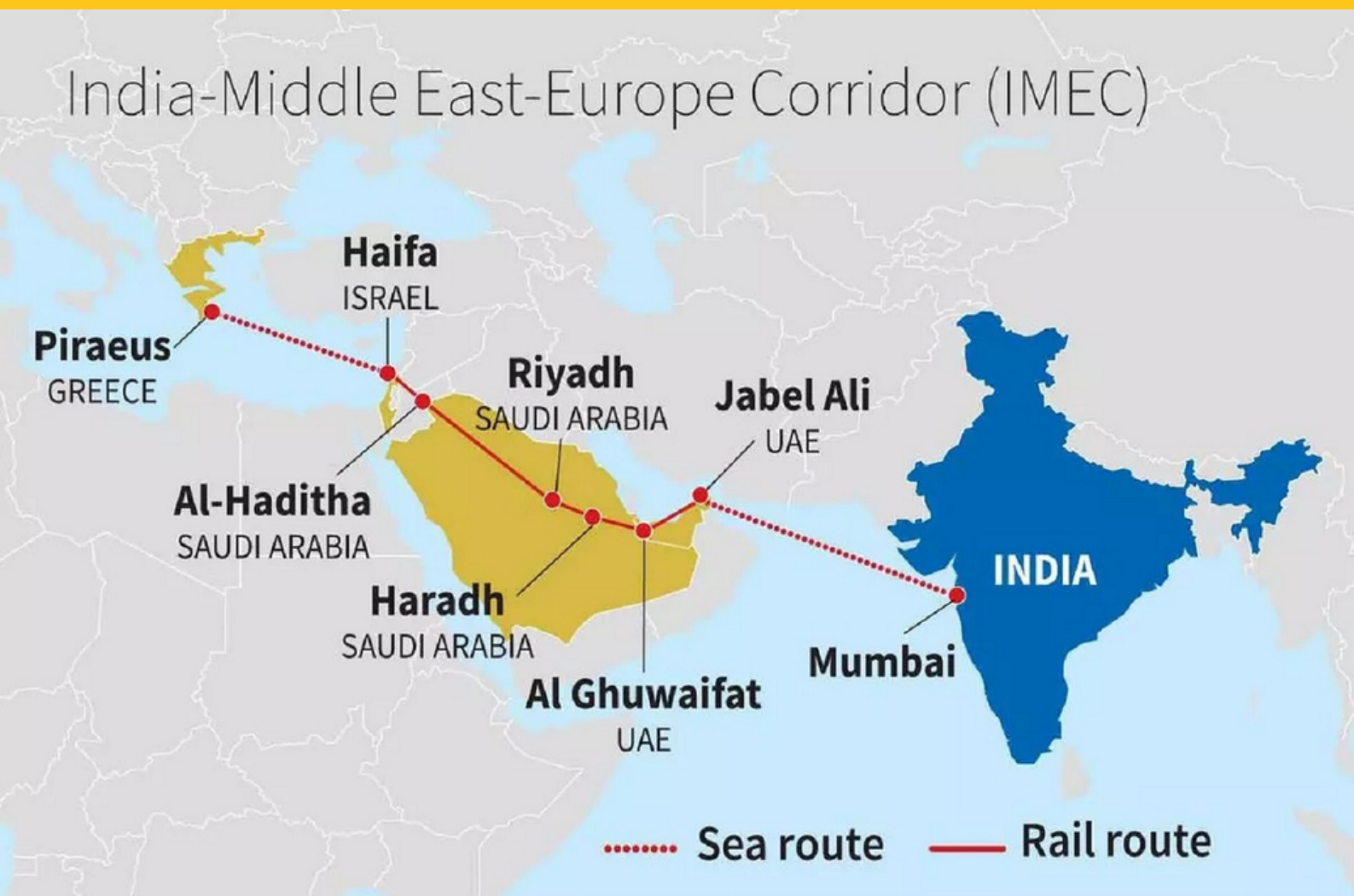
- The India-Middle East-Europe Economic Corridor (IMEC), which was announced during the G-20 summit in 2023, is another alternative which is not receiving much attention.
- Part of the problem is that apart from the MoUs, there have not been any investments or operations regarding the corridor.
- Furthermore, the Israel-Palestine conflict has put a pause on the normalisation of Arab-Israel relations which is a key element of the multi-nation initiative.

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Another major challenge is the vulnerability of the Strait of Hormuz.

- **The entire trade of the IMEC architecture flows through the Strait of Hormuz and with Iran's proximity and control over the strait, the risk of disruptions remain very high.**
- **Some experts argue that the Strait of Hormuz problem can be avoided by including Oman in the IMEC architecture and keeping the supply chain away from Iran's reach.**
- **However, that would mean further delays, as new ports and railway links will have to be developed across Oman connecting it to Saudi Arabia.**

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How can the IMEC be made viable?

- Despite such challenges, the economic logic of the corridor holds, which should encourage stakeholders to keep working towards it.
- First, an empirical study on the economic benefits of the corridor needs to be conducted.
- The corridor is estimated to cut the journey time from India to Europe by 40% and slash transit costs by 30%.
- However, there are speculations that multiple handling of cargo and multi-nation transit would increase carriage and compliance costs.

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- Therefore, it is critical to quantify the economic advantages of the corridor to attract more stakeholders.
- Secondly, a robust financial framework needs to be in place.
- Since there are no binding financial commitments on any of the signatories of the corridor, investments will have to be attracted from governments, international organisations, and private sector entities.
- Lastly, a comprehensive multi-nation operational framework is needed.
- As the corridor involves facilitating trade across different legal systems, a multi-national framework is necessary

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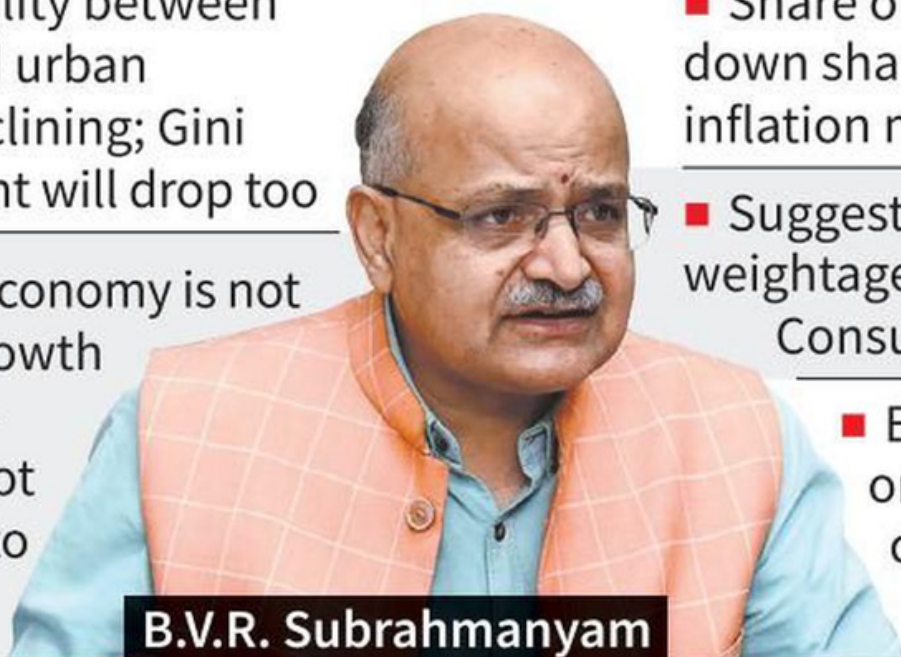
Topics- Household Consumption Expenditure Survey

Expert view

Niti Aayog CEO presents his take on consumption trends

- Inequality between rural and urban India declining; Gini coefficient will drop too

- Rural economy is not weak; growth is broad-based, not 'limited to a few'



B.V.R. Subrahmanyam

- Share of food spending down sharply; retail inflation may be overstated

- Suggests lower weightage for food in the Consumer Price Index

- Expects an impact on GDP growth calculations for the economy

**The hindu analysis by saurabh
pandey sir - 25th Feb 2024**

Counting the **spending** | The All-India Households' Consumer Expenditure Survey will be conducted between July 2022 and June 2023

What is it?

Usually carried out every five years, the survey helps assess poverty levels and consumption patterns across the country, and rebase GDP calculations

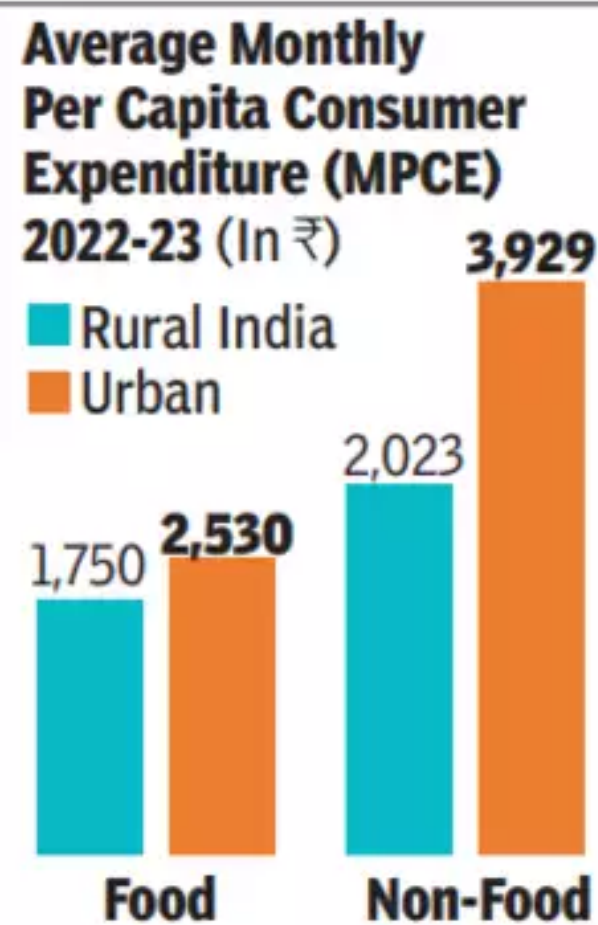
What's the big deal? The last survey whose findings were made public was conducted in 2011-12

Why this long pause? A survey was conducted in 2017-18 too, but its results were not released owing to 'quality' concerns. It reportedly reflected the first drop in monthly per capita household spending since 1972-73, with a rise in poverty incidence

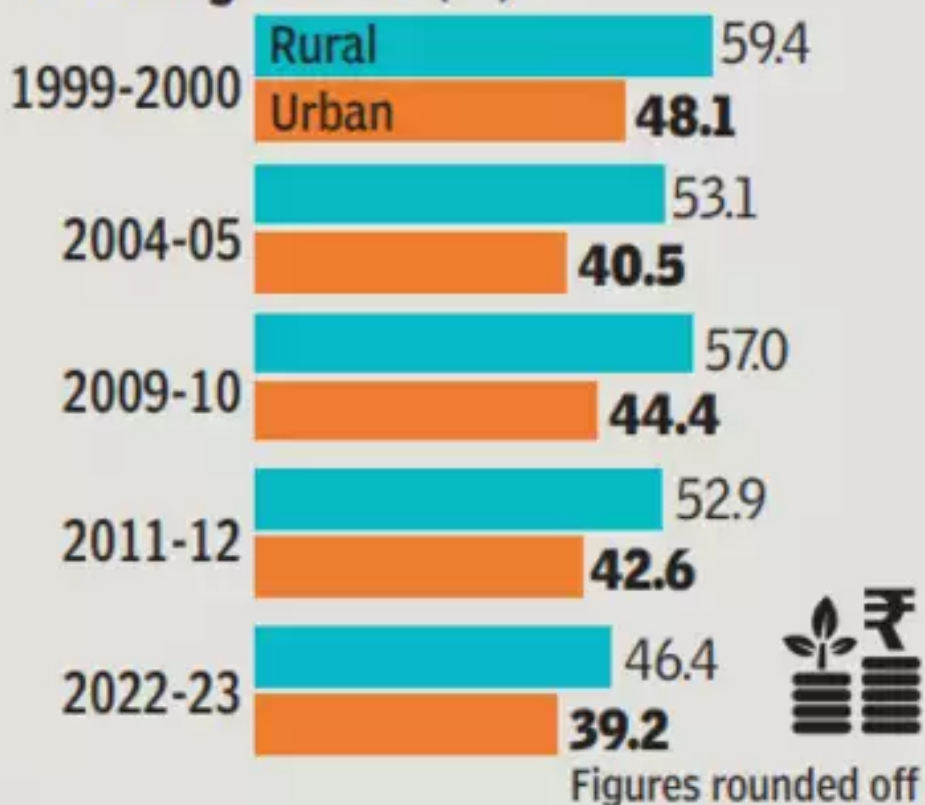


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SPENDING ON FOOD DECLINING



Share Of Food Consumption In Average MPCE (%)



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Consumption Rises 2.5x in a Decade

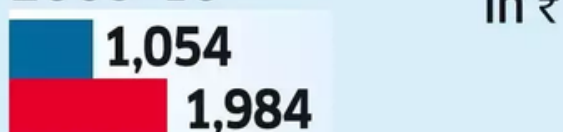
1999-2000



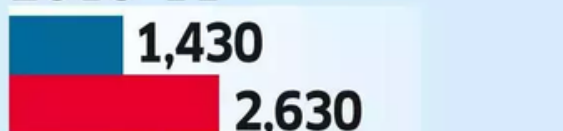
2004-05



2009-10



2010-11



2022-23



Households Spend Less on Food

(% share of total spending)



Social Welfare Programmes Increasing Consumption

(avg monthly per capita expense, in ₹)

| | Without social welfare programmes and home produce | Including social welfare programmes and home produce |
|-------|--|--|
| Rural | 3,773 | 3,860 |
| Urban | 6,459 | 6,521 |

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Target Mains 2024

Q Maritime routes are shaping world order” illustrate

समुद्री मार्ग विश्व व्यवस्था को आकार दे रहे हैं।"

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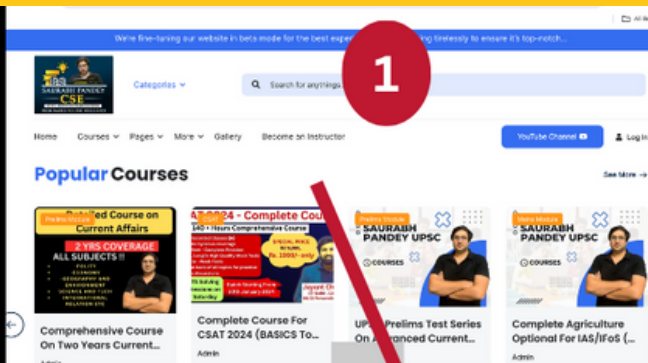


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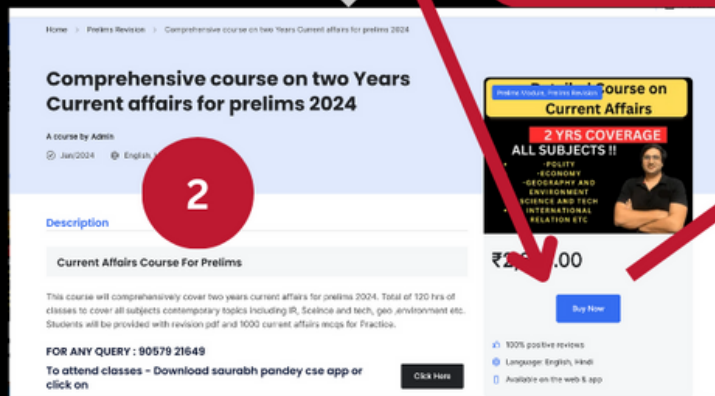
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THE HINDU ANALYSIS

27th Feb 2024

by saurabh
pandey



Topic-Quantum computers/singlet fission

- qubit is a physical system with two quantum states, and it is the fundamental physical component of a quantum computer.
- A qubit can exist in one of the two states or — unlike classical computers — a superposed state with contributions from both states .
- . Superposed states, also known as coherent superpositions, are important in quantum information-processing protocols

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- Many qubits, one problem A collection of qubits is required to make a quantum device.
- For this, any group of qubits needs to satisfy a few basic requirements.
- One: the qubits should be identical.
- The qubits can't be guaranteed to be identical since they need to be manufactured, and some 'imperfections' will creep in.
- Two: it should be relatively easy to integrate several qubits that can be operated controllably.
- Here, controllability refers to both the manipulation of individual qubits (a.k.a. "addressability") and qubit-qubit interactions

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The ‘colour molecules’

- In the system studied by the Japanese team, zirconium is the metal component and an organic molecule containing the chromophore pentacene bridges the metal atoms.
- A chromophore is an organic molecule or a part of a larger molecule that absorbs light of some specific colour.
- An object containing such molecules thus appears to have some dominant colour.
- For example, the leaves of many plants appear green since the chromophore chlorophyll predominantly absorbs red and blue colours from sunlight.
- Since the presence of chromophores is responsible for the colouration, they are also called “colour molecules”..

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- When it absorbs light, the chromophore molecule jumps to a higher energy level (i.e. an excited state).
- In its lowest energy state, or ground state, a chromophore molecule has a pair of electrons in a special configuration called a singlet.
- Every electron possesses a property called spin that is inherent to it.
- The spin of an electron can point in two opposite directions, each corresponding to a distinct quantum state.

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- In a singlet, the spins of the two electrons are pointing in opposite directions.
- If we say 'pointing up' is +1 and 'pointing down' is -1, we can say the spins in a singlet add up to zero.
- When the chromophore molecule absorbs some light, one of the electrons moves to a higher energy level while their respective spins still point in opposite directions

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Role of singlet β -fission

- An excited molecular system has a small but non-zero chance of releasing its extra energy in a process called deexcitation.
- The higher energy singlet excited state can deexcite to a lower energy triplet excited state.
- The energy released in the process will excite a neighbouring chromophore molecule in a singlet ground state to jump to a triplet excited state.
- This process of generating two triplet excited chromophores from a singlet excited state chromophore is called singlet \rightarrow fission.
- This energy transfer happens as the two chromophores interact.

**The hindu analysis by saurabh
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Baleen whales

- It is one of the earth's most haunting sounds, the "singing" of baleen whales like the humpback, heard over vast distances in the watery realm.
- Now scientists have finally figured out how these filter-feeding marine mammals do it.
- Baleen whales — a group that includes the blue whale, the largest animal — use a larynx, or voice box, anatomically modified to enable underwater vocalisation, researchers said.
- They have evolved a novel structure: a cushion consisting of fat and muscle that sits inside the larynx, the researchers said.
-

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- That means baleen whales make their sounds with their larynx, as do humans, while toothed whales – including dolphins, porpoises, killer whales and sperm whales – evolved a different mechanism employing a special organ in their nasal passages

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Focus on land management

- the annual losses of ecosystem services due to land degradation has been estimated at \$6 trillion.
- The United Nations Convention to Combat Desertification (COP14) in New Delhi in 2019 specifically discussed the problem of land degradation experienced by different countries and the need to find ways of achieving land degradation neutrality.
- The Intergovernmental Panel on Climate Change's special report on 'Climate Change and Land' (2019) suggested country-level stocktaking of land management practices

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The challenges in India

- India with only 2.4% of world's geographical area and more than 17% of the world population experiences several land management challenges.
- Arable land in India is around 55% of total geographical area and forest cover accounts for another 22%.
- The rest is desert, mountains, etc.
- Around 30% of total geographical area is degraded land.
- Access to agricultural land continues to be an important livelihood issue as a significant share of the population depends on agriculture for their sustenance.
- Development targets and the demand for land to accommodate the growing population, infrastructure, rapid urbanisation, and social, cultural, and environmental aspects are placing unprecedented pressure on land. .

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- This is resulting in more competition among farmers and between agriculture and other land resource-based sectors, as well as land use conflicts, escalation of land prices, and changing land rights.
- Across the country, natural areas are being squeezed and ecological functions being lost.
- Not only does this adversely affect the livelihood opportunities of the people who directly depend on environmental resources, but also the buffering effects of natural ecosystems in the face of disasters such as floods and droughts, temperature rise, and environmental pollution are severely compromised.
- Climate change has brought with it another set of challenges

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STEPS

- In India, current land management practices are sectoral with each department following its own approach.
- Land management falls under the purview of State governments.
- Further, cultural land is privately owned and land-use decisions are constitutionally vested with the owner.
- Apart from this administrative complexity, the challenges to adopt and implement appropriate land management practices in the country include knowledge gaps, a short-term planning bias, a fragmented approach, lack of action for unforeseen events, and regulatory barriers.

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- As a critical mechanism to achieving sectoral integration and addressing these challenges, it is imperative to set up a multi-stakeholder platform at the district and sub-district levels to bring together farmers, other land managers, policymakers, civil society organisations, business leaders, and investors under a common platform.
- Article 243ZD (1) of the Constitution provides for district planning committees to consolidate plans from panchayats and municipalities

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TOPIC- Tanzania switches on first turbine of hydro unit in World Heritage site

- **Tanzania has switched on the first turbine of a new hydroelectric plant set to double power generation capacity.**
- **conservationists warned that building a dam on a major river that runs through the Selous Game Reserve could affect wildlife and their habitats downstream.**
- **The reserve is among the largest protected areas in Africa, harbouring one of the most significant concentrations of animals, including elephant, black rhino and cheetah and a large variety of habitats, according to United Nations agency UNESCO.**

**The hindu analysis by saurabh
pandey sir**



- The Selous Game Reserve, now renamed as Nyerere National Park (in part), is a protected area in southern Tanzania.
- It covers a total area of 50,000 km² (19,000 sq mi) and has additional buffer zones.
- It was designated a UNESCO World Heritage Site in 1982 due to its wildlife diversity and undisturbed nature

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Q Why biodiversity conservation and human development cannot co-exist.??

Q जैव विविधता संरक्षण एवं मानव विकास क्यों नहीं हो सकता सह-अस्तित्व.??

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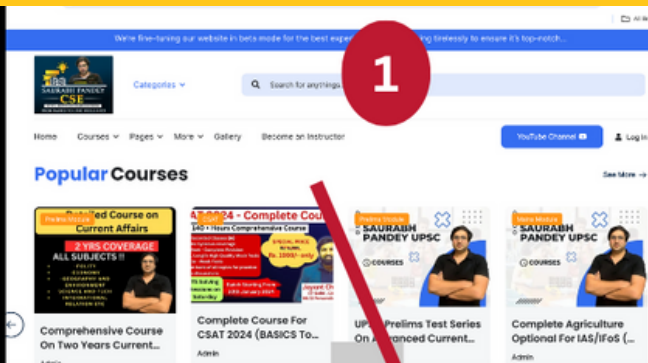


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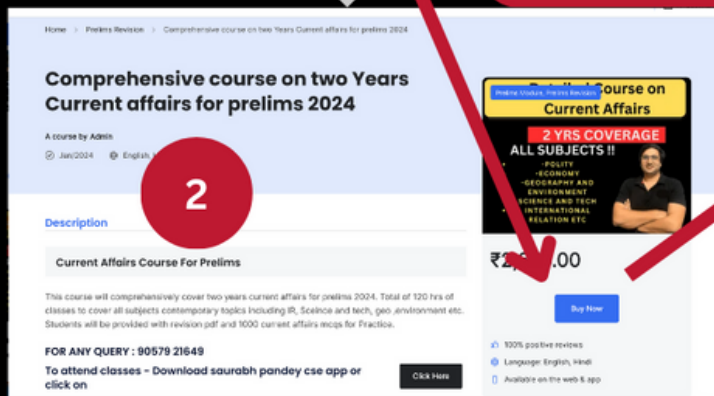
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THE HINDU ANALYSIS

29th Feb 2024

by saurabh
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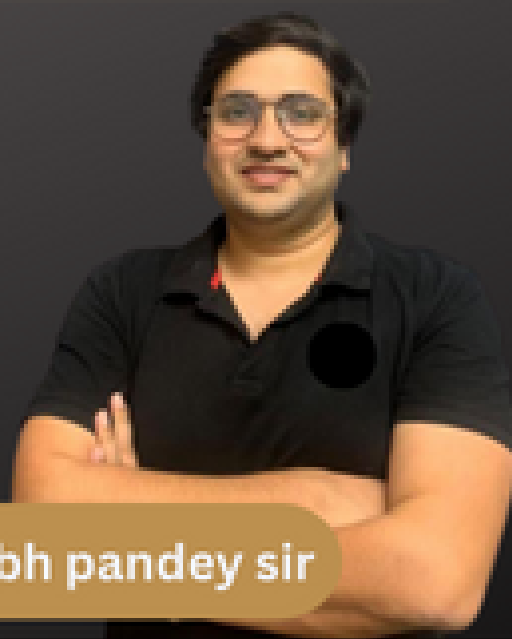
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Topic-Article 371 A

- **Article 371A of the Constitution of India has been the major hurdle in the Nagaland government's efforts to regulate small-scale illegal coal mining activities in the State. Specifically to Nagaland, Article 371A has special provisions guaranteeing the protection of land and its resources apart from the Naga customary law and procedure.**

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| Article No. | Subject-matter |
|-------------|--|
| 371 | Special provision with respect to the states of Maharashtra and Gujarat. |
| 371 – A. | Special provision with respect to the state of Nagaland. |
| 371 – B. | Special provision with respect to the state of Assam |
| 371 – C. | Special provision with respect to the state of Manipur |
| 371 – D. | Special provisions with respect to the state of Andhra Pradesh or the state of Telangana |
| 371 – E. | Establishment of Central University in Andhra Pradesh |
| 371 – F. | Special provisions with respect to the state of Sikkim |
| 371 – G. | Special provision with respect to the state of Mizoram |
| 371 – H. | Special provision with respect to the state of Arunachal Pradesh |
| 371 – I. | Special provision with respect to the state of Goa |
| 371 – J. | Special provisions with respect to the state of Karnataka |

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Article 371 – A → Special Provisions for Nagaland

- Act of parliament relating to following matters would not apply to Nagaland unless state assembly so decides:
 - Religious & social practices of Nagas
 - Nagas customary law & procedure
 - Administration of civil or criminal justice involving decisions according to Naga customary law
 - Ownership & transfer of land & its resources
- Special responsibility of governor wrt law & order in the state (after consulting COMs, but his decision will be final) regarding internal disturbances occurring in Naga hills mainly in Tunesang area (Special responsibility ceases if President directs so)

Jacaranda and climate change

- Jacaranda mimosifolia is a subtropical tree native to south-central South America that has been widely planted elsewhere because of its attractive and long-lasting violet-colored flowers.
- It is also known as the jacaranda, blue jacaranda, black poui, Nupur or fern tree



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- **Local scientists have begun investigating how widespread the early-bloom phenomenon is, but they point to climate change as the first culprit.**
- **“They are starting to flower in January, February, which is winter, when it is not yet their time.**

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Medicinal properties of cannabis

- The cannabis plant (*Cannabis sativa*) has long been of interest to psychiatrists for its perceived effects on mood and cognition.
- There is currently significant research interest in using cannabis-based compounds to manage and/or treat schizophrenia and cannabis-use and heroin-use disorders.

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- The major psychotomimetic agent in *C. sativa* is a compound called delta-9-tetrahydrocannabinol (THC).
- There is growing interest in another cannabinoid, cannabidiol (CBD), which may have antipsychotic, anti-inflammatory, and neuroprotective properties.
- The plant's □flowering parts are more potent than its leaves.

The cannabinoid system

- The human cannabinoid system has two cannabinoid receptors, called CB1 and CB2.
- The naturally occurring substrate of the CB1 receptor is anandamide, a compound whose name comes from the Sanskrit word 'ananda', meaning bliss. CB2 is found in the spleen and testes and to a lesser extent in the central nervous system (CNS).
- CB1 is found diffusely throughout the CNS.
- The CNS is involved in the release of various neurotransmitters, including dopamine, noradrenaline, and serotonin. CB1 is like a traffic cop: it controls the level

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- The endocannabinoid system (ECS) comprises a dense network of chemical signals and cellular receptors.
- The cannabis plant works its effect by hijacking this machinery.
- The cannabinoid system modulates a host of bodily functions, including pain, memory, psychomotor control, sleep, and appetite

Rare diseases

- According to the World Health Organization, rare diseases afflict 1 or less per 1,000 population.
- Barely 5% of the over 7,000 known diseases worldwide are treatable.
- India accounts for one-third of the global rare disease incidence, with over 450 identified diseases.

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- Rare diseases are broadly defined as diseases that infrequently occur in a population, and three markers are used — the total number of people with the disease, its prevalence, and the availability/non-availability of treatment options.
- WHO defines rare disease as having a frequency of less than 6.5-10 per 10,000 people.

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- According to the Organization for Rare Diseases India, these include inherited cancers, autoimmune disorders, congenital malformations, Hirschsprung's disease, Gaucher disease, cystic fibrosis, muscular dystrophies and Lysosomal Storage Disorders (LSDs)

•

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Editorial special Rare diseases

India's fight against rare diseases

The tragic death of 19-year-old child actress Suhani Bhatnagar from dermatomyositis, a rare disorder that causes inflammation in muscles, came in the same month as Rare Disease Day, which is marked today. The last day of February every year is consecrated to support crores of individuals who, because of their rare medical conditions, have long been neglected and stigmatised.

According to the World Health Organization, rare diseases afflict 1 or less per 1,000 population. Barely 5% of the over 7,000 known diseases worldwide are treatable. Most patients typically receive only basic treatment that alleviates symptoms. Some require exorbitantly priced antidotes and supportive medication throughout their lives, which they can't afford.

Rare diseases in India
India accounts for one-third of the global rare disease incidence, with over 450 identified diseases. These range from widely known ones such as Spinal Muscular Atrophy and Gaucher's disease to lesser-known ones such as Mucopolysaccharidosis type 1 and Whipple's disease. Roughly about 8 crore-10 crore Indians suffer from one rare disease or another; over 75% are children. Yet these diseases are largely overlooked.



Shashi Tharoor
is third-term MP (Congress) for Thiruvananthapuram in the Lok Sabha and the Sahitya Akademi Award-winning author of 25 books



Shashank Shekhar
is his Legislative and Legal Adviser

not the government's job.

Timely and accurate diagnosis is indispensable for the robust management of any disease, yet for rare disease patients, it takes an average of seven years for their conditions to be diagnosed (if at all). Physicians are generally unaware of how to interpret the signs and symptoms; healthcare professionals must be trained to improve their diagnostic accuracy. Expectant mothers with a history of rare diseases in their family must undergo mandatory pre-natal screening and post-natal diagnosis and care.

Less than 1% of the over 7,000 rare diseases Article with title: India's fight against rare diseases are treatable. Worse, treatments approved by the Drugs Controller General of India are available for just about 20 rare diseases and can be availed only from Centres of Excellence (CoEs). Since CoEs are few (12), unevenly distributed, and uncoordinated, late diagnosis, inadequate therapies and lack of timely availability are the norm.

Funds are a major challenge too. The Budget's allocation for rare diseases, although increasing over the years, remains low at ₹3 crore for 2023-2024, with previous years having seen reductions of up to 75% from the Budget Estimate stage to the Revised Estimates and an even worse reduction of 90% in actual expenditure. Under the

than 20%. And in a classic case of abdication of governmental responsibility, NFRD has urged the CoEs to crowdfund to treat rare disease patients. A portal with over 1,400 registered patients has collected less than ₹3 lakh in three years. Can crowd-funding ever be a sustainable national policy?

The way forward

Admittedly, the situation is not easy for the government, and to its credit, India has at least recognised rare diseases. However, the efforts are far from satisfactory. It is imperative for the

government to take the following steps: 1. Increase funding for drug development and therapy, and increase the number of CoEs while also ensuring better coordination and responsible utilisation of funds. State governments must introduce social assistance programmes and develop satellite centres under the CoEs. Public and private companies could be co-opted for funding. CSR initiatives and partnerships can be leveraged to meet shortfalls. Finally, the issue of exorbitant drug prices and availability must be addressed. Last year, the government waived off GST and customs duty on medicines for rare diseases. But this exemption

The nagging problem of Katchatheevu

Though fisherfolk want to resume fishing in the islet, India cannot allow it

STATE OF PLAY

L. Srikrishna
srikrishna.lj@thehindu.co.in



Katchatheevu islet, a part of Sri Lanka and located about 14 nautical miles from Rameswaram in Tamil Nadu, is back in the limelight for the wrong reasons.

On February 17, fishermen associations in Ramanathapuram district announced that they were boycotting the annual two-day festival, scheduled for February 23 and 24, at the St. Anthony's Church in the uninhabited islet. Every year, this event brings together the people from both sides of the Palk Bay separating India and Sri Lanka. The fisherfolk also announced that they would observe an indefinite strike. These decisions were a mark of protest against the Sri Lankan government's continuing arrests of Indian fishermen on charges of poaching.

Shift in approach

Though the response of the Sri Lankan authorities is not new, there seems to be a shift in the way the island nation's judic-

the original shrine of the Church was built by the Ramanathapuram Diocese more than 100 years ago. As per the Sri Lankan Navy records, it was constructed in 1901. Though it was taken over by the Jaffna diocese after India ceded Katchatheevu to Sri Lanka in 1974, the two countries organise the festival together. In recent years, people from other States such as Karnataka have also been attending it.

Over the last 15-odd years, it has been a practice for the Church authorities to extend an invitation to the Verkadu parish, which, in turn, seeks applications from pilgrims. On producing valid documents, pilgrims are allowed to cross the Palk Strait using trawlers. Their actions are monitored by Central and State agencies

and legal assistance to the imprisoned fishermen and work towards their early release. New Delhi has been asking Colombo to treat the fishermen issue as "a purely humanitarian and livelihood concern." It says both sides should ensure that force is not used under any circumstance. Even though the Sri Lankan authorities release the fishermen as a matter of routine, they do not return the impounded fishing vessels. The Ramanathapuram fishermen believe that this adds insult to injury. This time too, vessels were impounded and not returned.

Resolving the issue


For about 10 years, the fishermen have been hoping that their issue will get resolved. Sudhama Swaraj, as External Affairs Minister, had even organised a high-level meeting of fishermen from both the countries to work out a solution. "But this could not deliver results fully due to various political developments," Mr. Jesu Raja said.

Now, sections of the fisherfolk expect the Indian government to impress upon the Sri Lankan government to allow



THE SCENARIO IN INDIA

FROM OVER 7,000 IDENTIFIED RARE DISEASES, 95% DO NOT HAVE ANY FDA APPROVED ORPHAN DRUGS

 **80%** of the diseases occur at birth and are genetic in nature

 **50%** babies born with rare diseases die within a year of birth

ESTIMATES

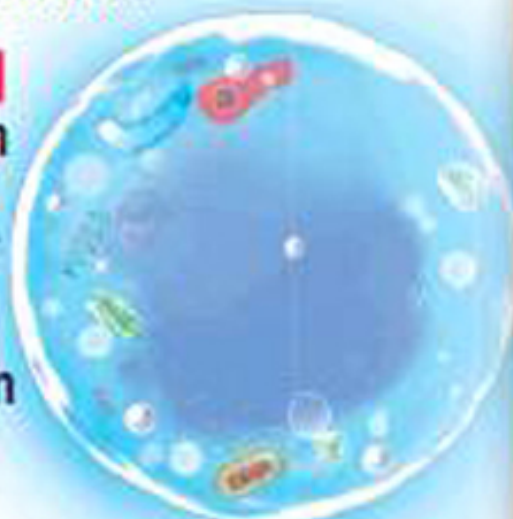
9-10 crore | No. of people in India who suffer from rare diseases, which is 25% of global patients

5.4 to 6.5 lakh | No. of people in Hyderabad, of a population of 90 lakh, who suffer from rare diseases

40% | Chances of error in diagnosis during a patient's first visit

4.8 years | Average time taken for diagnosis

20 years | Maximum time taken to detect



SOME RARE DISEASES

- Thalassemia
- Sickle cell anaemia
- Ataxia
- Lysosomal storage disorder
- Congenital insensitivity to pain (rarest of rare)
- Acquired aplastic anaemia
- Muscular dystrophy
- Multiple sclerosis
- Sweet syndrome
- Paediatric cardiomyopathy

HOW INDIA CATEGORIZES RARE DISEASES

Group 1

Disorders amenable to one-time curative treatment:

Treated with stem cell transplantation

Treated with organ transplantation

Group 2

Diseases requiring long term or lifelong treatment with relatively low cost

Managed with special dietary formulae or food for special medical purposes

Amenable to hormones or specific drugs

Group 3

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



What is Dermatomyositis?

Dermatomyositis is a condition that affects the muscles, skin, and blood vessels, and it is both inflammatory and degenerative. Inflammatory myopathies are a category of disorders that cause the body's immune system to target healthy muscle tissue.



- There are fundamental challenges in the research and development for the majority of rare diseases as relatively little is known about the pathophysiology or the natural history of these diseases particularly in the Indian context.
- Rare diseases are also difficult to research upon as the patients pool is very small and it often results in inadequate clinical experience.
- Availability and accessibility to medicines are also important to reduce morbidity and mortality associated with rare disease.

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National Policy for **Rare Diseases 2021** approved



Ministry of Health and Family Welfare
Government of India

- Provides for financial support upto Rs 20L to individuals with certain rare diseases that require one-time treatment.
- Assistance to be extended to not just BPL families, but to about 40% of the population who are covered under Pradhan Mantri Jan Arogya Yojana
- The financial support will be provided under the umbrella scheme of Rastriya Arogya Nidhi & not PM-JAY

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THE HINDU



Editorial special text category

seizure is estimated to be between ₹1,200 and ₹2,000 crore in the market. ^{PH} from ₹5.80, while urban consumers will pay ₹6.65 per unit, up from ₹6.30. ^{PH} currently operates 350 daily flights and has a fleet of 69 planes. ^{PH} ministry said. Nearly 1.5 million people are packed into the city of Rafah. ^{AP} ₹2,000. ^{PH} COMPILED BY THE HINDU DATA TEAM

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On irregularities in vertical devolution

Agitations by different State governments in New Delhi have highlighted many disquieting issues in the practice of fiscal federalism in India. In light of this, the 16th FC must take initiative to correct historical wrongs in vertical devolution through compensations to the States

ECONOMIC NOTES

R. Ramakumar

The recent agitations by the governments of Kerala and Karnataka, and the support extended by several State governments, have highlighted many disquieting issues in the practice of fiscal federalism in India. These agitations show that the newly constituted 16th Finance Commission (FC) would have to proceed seriously and innovatively to justly address complaints of increasing vertical and horizontal inequalities in devolution. Within the domain of vertical devolution – that is the sharing of resources between the Union and States – there are two disturbing trends that need urgent redressal. First, the Union government has sought to keep an increasing share of its proceeds out of the divisible pool so that they need not be shared with States. Secondly, it has also

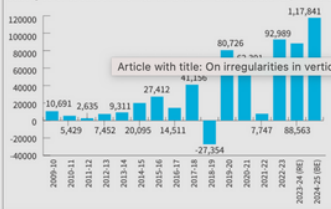
How much funding do States get from the Centre?

The net divisible pool is that part of the gross tax revenue from which a share would have to be vertically devolved by the Union to all States. These charts explain how they are actually distributed versus entitlements

Chart 1: The share of cesses and surcharges in the gross tax revenue from 2009-10 to 2024-25, in %



Chart 2: Difference between the entitlement of all States as per FC awards and actually devolved State's share in central taxes from 2009-10 to 2024-25, in ₹ crore



requirements of the Union government.

Deviations from FC recommendations

Speaking in Parliament on February 8, 2024, the Union Finance Minister claimed: "whatever the Finance Commission has recommended [as the rate of devolution], I follow it to the last word". How robust is this claim? We have seen that a significant portion of the gross tax revenue is retained by the Union government as cesses and surcharges. One may disagree with such a devolution but it has some basis in constitutional provisions. However, what has happened to the recommendation of the FCs that a certain share of the net proceeds must be shared with all States? These shares were stipulated as 32% by the 13th FC (2010 to 2015), 42% by the 14th FC (2015 to 2020), and 41% by the 15th FC (2020 to 2025). Annual estimates of net proceeds can be obtained by deducting cesses, surcharges, and costs of collection of taxes from the gross tax revenue. These



vertical devolution and fiscal federalism

- The net divisible pool, or net proceeds, is that part of the gross tax revenue from which a share would have to be vertically devolved by the Union to all States.
- Such shares are assigned by each FC for a five-year period.
- Earlier, all corporation taxes and customs duties were fully absorbed by the Union, and only income taxes and excise duties were shared with the States.
- .

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- However, with changes over the years, culminating in a constitutional amendment in 2000, all taxes of the Union were added to the net proceeds.
- But there was a catch — cesses and surcharges under Article 270 and Article 271 were kept out of the net proceeds.
- In the past, such exclusion of cesses and surcharges were based on specific FC recommendations
-

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- But the amendment in 2000 provided a constitutional basis for it. Presently, the net proceeds consists of the gross tax revenue after the deduction of cesses, surcharges and the cost of collection of taxes.
- Over the past decade or more, several cesses and surcharges were introduced by the Union government.
- When the Goods and Services Tax (GST) was initiated in 2017, the expectation was that many cesses and surcharges would be discarded and subsumed into the GST system.
- On the contrary, new cesses and surcharges continued to be introduced, and many old cesses and surcharges remained outside the GST system.

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Q "Without transparent vertical devolution , fiscal federalism cannot be established"examine

प्रश्न "पारदर्शी ऊर्ध्वाधर हस्तांतरण के बिना, राजकोषीय संघवाद स्थापित नहीं किया जा सकता है" परीक्षण करें

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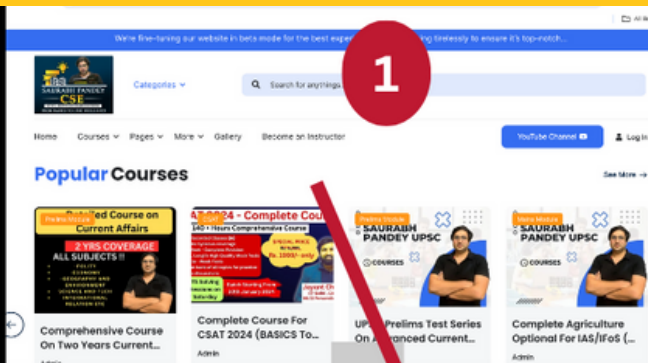


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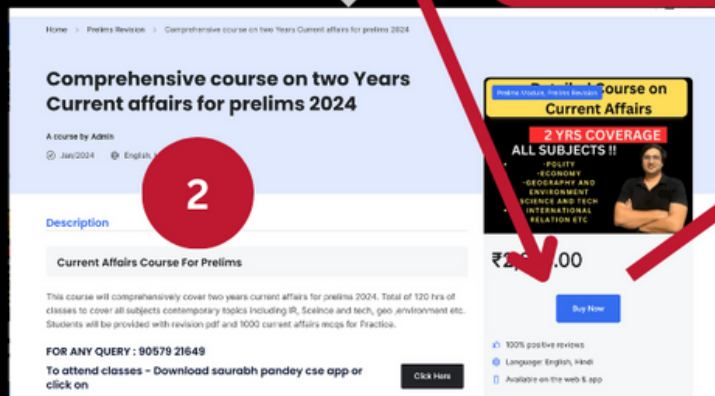
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