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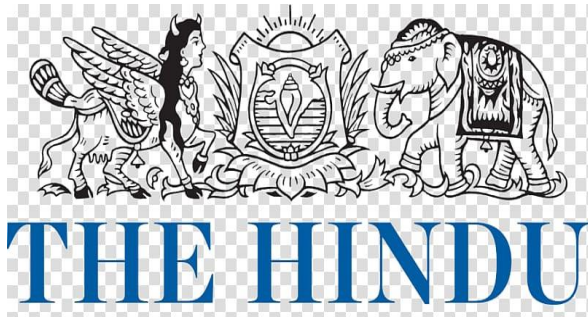
About Author



Saurabh Pandey established Saurabh Pandey CSE Channel an online learning platform. He has 8 years of experience in teaching for the UPSC/IAS exam in various renowned institutes like Vision IAS, Study IQ, and Unacademy. He qualified for many exams like NET JRF. He appeared for a UPSC interview and wrote 3 civil services mains exams. He is MA in public administration. He did B.Tech in biotechnology.

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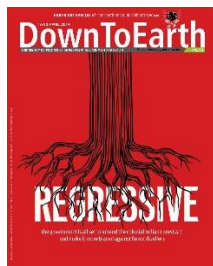
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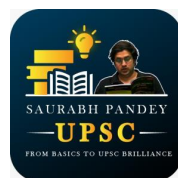
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Simultaneous election

- The first four general elections involved simultaneous elections for the Lok Sabha and State Assemblies.
- After the NITI Aayog backed the proposal in 2017, it was mentioned next year in then President Ram Nath Kovind's address to the joint session of Parliament.
- He asked parties to have a 'sustained debate on the subject of holding simultaneous elections'.
- The Law Commission also released a draft report on August 30, 2018, examining the legal constitutional aspects related to the proposal
- Second, the dense electoral cycle involves prolonged deployment of security and police forces on election duty, thus posing a concern for national security and maintenance of law and order.
- The administration comes under strain due to the mass scale transfers of officials within the State, either by the government looking for pliable officers in key positions or by the order of the ECI once code of conduct comes into force.
- Third, holding separate elections comes in the way of development as the enforcement of the code of conduct for a longer period leads to the stoppage of ongoing development work.

WHY Simultaneous election?

- First, holding separate elections incurs massive recurring expenditure for the State and the Central government.
- In case of simultaneous elections, there would only be one electoral roll for all elections and the government would need the services of security forces and civilian officials only once.
- No new projects can be started during this period and even ongoing projects suffer from inertia
- Fourth, simultaneous elections would lessen the role of money in elections as campaign finance of parties' would come down.
- The monitoring of election expenditure by the ECI will also become more effective due to a

concerted effort at the national level.

- Fifth, given the increasing role of divisive politics for electoral gains, the 'one nation one election' plan would help in reducing the pernicious role of regionalism, casteism, and communalism in mobilizing electorates. It would help in bringing issues of national importance on the electoral agenda.
- And finally, it is being argued that having too many elections creates a sense of fatigue among electorates. Voter turnout at the national level has stagnated in recent elections
- **Why not simultaneous election?**
- First, the Centre's initiative is being viewed as being antithetical to the federal spirit as there has not been wider consultation with constituent States, especially the ones that are being ruled by non-BJP parties.
- Second, holding simultaneous elections would most likely push local and regional issues to the periphery.
- There would be a 'national constituency phenomenon' favouring politywide parties due to

their comparative advantage in terms of their claim to better serve 'national interest/ national security/national unity' rather than regional parties who will be sidelined for focusing on 'narrow, parochial' issues.

- Simultaneous elections in a federal polity, would incentivise regional discontent.
- Third, as far as cost saving is concerned, holding simultaneous elections would require large scale purchase of Electronic Voting Machines (EVM) and Voter Verifiable Paper Audit Trail Machines (VVPAT).
- Moreover, biennial elections to Legislative councils/Rajya Sabha and by elections would still be held, costing money and resources.
- Fourth, frequent elections rather than sagging the enthusiasm of voters keep them enthused, as evident in the comparatively higher percentage of voting in State and local elections.

The Hindu

Legal and constitutional issues

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First, at least five Articles in the Constitution shall need amendment.

- These articles are Articles 83(2) and 85(2) that relate respectively to the duration and dissolution of the Lok Sabha.
- Also, on the legislative agenda would be Articles 172(1) and 174(2), which provide for the duration and dissolution of the State Assemblies.
- Article 85 (1) and 174 (2) allows the President and the Governor to dissolve the Lok Sabha and Vidhan Sabha before the completion of their tenure of five years, under the circumstances mentioned in the Constitution.
- Article 83(2) allows the tenure of the Lok Sabha to be extended for one year at a time in case of an Emergency being proclaimed under Article 352. Article 172(1) makes a similar provision for State assemblies.
- These provisions would need to be repealed.
- As of now, after the passage of the anti-defection law enshrined in the 10th Schedule (52nd Amendment Act, 1985) and later the Supreme Court judgment in S.R. Bommai case

(1994) followed by the High Court judgment in Rameswar Prasad (2006), the decision to dissolve the Vidhan Sabha and impose President Rule under Article 356 is subject to judicial review.

- The Court can revive the Assembly and restore the government if it does not find the grounds of the President's rule to be constitutionally valid as has happened in recent years in the case of Nagaland, Uttarakhand and Arunachal Pradesh.
- Moreover, such amendments need not only the two third majority support of both Houses of Parliament but also ratification by at least half of the State Legislatures under Article 368
- It would also be much more complex and difficult to link general elections with local bodies elections.
- This is because local government is a State subject (seventh schedule, List II) and all the State Legislatures have passed separate Panchayati Raj Acts and Municipal Acts, fixing the tenure of these bodies (five years) as per Article 243(E) and 243 (U) respectively.

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- Since all 28 States have their own specific Acts, it would require changes in 56 sets of legal provisions.

The Hindu

Defence news

- 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.

- **Antiship missiles (MRAShM) for the Navy.** The MRAShM is a lightweight surface to surface missile which will be a primary offensive weapon aboard various Indian naval ships

- The Medium Range Surface to Air Missile (MRSAM) is a supersonic missile that can be launched vertically with a rapid response time and is intended to intercept various airborne threats such as guided bombs, aircraft, missiles, and helicopters.

- The first three of a series of eight antisubmarine warfare shallow water crafts being built by Cochin

Shipyard Ltd. for the Navy were launched on the shipyard premises on Thursday.

- The ships, to be named INS Mahe, INS Malvan and INS Mangrol upon commissioning, were launched.

The Hindu

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bombs, aircraft, missiles, and helicopters.

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The Hindu

Loss and Damage fund

- On the first day of the 28th Conference of Parties or COP28 here on Thursday, member countries agreed to make operational a Loss and Damage (L&D) Fund meant to compensate countries already dealing with climate change.
- To be based at the World Bank but managed by an independent secretariat, the Fund has received commitments worth nearly \$250 million from countries, though billions of dollars are still needed to meet its purpose.

- The Fund was first announced at the conclusion of COP27 in Sharm ElSheikh, Egypt,
- The World Bank will be the “interim host” of the Fund for a period of four years. All developing countries are eligible to apply for and every country has been “invited” to contribute to the Fund.

The Hindu

MILAN EXERCISE

About MILAN

- MILAN is a biennial multilateral naval exercise incepted by Indian Navy in 1995 at Andaman and Nicobar Command.
- Since its inception, the event has been held biennially except for 2001, 2005, 2016 and 2020. While the 2001 and 2016 editions were not held due to International Fleet Reviews, the 2005 editions was rescheduled to 2006 due to the 2004 Tsunami. 2020 edition of MILAN was postponed to 2022 due to COVID-19.
- Starting with the participation of only four countries, viz Indonesia, Singapore, Sri Lanka and Thailand, in

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the 1995 edition, the exercise has since transitioned leaps and bounds in terms of number of participants and complexity of exercises.

- Originally conceived in consonance with India's 'Look East Policy', MILAN expanded in ensuing years with the GOI's 'Act East policy' and Security and Growth for All in the Region (SAGAR) initiative, to include participation from island nations in the Western IOR as also IOR littorals.
- Participation increased from six regional countries to 18 countries in 2014 which included IOR littorals.
- With Indian Navy's engagement with Friendly Foreign Countries (FFCs) expanding over the decades, a need was felt to further consolidate the naval cooperation by enhancing the scale and complexity of the MILAN exercise and engaging both regional and extra regional navies of the world.
- Considering the infrastructure requirements of a large naval gathering, it was decided to shift the event to mainland, and Visakhapatnam, being the Headquarters of Eastern Naval

Command, was nominated to host the event.

- India is also gearing up to host its largest multilateral exercise early next year.
- The next edition of "Exercise Milan" is scheduled for February 2024

Maritime outreach

- India has also significantly expanded assistance in capacity building to countries in the region.
- This includes giving platforms, regular training as well as routinely deploying Mobile Training Teams (MTT) overseas to facilitate capacity development.
- "Recently, MTT from Indian Naval Work up teams undertook operational sea checks of ships of two friendly countries Sri Lanka and South Africa at Trincomalee and Cape Town respectively where they worked alongside the ship's crew to achieve very high standards of operational readiness as well as safety compliance,"

The Hindu

XPoSat

- The Indian Space Research Organisation has announced a plan to launch its first Xray Polarimeter Satellite (XPoSat) to investigate the polarisation of intense Xray sources.
- The ISRO said that while space based Xray astronomy had been established in India focusing on imaging, time domain studies, and spectroscopy, the XPoSat mission marked a major value addition.
- This research, supplementing traditional time and frequency domain studies, introduced a novel dimension to Xray astronomy, generating anticipation and excitement within the scientific community.
- The satellite will be launched by the Polar Satellite Launch Vehicle
- The XPoSat is designed for observation from a low earth orbit (non sun-synchronous orbit of 650km altitude, low inclination of approximately six degrees) and will carry two scientific payloads.
- With these two payloads, the mission is capable of simultaneous studies of temporal, spectral, and polarisation features of the bright Xray sources.
- The mission objectives include the measurement of Xray polarisation in the energy band of 830 keV emanating from Xray sources and longterm spectral and temporal studies of cosmic Xray sources in the energy band of 0.815 keV.
- The mission life is expected to be approximately five years.
- The primary payload, POLIX (Polarimeter Instrument in Xrays), is designed to measure polarimetry parameters, specifically the degree and angle of polarisation, in the medium Xray energy range of 830 keV photons originating from astronomical sources.
- The secondary payload is the XSPECT (Xray Spectroscopy and Timing) payload, which will provide spectroscopic information within the energy range of 0.815 keV.
- The Hindu

Antiretroviral THERAPY

- We have effective antiretroviral medications available to prevent

multiplication of HIV. People with HIV who are on these antiretroviral medications can lead a normal, healthy lifestyle without developing opportunistic infections.

- Results from clinical trials recommend starting Antiretroviral Therapy (ART) soon after diagnosis.
- Over 90% of anti retrovirals consumed globally were from India effective biomedical prevention tools in preexposure prophylaxis (PrEP) medications.
- These oral medications are very effective in preventing HIV acquisition if a person with high risk of HIV takes them correctly without fail.
- A long acting injectable PrEP medication called Cabotegravir has been developed.
- Cabotegravir injections can be taken every 2 months instead of the daily oral pill and studies have shown higher efficacy in HIV prevention with long acting injectable PrEP.
- The Hindu

Anti Retrovirus

Interesting Points about Retroviruses

- Retroviruses contain RNA as genetic material but have DNA-dependent steps in their replication.
- Replicates via reverse transcription because of the presence of reverse transcriptase enzyme.
- Integrase transfers the viral DNA into the cell nucleus and viral dsDNA is covalently and randomly integrated into the cell's genome.
- Retroviruses that can transform host cells at high rates contain gene sequences such as viral oncogenes and proto-oncogenes.
- Human retroviruses can cause immune deficiencies, cancer, and neurological diseases.

Report on air pollution

- Outdoor air pollution from all sources accounts for 2.18 million deaths per year in India, second only to China, according to a modelling study published in The BMJ.
- The research found that air pollution from using fossil fuels in industry, power generation, and transportation accounts for 5.1 million extra deaths a year worldwide.
- This equates to 61 per cent of a total estimated 8.3 million deaths worldwide due to ambient (outdoor) air pollution from all sources in 2019, which could be avoided by replacing fossil fuels with clean, renewable energy.

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Broadcast regulation

Act, 2000 and regulations made there under.

Broadcast regulation bill

- Consolidated Legal Framework for the entire Broadcasting sector
 - Content Evaluation Committees for adherence to Programme Code and Advertisement Code
 - Broadcast Advisory Council to replace existing Inter Departmental Committee
 - Penalty structure linked to financial capacity
 - Accessibility measures for persons with disabilities
- 2. Contemporary Definitions and Future-Ready Provisions: To keep pace with the evolving technologies and services, the bill introduces comprehensive definitions for contemporary broadcasting terms and incorporates provisions for emerging broadcasting technologies.
 - 3. Strengthens the Self-Regulation Regime: It enhances self-regulation with the introduction of 'Content evaluation committees' and evolves the existing Inter-Departmental Committee into a more participative and broader 'Broadcast Advisory Council'.

Key Highlights:

- 1. Consolidation and Modernization: It addresses a long standing need of consolidating and updating the regulatory provisions for various broadcasting services under a single legislative framework. This move streamlines the regulatory process, making it more efficient and contemporary. It extends its regulatory purview to encompass broadcasting over-the-top (OTT) content and digital news and current affairs currently regulated through IT
- 4. Differentiated Programme Code and Advertisement Code: It allows for a differentiated approach to Programme and Advertisement Codes across various services and require self-classification by broadcasters and robust access control measures for restricted content.
- 5. Accessibility for Persons with Disabilities: The bill addresses the specific needs of persons with

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disabilities by providing for enabling provisions for issue of comprehensive accessibility guidelines.

The Hindu

- **6. Statutory Penalties and Fines:** The draft Bill introduces statutory penalties such as: advisory, warning, censure, or monetary penalties, for operators and broadcasters. Provision for imprisonment and/or fines remains, but only for very serious offenses, ensuring a balanced approach to regulation.

- **7. Equitable Penalties:** Monetary penalties and fines are linked to the financial capacity of the entity, taking into account their investment and turnover to ensure fairness and equity.

- **8. Infrastructure Sharing, Platform Services and Right of Way:** The bill also includes provisions for infrastructure sharing among broadcasting network operators and carriage of platform services. Further, it streamlines the Right of Way section to address relocation and alterations more efficiently, and establishes a structured dispute resolution mechanism.

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ALTÉRRRA

- The UAE, host of the 28th Conference of Parties (COP28), announced a \$30-billion commitment to an investment fund called ALTÉRRRA.
- The privately managed fund aims to mobilise \$250 billion globally by 2030 and be the largest of its kind, geared towards climate investments and transforming emerging markets and developing economies.
- From the initial tranche, an unspecified amount has been earmarked for the development of over 6 GW (1 GW is 1,000 MW) of new clean energy capacity in India.
- This includes establishing 1,200 MW of wind and solar projects that will begin producing clean power by 2025.



ALTÉRRRA ACCELERATION, a US\$25 billion component of ALTÉRRRA, will steer institutional capital towards climate investments at scale that have the greatest potential to accelerate the transition to a net-zero and climate resilient economy. ALTÉRRRA ACCELERATION will serve as an anchor investor and co-investor in climate strategies, allocating capital both directly and through fund partnerships to maximize its global impact.

ALTÉRRRA TRANSFORMATION, a US\$5 billion component of ALTÉRRRA, will provide risk mitigation capital to incentivize investment flows into the Global South, directly addressing the challenges that currently limit climate investment and access to affordable capital. In-line with COP28's message of full inclusivity, ALTÉRRRA TRANSFORMATION will also create opportunities to leverage concessional finance to further attract climate investment to Least Developed Countries (LDCs) and Small Island Developing States (SIDS).

The vehicle will add to the UAE's accomplished track record of managing large investment platforms and successfully developing and operating renewable energy projects around the world, leading change as a trusted facilitator at the global crossroads between North, South, East and West.



- ALTÉRRRA has been established by Lunate, an independent global investment manager, and is domiciled in the Abu Dhabi Global Market.
- “ALTÉRRRA provides a transformational solution for attracting private capital.
- Its scale and structure will create a multiplier effect in climate focused

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investment, making it a vehicle like no other.

- Its launch reflects the COP Presidency's Action Agenda and the UAE's efforts to make climate finance available, accessible and affordable,"
- By 2030, emerging markets and developing economies will require reportedly \$2.4 trillion every year to address climate change.
- ALTÉRRRA will have four key verticals namely: Energy Transition, Industrial Decarbonisation, Sustainable Living and Climate Technologies.

The Hindu

Disinformation

- fake news had drowned out true information simply by virtue of the scale of dissemination in the digital age, replacing the character of discourse from truth seeking to the loudest voice.
- "Disinformation has the power of impairing democratic discourse forever, pushing a marketplace of free ideas to the point of collapse under the immense weight of fake stories,"

- Freedom of speech was traditionally considered an essential part of civil rights activism for the fear that the government would gag certain kinds of speech.

- "With the advent of troll armies and organised disinformation campaigns across social media platforms, the fear is that there is an overwhelming barrage of speech that distorts the truth

- There was a flip side to adopting privately owned platforms as the medium for dissent, activism, and expression of free speech.

- Unlike state actors who are held accountable by the Constitution and the electorate, social media platforms are relatively unregulated.

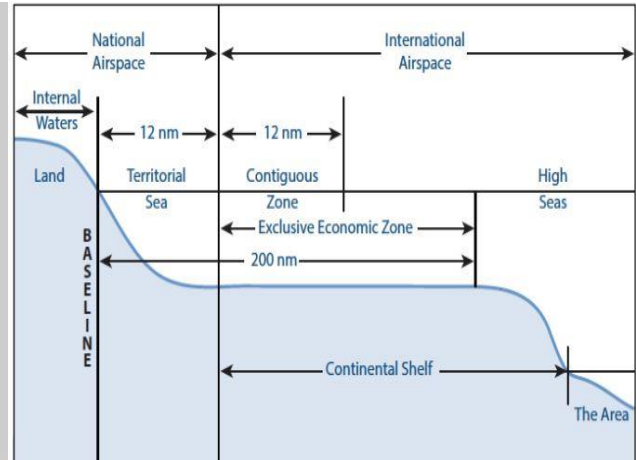
The Hindu

THITU ISLAND

- The Philippines inaugurated a new coast guard monitoring base on an island occupied by Filipino forces in the disputed South China Sea and plans to expand joint patrols with the U.S. and Australia to counter China's "pure bullying" in the strategic waterway.

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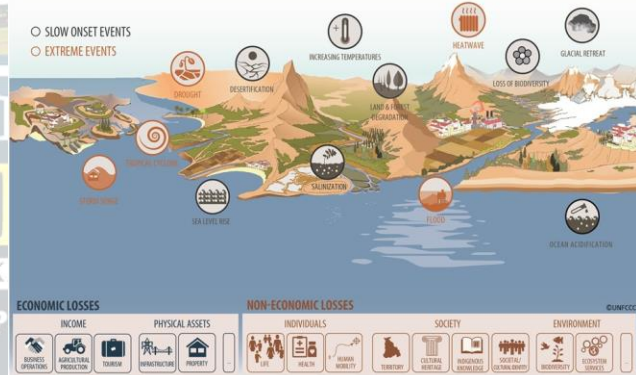
- High seas face offs between Chinese and Philippine ships have intensified this year in the contested waters, fueling fears of a larger conflict that could involve the U.S.



The Hindu

Loss and Damage fund

LOSS AND DAMAGE ASSOCIATED WITH THE IMPACTS OF CLIMATE CHANGE



What is “loss and damage”?

The phrase refers to costs already being incurred from climate-fuelled weather extremes or impacts, like rising sea levels

■ Climate funding so far has focused on cutting CO₂ emissions, while a third of it went towards helping communities adapt to future impacts

■ Loss and damage funding is expected to cover the cost of damage that countries cannot avoid or adapt to

■ A report by 55 vulnerable countries estimated that their combined climate-linked losses in the last two decades totalled



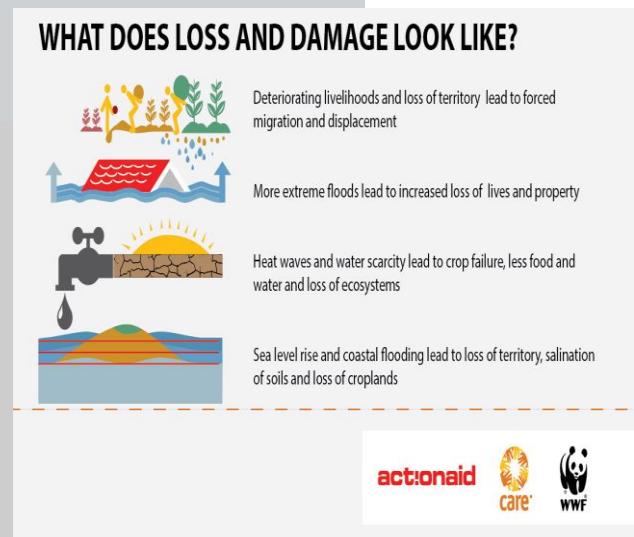
\$525 billion, or 20% of their collective GDP. This could go up to \$580 billion per year by 2030

■ Vulnerable countries and campaigners argue that rich countries that caused the bulk of climate change with their historical greenhouse gas emissions should pay

Source: Reuters

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- Loss and damage (L&D) fund, a three decade old demand, is a fundamental expression of climate justice.
- The L&D fund is a corpus of money and technologies that will be replenished by developed countries and used by the rest to respond to the more unavoidable effects of climate change
- First, it will be hosted by the World Bank for an interim period of four years and will be overseen by an independent secretariat.
- Second, while some countries have committed amounts to the fund from \$10 million by Japan to \$100 million each by Germany and the UAE whether they will be periodically replenished is not clear.
- The committed amounts are also insufficient, totalling \$450 million (for now) against an actual demand of several billion dollars.
- The World Bank will have to meet some conditions on managing the fund, including a degree of transparency it has not brooked so far, and submit a report to the Parties to the Paris Agreement.
- If its stewardship is determined to be unsuitable, the fund can 'exit' the World Bank.
- The L&D fund's contents need to be easily accessible to those who need it most, in timely fashion, sans pedantic bureaucratic hurdles, and in sufficient quantities



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- The Hindu

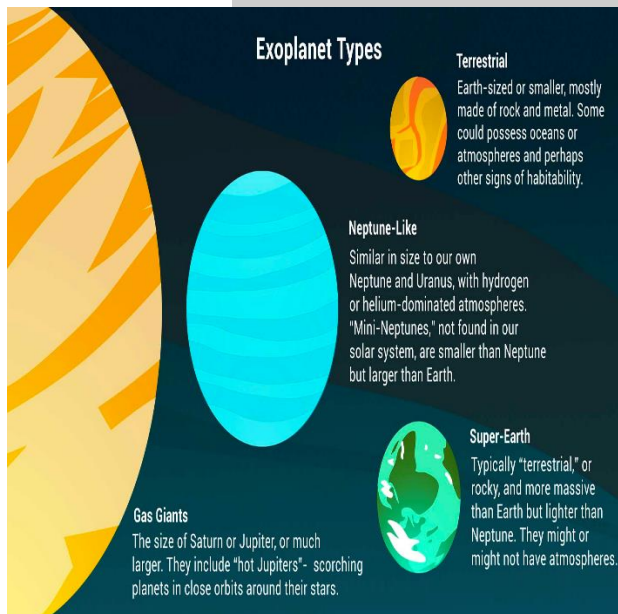
SC on governor

- The CJI said once the Governor withholds assent, he cannot stultify the Bills.
- He has to send them back to the Assembly under the first proviso of Article 200.
- Consequently, if the Assembly re-passes the Bills, with or without amendments, the Governor has no choice left but to grant his assent to the Bills in the reenacted form.
- Chief Justice Chandrachud, towards the end of the hearing, urged the Governor to resolve the impasse with the Chief Minister.
- “So many things need to be resolved between the Chief Minister and the Governor. Please ask the Governor to engage with the Chief Minister... Let them sit down and discuss.

The Hindu

Bright star (HD 110067)

- Six exoplanets orbiting around a nearby bright star (HD 110067) in the Coma Berenices constellation has been discovered. ‘
- The planets have radii between that of Earth and Neptune.



- Observations of HD 110067 made by NASA's Transiting Exoplanet Survey Satellite (TESS) in 2020 and 2022 revealed several dips in the star's brightness, and with additional observations from the 'Characterizing Exoplanets Satellite' (CHEOPS) the signals were interpreted as six planets passing in front of the star

- HD 110067 is the brightest star found to host more than four transiting exoplanets to date, the authors note, and add that more planets may exist within or beyond the temperate zone, although such observations have not been made so far.

- They conclude that the HD 110067 system offers a chance to learn more about sub Neptune's and how systems in this configuration might form.

- Planets with radii between that of the Earth and Neptune (referred to as 'subNeptunes') are found in close in orbits around more than half of all Sunlike stars, but details of their composition, formation and evolution are not well understood.
- HD 110067 is a bright star in the Coma Berenices constellation (around 100 light years away), which is visible from Earth's Northern Hemisphere.

FROM BASICS TO UPSC BRILLIANCE
The Hindu

Chinstrap penguin



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- In the wild, nesting chinstrap penguins get more than 11 hours of sleep per day but not all at once.
- According to a study, these birds nod off thousands of times per day, but for only four seconds at a time, cumulatively accruing their daily sleep needs while remaining continuously vigilant over their nests.
- the findings suggest that, given the breeding success of these penguins, the benefits of sleep can accrue incrementally and those micro sleeps can fulfil at least some of the benefits of longer sleep bouts.

• About chinstrap penguin

The chinstrap penguin (*Pygoscelis antarcticus*) is a species of penguin that inhabits a variety of islands and shores in the Southern Pacific and the Antarctic Oceans.

- Its name stems from the narrow black band under its head, which makes it appear as if it were wearing a black helmet, making it easy to identify.
- Other common names include ringed penguin, bearded penguin, and stone cracker penguin, due to its loud, harsh call.

- Chinstrap penguins have a circumpolar distribution.
- They breed in Antarctica, Argentina, Bouvet Island, Chile, the French Southern Territories, and South Georgia and the South Sandwich Islands.
- Vagrant individuals have been found in New Zealand, the islands of Saint Helena and Tristan da Cunha, and South Africa.

• The Hindu

M dwarf star LHS 3154 / mTORC1

- The discovery of a Neptune mass exoplanet orbiting the very low mass M dwarf star LHS 3154 challenges theoretical models of planet formation, according to a new study.
- The planet, which has a mass at least 13 times that of Earth, tightly orbits a star nine times less massive than the Sun, demonstrating that small stars can sometimes host larger planets than was previously thought.
- Although massive planet candidates have been detected around a few very low mass dwarfs
- Bacillus Calmette-Guerin (BCG)
- Scientists have uncovered a molecular mechanism that limits the

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abnormal growth of new blood vessels.

- Their results show that the mechanism limits blood vessel growth by restraining the size of endothelial cells and the activity of the mTORC1 signalling pathway.
- Angiogenesis, the development of new blood vessels, is important during tissue development and to restore blood flow to tissues that have been injured or are starved of oxygen.

mTORC1

- mTORC1 integrates signals from multiple growth factors, nutrients, and energy supply to promote cell growth when energy is sufficient and catabolism when the body is hungry.
- mTORC1 mainly regulates cell growth and metabolism, while mTORC2 mainly controls cell proliferation and survival.

The Hindu

Health and COP 28

- Bacillus Calmette-Guerin (BCG) is the live attenuated vaccine form of Mycobacterium bovis used to prevent tuberculosis and other mycobacterial infections.

- The vaccine was developed by Calmette and Guerin and was first administered to human beings in 1921.

- BCG is the only vaccine against tuberculosis.

- It is the most widely administered vaccine and usually a part of the routine newborn immunization schedule.

- BCG vaccine also offers protection against non-tuberculous mycobacterial infections like leprosy and Buruli ulcer.

- This activity reviews the mode of action of the BCG vaccine and highlights the role of the inter professional team in educating patients about tuberculosis prevention.

Health and COP 28

- The 'groundbreaking Health Day at COP28', as COP28 president Sultan Ahmed Al Jaber put it, is expected to pose two questions: how public health can become resilient to climate change, and who will finance this transformation.

- India also highlighted the intricate link between climate change and public health during the health talks held under its G20 presidency this year.

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- “Health Day in itself doesn’t necessarily mean that health will be reflected in the negotiations.
- “The connection between health and climate change is evident, yet it has not been a specific focus of the COP process until now.
- The United Nations Framework Convention on Climate Change (UNFCCC) recognizes the health impacts of climate change.
- The COP28 UAE Declaration on Climate and Health includes dialogue on mitigating emissions, health sector adaptation to climate change, mainstreaming of health into climate policies and the sticky question of climate financing for health.
- The Declaration, however, doesn’t mention fossil fuels. It recognizes the need for climate mitigation, “strengthening research on the linkages between environmental and climatic factors and antimicrobial resistance”;
- and “intensifying efforts for the early detection of zoonotic spillovers” to prevent future pandemics.
- It does not mention pollution related harms or identify ‘fossil fuels’ coal, oil and gas as a driver of health threats, or emphasizes the need to end fossil fuel dependence.
- Fossil fuels are seen as the largest contributor to global climate change
- Changing weather patterns and rising temperatures are altering the life cycle of vector borne diseases such as dengue and malaria, which disproportionately impact poorer, marginalized groups (the spread of dengue has increased in India over the last two decades, research shows).
- Then there is the matter of finance.
- Health crises triggered by warming climate are expected to chart a financial toll of around \$24 billion annually by 2030.
- Another estimate shows that 40% of climate related poverty would be due to direct health impacts, as people’s income, productivity and health costs would soar.
- The Green Climate Fund, the Asian Development Bank, the Global Fund and Rockefeller Foundation pledged a new \$1 billion finance pledge for climate and health.
- “This \$1 billion sum is a tremendous addition to current levels of climate and health finance,”.
- “It is also key that funding for climate and health be truly new and additional, and not pulled from other

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key areas...that are vital to protecting health, such as water and sanitation, food security, and humanitarian action.”

- Developing countries had earlier asserted the need for grant based international public finance that doesn't add to their debt burden.
- However, the Declaration endorses climate health funding from “domestic budgets, multilateral development banks, multilateral climate funds...”, along with philanthropies and private sector actors.

The Hindu



SAURABH PANDEY
— CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

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Gender neutrality and adultery

- Last month, the Parliamentary Standing Committee on Home Affairs, examining the three new criminal law Bills set to replace the Indian Penal Code (IPC), Code of Criminal Procedure (CrPC), and the Indian Evidence Act, recommended the criminalization of adultery on gender neutral lines.
- This comes after a five judge Constitution Bench of the Supreme Court unanimously decriminalized adultery in 2018 on several grounds including discrimination.
- The Committee reasoned that adultery be criminalized in a gender neutral manner on the ground that it is crucial to safeguard the sanctity of the institution of marriage
- In his dissent note to the three Bills, Congress MP and former Home Minister P. Chidambaram emphasized that interference by the State in the private lives of consenting adults must be avoided.
- “Adultery should not be a crime.
- It is an offence against marriage which is a compact between two persons; if the compact is broken, the aggrieved spouse may sue for divorce or civil damages.
- To raise marriage to the level of a sacrament is outdated. In any event, a marriage concerns only two persons and not society at large.
- The State has no business to enter into their lives and punish the alleged wrongdoer,” the note reads.
- A five judge Constitution Bench of the Supreme Court led by then Chief Justice of India (CJI) Dipak Misra, and comprising current CJI D. Y. Chandrachud, and Justices A. M. Khanwilkar, R. F. Nariman, and Indu Malhotra, in Joseph Shine versus Union of India (2018), held that adultery is not a crime and struck it off the IPC.
- According to senior Advocate Gopal Sankaranarayanan, the problem with adultery being in the IPC was two-fold.
- The first is criminalizing it on the basis of the institution of marriage and the second is treating women as property.
- Making it gender neutral would do away with the second, but still leave the first.

Meta vs FTC

- usually competition regulators investigate trade practices, sue

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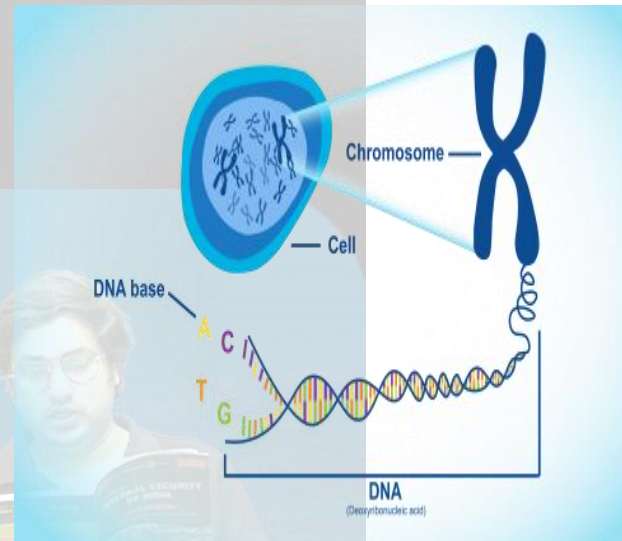
corporations, and levy penalties on them.

- The U.S. Federal Trade Commission (FTC) probes antitrust practices and files lawsuits against tech companies it sees as violating consumer laws.
- But in a shock move, Facebook - parent Meta in late November sued the FTC, claiming the regulator was making an “obvious power grab” and that its action caused the social media giant “immediate and irreparable” harm
- The FTC, in May, proposed changes to the three year old agreement, noting that Meta had not fully complied with the previous terms.
- The FTC alleged that Meta misled parents about the Messenger Kids app and misrepresented how some app developers could access private user data.
- As part of the latest changes proposed by the FTC, Meta would be barred from profiting off the data it collected from children (users below 18) as well as the data from its virtual reality products.
- Meta would also be restricted in its use of facial recognition technology, its launch of new products and features, and would have to provide

even more user protections, as per the regulator.

The Hindu

Genome sequencing of population



- An early effort to use large scale population genetic studies was initiated in Iceland by deCODE genomics in 1996, with most of the Icelandic population enrolling.
- The initiative provided the initial impetus for programmes that wished to use population scale genomic data for precision medicine and public health
- A recent initiative by the pharmaceutical companies Regeneron Genetics Center, AstraZeneca, Novo Nordisk, and Roche, along with the Meharry Medical College, Tennessee, plans to sequence five lakh individuals of

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African ancestry through the Diversity Human Genome Initiative

- A programme for population genomes in India named IndiGen provided an early view of more than a thousand genomes from cosmopolitan areas.
- It yielded clues to the landscape of many treatable genetic diseases and variants of clinical significance, including the efficacy and toxicity of drugs and prevalence of rare disorders
- The Genome Asia project, led by multiple partners across the continent, plans to sequence a lakh whole genomes from diverse populations.
- A pilot programme for population genomes in India named IndiGen provided an early view of more than a thousand genomes of individuals from cosmopolitan areas in India.
- It also yielded some clues to the landscape of many treatable genetic diseases and variants of clinical significance, including the efficacy and toxicity of drugs and the prevalence of rare disorders.
- Looking to the horizon, the long term impact of population scale genomics extends beyond individual health,

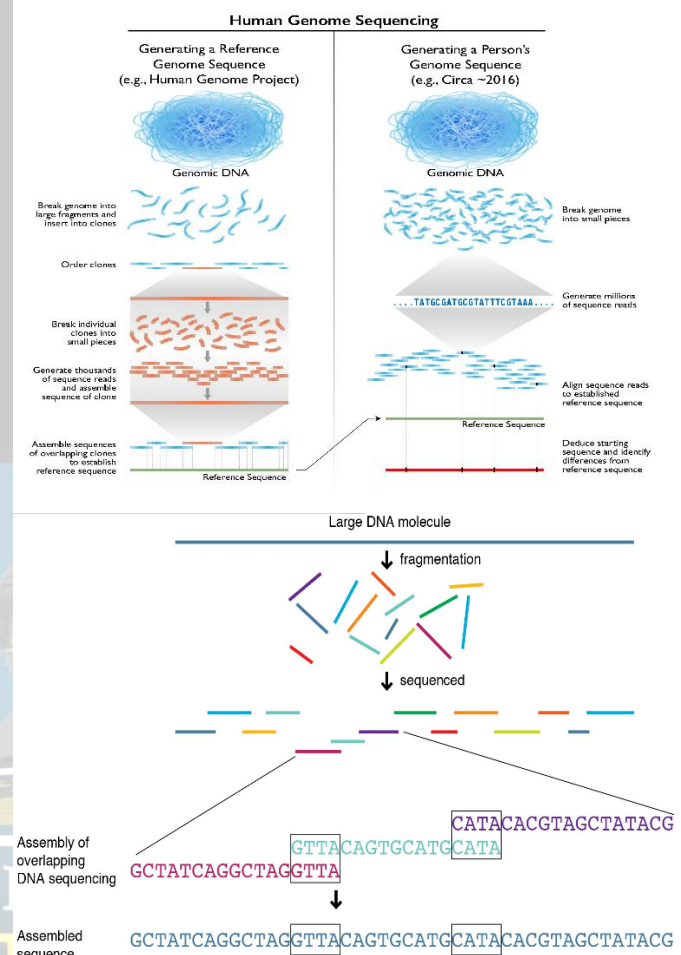
shaping our comprehension of human evolution,

- Migration patterns, and adaptation to diverse environments.
- It will also contribute significantly to our knowledge of human biology.
- In essence, population scale genomics stands at the forefront of a genomic revolution, poised to revolutionise healthcare, illuminate our evolutionary history, and propel us towards a future in which precise, personalised approaches will influence the landscape of medical and biological understanding
- Methane is an organic compound. Its molecule consists of carbon and four hydrogen atoms (CH₄).
- It's in the news of late because of its character as a potent climate pollutant.
- While climate talks have by and large focused on carbon and carbon dioxide emissions, there is increasing acknowledgement among the world's leaders as well as philanthropists of methane's effects on global warming.
- At the ongoing COP28 climate talks in the United Arab Emirates, for example, a group of well endowed philanthropic bodies, including the Sequoia Climate Foundation and the

Bezos Earth Fund, announced that they would collectively invest \$450 million in solutions to tackle methane emissions.

- Methane has a greater global warming potential (GWP) than carbon dioxide.
- The GWP is a measure of the warming caused by a substance relative to that due to the same mass of carbon dioxide; the GWP100 measures this over a century at a time.
- If carbon dioxide has a GWP100 of 1, methane is 28, nitrous oxide is 265, and sulphur hexafluoride is 23,500.
- However, while carbon dioxide lasts for several decades at a time in the atmosphere before breaking down, methane breaks down in a matter of years. That is, it's a short lived climate pollutant

The Hindu



The Hindu

Technology in news- VOIP

What is a VoIP phone?

- A VoIP phone is a hardware- or software-based telephone designed to use voice over Internet Protocol (VoIP) technology to send and receive phone calls over an IP network.
- The phone converts analog telephony audio into a digital format that can be transmitted over the

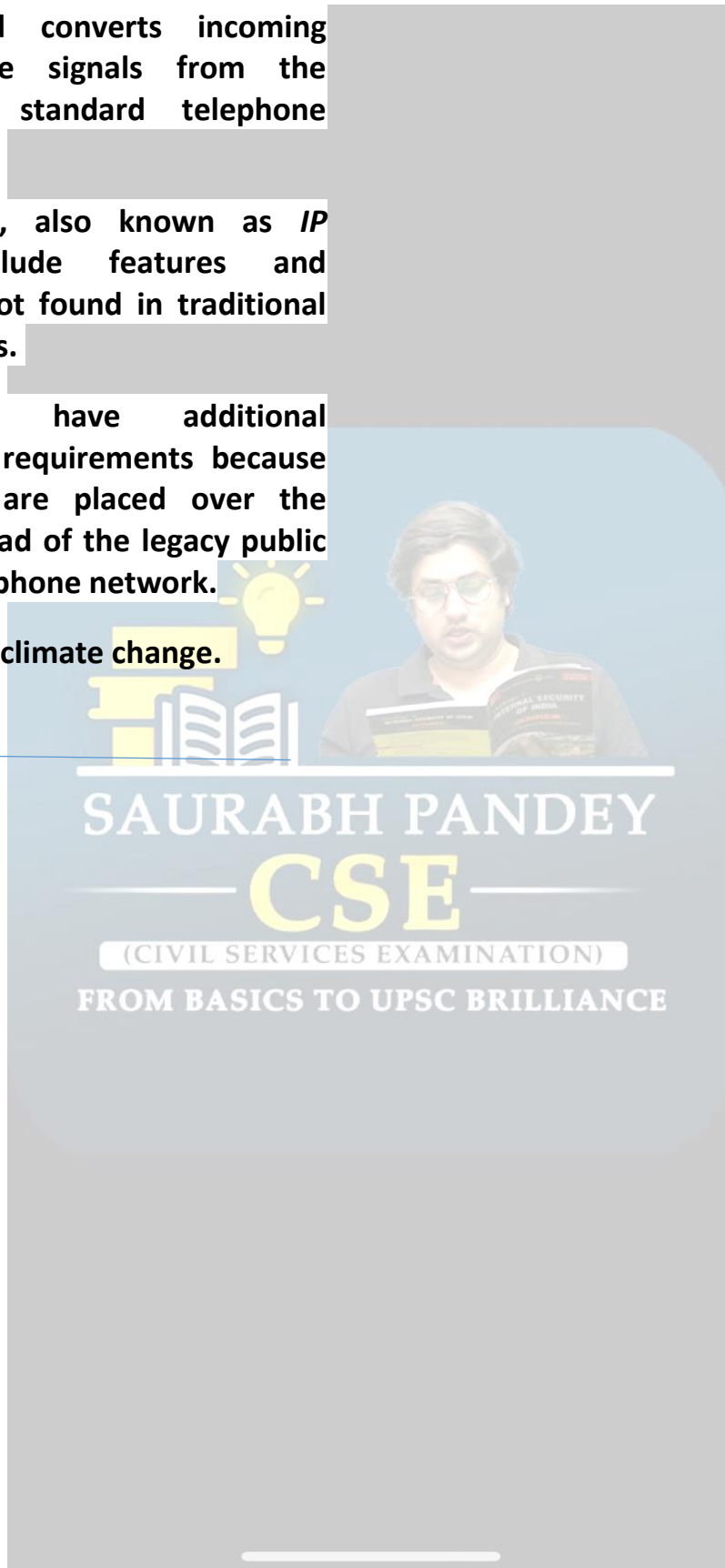
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internet and converts incoming digital phone signals from the internet to standard telephone audio.

- VoIP phones, also known as *IP phones*, include features and capabilities not found in traditional analog phones.
- They also have additional performance requirements because phone calls are placed over the internet instead of the legacy public switched telephone network.

Methane and climate change.

The Hindu



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The Intergovernmental Negotiating Committee (INC) on plastic pollution.

- The Intergovernmental Negotiating Committee (INC), under the United Nations Environment Programme, met in Nairobi from November 13 to 19 for its third round of negotiations to develop an international legally binding instrument to end plastic pollution worldwide.
- Under the UN Environment Assembly Resolution 5/14, the INC is responsible for delivering a global plastics treaty by 2025.
- The INC3 was a make or break opportunity as countries came together to negotiate the 'zero draft' text developed by the committee's secretariat, with various options for core obligations and control measures
- **What does the 'zero draft' say?**
 - The zero draft as prepared by the secretariat contained strong options for an international legally binding treaty to end plastic pollution.
 - Most countries agreed that the treaty's objective should be to end plastic pollution and protect human health and the environment.
 - But a group of likeminded countries including Saudi Arabia, Russia, China, Iran, and some members of the Gulf Cooperation Council argued to include the clause "while contributing to the achievement of sustainable development", to ensure their economic interests and investments.
- The most important provision, that is a reduction in the production of primary polymers, also stirred controversy because of its implications for industry.
- plastic pollution can be managed only with strong, concrete measures at each stage throughout the lifecycle of plastics, many countries disagreed where the life cycle begins.
- While this would ideally mean that it begins at the point of sourcing raw materials for production, some countries argued that the life cycle starts at product design.
- Similarly, the same group objected to including provisions pertaining to eliminating compounds and polymers of concern and problematic and avoidable plastics, which are key in ending plastic pollution, and called for a 'null option' despite broad agreement from other countries that were pushing for a binding agreement
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be paid by plastic polymer producers, and another on reducing the financial flow into projects with a high carbon footprint.

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GPS Working

What is GPS?

The U.S. Department of Defence started the GPS programme in 1973 and launched the first satellite in 1978.

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What is GPS?

GPS, which stands for Global Positioning System, is the only system today able to show you your exact position on the Earth anytime, in any weather, anywhere.

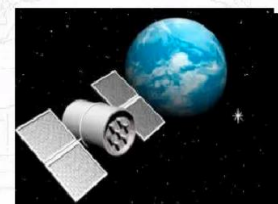
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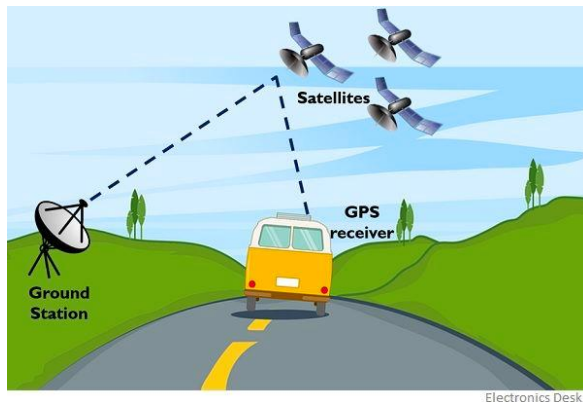
- Satellites
- Receivers
- Software



Satellites

There are quite a number of satellites out there in space. They are used for a wide range of purposes: satellite TV, cellular phones, military purposes and etc. Satellites can also be used by GPS receivers.





- The overall programme has **three main components** the **space segment**, the **control segment**, and the **user segment**.
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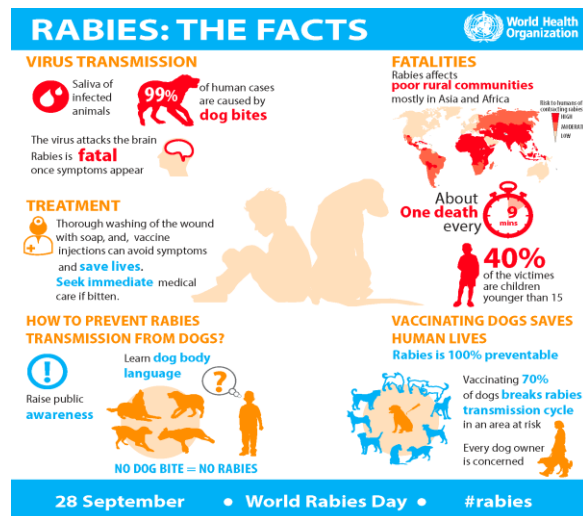
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How rabies virus travels

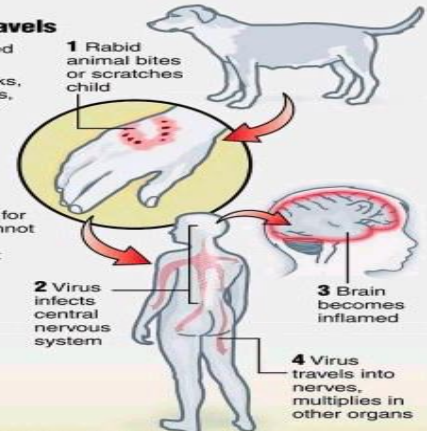
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Source: U.S. Centers for Disease Control and Prevention
Graphic: Pat Carr, Garrick Gibson

Vaccines for Rabies Prevention



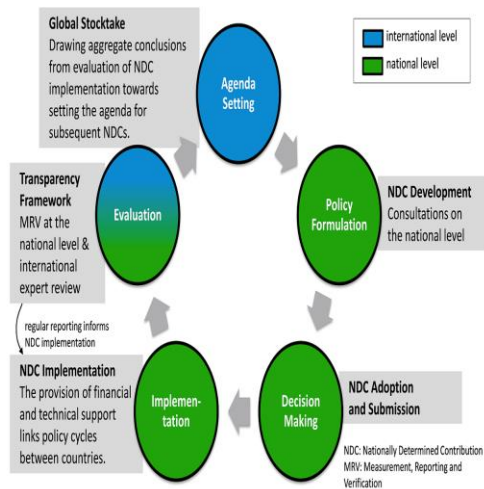
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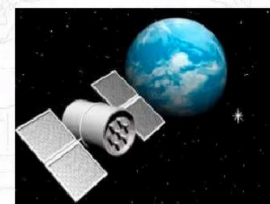
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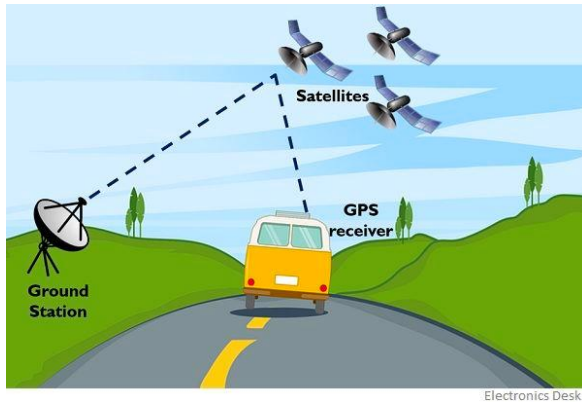
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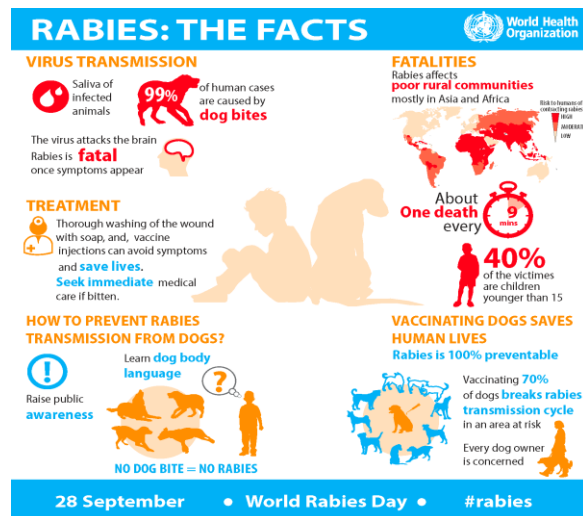
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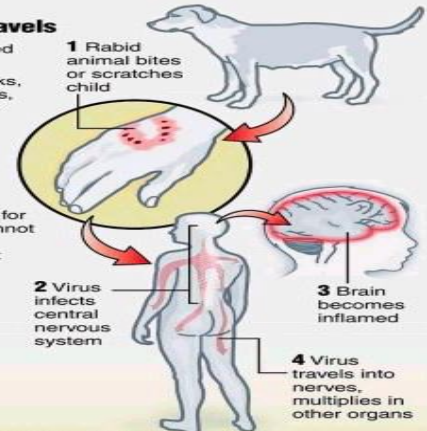
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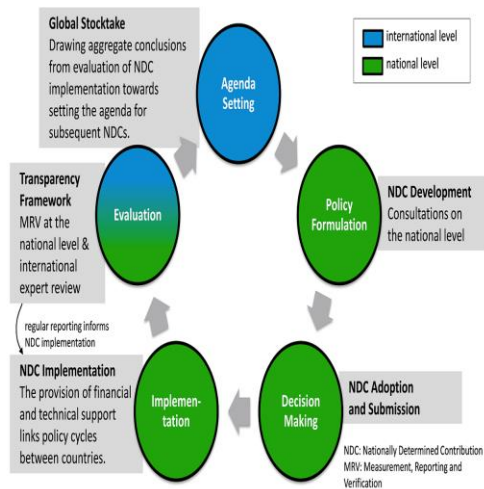
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US-CHINA Relationship

- The most consequential outcome was the decision to restore **military to military communications** between the two nuclear weapons states, critical to prevent **potentially catastrophic miscalculations**.
- The respective defence forces will now resume regular exchange of information under the **Military Maritime Consultative Agreement** that started in 1998.
- A self ruled island state, **Taiwan's status remains a bone** of contention between the world's biggest superpowers, with **China pursuing the goal of its reunification into the mainland**.
- Under the **"one China" policy**, Washington accepts Beijing as the **only legitimate government of China** and acknowledges, but does not endorse, Taiwan as part of that country, and provides concrete security guarantees under the **Taiwan Relations Act**.
- More specifically, Washington and Beijing are leveraging their own areas of strength to inflict maximum damage on the other.
- A case in point is the **sweeping controls** the Biden administration enacted in October 2022, further extended in October 2023, on exports of **advanced computer chips for the manufacture of semiconductors**.
- The rationale behind the export bans is to undercut Beijing's strides in **AI and supercomputing**, which have

powered its supersonic and nuclear weapons capability, which Washington views as detrimental to its security interests.

- On top of the ban on tech exports comes the executive order Biden issued in August prohibiting **U.S. investments in the high-tech arena**.
- China has hit back in kind, clamping a ban in July on gallium and germanium exports, raw materials used in the production of microchips and weapons systems.
- These are the items listed in the U.S. inventory of materials critical for economic and national security.
- Additionally, curbs were imposed in October on exports of various types of graphite, a vital mineral for the production of electric vehicle batteries, where China enjoys dominance in the global supply chain.
- The Hindu

Ethics committee and privilege committee

What is the role of ethics committee?

- The ethics committee was constituted in 2000, to **oversee the moral and ethical conduct of members** and examine cases of 'unethical conduct' referred to it.
- The Committee examines **complaints filed against members of the House by other members; outsiders through a member; or referred by the Speaker**.
- The Committee makes a **prima facie inquiry before deciding to examine a complaint and presents its report to**

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the Speaker, who places it before the House for consideration.

- It must be noted that the **term 'unethical'** is not defined.
- It is left to the Committee to decide whether any act is unethical or not.

What are privileges committees?

- The privileges committee or special inquiry committee examines the more serious accusations against a member.
- In 1951, a special committee found a member guilty of promoting a business interest by putting questions in return for financial benefits.
- It was again a special committee that inquired into the 'cash for query' scam of 2005 where 10 MPs of Lok Sabha were recommended for expulsion.

Is an expulsion constitutional?

- The Constitution under Article 101 lists down the grounds for vacation of a seat by an MP.
- It includes **voluntary resignation, disqualification and continuous absence from the House for 60 sittings.**
- Expulsion is not mentioned explicitly in the Constitution. However, the Supreme Court has provided conflicting judgments in this regard.
- In **Raja Ram Pal versus Hon'ble Speaker (2007)**, it upheld the power of Parliament to expel its members for breach of privilege by interpreting

Article 101 to include expulsion as a ground.

- But in **Amarinder Singh versus Special committee, Punjab Vidhan Sabha (2010)**, the Supreme Court held expulsion by the State Assembly as unconstitutional.
- It held that such scenarios would frustrate the objectives of Parliamentary democracy.

How to reconcile privileges of the House and democratic representation?

- The privileges of the House developed in medieval Britain to protect the House of Commons from an authoritarian King.
- It is important to preserve the dignity and privilege of the House.
- It is equally imperative, if not more in a modern democracy, to ensure that democratic representation is not prejudiced for political reasons.
- It must be noted that Parliamentary Committee proceedings are not as detailed as a judicial case that is conducted as per the Evidence Act.

The Hindu

Conflict in Myanmar

- Conflict intensifies between armed resistance groups and the Myanmar military in the Chin, Shan and Sagaing provinces, India reminded Myanmar to return to the path of federal democracy.
- Following intense fighting, thousands of Myanmar nationals including

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former military personnel recently sought refuge in India

- “The Indian side said it continued to support people centric socio-economic developmental projects, including connectivity projects and projects under the Rakhine State Development Programme and Border Area Development Programme for the benefit of the people of Myanmar.

The Hindu

Garba in Unesco

- Gujarat’s traditional dance form ‘Garba’ was on Wednesday included in the list of Intangible Cultural Heritage by the United Nations Educational, Scientific and Cultural Organization (UNESCO).
- The popular dance form is the 15th cultural item from India to make it to the UNESCO list. Kolkata’s Durga Puja was the last one added two years ago.
- The inclusion has been made under the provisions of the 2003 Convention for the Safeguarding of Intangible Cultural Heritage.
- The international cultural body described the ‘Garba’ as a ritualistic and devotional dance performed India.

• Climate change and Health

- Heat stress. Lung damage from wildfire smoke.
- The spread of disease carrying mosquitoes into new regions as temperatures rise.

- These are just some ways public health has been compromised by climate change a focus for the first time ever at the annual U.N. climate summit COP28

- From 2030, experts expect that malnutrition, malaria and dengue, diarrhoea, and heat stress will push global death tolls up by 250,000 per year, according to the World Health Organisation (WHO).

- Mosquitoes that carry viruses including dengue, malaria, West Nile, and Zika are shifting into new parts of the world as warmer temperatures and heavy rains create more hospitable conditions for them to breed.

- Climate change is also having an unpredictable impact on malaria, with 5 million more cases registered in 2022.

- Similarly, after decades of progress against cholera, an intestinal infection spread by contaminated food and water, case numbers are rising again, including in countries that had all but extirpated the disease.

- Diarrhoea also receives a boost from climate change, via increasingly erratic rainfall. It’s the world’s second leading cause of death among children under 5, claiming the lives of more than half a million kids every year.

- Heat stress is projected to impact hundreds of millions of people as temperatures continue to climb through the next few decades.

The Hindu

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Trade and agriculture product and environment impact

- increasing demand for agricultural products is leading to significant social and environmental consequences worldwide.
- The expansion of international trade has created global supply chains, directly linking consumers to geographically distant impacts, including carbon emissions, biodiversity loss, freshwater depletion, soil degradation and labour rights issues all of which have local, regional, and global relevance.
- Due to its vast size and consumer market, India is a global anchor of the trade in agricultural products.
- This has led to an increasing demand as well as supply of these products.
- Large land areas in India are used to service the international demand for grains, fruits, and vegetables, among other products, which puts pressure on national soil and water resources.
- At the same time, India's vast consumer market means that large amounts of land, even outside its borders, are used to satisfy domestic demand

Food based impact accounting

- The expansion of such imports has contributed to increasing the environmental pressure in the exporting countries.
- Recent studies have shown that a substantial share of the total ecological impact is due to the

displacement of environmental damage through international trade.

- The current paradigm in measuring impacts and allocating responsibility is based on a production based accounting method: it measures impacts in the place where the products are produced.

Consumption based accounting

- Consumption based accounting accounts for impact at the point of consumption, attributing all the social and environmental impact that occurred during production and trade to the final products and to the eventual consumers.
- That is, the approach urges the consumer (whether social groups or countries) to accept responsibility for the embodied or 'virtual' impacts of the product that is being consumed.

What is the supply perspective?

- From a supply perspective, the proponents of consumption based accounting claim that it can encourage cleaner production since producer countries are implicitly encouraged to implement strategies that lower the environmental footprint of their exports.

Benefits of environmental action?

- The application of this approach to estimate carbon emissions, in the form of embodied emissions, and water use, in the form of virtual water, has also been around in the scientific literature for some time, but has only recently made inroads into policymaking.

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- For example, the European Commission recently initiated steps to ensure products consumed in the European Union have not contributed to deforestation in their country of origin.
- This measure is expected to significantly reduce carbon emissions from deforestation as well as biodiversity loss, since the European Union is a major consumer of agricultural and forestry products.

The Hindu



SAURABH PANDEY

— CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

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Deepfake regulation

How did deepfake tech emerge?

- Deepfakes are made using technologies such as AI and machine learning, blurring the lines between fiction and reality.
- Although they have benefits in education, film production, criminal forensics, and artistic expression, they can also be used to exploit people, sabotage elections and spread largescale misinformation.
- While editing tools, like Photoshop, have been in use for decades, the first ever use of deep fake technology can reportedly be traced back to a Reddit user who in 2017 had used a publicly available AI driven software to create pornographic content by imposing the faces of celebrities on to the bodies of ordinary people.
- Now, deepfakes can easily be generated by semiskilled and unskilled individuals by morphing audiovisual clips and images.
- For instance, the Massachusetts Institute of Technology (MIT) created a Detect Fakes website to help people identify deepfakes by focusing on small intricate details.
- The use of deepfakes to perpetrate online gendered violence has also been a rising concern.
- A 2019 study conducted by AI firm Deep trace found that a staggering 96% of deep fakes were pornographic, and 99% of them involved women.

- Highlighting how deepfakes are being weaponized against women,

What are the laws against the misuse of deepfakes?

- India lacks specific laws to address deepfakes and AI related crimes, but provisions under a plethora of legislations could offer both civil and criminal relief.
- For instance, Section 66E of the Information Technology Act, 2000 (IT Act) is applicable in cases of deepfake crimes that involve the capture, publication, or transmission of a person's images in mass media thereby violating their privacy.
- Such an offence is punishable with up to three years of imprisonment or a fine of two lakh.
- Further, Sections 67, 67A, and 67B of the IT Act can be used to prosecute individuals for publishing or transmitting deepfakes that are obscene or contain sexually explicit acts.
- The IT Rules, also prohibit hosting 'any content that impersonates another person' and require social media platforms to quickly take down 'artificially morphed images' of individuals when alerted.
- In case they fail to take down such content, they risk losing the 'safe harbour' protection a provision that protects social media companies from regulatory liability for third party content shared by users on their platforms.
- Provisions of the Indian Penal Code (IPC) can also be resorted for

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cybercrimes associated with deepfakes Sections 509 (words, gestures, or acts intended to insult the modesty of a woman), 499 (criminal defamation), and 153 (a) and (b) (spreading hate on communal lines) among others.

- The Delhi Police Special Cell has reportedly registered an FIR against unknown persons by invoking Sections 465 (forgery) and 469 (forgery to harm the reputation of a party) in the Mandanna case

What has been the Centre's response?

- The Union Minister of Electronics and Information Technology Ashwini Vaishnaw on November 23 chaired a meeting with social media platforms, AI companies, and industry bodies where he acknowledged that “a new crisis is emerging due to deep fakes” and that “there is a very big section of society which does not have a parallel verification system” to tackle this issue.
- The Hindu

Flooding and after disaster challenge

- The Indian monsoon brings with it cyclones and flooding.
- Fearful and battered communities are left to cope with vector borne diseases; an ever present threat of drowning, electrocution, snakes, poisonous insects, respiratory diseases and of late COVID19, owing to crowding.

- Floods disrupt access to food, water and safe shelter and jeopardise the community's ability to get the healthcare services they need.
- Contaminated water which is all around after flooding is responsible for vector borne diseases such as cholera, typhoid, and malaria.
- After the cyclone and rains died down, the State government also commissioned mobile medical units.
- The units, which include a doctor, staff nurse, a sanitary inspector and an assistant, will function all day in the urban health centres for at least a week.
- Acute diarrhoeal diseases and cholera can be prevented by ensuring safe water and sanitation.
- Those with severe symptoms will need rapid treatment with intravenous fluids and antibiotics.
- In localities that have a high risk of cholera, improved sanitation and oral vaccines have helped.
- The Union World Conference on Lung Health 2023

- For over 100 years, The Union World Conference on Lung Health has come together to present the latest scientific research in all aspects of lung health.
- THEME FOR 2023
- TRANSFORMING EVIDENCE
- INTO PRACTICE
- The Union World Conference on Lung Health 2023 will take place in-person from 15-18 November in Paris.

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- The Hindu

DRUG RESISTANT TB

Box 1. Definitions drug-resistant tuberculosis.

- > **Multidrug-resistant (MDR)-TB:** TB caused by strains of *Mycobacterium tuberculosis* that are resistant *in vitro* to rifampicin and isoniazid.
- > **Extensively drug-resistant (XDR)-TB:** TB caused by strains of *M tuberculosis* that are resistant *in vitro* to isoniazid, rifampicin and at least one injectable agent (ie amikacin, kanamycin or capreomycin) and any of the fluoroquinolones (totally drug-resistant [TDR]-TB is not official terminology).
- > **Mono-resistant TB:** TB caused by strains of *M tuberculosis* that are resistant to just one anti-TB drug.
- > **Poly-resistant TB:** TB caused by strains of *M tuberculosis* that are resistant to more than one drug, but not isoniazid and rifampicin together.

MDR = multi-drug resistant; TB = tuberculosis.

- **Tuberculosis diagnostics:** Several molecular tests are now endorsed by the WHO, including Xpert MTB/RIF Ultra (Cepheid Inc., USA), TrueNAT MTB and TrueNAT MTBRIF Dx (Molbio Diagnostics, India), loop mediated amplification (LAMPTB), assay line probe assays and centralized assays. Some are low complexity tests, while others are moderate to high complexity assays.

The Hindu

(CIVIL SERVICES EXAMINATION)

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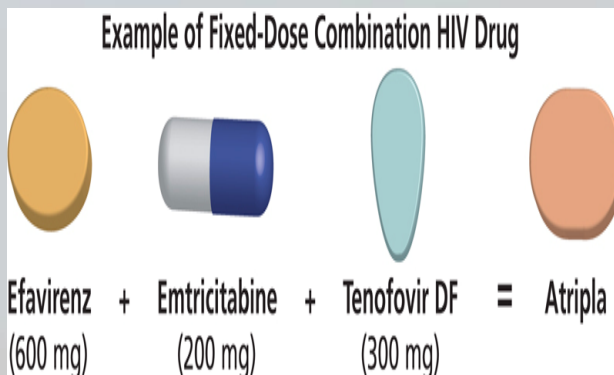
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Fixed dose combinations

- FDCs are combinations of one or more known drugs and can be useful in the treatment of some diseases since the combination can improve patient compliance.
- For instance, if a patient has to take three different medications for a particular treatment, she may forget to take one.
- But if all three medications are combined into one tablet or one syrup, the chance of her forgetting to take one or two of the drugs is reduced.



For diseases such as AIDS, it is well documented that FDCs have proven to be very useful in improving patient compliance, which at the end of day improves treatment outcomes.



Emerging issue

- Pharmaceutical companies in India use these FDCs to escape liability under multiple laws without much concern for public health.
- One such law is the Drugs (Prices Control) Order (DPCO), under which the government fixes the prices of individual drugs.
- Since drug combinations were traditionally not covered under the DPCO, the pharmaceutical industry decided that making FDCs provided an easy way to escape the remit of the DPCO.
- the fact that because of the bewildering variety of FDCs being sold in the market, there were no standards set by bodies such as the Indian Pharmacopoeia Commission for testing these drugs for quality of manufacture.
- The second advantage of going down the FDC route is that it gives individual companies a reason to charge higher prices for their drugs.
- In 1982, Parliament changed the law to give the central government the power to "prohibit" the manufacture of specific drugs that lack therapeutic value or justification.
- Later in that decade, in 1988, the central government amended the rules to introduce a new requirement for manufacturers of all "new drugs", including FDCs, to submit proof of safety and efficacy to the Drugs Controller General of India (DCGI) who heads the Central Drugs Standard Control Organization (CDSCO)

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- Despite the law being crystal clear on the issue, **State drug controllers have simply ignored the law** to continue issuing manufacturing licences for FDCs not approved by the DCGI with impunity.

Glacial lake outburst flooding- WMO Report



Figure-1: Illustrative graphic showing various reasons for GLOF occurrence
(A) Cloudburst (B) Snow avalanche (C) Landslide (D) Melting of ice in moraine
(E) Earthquake (F) Overflow

- The World Meteorological Organization's recent report, **"The Global Climate 2011-2020"**, gives a broad view of the planet's **response** to greenhouse gas emissions.
- In the section on the state of glacier health, it points out that, on average, **the world's**

glaciers thinned by approximately a metre a year from 2011 to 2020.

- When compared across decades, there is significant **regional variability**, but the overall pattern remains that **glaciers in all regions of the world are becoming smaller**



- In Africa, glaciers on the Rwenzori Mountains and Mount Kenya are projected to disappear by 2030, and those on Kilimanjaro by 2040.
- The report points to the **rapid growth of proglacial lakes and the likelihood of glacier lake outburst flood (GLOF)**, posing additional threats to ecosystems and livelihoods.
- The reports singled out how "...water from glacial melt contributed to one of the decade's **worst flooding disasters, the Uttarakhand floods of June 2013**".
- The fury of a GLOF event was brought home this year by the **destruction of the Chungthang dam in Sikkim after the South Lhonak Lake flooded from a melting glacier**, triggering catastrophe downstream.
- Earlier this year, a separate report by the International Centre for Integrated Mountain Development found that the

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disappearance of glaciers in the Hindu Kush Himalayas was "65% faster in the 2010s than in the previous decade".

- At the current rate of global greenhouse gas emissions, which is expected to see temperatures increase by 2.5°C by the end of the century, the volume of glaciers is forecast to decline anywhere from 55% to 75%.
- This means sharp reductions in freshwater supply in the immediate vicinity of 2050.
- The sensitivity of glacier systems to warming underlines the need for their careful monitoring.
- Despite awareness of the risks posed by Himalayan glaciers there is no early warning system for the likelihood of GLOF events.
- Much like warnings before cyclones, floods and earthquakes, authorities must elevate threats from contracting glaciers to the same category of risk.
- Correspondingly, there is a need to make comprehensive risk assessments, map regions of vulnerability and commission infrastructure development with the highest standards of care.
- The Hindu

India and Sri Lanka

- the relationship between the two countries in the area of infrastructure development should have been much deeper than what it is.

- For example, the idea of connecting the electricity networks of the two countries was floated even in 1970.
- Over 13 years have lapsed since the two countries signed a memorandum of understanding on the bilateral grid, but not even one unit of electricity has been transmitted.
- In the case of Bangladesh, India has been exporting at least 7,000 million units (MU) annually for the last couple of years. About a month ago
- Energy is not the only area where progress has been tardy.
- The India Sri Lanka Free Trade Agreement was signed in December 1998, yet the two countries have not yet been able to go beyond it despite holding talks for years on entering into an economic and technology cooperation agreement
- In the area of tourism, which is a major source of revenue for Sri Lanka, India remained the largest single country of tourist arrivals, with its share being 17% of the overall number of arrivals. But, the potential is much high.
- The presence of anti- Indian nationalist forces in the political class is nothing unique to this country.

The Hindu

New draft of Global stocktake

- The latest draft of the Global Stocktake, one of the key documents being negotiated at the UN's climate summit in Dubai, has linked the tripling of renewable energy

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capacity with a “phase out”, or a time - bound ending, of the use of fossil fuels.

- Though by no means final and only offered as an “option”, it expresses a strong push by the leadership at the COP28 climate talks to move towards ending the fossil fuel economy.
- “Tripling renewable energy capacity globally by 2030 ensuring that the increase in renewable energy capacity is strategically implemented to displace fossil fuel based energy, thereby significantly reducing global reliance on nonrenewable and high emission energy sources,
- India’s position is to not support such a clause.
- Tripling capacity is fine but not with such conditions which are prescriptive in nature.
- The latest draft also does away with the clause calling for a “just and orderly phase out of fossil fuel” that appeared in the first version of the text on December 6.
- This has now been replaced with four pointed options demanding that fossil fuels responsible for 80% of greenhouse gas emissions be phased out in such a way that global temperatures do not rise more than 1.5 degrees Celsius by 2100, and energy companies become fossil fuel free by mid-century.
- Here too, there’s an option for “no text”, meaning that all references to doing away with fossil fuels can be entirely deleted. The tripling of energy capacity was a clause that first came up formally in international agreements during the G20 summit in India.

Honeyguide bird

- African honeyguide birds understand and respond to the culturally distinct signals made by local human honey hunters, suggesting cultural coevolution between species.
- These successful calls have been maintained in these groups for generations.
- Systems in which humans successfully cooperate with wild animals are rare.
- One such involves the greater honeyguide, a small African bird known to lead humans to wild bees' nests



- Honeyguides (family Indicatoridae) are near passerine birds in the order Piciformes.
- They are also known as indicator birds, or honey birds,
- These birds are best known for their interaction with humans. Honeyguides are noted and named for one or two species that will deliberately lead humans (but, contrary to popular claims, not honey badgers) directly to bee colonies, so that they can feast on the grubs and beeswax that are left behind.
- Near passerines and higher land-bird assemblage are terms of traditional, pre-cladistic taxonomy that have often been given to tree-dwelling birds or those most often believed to be related to the true passerines.

• The Hindu

Annual tree ring

- Annual tree ring growth records from more than 122 species of trees show that trees growing in wetter forests are more sensitive to increasing drought.
- The findings suggest that land management and policy focused solely on drought effects in drier regions overestimates the resilience of forests in wetter regions.

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- Dendrochronology (or tree-ring dating) is the scientific method of dating tree rings (also called growth rings) to the exact year they were formed in a tree



- Research suggests that forests will continue to shift from carbon sinks to sources as the effects of climate change increase. So there is a need to predict which forests are vulnerable to a hotter future.

The Hindu

Teosinte

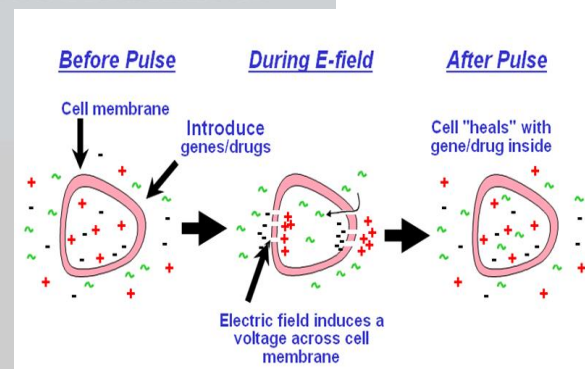
- Teosinte, any of four species of tall, stout grasses in the genus *Zea* of the family Poaceae.
- Teosintes are native to Mexico, Guatemala, Honduras, and Nicaragua. Domesticated corn, or maize
- Teosinte expands outward. It's an Omni-directional force starting from a pin point and then outward like an exploding star. This makes it

impossible to define by a small sample

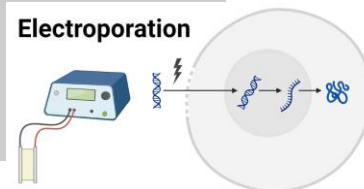


Electroporation

- Electroporation designates the use of short high-voltage pulses to overcome the barrier of the cell membrane.
- By applying an external electric field, which just surpasses the capacitance of the cell membrane, transient and reversible breakdown of the membrane can be induced



Electroporation



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Green turtle

- Rising global temperatures could lead to an increase in the nesting range of green turtles in the Mediterranean Sea, as per a study in Scientific Reports.
- Under the worst case climate scenario, the nesting range could increase by over 60% points, spreading west from the current area to include much of the North African, Italian, and Greek coastlines.
- Human caused climate change has caused sea surface temperatures to increase globally, with severe impacts on some marine life.
- Sea turtles are particularly susceptible, as the sex of their offspring is dependent on incubation temperature

About Green turtle

- The green turtle is one of the largest Sea turtles and the only herbivore among the different species. Green turtles are in fact named for the greenish color of their cartilage and fat, not their shells.
- In the Eastern Pacific, a group of green turtles that have darker shells are called black turtles by the local community. Green turtles are found

mainly in tropical and subtropical waters.

- Like other sea turtles, they migrate long distances between feeding grounds and the beaches from where they hatched. Classified as endangered, green turtles are threatened by overharvesting of their eggs, hunting of adults, being caught in fishing gear and loss of nesting beach sites.
- The Hindu

Michaung intensification and MJO

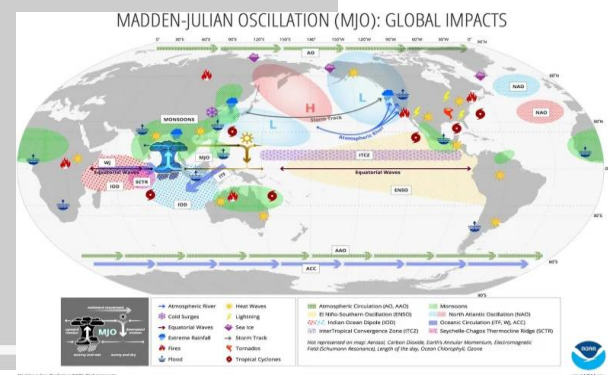
- On December 4, the cyclonic storm intensified into a supercyclonic storm. Tropical cyclones are 'engines' that use a warm sea surface as 'fuel'.
- As air moves over a warm sea, it also warms and accumulates moisture, and begins to ascend.
- In the process, it becomes cooler, which condenses the vapour and forms clouds. Condensation releases heat, which makes the air lighter and causes it to ascend further.
- As it does, the surrounding air moves in underneath, creating the surface winds associated with cyclones.
- This (simplified) process is the reason climate change has been conducive to cyclone intensification.

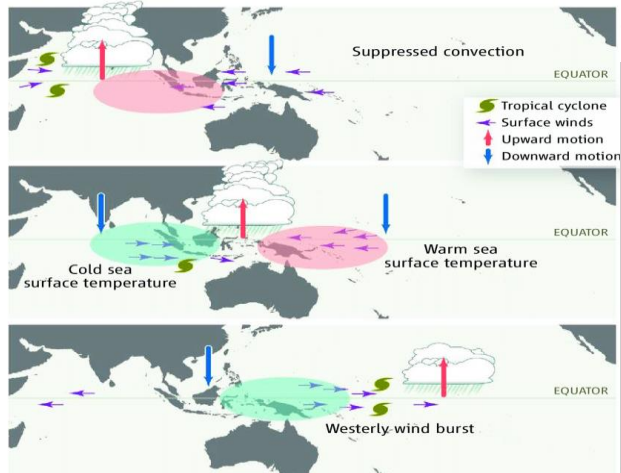
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- Large water bodies absorb most of the heat of global warming.
- The intensification is also greater if the cyclone spends more time over water before landfall, as Cyclone Michaung did off the Tamil Nadu coast.
- Cyclone intensification complicates forecast models and allows storms to make landfall with more energy, move further inland, survive longer, and bring their on ground devastation to previously 'inaccessible' areas.

Why does intensification matter?

- Cyclones draw heat from the sea and move it to the upper atmosphere, where winds carry it to the earth's poles.
- An intensifying cyclone will do this more powerfully. A study published in May 2020 found that tropical cyclones with wind speeds upward of 185 km/hr had become 15% more likely since 1979.
- Cyclone Michaung's own intensification was also assisted by the Madden-Julian oscillation (MJO), among other factors
- The MJO consists of a 'pair' of weather anomalies that move eastward around the world once every one to two months.
- The leading side imposes dry weather while the trailing side imposes wet (rainy) weather. The advisory said that on December 3, the MJO near Cyclone Michaung maintained favourable conditions for rain formation.
- Imagine ENSO as a person riding a *stationary* exercise bike in the middle of a stage all day long. His unchanging location is associated with the persistent changes in tropical rainfall and winds that we have previously described as being linked to ENSO.
- Now imagine another bike rider entering the stage on the left and pedaling slowly across the stage, passing the stationary bike (ENSO), and exiting the stage at the right.
- This bike rider we will call the MJO and he/she may cross the stage from left to right several times during the show.





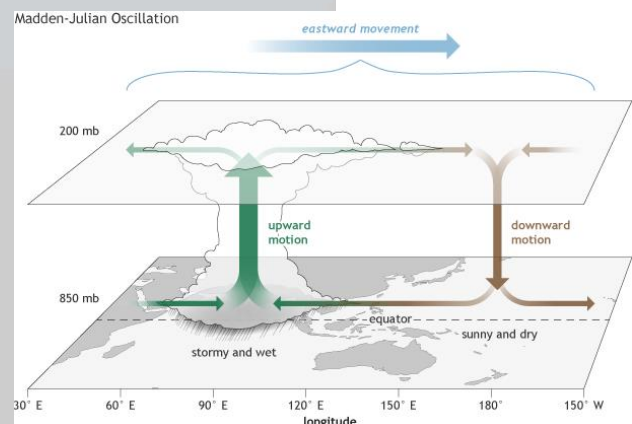
- So, unlike ENSO, which is stationary, the MJO is an *eastward moving* disturbance of clouds, rainfall, winds, and pressure that traverses the planet in the tropics and returns to its initial starting point in 30 to 60 days, on average.
- This atmospheric disturbance is distinct from ENSO, which once established, is associated with persistent features that last several seasons or longer over the Pacific Ocean basin.
- There can be multiple MJO events within a season, and so the MJO is best described as *intraseasonal* tropical climate variability (i.e. varies on a week-to-week basis).
- The MJO was first discovered in the early 1970s by Dr. Roland Madden and Dr. Paul Julian when they were studying tropical wind and pressure patterns.

- The MJO consists of two parts, or phases: one is the enhanced rainfall (or convective) phase and the other is the suppressed rainfall phase. Strong MJO activity often dissects the planet into halves: one half within the enhanced convective phase and the other half in the suppressed convective phase.

- These two phases produce opposite changes in clouds and rainfall and this entire dipole (i.e., having two main opposing centers of action) propagates eastward.

- In the enhanced convective phase, winds at the surface converge, and air is pushed up throughout the atmosphere. At the top of the atmosphere, the winds reverse (i.e., diverge).

- Such rising air motion in the atmosphere tends to increase condensation and rainfall



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PMJANMAN

- The Tribal Affairs Ministry told the Rajya Sabha that the population of Particularly Vulnerable Tribal Groups (PVTGs) was not in decline, citing information provided by the Office of the Registrar General and Census Commissioner of India (ORGI)

Who are the PVTGs?

- Initially known as Primitive Tribal Groups, the PVTGs are defined by the government as tribal communities that show either a declining or stagnant population, use of pre-agrarian technology, economic backwardness, low literacy etc.
- They are found to be living in some of the remotest and most inaccessible areas in the country.
- There are 75 such communities which are spread over 18 States and Union Territories, according to government figures.

What does the PMJANMAN aim to do?

- The Cabinet recently approved the ₹24,000 crore Pradhan Mantri Janjati Adivasi Nyaya Maha Abhiyan after the Prime Minister announced the Particularly Vulnerable Tribal Groups Development Mission early this year that would take basic facilities like

roads, power, homes, mobile connectivity, etc. to the most backward among the Scheduled Tribes, the PVTGs.

- The first announcement of this package came early this year during the Budget Session, when Finance Minister Nirmala Sitharaman announced that a PMPVTG Development Mission would be launched, for which the Government was planning a ₹15,000 crore expenditure, to be spent over a period of three years.
- The allocation cleared by the Union Cabinet on November 29 for this package stood at ₹24,104 crores out of which the central share would be ₹15,336 crores and the share for the respective State governments would stand at ₹8,768 crores.

• [The Hindu](#)

Germany's debt trade rule

- Germany's constitutional court on November 15 ruled unlawful a government move to reallocate €60 billion, unused from the sums initially earmarked for the pandemic emergency, to a "climate and transformation fund" (KTF).
- The coalition government led by Chancellor Olaf Scholz's centreleft Social Democrats (SPD) was in breach of the fiscal deficit limits enshrined in 2009 on two counts, the Karlsruhe court ruled.
- The first was the move to channel underutilized allocations from one sector to another and the second, the rollover of debt from one fiscal year to the next.

What is the debt brake rule?

- The debt brake rule, or the balanced budget rule, sets a cap on how much governments can borrow to finance various public projects.
- It restricts the federal government in Berlin from running a fiscal deficit in excess of 0.35% of Gross Domestic Product (GDP) and in effect prohibits the country's 16 regions from any deficit spending whatsoever.
- The measure was enshrined into law in 2009 by the grand coalition

government of the centre right Christian Democratic Union (CDU), its sister party in the state of Bavaria the Christian Social Union (CSU) and the SPD, through an amendment to the German constitution

Eliza effect

What is the ELIZA effect?

- ELIZA effect is the phenomenon in which people think computer programs or similar systems have become capable of human emotions or functions because of the way they respond to user input.
- It is named after a 1960s computer program which also responded to users, albeit with very basic sentences that echoed their original words.
- This program was credited to MIT professor Joseph Weizenbaum.
- In computer science, the ELIZA effect is the tendency to project human traits such as experience, semantic comprehension or empathy into computer programs that have a textual interface.



Cauvery basin

- Natural vegetation on nearly 12,850 sq. km of land in the Cauvery basin was lost in the 50 years from 1965 to 2016, stated a paper published by scientists and researchers at the Indian Institute of Science (IISc), Bengaluru.
- Karnataka has lost much more than any other State in the basin.
- It accounts for three fourths of the lost cover, while Tamil Nadu's share is around one fifth, the study added.
- Pointing out that natural vegetation cover went down by around 46% all these years,
- The quantum of reduction of dense Vegetation was 35% (6,123 sq. km) and that of degraded vegetation, 63% (6,727 sq. km).
- Areas that suffered adverse changes in the extent of forest cover include the Brahmagiri Wildlife Sanctuary,

Bandipur National Park, Nagarhole National Park and the Cauvery Wildlife Sanctuary.

In respect of the Bannerghatta National Park, the moist deciduous forest area, which was about 50% in 1973, stood at 28.5% in 2015 due to "anthropogenic pressure" on the National Park and its environs

Vishwakarma scheme

- scheme that will benefit individuals skilled in traditional craftsmanship.
- Named the 'PM Vishwakarma Yojana', the scheme was launched on the occasion of Vishwakarma Jayanti on September 17, 2023, at the India International Convention and Expo Centre in Dwarka, New Delhi.
- The objective of the scheme is to support the people engaged in traditional crafts.
- This objective is driven by the desire to support the artisans and craftspeople financially as well as to keep the age-old traditions and diverse heritage alive through local products, art and crafts
- A significant section of the workforce of the Indian economy consists of artisans and craftspeople, people who work with their hands and tools, are usually self-employed and are

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generally considered to be a part of the informal or unorganized sector of the economy.

- These traditional artisans and craftspeople are referred to as 'Vishwakarma' and are engaged in occupations like blacksmiths, goldsmiths, potters, carpenters, sculptors, etc.
- These skills or occupations are passed from generation to generation following a guru-shishya model of traditional training, both within the families and other informal groups of artisans and craftspeople.
- PM Vishwakarma Yojana aims to strengthen the Guru-Shishya Parampara or family-based practice of traditional skills by artisans and craftspeople working with their hands and tools.
- The scheme also aims at improving the quality as well as the reach of products and services of artisans and craftspeople.
- The scheme is tasked with ensuring that the Vishwakarmas of India are integrated with the domestic and global value chains.
- PM Vishwakarma Yojana is expected to reach and bring prosperity to 30 lakh families.

- Eighteen traditional trades will be covered initially under PM Vishwakarma Yojana.

- The Hindu

Fractal geometry

A fractal is a never-ending pattern.

- Fractals are infinitely complex patterns that are self-similar across different scales.
- They are created by repeating a simple process over and over in an ongoing feedback loop.
- Driven by recursion, fractals are images of dynamic systems the pictures of Chaos. Geometrically, they exist in between our familiar dimensions.
- Fractal patterns are extremely familiar, since nature is full of fractals. For instance: trees, rivers, coastlines, mountains, clouds, seashells, hurricanes, etc.
- Physicists use the fractal geometry approach to study quantum systems in dimensions like 1.55 or 1.58, or in fact anything between one and two dimensions
- On the macroscopic scale, fractals can be seen as irregular, complex patterns at all scales and in all views, near or far.

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- Some remarkable examples include human fingerprints, stumps of trees, human veins, river networks as seen from above, veins in a plant leaf, the edges of a snowflake, and so on
- The value of fractals is that they describe a new kind of order in systems that we may have overlooked.
- They pave the way to potential new insights from otherwise familiar shapes like lines, planes, and points, in the unfamiliar milieu of a space with no integer dimensions
- The dimensionality of a quantum system is an important thing to bear in mind when physicists study its properties.
- For instance, electrons in a one dimensional system form a Luttinger liquid (not a liquid per se but a model that describes the electrons' liquid like behaviour);
- in a two dimensional system, the particles exhibit the Hall effect (the conductor develops a side to side voltage in the presence of a top to bottom electric field and a perpendicular magnetic field).

Pinna Nobili's



Pinna nobilis, whose common name is the noble pen shell or fan mussel, is a large species of Mediterranean clam, a marine bivalve mollusc in the family Pinnidae, the pen shells. It reaches up to 120 cm of shell length.

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- It produces a rare manganese-containing porphyrin protein known as pinnaglobin
- A huge clam that was on the verge of extinction has made a comeback, with a surge in numbers in waters off Croatia, marine biologists say.
- The clam, known as the noble pen shell or pinna Nobili's, started dying out as a deadly pathogen spread in parts of the Mediterranean around 2016.
- Numbers plummeted across the region and, until recently, scientists in Croatia only knew of around 10 surviving in their corner of the Adriatic,
- The Hindu
- World real GDP growth has also fallen, leading to reduced demand for global exports.
- Many countries including India want to reduce their dependence on imported petroleum due to supply uncertainties and price volatility
- India will have to rely relatively more on domestic growth drivers.
- To achieve and sustain a 7% plus real growth in particular, domestic savings will be critical.
- We estimate the nominal saving rate in 2022/23 to be about 29%.
- One area of concern relates to the recently noted fall in the household sector's savings in financial assets which declined to 5.1% of GDP in 2022/23 from an average of 7.8% during the preCOVID19 period of 2015/16 to 2019/20 a fall of 2.7% points.

Indian economy

- There is a movement towards deglobalisation.
- Many ongoing geopolitical conflicts such as the Russia Ukraine war and the Israel Hamas war have created a climate of sanctions, leading to breaks in supply chains as well as disruptions in international settlements due to non access to systems such as SWIFT for the sanctioned countries.
- India would find itself in a unique position in the next three decades with a large potentially employable population seeking jobs in the presence of progressively more labour saving innovations and technologies.
- According to United Nations population projections, the share of India's working age population is projected to peak at 68.9% in 2030

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while its overall dependency ratio would be at its lowest at 31.2%.

- Employment growth is critically dependent on GDP growth and the structure of output
- Going forward, nonagricultural growth will have to be high enough to absorb labour released from agriculture
- It should also be able to absorb the labour substituting impact of new technology.
- Facilitating absorption of productivity enhancing technologies including Artificial Intelligence (AI) and Generative AI would add to overall growth.
- India has committed to certain targets to reduce carbon emissions in view of global climate concerns.
- In the COP26 Summit, in 2021, India had committed to reducing total carbon emissions by one billion tonnes between 2021 to 2030 and achieving the target of net zero emissions by 2070.
- India's own initiatives include the Green Grids Initiative (GGI) and One Sun One World One Grid (OSOWOG).
- It is also placing an emphasis on the use of electric vehicles and ethanol based and hydrogen fuels.

- Climate promoting technological changes may reduce the potential growth rate.

- This adverse impact can be minimized by emphasizing service sector growth which is relatively climate friendly.

- The Hindu

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FSBs On Crypto

- The international Financial Stability Board (FSB)'s latest report on crypto-asset intermediaries sought measures to enhance crossborder cooperation and information sharing among local authorities.
- This is to effectively regulate and address gaps in multifunction crypto asset intermediaries (MCIs) operating globally.

Arguments Supporting and Against Cryptocurrency as a Commodity



How does the report define MCIs?

- The report defines MCIs as individual firms, or groups of affiliated firms that offer a range of crypto based services, products and functions which primarily revolve around operating of the trading platform.
- Examples include Binance, Bitfinex and Coinbase. In the traditional financial landscape, the functions are provided by separate entities, instead of the same entity.
- This prevents conflict of interest and promotes market integrity, investor protection and financial stability.
- The primary source of revenue for these platforms are the transaction fees generated from trading related activities, the traded security here being self issued crypto assets.
- Trades from alternative platforms may also indirectly drive additional demand for other services offered by the platform
- These may include prepaid debit cards and lending, among other services.
- This shows that the aspirations of MCIs extend beyond just trading to becoming a "one stop shop" for crypto based services.
- FSB's report observes that the magnitude of these revenue sources is unclear because of the limited publicly disclosed information.
- Poor risk management, the report says, "may make it easier for insiders to engage in misconduct that magnifies MCI vulnerabilities."
- The lack of transparency could also mean that risks from lack of effective governance or lack of profitability of the business model would be hidden until the negative shocks fully materialise.

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- The report observes that, based on available evidence, the threat to global financial stability and to the real economy from the failure of an MCI is presently “limited.”
- However, recent experience about failure or closure of “crypto asset friendly” banks reveal the prevalence of concentrated deposit exposures to firms whose business models rely in some form on crypto assets.

The Hindu

Ek Bharat Shreshtha Bharat

- Ek Bharat Shreshtha Bharat programme aims to enhance interaction & promote mutual understanding between people of different states/UTs through the concept of state/UT pairing.
- The states carry out activities to promote a sustained and structured cultural connect in the areas of language learning, culture, traditions & music, tourism & cuisine, sports and sharing of best practices, etc.
- Ek Bharat Shreshtha Bharat programme aims to celebrate cultural diversity through mutual interaction & reciprocity between people of different States and UTs so that a spirit of understanding resonates throughout the country.

- Every State and UT in the country is paired with another State/UT to carry out a structured engagement with one another in the spheres of language, literature, cuisine, festivals, cultural events, tourism etc.

The Hindu

Phasing out fossil fuel

- The text has employed stronger language against coal, with a recommendation to “rapidly phase down unabated coal,” that countries such as India, Indonesia and China major consumers of coal power and developing countries at that could find objectionable.
- Observers of COP28 say that even a mention of the need to do away with fossil fuels in the final text, would be a significant step towards bringing parity between coal, oil and gas, and the need to do away with them to keep temperature increase below 1.5°C by the end of the century.
- On fossil fuels, the text now exhorts countries to “reduce both consumption and production of fossil fuels, in a just, orderly and equitable manner so as to achieve net zero by, before, or around 2050 in keeping with the science.”
- Burning of fossil fuel contributes nearly 80% of the greenhouse gas

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emissions of which coal makes up about 40% and oil and gas collectively constitute the rest.

- Humanity's best chance at **keeping global temperature increase below 1.5°C** is by cutting emissions down to 43% of the 2019 levels by 2030.

- However, the reality is that **emissions are increasing year on year** and despite pledges by countries to spruce up their renewable energy infrastructure

• **About CAN**

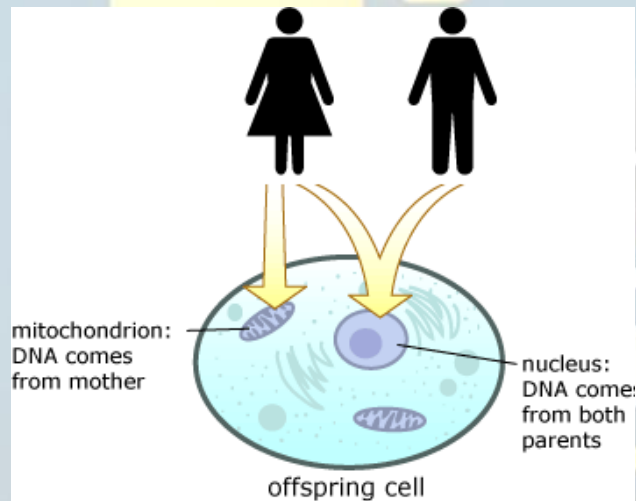
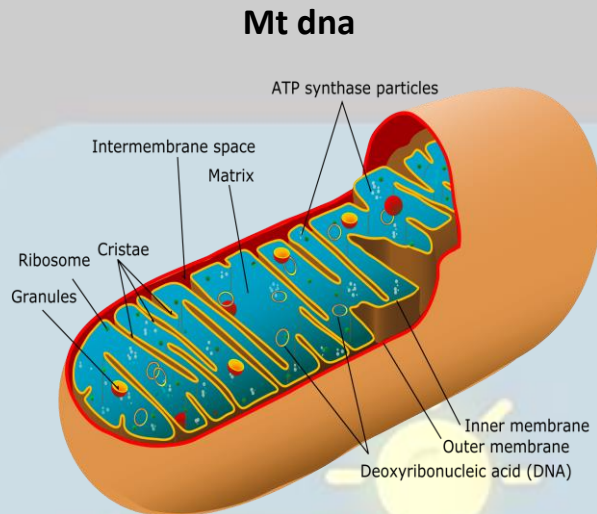
- Climate Action Network (CAN) is a global network of more than 1,900 civil society organisations in over 130 countries driving collective and sustainable action to fight the climate crisis and to achieve social justice.
- CAN convenes and coordinates civil society at the UN climate talks and other international fora
- All non-governmental organisations or community non-profit organisations that do not represent industry, have an interest in the promotion of sustainable development and are active in, have a focus on, or are interested in climate change issues, are eligible to become members and may apply to do so.

- CAN is organised into regional and national nodes. Each node is responsible for its own governance and procedures and conducts joint advocacy work within its given country or region.

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- The scientists have reported that using mitochondrial DNA, they were able to trace the baboons to the ancient city of Adulis, in present day coastal Eritrea, and a bustling trade centre between the first and seventh centuries AD.
- Members of the team were able to retrieve ancient DNA from a mummified baboon found at the Gabbanatel Qurud site


Why is a baboon mummy puzzling?

- Ancient Egyptians did mummify animals.
 - Mummified cats were buried with their owners in the hope of reuniting them in the afterlife.
 - They were also given as offerings to Bastet, the goddess of fertility and war who had the head of a cat.
 - Older studies have also reported that Egyptians removed the canine teeth of these baboons and bred them in captivity to be mummified later, as a votive gift to Thoth, the god of wisdom and the moon, often depicted as a baboon with a heavy mane.
 - But the latter was strange because Egypt isn't a natural habitat for baboons.
 - Papio anubis and Papio hamadryas, the species whose mummies were found, are actually indigenous to Sub Saharan Africa and the southwestern Arabian Peninsula
- Role of strontium**
- The concentration of strontium isotopes in soil, water, and local plants varies from place to place.
 - When living creatures eat food and drink water, the strontium leaves a geographical impression in their teeth, bones, and hair.

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- The same goes for the concentration of oxygen in these body parts.
- Mitochondrial DNA has been used to trace the ancestry of an animal to its source population with greater accuracy.

The Hindu



SAURABH PANDEY

— CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

MITOCHON

VE

NUCLE

Mitochondrial DNA
consists of the
mitochondrial genome

Double-stranded & circular

Arranged into a single
chromosome

Composed of 0.25% of
the cell's genetic makeup
in animal cells

Freely floating in the
mitochondrial matrix

Not enclosed by the
nuclear envelope

Size is 16,569 base pairs

Not packed with histone
proteins



PANDEY

SE

(EXAMINATION)

UPSC BRILLIANCE

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Putin in west Asia



U.S.'s chagrin, remain at levels that serve the producers' interests.

- Despite their longstanding alliance with the U.S., both the UAE and Saudi Arabia have in recent years been asserting "strategic autonomy" and have prioritised expanding ties with China and Russia.
- The UAE is now Russia's most important trade partner in the Gulf. Neither the UAE nor Saudi Arabia have supported the U.S.sponsored sanctions on Russia or criticised the latter for the Ukraine war.
- In fact, thousands of Russians have set up alternative homes, businesses, and investments in the UAE. Cooperation is thriving between the two countries in the technology sector.
- As a result, the West has placed the UAE under scrutiny to ensure that restrictions on export of hitech products to Russia are complied with.
- Russia has also conveyed it is standing by to support Saudi Arabia's civilian nuclear programme at the opportune moment.
- Iran and Russia, as targets of increasingly onerous western
- The agenda was self evident: continued cooperation among "OPEC +" members on oil policy;
- exchange of views on the Ukraine and Gaza conflicts; increasing humanitarian assistance to the Palestinians trapped in Gaza; and enhancing bilateral political economic ties.
- Cooperation among "OPEC +" countries led by Saudi Arabia and Russia, for instance, has ensured that the agreed production cuts are adhered to and oil prices, much to the

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sanctions, challenge the West's global strategic leadership and seek the realisation of a multipolar world order.

- Flowing from this, they have built substantial bilateral relations in the energy and military areas: in March this year, the Russian, Chinese and Iranian navies carried out joint exercises in the Gulf of Oman
- Iran has boosted Russia's military prowess in Ukraine with supplies of drones, ammunition and body armour.
- During Mr. Raisi's visit to Moscow, the two sides had "extremely intensive discussions" covering the Gaza war, Ukraine, and oil prices.

PUTIN'S AGENDA

- Mr. Putin was signalling that Russia was not isolated and that it had some close friends, such as the UAE and Saudi Arabia, that, till recently, had been the U.S.'s closest allies in the region.
- First, on the basis of Russia's close ties with Iran, he would have told the UAE and the Kingdom that the Gaza war will not spread across the region, conveying the assurance that Iran will restrain the Hezbollah and the Houthis in Yemen in the interests of regional stability.

- Second, Mr. Putin would have sought a deeper strategic and political alignment between the Gulf Cooperation Council states and Iran, presenting Russia and China as guarantors of regional peace.
- In this context, Mr. Putin would have recognised China as the lynchpin in regional politics and, given Russia and China's close alignment on global security issues, projected Russia as complementing China's diplomatic role in the region.
- Third, Mr. Putin would have sought the support of his Gulf interlocutors to the consolidation of this regional alignment so that, in the post Gaza war scenario, they would act unitedly with Russia and China in managing regional political and diplomatic challenges, while excluding the U.S. from this arrangement

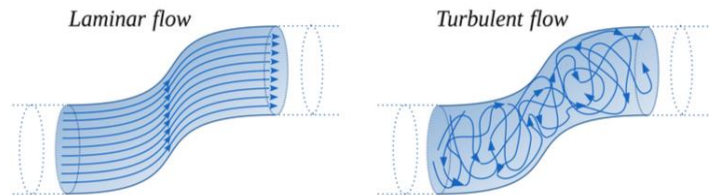
Navier Stokes equations

The two key physical effects that determine the state of a fluid's motion are inertia the tendency of a fluid to keep moving and viscous friction, which tends to bring all motion to a halt.

The strength of inertia increases with the speed of motion, the mass of the fluid, and the distances over which the flow occurs.

The strength of friction is determined by the fluid's viscosity, which is higher for honey, moderate for water, and lower for air.

- When viscous effects dominate, a flow is well ordered and predictable, and disturbances quickly dampen out.
- There is little mixing and the fluid tends to move as if it were composed of distinct layers, which is why it's called laminar flow.
- But when inertia dominates, the flow is highly unstable.
- Without much friction, small disturbances don't die out but instead grow and spread.



- This is what happens to a rising plume of incense smoke: tiny fluctuations in the air are amplified within the plume, causing it to become turbulent.
- The balance between fluid inertia and viscosity (and other forces due to pressure differences and gravity) are precisely described by the Navier Stokes equations, which extend Newton's law for a rigid body (like a billiard ball) to a fluid

- In fluid mechanics, the Navier-Stokes equations are partial differential equations that express the flow of viscous fluids.
- These equations are generalizations of the equations developed by Leonhard Euler (18th century) to explain the flow of frictionless and incompressible fluids.

The Hindu

Ashley

- Ashley, an artificial intelligence campaign volunteer (US)
- Ashley is one of the first examples of how generative AI is ushering in a new era of political campaigning in which candidates use technology to engage with voters in ways increasingly difficult to track.
- To some, it is an exciting new tool for conducting high quality conversations on a large scale. Over the weekend, Ashley called thousands of Pennsylvania voters.
- Like a seasoned campaign volunteer, Ashley analyzes voters' profiles to tailor conversations around their key issues.

Extreme rainfall corridor

- The Indian monsoon has well known features, such as the onset of the

monsoon, the withdrawal, the active and break periods, and the low pressure systems (or monsoon depressions).

- Every aspect of the monsoon has been affected by global warming.
- The total seasonal rainfall has also trended downwards for more than seven decades, due to the differential heating of the land versus the ocean due to global warming.
- However, this trend has been distributed unevenly through the monsoon season as manifest in the longer duration but lower intensity of dry spells and the greater intensity of wet spell.

Where does extreme rain occur?

- India's monsoon forecasts rely heavily on its relation to the El Niño and the La Niña phenomena, although this relation holds only about 60% of the time.
- The so called large scale extreme rainfall events are actually simultaneous or near simultaneous heavy rain episodes that are strewn across a 'highway' that extends from parts of West Bengal and Odisha to parts of Gujarat and Rajasthan.
- The most remarkable new finding is that this corridor has remained unchanged from 1901 to 2019.

- In the seemingly chaotic change in all aspects of the monsoon, such a trapping of the extreme events to a relatively narrow corridor is good news for potential improvements in process understanding, which is bound to lead to better predictions of these synchronized extreme rainfall events.
- Section 43D(5) makes grant of bail virtually impossible under UAPA.
- It leaves little room of judicial reasoning.
- The test for denying bail under the UAPA is that the court must be satisfied that a “prima facie” case exists against the accused.
- Section 43D(5) in The Unlawful Activities (Prevention) Act, 1967
- (5) Notwithstanding anything contained in the Code, no person accused of an offence punishable under Chapters IV and VI of this Act shall, if in custody, be released on bail or on his own bond unless the Public Prosecutor has been given an opportunity of being heard on the application for such release:
- Provided that such accused person shall not be released on bail or on his own bond if the Court, on a perusal of the case diary or the report made under section 173 of the Code is of the opinion that there are reasonable

grounds for believing that the accusation against such person is prima facie true.

UAPA #UPSC #CSE

What is UAPA?
The Unlawful Activities Prevention Act, 1967 is a Parliamentary law that gives powers to the central government to deal with activities directed against the integrity and sovereignty of India.

New Amendments (2019)

- NIA officers of the rank of Inspector or above can investigate a case in addition to DSP or ACP ranked officer in a state.
- The law empowers the government to designate individuals as terrorists.
- The approval of Director General of Police is required to attach properties connected with terrorism.

Provisions

- UAPA is applicable to both Indians and well as foreigners. It can be applied to offences committed either in India or outside.
- The law provides for death penalty and life imprisonment as the highest form of sentences.
- A maximum time of 180 days is given to the Investigating agency to file report, which can also be extended.

Concerns

- It gives absolute and sweeping powers to the central government to arrest individuals indulging in an activity it considers as unlawful.
- The courts are bound to give stringent punishment under the UAPA even if offence is not serious.

IN THE LOK SABHA

NATIONAL INVESTIGATION AGENCY AMENDMENT BILL, 2019

- Empowers NIA** to probe terror attacks targeting Indians, Indian interests on foreign soil
- Allows NIA** to probe cyber-crimes and cases of human trafficking
- Allow the Centre** and states to designate sessions courts as special court for trial

UNLAWFUL ACTIVITIES (PREVENTION) ACT AMENDMENT BILL

UAPA Bill empowers NIA DG to approve seizure/attachment of property in case

Inspector of NIA can investigate offences under chapter IV and VI

PROTECTION OF HUMAN RIGHTS (AMENDMENT) BILL

- Increase NHRC members** from two to three, one of which will be a woman
- A retired Supreme Court judge** could also be considered as chairperson

The Hindu

Imp section of Indian patent act

What is a Patent?

- Patent
 - is an exclusive and monopoly right
 - to use the patented invention
 - for a limited area and time (20 Years)
 - by stopping others
 - from making, using, importing or selling.
- Patents are territorial rights,
 - so an Indian patent will only give the owner rights
 - within India and
 - rights to stop others from importing products into India
- No concept of International Patents
- When a patent is granted,
 - the applicant becomes the owner of the patent.
 - Like any other form of property, a patent can be bought, sold, licensed or mortgaged.



THE PATENT ACT, 1970

PATENT- The word patent derives from the Latin word patere means 'to lay open i.e. to make available for public inspection. A patent gives its owner the right to exclude others from making, using, selling & importing an invention for a limited period of time.

PATENT ACT 1970 along with PATENT RULES 1972 came into force on 20th April 1972 replacing the Indian Patents and design act 1911.

This act was based on the recommendation of the Ayyangar committee.

The main reason behind this act was to become a member of TRIPS.

The head patent office is located in Kolkata. Other branches are Delhi, Mumbai & Chennai.

The patent system in India is administered by the controller general of patents, designs & trademarks. (sec 73).

TERMS

1. **CONVENTION COUNTRY**- means a country that is a member of a group of countries or union of countries or intergovernmental organizations (sec 133)

2. **CONVENTION APPLICATION** - this means an application for a patent made by virtue of sec 135.

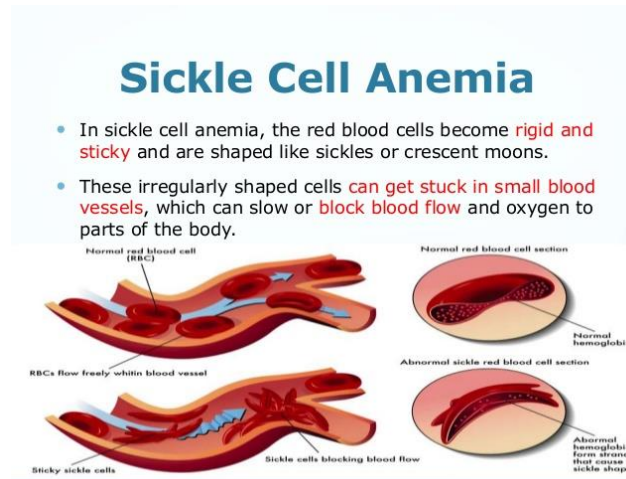
3. **DISTRICT COURT** - by code of civil procedure 1908

Section 43D (5) of UAPA

- This, therefore, means that if any ingredient independently satisfies the requirements for the grant of a patent, irrespective of its inclusion in a composition under Section 3(e), it would be patent eligible.
- The court's close scrutiny of the precise legislative text stands out. It further held that the rejection of the composition in the instant case was justified due to the patentee's failure to produce evidence to substantiate that the invention was more than a sum of its part
- Section 3 of the Patents Act -This provision contains a set of filters that every invention must pass through for it to be patentable.
- Apart from the famous Novartis judgment from the Supreme Court of India on one such exclusion relating to Section 3(d) on the need for an invention to showcase enhanced therapeutic efficacy.
- Novozymes vs Assistant Controller of Patents and Designs, relates to Section 3(e), which excludes from protection those compositions that amount to a mere aggregation of their components.
- The court holds that Section 3(e) does not exclude from the scope of protection aggregates that are already known.
- The second case is Hong Kong and Shanghai University versus Assistant Controller of Patents which relates to Section 3(i).
- This provision, in a nutshell, excludes from the scope of protection, inventions which consist of any process for the medicinal, surgical, curative, prophylactic, diagnostic, therapeutic or other treatment of human beings or animals to render them disease free or to enhance their economic productivity.
- The judgment sheds considerable light on the kinds of diagnosis that are excluded by this filter.

The Hindu

Casgevy and Lyfgenia - Gene therapy



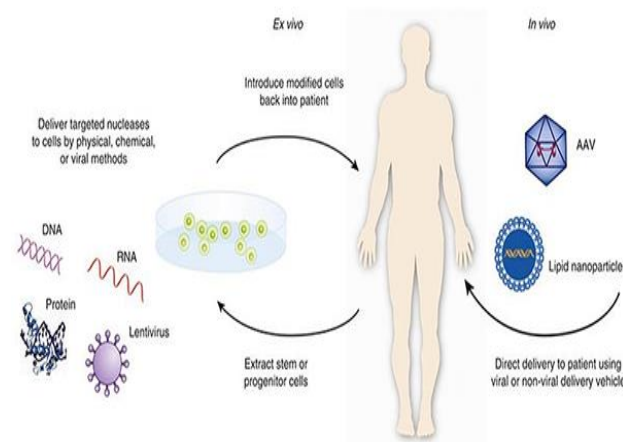
Unlike traditional medicines or therapies, **gene therapy** is a potential one-time treatment aimed at targeting the underlying cause of a disease at the cellular level and may deliver transformational improvement in quality of life.



This approach may be significant for patients with genetic diseases, and has the potential to deliver breakthroughs that change patients' lives — today and in the future.



Pfizer.com/RareDisease



- UK drug regulator approved **Casgevy**, the gene therapy to treat people above 12 with sickle cell disease and beta thalassemia, the U.S. FDA has approved two gene therapies **Casgevy** and **Lyfgenia** to treat sickle cell disease in patients over 12.

- These landmark decisions mark the beginning of gene therapy using the **CRISPRCas9** tool to treat diseases that could otherwise be cured only through bone marrow transplantation.

- While **Lyfgenia** uses a disabled lentivirus as a vector to introduce into the blood stem cells a new gene for Haemoglobin that mimics the healthy version, **Casgevy** uses the gene editing tool of CRISPRCas9 to disable a particular gene (**BCL11A**) that turns off foetal Haemoglobin production in blood stem cells.

- While about **10% of adults** continue to produce foetal Haemoglobin, in others, the **BCL11A** gene prevents the production of foetal Haemoglobin.

- By disabling the **BCL11A** gene, **foetal Haemoglobin** that is produced, which does not have the abnormalities of adult Haemoglobin, helps treat patients with sickle cell disease or beta thalassaemia.

- Both gene therapies use patients' own blood cells for gene editing, the number of patients who can potentially be treated will be huge as these treatments do not rely on matching bone marrow donors.
- But in reality, these treatments would be exorbitantly expensive.
- Also, much like bone marrow transplantation, only certain hospitals will be equipped to extract a patient's blood stem cells and use the genetic editing tool to the stem cells before reinjecting them, thus limiting the number of beneficiaries

The Hindu

New Delhi declaration- GPAI

- European Union adopted the “New Delhi Declaration” of the Global Partnership on Artificial Intelligence (GPAI).
- India is hosting the summit, and will chair the GPAI grouping in 2024. The ministerial declaration affirms the countries’ commitment to “principles for responsible stewardship of trustworthy AI rooted in democratic values and human rights and promoting trustworthy, responsible, sustainable and human centred use of AI”.
- GPAI is a grouping of countries in North and South America, Europe, and East Asia, which strive to work towards “trustworthy development, deployment, and use of AI.
- The previous summit was held in Japan, which is the outgoing chair of GPAI.
- “We have also agreed that GPAI, in keeping with values of partner - countries, will be an inclusive movement, including countries in the Global South and make benefits of AI available to all the people of the world,
- The Delhi Declaration commits countries to work on mitigating

“concerns around misinformation and disinformation, unemployment, lack of transparency and fairness, protection of intellectual property and personal data, and threats to human rights and democratic values”.

About GPAI

- The Global Partnership on Artificial Intelligence (GPAI) is a multi-stakeholder initiative which aims to bridge the gap between theory and practice on AI by supporting cutting-edge research and applied activities on AI-related priorities.
- Built around a shared commitment to the OECD Recommendation on Artificial Intelligence, GPAI brings together engaged minds and expertise from science, industry, civil society, governments, international organisations and academia to foster international cooperation.
- Launched in June 2020, GPAI ("gee-pay") is a multi-stakeholder initiative bringing together leading experts from science, industry, civil society, international organizations and government that share values to bridge the gap between theory and practice on AI by supporting cutting-edge research and applied activities on AI-related priorities.

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- We aim to provide a mechanism for sharing multidisciplinary research and identifying key issues among AI practitioners, with the objective of facilitating international collaboration, reducing duplication, acting as a global reference point for specific AI issues, and ultimately promoting trust in and the adoption of trustworthy AI.
- GPAI experts will collaborate across four working groups on the themes of responsible AI (including a subgroup on AI and pandemic response), data governance, the future of work, and innovation and commercialization.
- Members and participants of GPAI are brought together first and foremost by a shared commitment to the values expressed in the OECD Recommendation on Artificial Intelligence.
- All GPAI activities are intended to foster responsible development of AI grounded in these principles of human rights, inclusion, diversity, innovation and economic growth.
- Principles for responsible stewardship of trustworthy AI
- Inclusive growth, sustainable development and well-being
- Human-centred values and fairness
- Transparency and explainability
- Robustness, security and safety
- Accountability
- National policies and international cooperation for trustworthy AI
- Investing in AI research and development
- Fostering a digital ecosystem for AI
- Shaping an enabling policy environment for AI
- Building human capacity and preparing for labour market transformation
- International cooperation for trustworthy AI
- Hosting the GPAI Secretariat at the Organisation for Economic Cooperation and Development (OECD)
- The Hindu

EFF –IMF

- The International Monetary Fund (IMF) has cleared the second tranche about \$337 million of the Extended Fund Facility (EFF) to Sri Lanka, based on the debt treatment plan drawn up by the crisis battered island nation and its bilateral creditors.
- The Extended Fund Facility (EFF) provides financial assistance to countries facing serious medium-term balance of payments problems because of structural weaknesses that require time to address.
- To help countries implement medium-term structural reforms, the

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EFF offers longer program engagement and a longer repayment period.

Purpose	Provide assistance to countries experiencing serious payment imbalances because of structural impediments or slow growth and an inherently weak balance-of-payments position. Support comprehensive programs with a focus on policies needed to correct structural imbalances over an extended period.
Eligibility	All member countries facing actual or potential external financing needs. Most often used by advanced and emerging market countries, but low-income countries sometimes use the EFF together with the Extended Credit Facility (ECF).

Conditionality	Countries' policy commitments expected to focus on structural reforms to address institutional or economic weaknesses, in addition to policies to maintain macroeconomic stability. Disbursements conditional on the observance of quantitative performance criteria. Progress in implementing structural measures that are critical to achieving the objectives of the program is assessed in a holistic way, including via benchmarks. See more on conditionality.
Review modalities	Periodic reviews of policies and program implementation, as access to IMF resources occurs in tranches (phasing). The IMF's Executive Board regularly assesses program performance and can adjust the program to adapt to economic developments.
Duration	Typically approved for periods of 3 years, but may be approved for periods as long as 4 years to implement deep and sustained structural reforms.
Repayment	Over 4½–10 years in 12 equal semiannual installments.

The Hindu

RoDTEP

- The U.S. and the European Union have now imposed countervailing duties (CVD) on four Indian products, as a retaliation against the Remission of Duties and Taxes on Export Products (RoDTEP) scheme.

RoDTEP stands for Remission of Duties or Taxes on Export Products.

- It is a new Scheme, introduced by the Government of India by making amendment in the Foreign Trade Policy 2015-20 vide DGFT Notification No. 19/2015-20 dated 17.08.2021.
- The scheme has been made effective for exports from 01.01.2021.
- This scheme has been introduced with an objective to neutralize the taxes and duties suffered on exported goods which are otherwise not credited or remitted or refunded in any manner and remain embedded in the export goods.
- This scheme provides for rebate of all hidden Central, State, and Local duties/taxes/levies on the goods exported which have not been refunded under any other existing scheme.
- This does not only include the direct cost incurred by the exporter but also the prior stage cumulative indirect taxes on goods.

- The scheme intends to compensate the duties/taxes/levies at the Central, State and Local level borne on the exported product including prior stage cumulative indirect taxes on goods and services used in the

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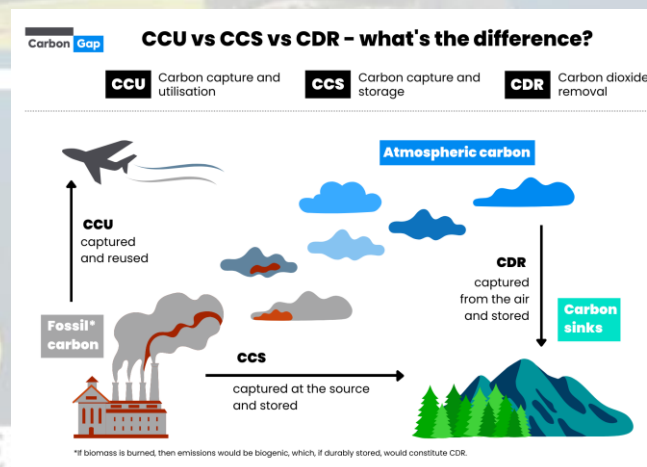
production and distribution of the exported product

What Are Countervailing Duties (CVDs)?

- Countervailing Duties (CVDs) are tariffs levied on imported goods to offset subsidies made to producers of these goods in the exporting country.
- CVDs are meant to level the playing field between domestic producers of a product and foreign producers of the same product who can afford to sell it at a lower price because of the subsidy they receive from their government.
- Carbon capture and storage (CCS) and carbon-dioxide removal (CDR) technologies
- At the COP28 climate talks underway in Dubai, draft decisions thus far have referred to the abatement and removal of carbon emissions using carbon capture and storage (CCS) and carbon dioxide removal (CDR) technologies.
- Considering the meaning of the word 'abatement' has become an important bone of contention, understanding the meaning and limitations of CCS is important as also those of CDR.

What are 'unabated' fossil fuels?

- When it comes to fossil fuels, "unabated" means doing nothing to reduce the carbon dioxide (CO₂) and other greenhouse gases that are released from the burning of coal, oil, and natural gas.
- Conversely, "abated" refers to the attempts to decrease the release of polluting substances to an acceptable level. However, there isn't any clarity on what this level is and how to get there. Moreover, there is no international or common agreed-upon definition of the two phrases.

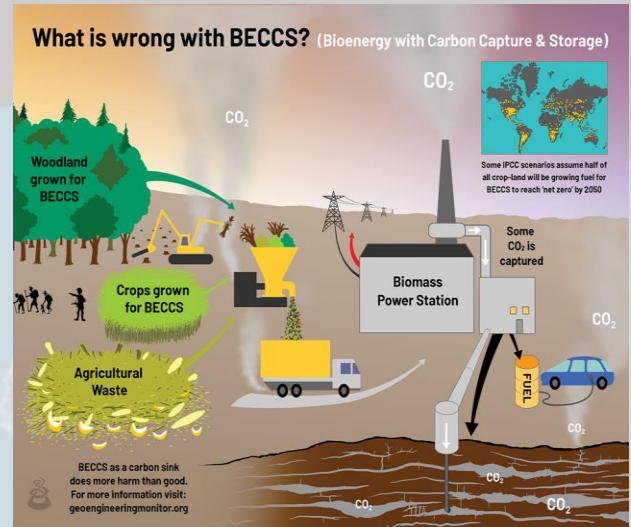
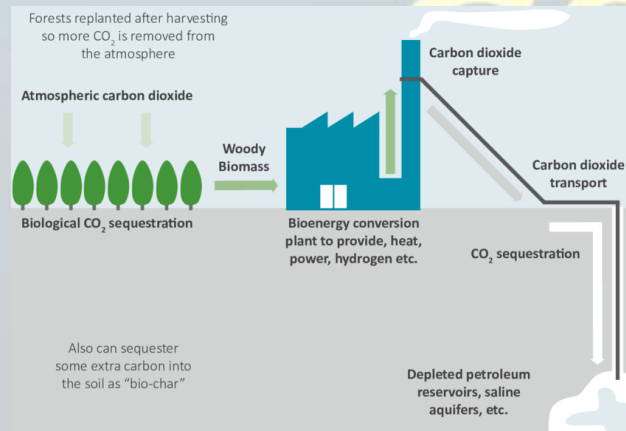


What are CCS and CDR?

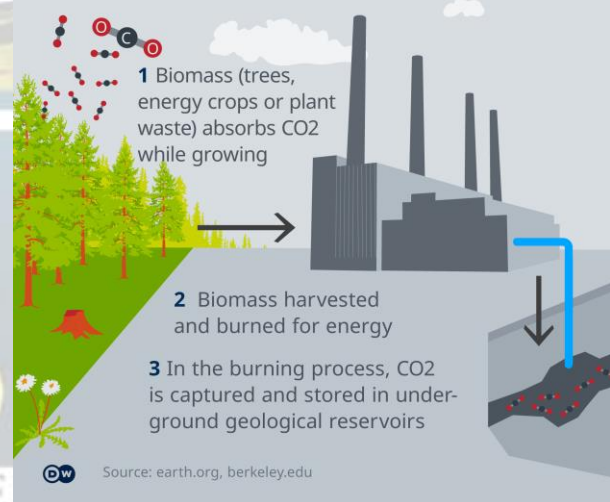
- CCS refers to technologies that can capture carbon dioxide (CO₂) at a source of emissions before it is released into the atmosphere. These sources include the fossil fuel industry (where coal, oil and gas are combusted to generate power) and

industrial processes like steel and cement production.

- CDR takes the forms of both natural means like afforestation or reforestation and technologies like direct air capture, where machines mimic trees by absorbing CO₂ from their surroundings and storing it underground.
- There are also more complex CDR technologies like enhanced rock weathering, where rocks are broken down chemically; the resulting rock particles can remove CO₂ from the atmosphere.
- Other technologies like bioenergy with carbon capture and storage (BECCS) capture and store CO₂ from burning biomass, like wood.



Bioenergy with carbon capture and storage (BECCS)



- At COP28, the term “unabated fossil fuels” has come to mean the combustion of these fuels without using CCS technologies to capture their emissions.
- Draft decision texts point to a need to “phase out” such unabated fossil fuels.

- On the other hand, removal technologies have been referenced in the context of the need to scale zero and low emission technologies and support forest restoration as a means to promote emission removals.
- In future emissions scenarios that the IPCC has assessed, the world's use of coal, oil, and gas in 2050 needs to decline by about 95%, 60%, and 45% respectively (all median values) from their use in 2019 to keep the planet from warming by less than 1.5 degrees C with no or limited overshoot.

How well does CDR work?

- CDR methods like afforestation, reforestation, BECCS, and direct air capture are constrained by their need for land. Land also invokes equity concerns.
- But without CCS, the expected reductions are 100%, 60%, and 70% for coal, oil, and gas by 2050.
- Land in the Global South is often considered to be 'viable' and/or 'costeffective' for planting trees and deploying other large scale CDR methods.
- As a result, such CDR projects can adversely affect land rights of indigenous communities and biodiversity and compete with other forms of landuse, like agriculture that is crucial for ensuring food security
- Pitfalls of CCS and CDR By removing CO2 from their environs, there are concerns that CCS and CDR create more 'room' to emit the greenhouse gas.
- (In some cases, CCS has also been used to inject captured CO2 is into oil fields to extract more oil)

The Hindu

Constitutional monism

- The terms monism and dualism are used to describe two different theories of the relationship between international law and domestic law.
- Monism and dualism both offer approaches to how international law comes into effect within states, and how conflicts between national and international law are resolved.
- In practice, many states are partly monist and partly dualist in their actual application of international law in their national systems.
- Monists accept that the internal and international legal systems form a unity. Both national legal rules and

international rules that a state has accepted, for example by way of a treaty, determine whether actions are legal or illegal.

The monism that is reflected in the judgment imagines the Union Constitution as the sole bearer of internal and external sovereignty.

The Hindu

Unabated fossil fuel <https://saurabhpandeyupsc.com/>

- Nations took a small but decisive step towards ridding the world of fossil fuels, after negotiators in Dubai adopted a resolution, called the Dubai Consensus.
- The standout clause in the 21 page text is the one that “calls on Parties [to be] ...Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, to achieve net zero by 2050 in keeping with the science”
- Creating a path to net zero greenhouse gas emissions by 2050 is humanity’s best shot at keeping global temperatures from rising beyond 1.5 degrees Celsius by the end of the century.

- This implies cutting emissions to 43% of 2019 levels by 2030 and 60% by 2035, an onerous ask given that just seven years remain for the first target, while emissions keep rising, year on year.

- The consensus text reflects a compromise between developed and developing countries on what the world should do to stem greenhouse gas emissions while also ensuring that countries contribute proportionally, on the basis of their historic responsibility for the climate crisis.

The Hindu

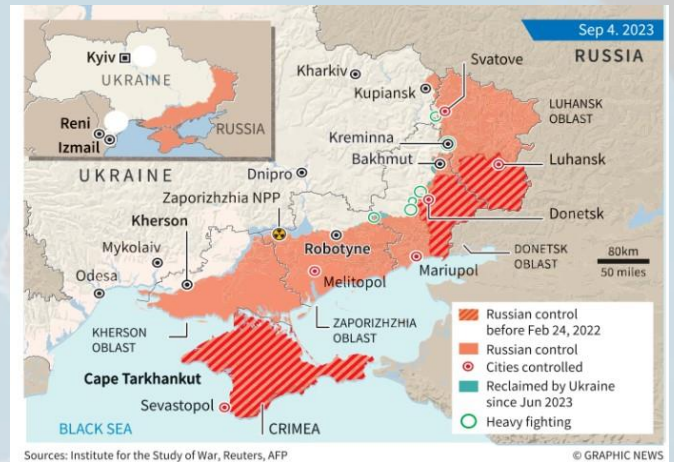
Fastest Solar electric boat

- Taking ahead the cause of eco-friendly maritime transportation, Barracuda, said to be India's fastest solar electric boat, at the yard of Navalt Solar and Electric Boats, located off Aroor in Alappuzha.
- Named after the swift, long fish, Barracuda was designed by Navalt and can be deployed even in the rough seas as a workboat to ferry up to 12 passengers and cargo

Robotyne

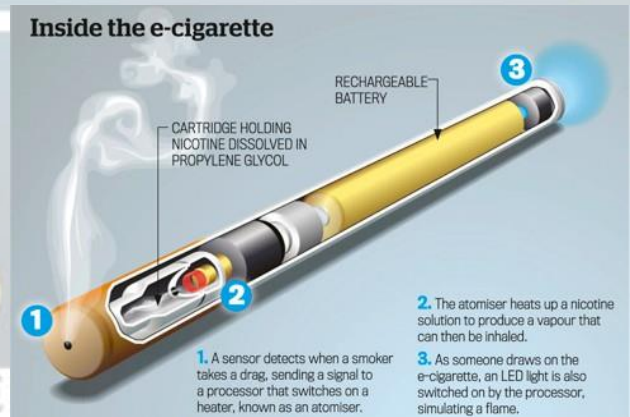
- When Ukraine captured Robotyne in Zaporizhzhia, it was hailed as a breach of Russian defences.
- But Robotyne turned out to be a killing hamlet for Ukrainians.
- As Ukraine's counter offensive faltered, the support it enjoyed in the West, especially in the U.S. came under growing pressure.
- Last month there were reports in the American media that the U.S. and the EU are now encouraging Kyiv to start talks with the Russians.
- In his annual press conference held on Thursday, Russian President Vladimir Putin said

peace with Ukraine will take place "only when we achieve our objectives"



The Hindu

E cigarettes



How e-cigarettes work



E cigarettes as consumer products are not shown to be effective for quitting tobacco use at the population level.

- Instead, alarming evidence has emerged on adverse population health effects, the World Health Organization said on Thursday.
- It added there is an urgent need to control e-cigarettes to protect children, as well as nonsmokers and minimise health harms to the population
- The WHO said that e cigarettes have been allowed on the open market and aggressively marketed to young people.
- According to data, children in the age group of 13-15 years are using e-cigarettes at rates higher than that among adults in all WHO regions.
- The world organisation noted that e cigarettes with nicotine are highly addictive and are harmful to health. While long-term health effects are not fully understood, it has been established that they generate toxic substances, some of which are known to cause cancer and some that increase the risk of heart and lung disorders.

The Hindu

Indira peace prize

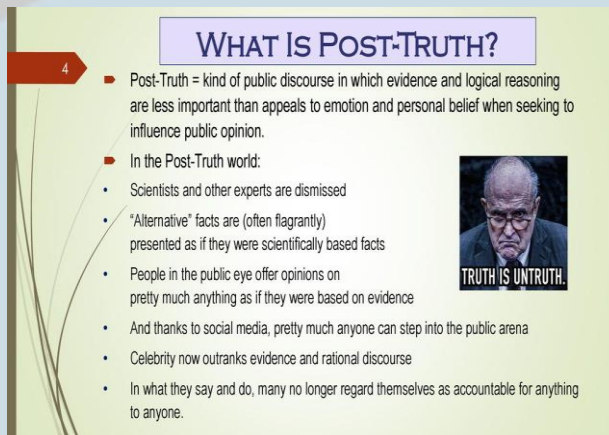
- Classical pianist Daniel Barenboim and peace activist Ali Abu Awwad have been named the winners of the Indira Gandhi Prize for Peace, Disarmament and Development for 2023 for their efforts in bringing together the youth and people of Israel and the Arab world for a non-violent resolution of the Israel - Palestine conflict.

About Indira Gandhi Peace Prize:

- The Indira Gandhi Prize for Peace, Disarmament, and Development was instituted in the memory of the former prime minister by a trust in her name in 1986.
- It consists of a monetary award of 25 lakh rupees along with a citation.
- The award is given to individuals or organisations that work towards ensuring international peace and development, ensuring that scientific discoveries are used to further the scope of freedom and better humanity, and creating a new international economic order.

The Hindu

- Is “authenticity” the plague of the 21st century?



increasingly concerned about integrity.

- Allegations of falsified or wrong data on various topics important to the common people, such as GDP, employment, inflation, and COVID19related statistics, frequently rock different societies.

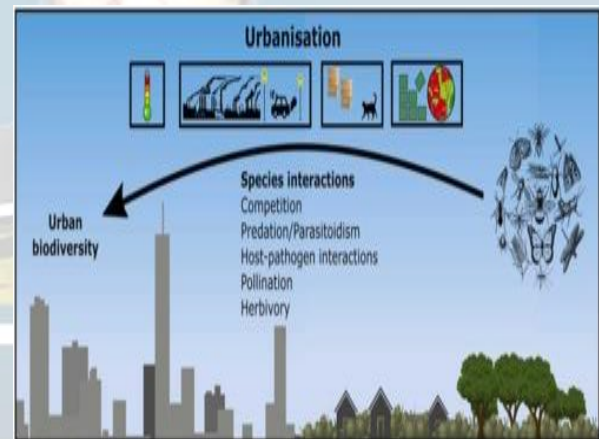
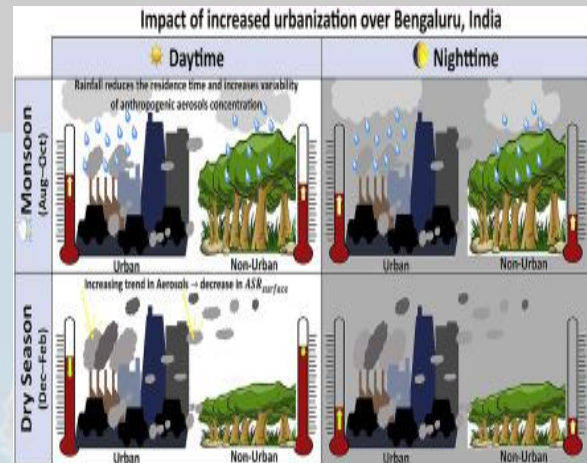
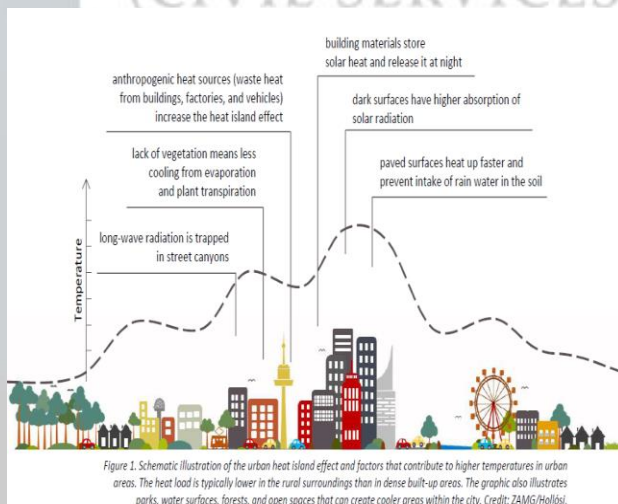
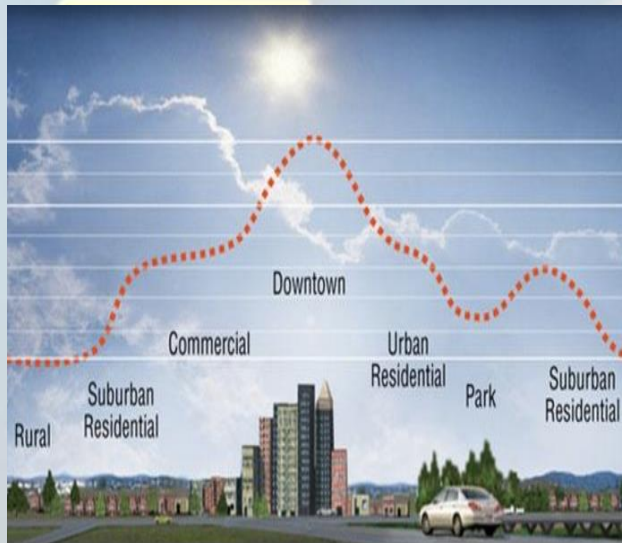
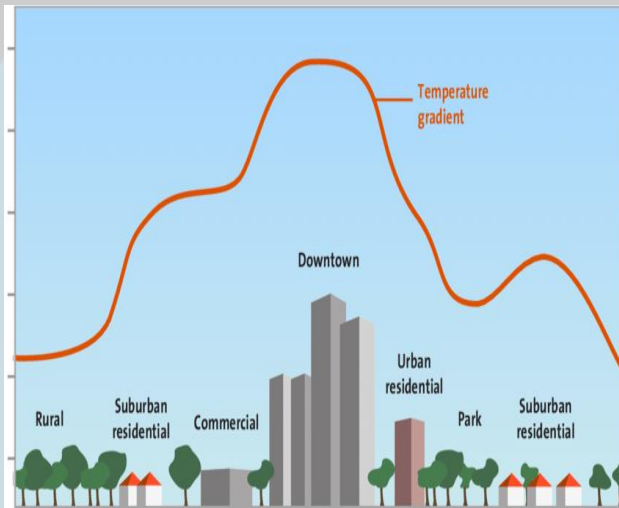
- The lines separating truth from falsehood, right from wrong, love and hate, and war and peace, are becoming more and more hazy in this post truth era.

- We understand that “authenticity”, which is inherently like an honest “performance”, remains elusive because fake news’s post authenticity is a social issue that is a sign of waning “trust” in a common civic endeavour rather than a purely technological or media problem.

The Hindu

- What has transpired is that because of constantly advancing technology, it is now easier, less expensive, and quicker to produce and distribute fake contents.
- Today’s AI avatars are able to create realistic looking opinion page articles, fiction, paintings, and even research papers.
- After admitting that AI was used to create a prize winning photograph, German photographer Boris Eldagsen declined the Sony World Photography Award in April, stating that he was curious to find out if contests were ready for AI photos to enter
- Because of AI’s presumed ability to create seemingly convincing text and data, researchers and journal editors are becoming

Urbanisation and cities



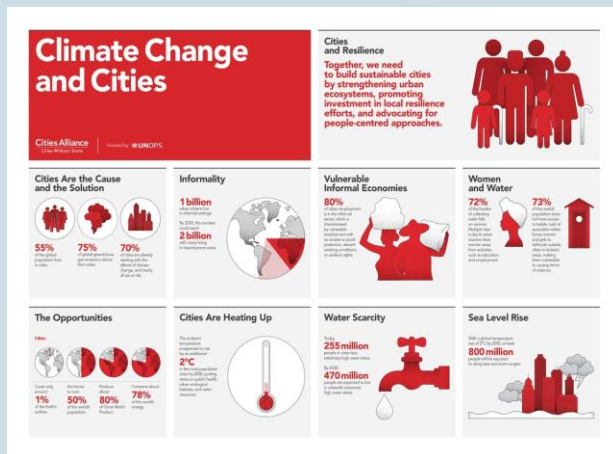
It is extremely critical to acknowledge the fact that the degree of urban expansion in the Chennai city has been one of the fastest in the country.

- And, it is important to recognise that the urban expansion process is irreversible and can be disastrous if not regulated.
- When the city limit was expanded from 174 sq.km to 426 sq.km, and the CMA to 1,189 sq.km, there was very little thought devoted to protecting

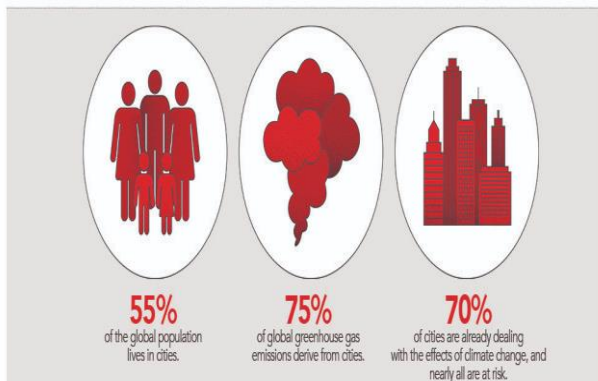
Current Affairs 16th December 2023 by Saurabh Pandey

the ecological hotspots in the expanded areas.

- In the process, Chennai has lost many water bodies (lakes and ponds) and much of the Pallikaranai marsh land and coastal wetlands.



Cities Are the Cause and the Solution



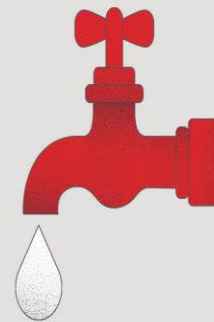
Sea Level Rise

With a global temperature rise of 2°C by 2050, at least **800 million** people will be exposed to rising seas and storm surges.



Water Scarcity

Today, **255 million** people in cities face extremely high water stress.



By 2030, **470 million** people are expected to live in cities with extremely high water stress.

Vulnerable Informal Economies

80% of urban employment is in the informal sector, which is characterised by vulnerable employment with no access to social protection, decent working conditions, or worker's rights.



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Women and Water

72%

of the burden of collecting water falls on women. Multiple trips a day to water sources draw women away from activities such as education and employment.



73%

of the world's population does not have access to toilets. Lack of accessible toilets forces women and girls to defecate outside, often in isolated areas, making them vulnerable to varying forms of violence.



Climate Change and Cities

Informal Settlements



1 billion
urban citizens live
in informal settings.

By 2030, this number
could reach
2 billion
with many living
in hazard-prone areas.

The Hindu

India and Oman

- The Sultan of Oman, Sultan Haitham bin Tarik, is visiting India from December 16 on a state visit.

- This is his first visit to India after taking over in January 2020 following the passing of Sultan Qaboos. Oman is the closest neighbour to India in the Arabian Gulf region.
- With key Omani ports abutting the coastline along the Arabian Sea as well as the Gulf of Oman leading into the Persian Gulf and towards the Gulf of Aden, Oman's location is of utmost strategic importance to India.
- Along with Saudi Arabia and the United Arab Emirates (UAE), Oman completes the trio of key strategic partners of India in the Gulf region.
- The ruling family of Oman has always had a strong connection with India.
- Sultan Qaboos was always favourably disposed towards India and invited Indian companies and professionals to undertake projects apart from sourcing supplies from India.
- At the people to people level too, India and Oman enjoy close ties.
- There is a large Indian community of almost seven lakh people which has contributed to the constantly evolving vibrant relations.
- During the Cold War era, and even thereafter, when the Arab world was largely ambivalent towards India and was often soft and supportive of

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Pakistan, it was Oman which kept its doors open to India.

- In a conflict prone region, Oman has always been an island of peace.
- It has pursued a foreign policy which is based on the twin strands of moderation and mediation, including a policy of deliberate neutrality in dealing with regional issues and conflicts.
- It has carefully balanced its close relations with the western powers and the Gulf Cooperation Council (GCC) countries, with a pragmatic approach to neighbouring Iran, maintaining that the Straits of Hormuz will not be closed.
- Even during the Persian Gulf crisis in 2019, when the United States and Iran were on the brink of a military conflict, it was Oman which played a key role in diffusing tension
- During the GCC Qatar diplomatic standoff, Oman refused to join Saudi Arabia and other countries in breaking diplomatic ties with Qatar in June 2017.
- Much before the Abraham Accords were signed between Israel, the UAE and Bahrain in September 2020, Israeli Prime Minister Benjamin Netanyahu had made a surprise visit to Oman in October 2018, once again

confirming the importance of Oman in the region.

India Oman strategic partnership

- Oman is a crucial pillar of India's West Asia policy, with their multi-faceted engagement increasingly taking on a more strategic shape in recent decades.
- The India Oman strategic partnership was signed during Prime Minister Manmohan Singh's visit to Oman in November 2008 and is based on twin pillars of mutual trust and shared interests.
- Oman was one of the few countries to have been invited by India to its G-20 presidency as a guest nation earlier this year.
- Defence and security engagement form a key pillar of this strategic partnership and are governed by a memorandum of understanding (MoU) signed in 2005.
- Oman is the first Gulf country with which all the three wings of India's defence forces hold joint exercises. Since 2012/13, an Indian naval ship has remained on duty in the Gulf of Oman for antipiracy operations.
- Oman has allowed overflights/transit by Indian military aircraft too.

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- During the Persian Gulf crisis in June 2019, the Indian Navy launched 'Operation Sankalp' to ensure the safe passage of Indian flagged ships which most often operated off the coast of Oman.
- The MoU on Duqm Port during Mr. Modi's visit is a historic landmark in our security cooperation, providing basing facilities, Operational Turn Round and other logistics facilities to Indian naval ships operating in the region.
- Trade and commerce forms yet another important pillar of engagement. Bilateral trade during FY2022/23 reached \$12.388 billion.
- There are over 6,000 India Oman joint ventures in Oman, with an estimated investment of over \$7.5 billion.
- India was the second largest market for Oman's crude oil exports for the year 2022 after China.
- In October 2022, India and Oman launched the Rupay debit card in Oman, a key footprint of India's initiative of promoting digital public infrastructure (DPI) in the world.
- India and Oman are looking forward to increased engagement in strategic areas such as space cooperation and

MoU on this was signed during Mr. Modi's visit.

- The possibility of an agreement on joint exploration of rare earth metals, vital to modern electronic equipment, could add strength to the partnership.
- The proposed India Middle East - Europe Connectivity Corridor (IMEEC) infrastructure project to link India to Europe across West Asia could also see Oman playing an important role.
- There is a proposal from the South Asia Gas Enterprise (SAGE), a private consortium based in India, to lay a 1,400 km long deepsea pipeline from Oman to India for the transfer of gas.

India's gateway to West Asia

- Security challenges in the region have a ripple effect in India and, therefore, any instability in the region has a direct bearing on the safety and security of millions of Indians working there, India's energy security and its steadily growing trade relations.
- Apart from being India's oldest strategic partner in the region and closest neighbours, Oman is an integral part of all important groupings in the region; the GCC, the Organisation of Islamic Cooperation, the Arab League.

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- Its ability to manage rival ideologies and power games in the region makes it vitally important to India.
- Both countries consider themselves as ambassadors of peace and enjoy goodwill across ideologies in the world.
- Oman is, therefore, India's gateway to West Asia.

The Hindu

Inflation

- From the TOP or tomato, onion and potato triumvirate of India's most widely consumed vegetables, onion prices remained the biggest source of concern as year on year inflation ballooned to 86%, from October's 42% pace, and the sequential pace swelled to 48%.
- With reports that inclement weather and depleting groundwater are likely to cause a near 25% shortfall in onion output during the key rabi season, the outlook for prices of the nutrient dense bulb moderating in the near future appears bleak, the government's move to impose a ban on its exports notwithstanding.
- Pulses and sugar are other areas of concern, with the first witnessing more than 20% inflation and the sweetener also experiencing an

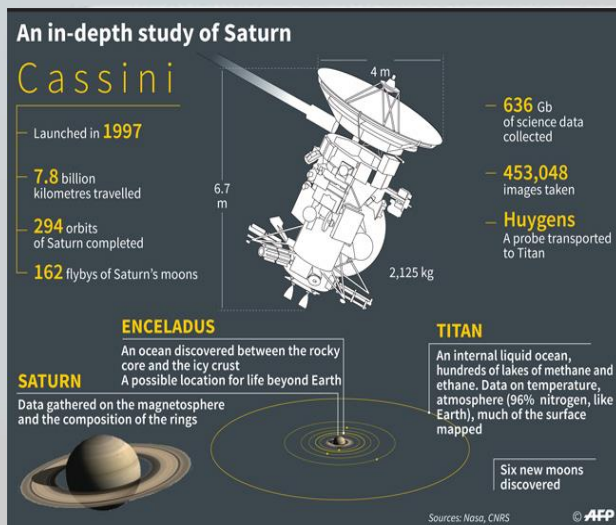
uptick in the pace of price gains to 6.55%.

- With sugar production also expected to take a hit due to lower rainfall, the number of supply related challenges policy makers face to rein in price gains is rising.
- With the RBI having opted to refrain from raising rates for now, the onus is squarely on the government to help temper inflation, or risk suffering an erosion in broader consumption and economic growth.

The Hindu

Cassini and Saturn

- Molecules including methanol, ethane, and oxygen are present in gaseous plumes emitted from Saturn's moon Enceladus.
- The Cassini spacecraft first discovered large plumes of material escaping into space from Enceladus's southern hemisphere in 2005.
- These plumes appear to be coming from a subsurface ocean through fissures in the moon's icy surface



- Composition of the plumes is the five already identified molecules along with newly identified hydrocarbons hydrogen cyanide (HCN), acetylene (C₂H₂), propylene (C₃H₆), and ethane (C₂H₆), and traces of an alcohol (methanol) and molecular oxygen.
- These compounds could potentially support extant microbial communities or drive complex organic synthesis leading to the origin of life," the authors write.
- The ability of these compounds to support life on Enceladus, however, depends largely on how diluted they may be in the moon's subsurface ocean, the authors note.

The Hindu


Woolly dogs

- DNA analysis of a 19th century dog, paired with traditional knowledge acquired through interviews, have provided new insights into the decline of Coast Salish "woolly dogs" an extinct Indigenous dog once bred for its unique woolly coat.
- Given the ubiquity of European ancestry present in many dog breeds at the time, the findings of the study suggest that the Coast Salish peoples carefully and successfully maintained the genetic integrity of the woolly

dog's genetic lineage for a substantial period

Pangolin

Endangered pangolins
The world's most heavily trafficked mammal



No reliable global population estimates but drastic local declines documented

- Increasing demand for their meat and body parts is fuelling illegal hunting
- More than 1 million pangolins believed to have been poached from the wild in the past decade

CITES* in September banned all international trade in pangolins
*CITES: Convention on International Trade in Endangered Species

Diet: ants, termites
Behaviour: Solitary, nocturnal
Digs long burrows to hunt termites and for shelter
Can climb trees
Good swimmer

Defence
Rolls into a ball
Easy to catch for illegal meat and medicine market


Scales
Made from keratin, the substance that also forms human hair and nails
Sought on the black market for supposed medicinal benefits

Young travel on mother's tail

Source: CITES/savepangolins.org/IUCN

PLIGHT OF PANGOLINS
Pangolins are the world's most trafficked mammals.

There are **nine** species of pangolins in the world, out of which **two** are found in India.



Pangolin species found in India:


- Indian pangolin (Endangered)**
Nearly **6000** pangolins were poached in India between 2009 and 2017
- Chinese pangolin (Critically Endangered)**
20 tonnes of pangolins and their parts are trafficked every year

Pangolins are prized for their meat, which is considered a delicacy in China and Vietnam.

Additionally, they are poached for their scales, which are used as ingredients in traditional Asian medicine

PANGOLIN FACTS

WORLD PANGOLIN DAY IS 17TH FEB



- The Indian Pangolin is also called the thick-tailed Pangolin.
- It's often on its own and it's very shy.
- Pangolins curl into a ball when they see an enemy.
- It's nocturnal. It sleeps in its burrow during the day.
- It has scales like other pangolins.
- It has a long, sticky tongue. But no teeth.

SCALY FUTURE FOR INDIA'S PANGOLINS

Netted, trapped, shot or snared, pangolins in India are poached for their scales and other body parts that are smuggled in large numbers to other countries for use in traditional medicines.



WILL YOU LEND YOUR HAND?
Help Stop Pangolin Poaching And Trade

Report poaching, smuggling or illegal trade to the Wildlife Crime Control Bureau (www.wccb.gov.in), local Forest and Police Departments.

Hunting, trapping and trade in pangolins is a punishable offence under the Wildlife (Protection) Act, 1972. Their international trade is restricted and liable for prosecution.

Pangolin images © Rajesh Kumar Wikipedi

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Email: trafficindia@wwf.org

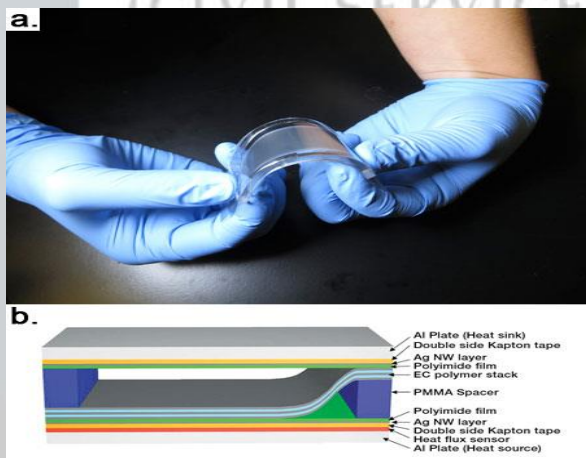
#StopIllegalWildlifeTrade
http://support.wwf.org/hi/pangolins.html
www.trafficindia.org www.traffic.org www.wwf.org

- Based on genomic analyses, researchers reveal illegal pangolin trafficking routes from origins in Africa to markets in Asia.
- The approach offers new opportunities to monitor pangolin poaching in near real time, allowing for targeted and more effective anti-trafficking measures.

- Pangolins are in high demand in Asia because their scales are believed, without scientific support, to have medicinal properties in traditional medicines, particularly in China.
- The white bellied pangolin is the world's most trafficked mammal.
- The Hindu

Electro calorie device

- Combining a flexible solar cell with an electro caloric device, researchers have created solar powered clothing that allows the body to adapt dynamically to changes in ambient temperature, thus allowing the new device to guarantee the safety and comfort of the human body.
- Active thermo regulatory systems used allow for rapid cooling or warming but often have large power demands, limiting their use in more conventional clothing types.



H1N2

- Several subtypes of the influenza virus are assigned according to combinations of mutations in the proteins on the surface of the virus hemagglutinin (H) and neuraminidase (N).
- The former binds to sialic acid receptors in the host. New influenza viruses can emerge through a process called reassortment where the co-infecting viruses could swap genomic fragments.
- Influenza A H1N2 is a subtype of influenza that is endemic in pigs and is rarely reported in humans.
- Swine influenza viruses normally do not infect humans, however, in rare cases, sporadic infections can occur especially with close contact with animals carrying the virus.
- Genome sequencing revealed that the virus belonged to a distinct clade 1B.1.1 of influenza viruses.
- While distinct from recent human cases of A(H1N2), its genetic makeup showed similarity to swine influenza viruses found in the UK and no other mutations of concern have been detected in this variant

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- According to the UKHSA, the variant influenza virus presents a low risk to the general public.
- However, people with direct regular exposure to pigs may be at a higher risk of acquiring this virus.
- Influenza viruses have the potential to spill over into human populations and cause severe illnesses although the variant virus detected in the U.K. does not show any characteristics suggestive of pandemic potential.

The Hindu

CT SCAN

- Ever since physicians started using computed tomography (CT) for medical imaging, its use grew rapidly.
- The benefits of CT imaging in clinically needed cases are well known.
- However, its potential for increased cancer risks and relatively high cumulative doses from multiple scans have raised concerns among the medical and scientific community.
- Radiation doses at moderate (over 100 mGy) to high (over 1 Gy) values are known to cause haematological malignancies (blood cancers) in both children and adults and other cancers

About CT scan

- A CT (computed tomography) scan is an imaging test that helps healthcare providers detect diseases and injuries.
- It uses a series of X-rays and a computer to create detailed images of your bones and soft tissues.
- A CT scan is painless and noninvasive

A CT scan takes pictures of your:

- Bones.
- Muscles.
- Organs.
- Blood vessels.

- A CT (computed tomography) scan is a type of imaging test. Like an X-ray, it shows structures inside your body.
- But instead of creating a flat, 2D image, a CT scan takes dozens to hundreds of images of your body.
- To get these images, a CT machine takes X-ray pictures as it revolves around you.

The Hindu

Verdict on Art 370 and federalism

Can a State be turned into a Union Territory?

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- The Court observed that carving out the Union Territory of Ladakh out of J&K was permissible under Article 3 of the Constitution and accordingly upheld the Jammu and Kashmir Reorganisation Act, 2019.
 - However, owing to the assurance given by the Union government that J&K's statehood would be restored soon, the court did not go into the issue of whether the conversion of J&K into a Union Territory was valid.
 - Importantly, the court pointed out that the views of the State legislature regarding the proposed reorganisation of the State are recommendatory and not binding on Parliament.
 - The Chief Justice, however, cautioned that "the necessary effect of converting a State to Union Territories which is that autonomy would be diminished, the historical context for the creation of federating units, and its impact on the principles of federalism and representative democracy" must be borne in mind
 - Reiterating similar concerns, Justice Sanjiv Khanna stated that the conversion of a State into a Union Territory has "grave consequences" and denies the citizens of the State an elected government, and impinges on federalism.
 - Thus, such a conversion has to be justified by giving very strong and cogent grounds
- What about the role of the State?**
- The Court ruled that the President while exercising powers under Article 370(3) of the Constitution can 'unilaterally' notify that Article 370 ceases to exist.
 - It further said that there was no requirement for the President to secure the concurrence of the State government in this regard as mandated by the provisos to Article 370(1)(d).
 - "The principle of consultation and collaboration underlying the provisos

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to Article 370(1)(d) would not be applicable where the effect of the provision is the same as Article 370(3).

- Since the effect of applying all the provisions of the Constitution to Jammu and Kashmir through the exercise of power under Article 370(1)(d) is the same as issuing a notification under Article 370(3) that Article 370 ceases to exist, the principle of consultation and collaboration are not required to be followed,” the Chief Justice reasoned.
- It was also pointed out that such collaboration between the President and the State government would have been necessary if provisions of the Indian Constitution were to be applied to the State in a manner that would require amendments to the State Constitution.
- However, in this case, the President through Presidential Order [C.O.272] ensured a total application of the Indian Constitution to the State to the effect that the State’s Constitution became inoperative

What did the Court specify about the President’s powers?

- The petitioners had pointed out that the proviso to clause 3 of Article 370 makes it clear that the presidential

power to abrogate Article 370 was contingent on the recommendation of the J&K Constituent Assembly.

- However, the Court ruled that even after the dissolution of the Constituent Assembly on January 26, 1957, the President’s power to abrogate the provision by exercising powers under Article 370(3) subsists and could be exercised “unilaterally”.
- The Chief Justice asserted that holding the power under Article 370(3) cannot be exercised after the dissolution of the Constituent Assembly would lead to “freezing of the integration” contrary to the purpose of introducing the provision.
- Concurring with this view, Justice Kaul emphasized that the purpose of Article 370 was to slowly bring J&K on par with the other States of India and thus the “requirement of recommendation of [the] J&K Constituent Assembly cannot be read in a manner making the larger intention redundant”

What about ‘asymmetric federalism’?

- The Court pointed out that unlike the Constitution of India, “there is a clear absence” in J&K’s Constitution of a reference to sovereignty.

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- Article 370 was held to be merely a “feature of asymmetric federalism” similar to other provisions in the Constitution such as Articles 371A to 371J examples of special arrangements for different States.
- “If the position that Jammu and Kashmir has sovereignty by virtue of Article 370 were to be accepted, it would follow that other States which had special arrangements with the Union also possessed sovereignty.

The Hindu

A man with glasses and a dark shirt is reading a book titled 'INTERNAL SECURITY OF INDIA'.

SAURABH PANDEY

CSE

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

Forest right act 2006

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

- Seasonal access to nomadic, pastoral and semi-nomadic communities over forestland

- Conversion of all leases granted by erstwhile governments, zamindars and king into permanent land records

- Finally, the Act lays down a democratic procedure for identifying whether and where wildlife conservation may require curtailing or extinguishing community rights.
- Simultaneously, having community rights over a forest translates ipso facto into the community having a say in, if not veto over, any diversion of that forest and a right to compensation if diverted.
- The issue of so called 'encroachments' is addressed through recognizing individual forest rights (IFRs) to continue habitation and cultivation or other activities that existed before December 2005.
- Forest villages are to be converted into revenue villages after full rights recognition.
- The issue of access and control is addressed by recognizing the rights of village communities to access and use forests and to own and sell minor forest produce, and, most importantly, to manage forests within their customary boundaries, including in sanctuaries and national parks.
- This is the most far reaching provision in the FRA, as it ensures decentralised forest governance, linking management authority and responsibility to community rights.
- This right was reaffirmed by the Supreme Court in the Niyamgiri case, and although the Forest Conservation Rules 2022 and FCA Amendment 2023 seek to bypass this right, States can still put in place such consent mechanisms.
- But the biggest lacuna in FRA implementation is the extremely slow and incomplete recognition of community rights to access and manage forests (loosely, community forest rights or CFRs).
- The (still colonially structured) forest bureaucracy is vehemently opposed to these rights, as it stands to lose its zamindari: our estimates show that 70%90% of the forests in central India should be under CFRs.
- The other departments and political representatives can only visualise forest dwellers as 'labharthis' (beneficiaries of state largesse), not

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as autonomous users and managers of their own forests.

- Maharashtra, Odisha, and, more recently, Chhattisgarh, are the only States to recognise CFRs substantially.
- But only Maharashtra has enabled their activation by denationalizing minor forest produce, at least in Scheduled Areas, resulting in at least a thousand villages managing their own forests.
- Even here, illegal non-recognition of community rights in densely forested potential mining areas has led to protest and unrest.
- The Hindu

Storm Red Sea

- Beyond the regional crisis points, depletion of security in the Red Sea will have a global impact, specifically for Asian economies such as India, Japan, South Korea, and China, drawing in their interests as well.
- In the Persian Gulf for example, India has operationalized military capacities under Operation Sankalp since 2019, where the Indian Navy began escorting India flagged ships, specifically oil tankers.
- Japan has worked its diplomatic channels directly with Tehran while

South Korea has also experienced tensions with Iran over its ships travelling through the region. A U.S. call for partners to mobilise is not irrational.

- Previously, the global community did rally to address the issue of piracy off coastal eastern Africa, specifically around the waters of Somalia.
- In 2012, India joined China, Japan, and South Korea for coordinated joint patrols in the Gulf of Aden. All states took point by rotation in leading these patrols
- Through the current churn in the global geopolitical order, there is one major trend that states must factor into their calculus: that non-state militant actors are strengthening in agency, both politically and militarily, and often as part of state promoted designs to secure short term gains for long term strategic victories.
- These are the fundamentals at play in an area such as the Red Sea which, in capitals such as New Delhi, do not enjoy the luxury of space in security debates.

The Hindu

One person, one vote

- On December 12, the Rajya Sabha passed The Chief Election

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Commissioner and other Election Commissioners (Appointment, Conditions of Office and Terms of Office) Bill, 2023.

- It provides for the procedure for appointment of the Chief Election Commissioner (CEC) and the other two Election Commissioners (ECs).

What does the Constitution say?

- Article 324 provides for the composition of the Election Commission of India (ECI).
- It consists of the CEC and two other ECs.
- The Constitution provides that the appointment of the CEC and EC shall, subject to the provisions of any law made by Parliament, be made by the President.
- While the existing parliamentary law provides for their conditions of service, it is silent with respect to appointments.
- The appointments till date are made by the President, that is the Central Government and there is no mechanism for ensuring independence during the appointment process
- The Supreme Court in this case, in March 2023, held that there has been a legislative vacuum due to the

absence of any law by Parliament in the last 73 years (since the adoption of the Constitution) with respect to the appointment of the CEC and EC.

- The independence of the ECI is essential for ensuring free and fair elections that is paramount for a vibrant democracy.
- The Supreme Court drew reference to various other institutions supporting constitutional democracy that have independent mechanisms for the appointment of its head/members like the National and State Human Rights Commission, the Central Bureau of Investigation (CBI), Information Commission, Lokpal etc.
- In the past, the Dinesh Goswami Committee on Electoral Reforms (1990) and the Law Commission in its 255th report on Electoral Reforms (2015), had suggested that the CEC and ECs should be appointed by a committee consisting of the Prime Minister, the Chief Justice of India (CJI) and the Leader of the Opposition or the largest Opposition party in the Lok Sabha.
- Considering these recommendations, the Supreme Court, exercising its powers under Article 142 (to issue directions for doing 'complete justice' in any matter), laid down that the CEC and ECs shall be appointed by a committee consisting of the Prime

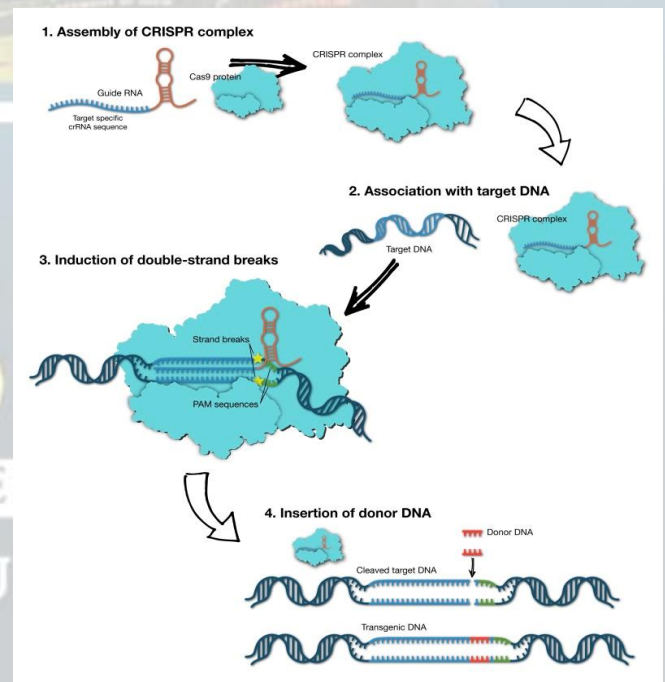
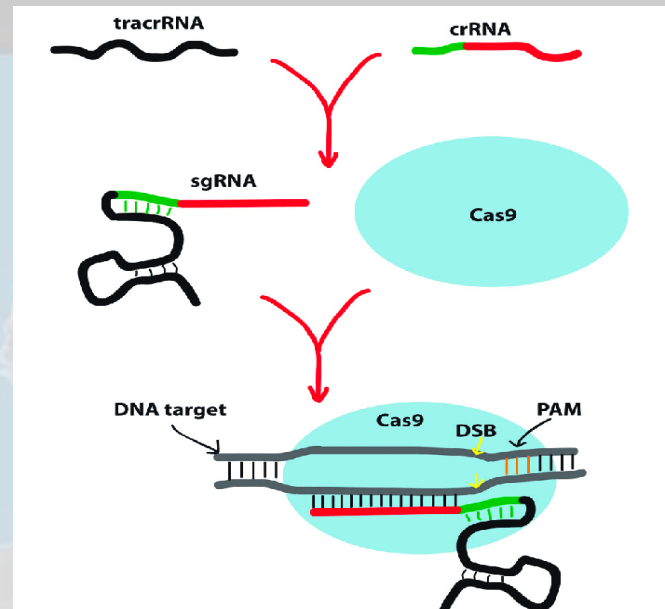
Minister, the CJI and the Leader of the Opposition or the largest opposition party in the Lok Sabha.

What does the proposed law provide?

- The CEC and other ECs shall be appointed from persons who are holding or have held a post equivalent to the rank of Secretary to the Government of India.
- There shall be a search committee headed by the Minister of Law and Justice, who shall prepare a panel of five persons for consideration to the selection committee.
- The CEC and EC shall be appointed by the President on the recommendation of this selection committee consisting of the Prime Minister, the Leader of Opposition in the Lok Sabha and a Union Cabinet Minister to be nominated by the Prime Minister.
- It is for the first time that the Parliament is proposing a structured mechanism for identification of suitable persons for the post of CEC and EC.

The Hindu

(CRISPR) and therapeutic



- The world of medicine is currently abuzz with news of regulatory agencies' approval for two highly anticipated CRISPR based therapies for sickle cell disease and β -thalassaemia in the U.K. and the U.S.

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Long and short of CRISPR

- Clustered regularly interspaced short palindromic repeats (CRISPR) are DNA elements that Spanish researchers discovered in archaea in 1993, and named and described later in a number of bacterial genomes.
- These elements contain pieces of genetic material derived from viruses that infect bacteria (for example, bacteriophages) and a set of proteins called Cas, or CRISPR associated.
- the researchers demonstrated the utility of the CRISPRCas9 system as a programmable 'molecular scissor' that could cut in DNA at a chosen spot with unparalleled accuracy. The specific spot could be picked by modifying the crRNA accordingly.
- the national regulator in the U.K., the Medicines and Healthcare products Regulatory Agency (MHRA), approved the use of a CRISPR based method called exagamglogene autotemcel sold under the brand 'Casgevy' to treat sickle cell.
- Disease and transfusion dependent β thalassemia.
- In Casgevy, a patient's blood stem cells are extracted, their genes modified to remove the defect that produces the sickling, and regrafted back.

- These cells then proliferate to produce normal red blood cells.
- One fascinating approach is called base editing, where scientists edit genomes at the resolution of a single nucleotide (DNA is a polymer consisting of multiple nucleotides chained together).
- Yet another emerging technique is prime editing, where researchers use a search and replace strategy to directly write or insert specific sequences into an existing genome with high accuracy.

The Hindu

Kraft process

- The kraft process is a technique that accepts wood chips as input to produce cellulose fibres, which are then used to make paper and other materials used in everyday objects.
- Paper is most commonly produced by the kraft process today.
- The process is chemical in nature. The chips are treated with water, sodium hydroxide, and sodium sulphide the last two forming a highly alkaline mixture called white liquor at a relatively high temperature.
- This breaks the bonds between lignin (an organic polymer and important constituent of cell walls),

hemicellulose (cellulose like fibres that are shorter), and cellulose.

The Hindu



SAURABH PANDEY

— CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

M-RNA Based medicines

- While using mRNA as medicine is new, mRNA has been inside you for your entire life.
- The cells in your body create mRNAs that serve as instructions to make specific proteins you need to function.
- Researchers can create new mRNAs to correct those instructions when they aren't working
- The "m" stands for messenger, as mRNA contains the message, or recipe, that codes for a protein.
- About one third of a cell's energy is devoted to maintaining the proteins you need, so cells are well equipped to recognise, use and then destroy mRNA once it's no longer needed.
- The language of mRNA is made of four building blocks called nucleotides, nicknamed A, U, C and G
- Scientists understand how mRNAs code for proteins, they can easily create recipes for any protein.
- These recipes can be edited to meet the needs of the patient, whether this means providing a whole new mRNA recipe or tweaking an existing one to make a slight variation of the protein.
- Producing mRNA treatments is also scalable because scientists can make large amounts of mRNA in the lab.
- Another benefit of using mRNAs as drugs are cells' natural ability to destroy them when they aren't needed.
- Since mRNAs aren't permanent, doses can be easily changed to meet the changing needs of the patient.

mRNA vaccines beyond COVID-19

- The COVID19 vaccines from Moderna and Pfizer BioNTech are the first mRNA-based medicines to gain FDA approval.
- When these vaccines are injected into your arm, the mRNA is absorbed into some of your cells, which read the mRNA recipe and make the spike protein the virus uses to invade cells.
- Your immune system recognizes this spike protein as foreign and makes antibodies that prepare your body to attack the virus if you encounter it later.
- These mRNA vaccines demonstrate the flexibility of mRNA-based therapies.
- As the virus that causes COVID19 mutates, new viral variants can evade existing antibodies and cause new waves of illness.

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- However, scientists are able to sequence new mRNA recipes based on these variants and tweak the vaccine recipes to match them.
- Boosters containing these edited recipes teach your body to make new antibodies that target the latest versions of the viral spike protein.
- Cancer vaccines, like BioNTech's BNT-111 for melanoma, target the most common cancer mutations in the hope of helping many patients.
- One mRNA drug increases the formation of new blood vessels, which can improve wound healing in diabetic patients who have poor blood circulation and higher amputation risks.

mRNA as treatment for disease

- The potential for mRNA-based medicine extends beyond vaccines to prevent infectious disease.
- One example is the use of mRNA to treat cancer. Some mRNA cancer treatments work like vaccines by training your immune system to specifically target cancer cells.
- As cancer cells grow, they rapidly gain mutations in many genes.
- Cancer vaccines contain mRNA recipes based on mutations commonly found in certain types of tumours.
- Another example is using mRNAs to treat propionic acidemia, a disease where children have low levels of two liver proteins that normally prevent toxic byproducts from building up in the body.
- The ability to easily customise and produce mRNA increases their potential as effective, personalised therapies with fewer side effects that can help many people.
- The Hindu

Afghanistan out of COP 28

- When injected into the body, the mRNAs from the vaccines allow normal cells to make those mutated proteins and broadcast them to the immune system, ramping up production of antibodies.
- These antibodies bind to cancer cells and mark them for immune attack.
- Humanitarian concerns have been raised over Afghanistan being left out of United Nations climate negotiations for a third year in a row, as the country grapples with worsening drought and floods.
- Afghanistan is one of the country's most vulnerable to climate change, but the country was absent from the COP28 climate summit in Dubai.

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- It has been left out of U.N. talks since the Taliban took over Kabul in 2021.
- No foreign government has formally recognised Taliban leadership and it doesn't have a seat at the U.N. General Assembly.
- Foreign officials have cited the Taliban's restrictions on women as the reason for current isolationist policies, particularly its barring of girls and women from high school and universities.
- The Hindu
- The proposed land connection from Gelephu or Samdrup Jongkhar, traversing Assam and Northeast Indian states, extends to Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, and Singapore, forming a dynamic economic corridor that bridges South Asia to Southeast Asia
- The Gelephu Special Administrative Region (SAR) is envisioned as an autonomous economic hub, endowed with the authority to shape essential laws and policies.

Gelephu



- Bhutan's King, Jigme Khesar Namgyel Wangchuck, highlighted Gelephu Mindfulness City in his 116th National Day address, emphasising South Asia's ongoing economic transformation and the vast opportunities for the region, home to approximately two billion people.
- With executive autonomy and legal independence, this SAR aims to become a distinctive economic centre, inviting foreign investment through a favorable business environment and compelling incentives.
- The Hindu
- Cities and cop 28
- United Nations Framework Convention on Climate Change (UNFCCC) initiated the COP in 1995, 44% of people lived in cities. Currently, 55% of the global population is urban and this is expected to reach 68% by 2050.
- The urban world today consumes nearly 75% of primary energy and is responsible for roughly 70% of CO2 (76% of total GHG) emissions.

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- Hence, the desired results of the Paris commitments are not possible without addressing urban issues.
- At this year's COP, there was a special day dedicated to a ministerial meeting on urbanisation and climate change.
- COP28, argued for formally recognising the role of subnational governments in global climate change negotiations, accelerating and scaling up climate action by working across all levels of governance and sectors, and providing direct financing and technical assistance to cities and regions
- and economic inequities are quite inherent in their systems.
- So, to ensure fair participation in climate action plans and to claim loss and damage compensation, etc., there has to be a radical shift in the processes governing the cities
- During the preparation of Nationally Determined Contributions (NDCs) and National Adaptation Plans, cities find themselves excluded from the process of climate action plans.
- There is hardly any representation of city leaders and civil society groups in this process.
- some cities like Chennai are spearheading their climate action plan and have decided to meet their zero emission targets by 2050, even before the Indian national government's stipulated time period of 2070.

What can be done in the Global South?

- The cities of the Global South are far more vulnerable than their western counterparts.
- The city leaders are hardly empowered, the major employment is in the informal sector, adaptation is key as most cities are vulnerable to climate induced disasters
- In most countries, and in India particularly, 40% of the urban population live in slums.
- Pollution is a major contributor in reducing life expectancies and social
- Though this may sound too ambitious, it qualifies the point that cities are at the forefront in reclaiming spaces in meeting climate action plans.
- The Hindu

Anti-defection law

- The anti- defection law, found under the Tenth Schedule of the

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Constitution, was enacted to curb frequent floor crossing by legislators.

- It provides for the disqualification of elected legislators from the legislature in instances where they voluntarily switch parties or vote against the party's direction.
- But when two thirds of elected members of a party agree to "merge" with another party, they become exempt from disqualification.
- Before 2003, there was a provision where, if as a result of a split in the original party, onethird of the members of the legislature moved out of the party, they were exempt from disqualification.
- Another practice which can be loosely termed as "splits followed by mergers".
- In this trend, an elected legislator (or a group of legislators) would separate from the political party they belonged to, and avail themselves of the exemption given to splits between political parties by forming a group of one third MLAs of the legislature party.
- After that, the entire group of splitting legislators would merge with another party. Given that they would merge in full, they would meet the threshold of twothird of the MLAs

required to effectuate a merger with another party.

• Article 200

- In a landmark judgment delivered on November 10, 2023, in the State of Punjab vs Principal Secretary to the Governor of Punjab and Another, the Chief Justice of India (CJI), D.Y. Chandrachud, gave a creative interpretation to Article 200 of the Constitution of India which relates to the options before a Governor when a Bill, after being passed by the State Legislature, is presented to him for his assent.
- The new interpretation relates to the real meaning of the first proviso to Article 200 which says that the Governor may send the Bill back to the Assembly with a request for reconsideration of the Bill as a whole or certain provisions thereof.
- It further says that if the Assembly after such reconsideration passes the Bill with or without the amendments, the Governor shall not withhold assent from the Bill.
- There has been a considerable amount of confusion about the meaning of Article 200 and this proviso.
- Most of the commentators of the Constitution, like D.D. Basu and others, have held the view that the

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Governor's power to withhold assent under this Article has a finality about it, and once assent is withheld, the Bill dies a natural death.

- They were also of the view that the option of sending the Bill back to the Assembly for reconsideration under the first proviso is discretionary and not mandatory.
- Thus, there was a presumption that the Governor's power to withhold assent from a Bill is absolute.
- The Supreme Court of India has in the Punjab case said emphatically that Governors cannot delay the decision on the Bills.
- Thus, the decision of the top court has brought greater clarity to Article 200 and Governors will have to quickly take a decision on the Bills.
- Governor can send to the President for his consideration.
- The second proviso to Article 200 mentions one kind of Bills which are mandatorily to be reserved for the consideration of the President.
- These are Bills which derogate from the powers of the High Court in such a way as to endanger the constitutionally designed position of that court.
- So, the Constitution requires the Governor to send all such Bills for the consideration of the President.
- Since consideration by the President means consideration by the Union government, the officials of the Home Ministry will in effect decide the fate of such Bills.
- The Constitution in fact does not refer to any category of Bills apart from the Bills mentioned above which can be sent to the President for his assent.
- Therefore, taking a surface view, the Governor can use his discretion to send any Bill to the President.
- The question of crucial importance in the present political context is whether a Governor can reserve Bills for the consideration of the President at his discretion. The Constitution is silent on this.
- It makes only an indirect reference to the reserving of Bills for the consideration of the President in two places.
- Article 213 deals with the ordinance making power of Governors.
- Under this provision, in certain cases, the Governor can promulgate an ordinance only with instruction from the President.

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- Under clause (b) of the above Article, the Governor can promulgate an ordinance only with instructions from the President in a case where he would have deemed it necessary to reserve a Bill containing the same provisions as in the ordinance.
- The second place where the Constitution makes an indirect reference to the President's assent to a State Bill is in Article 254.
- Under clause (2) of this Article, a State law on an item in the Concurrent List will prevail in that State even when it contains a provision repugnant to the provisions of an existing central law if it has been reserved for the consideration of the President and has received his assent.
- This would mean that a Bill on a Concurrent subject can be or needs to be sent to the President for assent only if it contains provisions repugnant to an existing central law.
- But it does not indicate that every Bill on a concurrent subject should be sent to the President for assent.
- Infact the President has no jurisdiction to scrutinise and give assent to a Bill exclusively on a subject in the State List because of the federal scheme of legislative division.
- Therefore, it would seem that if the Governor sends a Bill on the State's matter to the President, it would be an abdication of the constitutional duty of a Governor.
- The Hindu

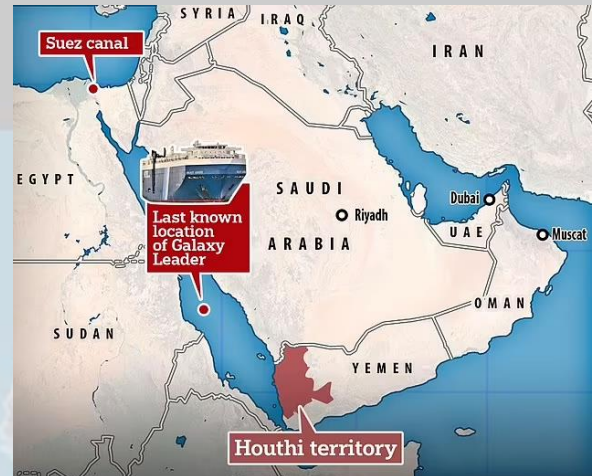
Photoreception

- Photoreception is activation of a biological process by light.
- Most organisms, including humans, respond to light. Some animals react to light waves not perceived by humans.
- Vertebrates have two types of photosensitive cells, rods and cones, so called because of their shape.
- The rods, which are long and fat, contain large amounts of visual pigment and they mediate vision under dim illumination (scotopic vision).
- The cone cells, which are relatively small, mediate daylight vision (photopic vision) and colour sensation.
- The retinas of animals active both day and night, as are those of humans, contain both rods and cones. In parts of the human retina, the rods and cones are intermingled and the nervous system provides a switching mechanism that permits adjustment for light conditions.
- In nocturnal animals, the optical arrangement of the eyes suggests that resolution is sacrificed for high light gathering power
- In nocturnal animals, the retina is mainly made up of rod cells.
- Rhodopsin, a photosensitive pigment present in rods, is decolourised by photons (light particles) and slowly regenerated in the dark. This ensures better vision for them in dim light.
- The Hindu

Red sea and Houthi

- U.S. Defense Secretary Lloyd Austin announced the creation of a multinational operation to safeguard commerce in the Red Sea following a series of missile and drone attacks by Yemen's Iran aligned Houthis
- The situation in the Bab el Mandeb Strait has been worrying shipping companies after several attacks by Houthi rebels on container ships.
- These attacks have prompted several major international companies to hold ships from venturing in the strait that separates Yemen from eastern Africa
- Prime Minister Narendra Modi and Israeli Prime Minister Benjamin Netanyahu held a telephone discussion on the escalating threats to maritime

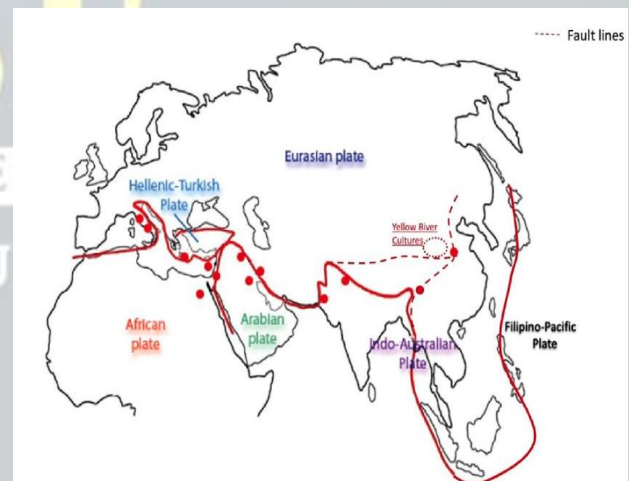
- The conversation came soon after the Pentagon announced an international mission to counter the growing number of attacks against Israel bound international traffic

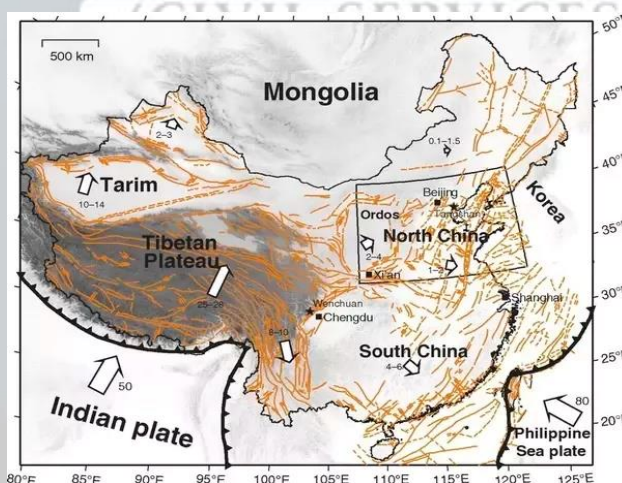
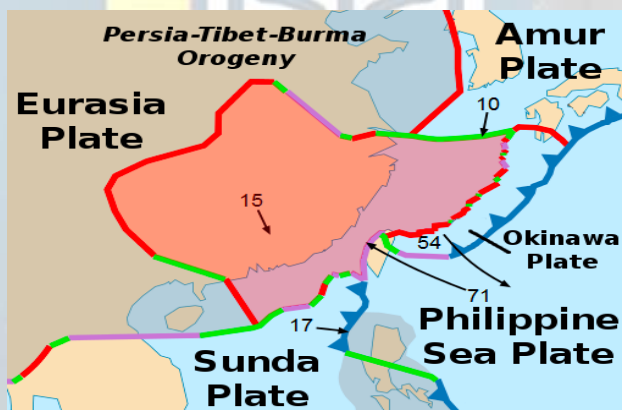
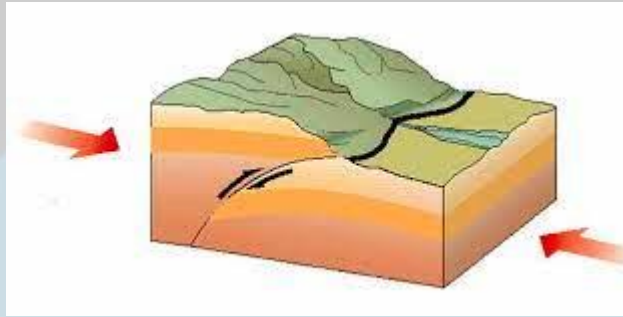


The Hindu

Why earthquake in china?

- A strong overnight earthquake rattled a mountainous region of northwestern China, destroying homes, leaving residents out in a below freezing winter night and killing 126 people in the nation's deadliest quake in nine years.





Ethanol

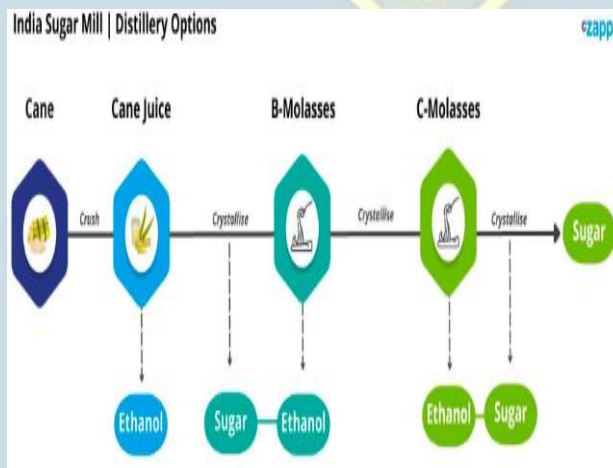
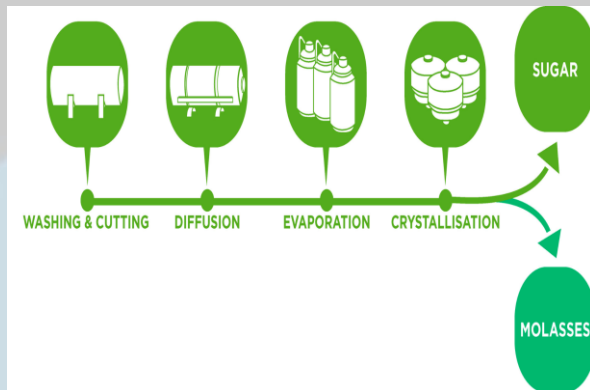
- As more than 100 countries at COP28 in Dubai pledged the tripling of global renewable energy capacity by 2030, India faces a tightrope walk with regard to its ethanol blending target.

- While ethanol blended petrol (EBP) increased from 1.6% in 2013-14 to 11.8% in 2022-23, the 20% target by 2025 has run into trouble with low sugar stocks in 2022-23 and the impending shortfall in sugarcane production this year

- The two major feedstock for ethanol production are sugarcane (Brazil) and corn (the U.S.).

- A crucial difference between the use of sugarcane and corn for producing ethanol is the degree of food fuel conflict that emerges. In the case of sugarcane, ethanol is produced by processing the molasses (C-heavy/B-heavy) and constitutes minimal trade off with the sugar output.









- The B-heavy molasses path produces less sugar compared to the C heavy one, but both produce sugar and ethanol simultaneously from sugarcane.



- But using **corn for producing ethanol directly** reduces its use as food or livestock feed.
- It not only diverts grain to fuel use, but also links food prices **directly** with crude oil prices through the demand side.
- **The very high crude prices that prevailed for a decade in 2004-14 pulled up ethanol and corn prices to historical highs**
- **This strong link between crude and food prices in the era of agro fuels**

- Unlike in the U.S., **sugarcane is the more obvious choice for tropical countries** such as Brazil or India where cane yields are higher.
- This is not to argue that **using sugarcane for ethanol does not have adverse impacts** on environment or hunger.
- **More land under water intensive sugarcane cultivation can displace food production** as well as degrade water tables, but these can be regulated by appropriate land use policies.
- It is far more difficult to control the market dynamics, driven by easily interchangeable grain use, as illustrated by the U.S.'s corn based ethanol experience.
- **The future of India's renewables strategy hangs on a delicate food fuel tradeoff; and a choice between intensifying hunger and reducing fossil fuel use.**

National biofuel policy

Salient Features	Benefits
 <ul style="list-style-type: none"> • Classification of basic bio fuels, 1G plants, 2G plants and bio refineries 	 <ul style="list-style-type: none"> • Reduce Import Dependency.
 <ul style="list-style-type: none"> • Permitted the use of cane juice, B-molasses, Lignocellulose feedstock 	 <ul style="list-style-type: none"> • Cleaner Environment
 <ul style="list-style-type: none"> • Allowed the use of surplus food grains to benefit farmers 	 <ul style="list-style-type: none"> • Infrastructural Investment in Rural Areas & Employment Generation
 <ul style="list-style-type: none"> • Funding scheme of 5000 Cr, Interest subvention scheme for molasses and grain-based distilleries 	 <ul style="list-style-type: none"> • Additional Income to Farmers

The Hindu

Telecommunication bill 2023

- The Telecommunications Bill, 2023 was introduced in Lok Sabha on December 18, 2023.
- It seeks to regulate activities related to telecommunication. It repeals the Indian Telegraph Act, 1885, the Indian Wireless Telegraphy Act, 1933, and the Telegraph Wires (Unlawful Possession) Act, 1950. It also amends the Telecom Regulatory Authority of India (TRAI) Act, 1997.
- **Authorisation for telecom-related activities:** Prior authorization from the central government will be required to: (i) provide telecommunication services, (ii) establish, operate, maintain, or expand telecommunications networks, or (iii) possess radio equipment.
- **Assignment of spectrum:** Spectrum will be assigned by auction, except for specified uses, where it will be allocated on an administrative basis.
- These include purposes such as: (i) national security and defence, (ii) disaster management, (iii) weather forecasting, (iv) transport, (v) satellite services such as DTH and satellite telephony, and (vi) BSNL, MTNL, and public broadcasting services.
- **Powers of interception and search:** Messages or a class of messages between two or more persons may be intercepted, monitored, or blocked on certain grounds.
- Such actions must be necessary or expedient in the interest of public safety or public emergency, and must be in the interest of specified grounds which include: (i) security of the state, (ii) prevention of incitement of offences, or (iii) public order
- **Powers to specify standards:** The central government may prescribe standards and assessments for telecom equipment, infrastructure, networks, and services.
- **Right of way:** Facility providers may seek a right of way over public or private property to establish telecom infrastructure. Right of way must be provided on a non-discriminatory and non-exclusive basis to the extent possible.
- **Protection of users:** The central government may provide for measures to protect users which include: (i) prior consent to receive specified messages such as advertising messages, (ii) creation of Do Not Disturb registers, and (iii) a mechanism to allow users to report malware or specified messages.

- **Appointments to TRAI:** The Bill amends the TRAI Act to also allow individuals with: (i) at least 30 years of professional experience to serve as the chairperson, and (ii) at least 25 years of professional experience to serve as members.
- **Digital Bharat Nidhi:** The Universal Service Obligation Fund has been established under the 1885 Act to provide for telecom services in underserved areas. The Bill retains this provision, renames the fund as Digital Bharat Nidhi, and also allows its use for research and development.
- **Offences and penalties:** The Bill specifies various criminal and civil offences. Providing telecom services without authorisation, or gaining unauthorised access to a telecom network or data, are punishable with imprisonment up to three years, a fine up to two crore rupees, or both.
- **Adjudication process:** The central government will appoint an adjudicating officer to conduct inquiries and pass orders against civil offences under the Bill.
- The officer must be of the rank of joint secretary and above. Orders of the adjudicating officer may be appealed before the Designated Appeals Committee within 30 days.
- Members of this Committee will be officers of the rank of at least Additional Secretary.

HFSS FOOD

What does HFSS stand for?

- HFSS stands for food and drinks that are high in fat, salt or sugar.
- HFSS examples
- Examples of HFSS food and drink covered by the regulations include:
 - Soft drinks with added sugar
 - Crisps
 - Granola
 - Sweet popcorn
- The HFSS rules aim to restrict the promotion of less healthy food and drink products as part of the government's pledge to reduce obesity and improve [health](#).

The Hindu

Ironing effect

The iron press /Ironing effect

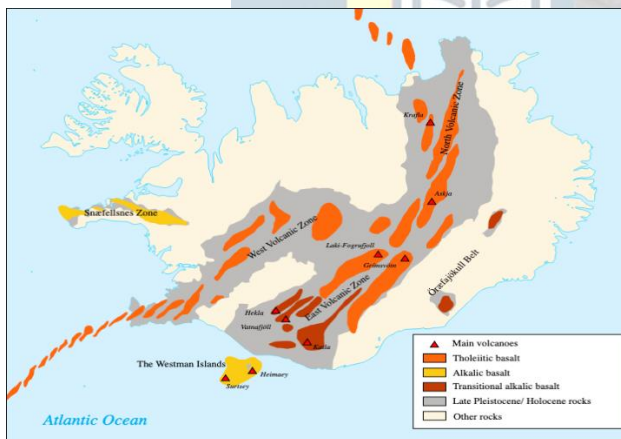
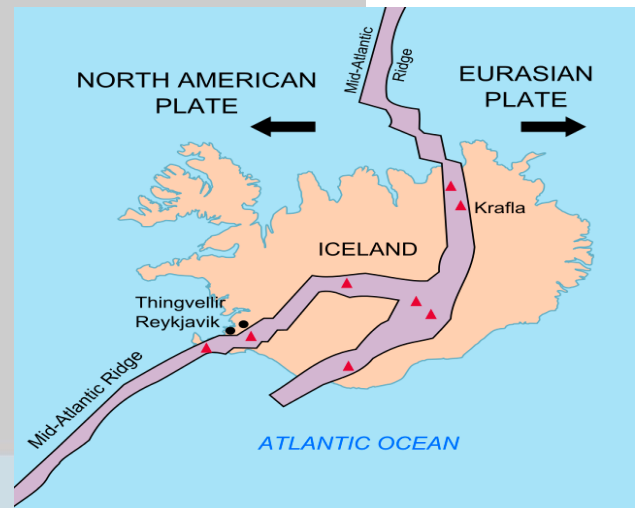
- The iron press is a wonderful machine.
- There are two important ingredients to this wonder: it has a heavy metal base (often some alloy of iron, thus the name) and that it heats up.
- Our clothes are made of some plant or animal fibres, like cotton, wool, etc.
- Fibres are long chain molecules often made of carbon, oxygen, and hydrogen very similar to the glucose and sugar that we eat.
- These molecules can be really, really long.
- If the water molecule, which is made of two hydrogen atoms and an oxygen atom, is the size of a pencil, a typical cellulose fibre, one of the primary molecules of cotton, would be about 100 metres long!
- These kinds of molecules are called polymers. Polymers make up many things around us, including plastic, soap, and even tomato ketchup.
- There are synthetic polymers (made in a lab, like plastic) and then naturally occurring ones, such as cotton.
- When you wash your clothes, these molecules become knotted around each other like noodles when you cook a packet,
- This is often because of the water molecules that become stuck between and around these molecules.
- When you iron your cloth, what you are really trying to do is rearrange these long molecules into neat, straight patterns.
- In the process, some of these water molecules escape and evaporate.
- Heat is nothing but energy: it causes all the atoms and molecules to vibrate a bit and that does the trick.
- As we know, each of these cellulose molecules is very long and they can have various twists and turns along their length, like one strand in a noodle.
- The Hindu

Volcanic eruption in Iceland



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- A volcano that had rumbled for weeks erupted in southwestern Iceland, spewing semi molten rock into the air in a spectacular show of the earth's power in the land known for fire and ice.
- Iceland, which sits above a volcanic hotspot in the North Atlantic, has about 20 hours of darkness a day in December.
- Iceland averages an eruption every four to five years. The most disruptive in recent times was of the **Eyjafjallajökull volcano**, which in 2010 spewed huge clouds of ash into the atmosphere



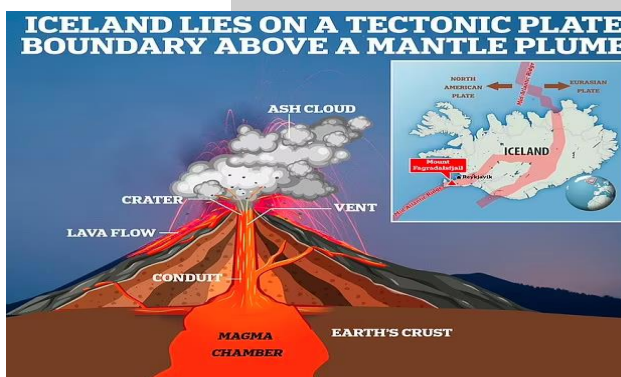
- A volcanic range on the Reykjanes Peninsula, about 50 km southwest of the capital, Reykjavik, has erupted thrice since 2021, after being dormant for 800 years.

- The nearby **Blue Lagoon geothermal spa** one of Iceland's biggest tourist attractions.

The Hindu

EU Bloc law

- EU countries and lawmakers reached an agreement on Wednesday on an overhaul of the **bloc's laws on**



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handling asylum seekers and migrants.

- The reform includes speedier vetting of irregular arrivals, creating border detention centres, accelerated deportation for rejected asylum applicants and a solidarity mechanism to take pressure off southern countries experiencing big inflows.
- The migration issue has taken on a harder political edge in Europe in recent years with the rise of nationalist anti immigrant parties in several EU countries, including Italy, Sweden and the Netherlands.
- The Hindu

COP 28 Outcome

What happened with respect to the loss and damage fund?

- Following the agreement reached at COP27 to create a 'Loss and Damage' (L&D) fund, the last year was dedicated to negotiations on fund management and financing.
- Moreover, the World Bank was designated to oversee and administer the fund.
- But concerns originating from the experiences of developing countries with the World Bank related to questions about legal autonomy,

flexibility, and decision making authority, and general scepticism about the fund's agility in responding promptly to emergencies, have emerged.

- There is also a prevailing sentiment among countries that the communities affected by climate related disasters should be able to directly access funding, preferably in the form of grants and not loans.

What about the global stocktake?

- This year's COP summit saw the first global stocktake (GST).
- According to the UNFCCC, the GST "enables countries and other stakeholders to see where they are collectively making progress towards meeting the goals of the Paris Agreement and where they are not".
- The decision of countries' at COP28 to transition away from fossil fuels was coupled with the ambition to triple renewable energy capacity by 2030.
- More than 20 countries also pledged to triple their nuclear energy capacity.
- However, the transition from fossil fuels is restricted to energy systems alone; they can continue to be used in the plastics, transport, and agriculture sectors.

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- The declaration also refers to 'transitional fuels', such as natural gas, for ensuring energy security.
 - while the declaration called for accelerated climate mitigation, it alluded to unproven and risky technologies such as carbon capture and storage (CCS) and carbon removal.
 - **What about green finance?**
 - The financial segment of the GST implementation framework explicitly recognizes the responsibility of developed nations to take the lead in climate finance.
 - There is also a reference to the private sector's role in addressing financial shortfalls and an imperative to supplement grant oriented, concessional finance to enable equitable transition in developing countries.
 - The Green Climate Fund received fresh support of \$3.5 billion, allowing it to finance adaptation and mitigation projects in vulnerable regions.
 - An additional \$188 million was pledged to the Adaptation Fund.
 - New partnerships between public and private sectors were forged to mobilise investments in renewable energy, sustainable agriculture, and infrastructure.
 - The COP28 Presidency also introduced ALTÉRRRA, an investment initiative with an ambitious goal to globally mobilise an unprecedented sum of \$250 billion by 2030.
- How did India fare at COP28?**
- The UAE declaration on climate and health came into being at COP28 through a partnership of the COP28 Presidency with the World Health Organization.
 - It recognizes the growing health impacts of climate change and acknowledges the benefits of climate action, including a reduction in air pollution and lowering the cost of healthcare.
 - The declaration, signed by 123 countries, has collectively committed \$1 billion to address the growing climate health crisis.
 - However, India didn't sign this declaration because reducing greenhouse gas (GHG) emissions in the health sector would mean reduction in emissions from gases used for cooling.
 - As India's healthcare infrastructure is still growing, such a commitment could compromise the healthcare

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requirements of a growing population, particularly rural.

- The Global Methane Pledge launched at COP26 received renewed attention at COP28, with the Climate and Clean Air Coalition becoming the new secretariat and partners of the pledge announcing more than \$1 billion in new grants for funding projects to reduce methane emissions from the agriculture, waste, and gas sectors.
- More than 150 countries signed the pledge to reduce methane pollution.
- India isn't a signatory to this pledge because it shifts focus from carbon dioxide to methane, a GHG with a lower lifetime.
- Also, methane emissions in India are primarily from rice cultivation and enteric fermentation (livestock rearing), which support the livelihoods of small and marginal farmers.

What are the takeaways?

- The COP28 outcomes had a lot of firsts, such as the declaration on climate and health, acknowledgement of the role of nature based solutions for biodiversity conservation and climate, and the need to transition away from fossil fuels.

- Some 134 countries also agreed to a landmark declaration to transition to sustainable and resilient food systems.
- However, some challenges and differences between developed and developing countries remain to be addressed.
- One key issue of contention was fossil fuel subsidies.
- While developed countries advocated for phasing them out, developing countries, including India, refused a phase out over implications on economic growth and development.
- Such a phase out also has social implications: several communities rely on fossil fuels (coal, in India's case) for gainful employment.
- Moreover, emphasising the principle of common and differentiated responsibilities and the historical responsibility of developed countries for GHG emissions, developing countries argued for increasing the flow of climate finance and technologies to facilitate just job transitions and inclusive development.
- Some other contentious issues spanned market mechanisms, financial resource allocation, the role

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of the World Bank as the agency for managing the L&D fund, and private sector engagement in climate action

Parliament security

- Parliament House following the attack in 2001.
- There are spike barriers, bollards, drop gates with the latest technology, scanners, Radio Frequency Identification (RFID) devices, anti-explosive checks, and additional manpower that form the layers of security.
- A phalanx of men and women from the central police forces are deployed in the outer precincts,
- neither door frame metal detectors nor handheld metal detectors can check for plastic or rubber, especially when hidden in one's shoes (as it was in this case).
- In fact, shoes are never checked in Parliament. The United States and Europe have moved to using millimeter wave scanners. Those who are watchful move ahead with the technology of the times.
- The posts of the two chiefs of the Central Reserve Police Force and the Central Industrial Security Force involved with Sansad security are vacant too.
- The inquiry into the breach has been entrusted with the Indo Tibetan Border Police (ITBP) chief whose force is involved in the security setup of Parliament.
- In the absence of the Joint Secretary, Security, the Lok Sabha and the Rajya Sabha each have a 'Director Security' to direct security operations
- It is not like the Special Protection Group (SPG) manned by the best Indian Police Service officers, who are always engaged in daily operations, monitor them for improvements as also scour for the latest technology to induct.

The Hindu

Terms related new variants of corona

- The World Health Organisation, has decided, due to its rapid spread, to classify the variant JN.1 as a separate variant of interest (VOI) from the parent lineage BA.2.86.
- It was previously classified as VOI as part of BA.2.86 sublineages.
- As per WHO's updated definition of a VOI, it would be a SARSCoV2 variant with genetic changes that are predicted or known to affect virus characteristics such as transmissibility, virulence, antibody evasion, susceptibility to therapeutics and detectability.
- It has also been identified to have a growth advantage over other circulating variants in more than one WHO region with increasing relative prevalence alongside increasing number of cases over time, or other apparent epidemiological impacts to suggest an emerging risk to global public health.
- "The continued growth of JN.1 suggests that it is either more transmissible or better at evading our immune systems.
- **Mutation:** A mutation refers to a single change in a virus's genome (genetic code). Mutations happen frequently, but only sometimes

change the characteristics of the virus.

- **Lineage:** A lineage is a group of closely related viruses with a common ancestor. SARS-CoV-2 has many lineages; all cause COVID-19.
- **Sublineage:** A term used to define a lineage as it relates to being a direct descendent of a parent lineage. For example, BA.2.75 is a sub lineage of BA.2.
- **Variant:** A variant is a viral genome (genetic code) that may contain one or more mutations.
- **SARS-CoV-2 Interagency Group (SIG)** as a Variant of Interest (VOI), Variant of Concern (VOC), Variant of High Consequence (VOHC) or Variant Being Monitored (VBM) due to shared attributes and characteristics that may require public health action.
- **Recombination:** A process in which the genomes of two SARS-CoV-2 variants combine during the viral replication process to form a new variant that is different from both parent lineages.
- This may occur when a person is infected with two variants at the same time.
- The lineage that results from recombination is called a "recombinant."

- **Pango Lineage System**

- The Pango lineage system is hierarchical like a family tree. Lineages are evolutionarily descendants of a “parent” lineage. A lineage may be described as a “sublineage” when it is being discussed in relation to its parent lineage.

- The Hindu

Next clade

- Next clade is a tool that is used to classify SARS-CoV-2 sequences according to their genetic relatedness.
- Potentially important branches of the SARS-CoV-2 family tree are given names, indicating members of that branch are a “clade” and are thought to arise from a common ancestor.

Uses four types of classifications:

- Variant of high consequence (VOHC)
- Variant of concern (VOC)
- Variant of interest (VOI)
- Variants being monitored (VBM)

What is Variants of interest?

Variants designated as VOI include variants that have:

- reduced neutralization by antibodies generated against previous infection or vaccination.
- Reduced efficacy of FDA approved treatments, or diagnostic tests.
- Predicted increase in transmissibility or disease severity.

Possible attributes of a Variant of Interest include:

- Specific genetic markers that are predicted to affect transmission, diagnostics, therapeutics, or immune escape.
- Evidence that it is the cause of an increased proportion of cases or unique outbreak clusters.

A VOHC has clear evidence that prevention measures or medical countermeasures (MCMs) have significantly reduced effectiveness relative to previously circulating variants.

In addition to the possible attributes of a variant of interest, variants designated as VOC include:

- Increase in transmissibility.
- More severe disease (for example, increased hospitalizations or deaths).
- Significant reduction in neutralization by antibodies

generated during previous infection or vaccination.

- Reduced effectiveness of treatments or vaccines, or diagnostic detection failures.
- The Hindu

Cotinine

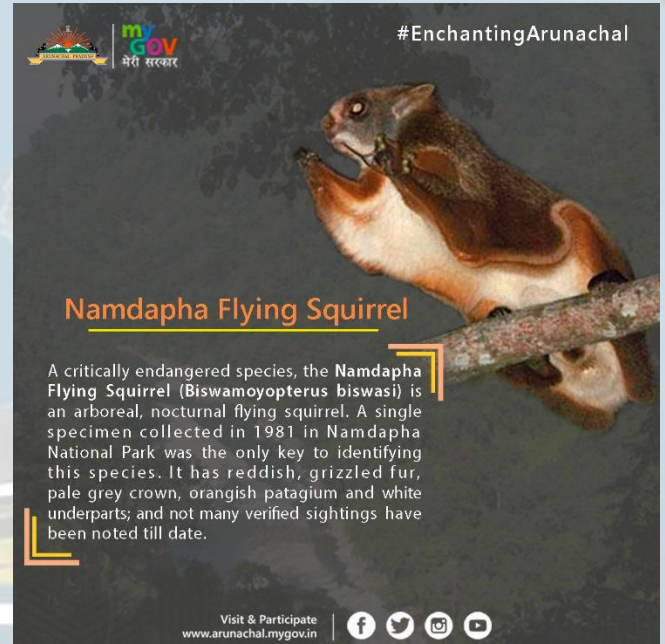
- Nicotine Replacement Therapy (NRT) nicotine patches or lozenges relies on providing additional nicotine to the body. Researchers have now turned to nicotine's oxidative metabolite, cotinine.
- Using ascorbic acid as a potential reducing agent, they converted cotinine in smokers' plasma back to nicotine, targeting both nicotine addiction and detoxification simultaneously
- A team of researchers from the Faculty of Pharmacy, Sri Ramachandra Institute of Higher Education and Research, have developed a dissolvable film containing Vitamin C that a smoker places on the tongue whenever tempted to smoke.
- Ascorbic acid in a specified dose (Vitamin C) converts cotinine back to nicotine within the smokers' plasma, they claim.

- Individuals find it difficult to quit smoking because of nicotine withdrawal. Current NRT products provide additional nicotine to the body.
- Nicotine is metabolised into cotinine, an oxidative metabolite.
- Cotinine will stay in the body for six weeks (the quantity of cotinine depends on an individual's tobacco consumption).
- Generally, 80% of nicotine accumulates as cotinine in the body, while the remaining 20% is eliminated in urine.
- Cotinine can cause cancer.
- So, for the first time, instead of adding on to the nicotine content in the body, we have showcased that vitamin C can be utilised to recirculate cotinine.
- Side effects are negligible, the person does not receive additional nicotine and detoxification occurs at the end of the cycle."
- The Namdapha flying squirrel. Nocturnal flying squirrel has resurfaced in Arunachal Pradesh after going missing for 42 years.
- The Namdapha flying squirrel (Biswamoyopterus biswasi) was last described in 1981



-
- **Namdapha Flying Squirrel**
- **SCIENTIFIC NAME:** *BISWAMOYOPTERUS BISWASI*
- **LAST SEEN: 1981 IN INDIA**
- **YEARS LOST: 42**
- **RED LIST STATUS: CRITICALLY ENDANGERED**
- The Namdapha flying squirrel (*Biswamoyopterus biswasi*) is an arboreal, nocturnal flying squirrel endemic to Arunachal Pradesh in northeast India, where it is known from a single specimen collected in Namdapha National Park in 1981
- It was the sole member in the genus *Biswamoyopterus* until the description of the Laotian giant flying squirrel (*Biswamoyopterus laoensis*) in 2013
- Arboreal locomotion is the locomotion of animals in trees. In habitats in which trees are present, animals have evolved to move in them.

- Nocturnality is a behavior in some non-human animals characterized by being active during the night and sleeping during the day.

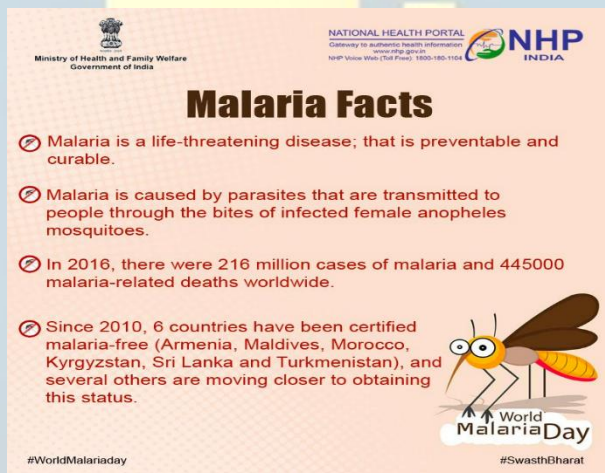


R21/MatrixM

- The World Health Organization (WHO) added the R21/MatrixM malaria vaccine, developed by Oxford University and manufactured by Serum Institute of India, to its list of prequalified vaccines.
- In October 2023, the WHO had recommended its use for the prevention of malaria in children.
- The R21 vaccine is the second malaria vaccine prequalified by the WHO.
- “The prequalification means larger access to vaccines as a key tool to prevent malaria in children, with it

being a prerequisite for vaccine procurement by UNICEF and funding support for deployment by Gavi, the Vaccine Alliance,” the WHO said in a statement

- Achieving WHO vaccine prequalification ensures that vaccines used in global immunisation programmes are safe and effective within their conditions of use in the targeted health systems.”



The Hindu

Post Office bill 2023 & concern

What are the key features of the Bill?

- The Post Office Bill, 2023 allows the interception of articles transmitted via post on grounds such as the security of the state, friendly relations with foreign states, public order, emergency, public safety, or contravention of the provisions of the Bill or any other laws.

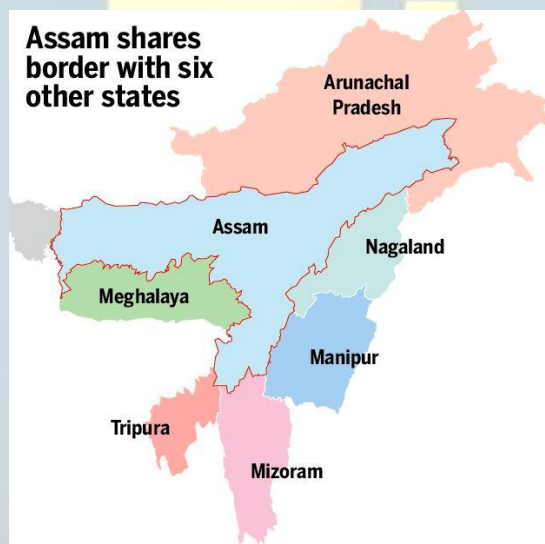
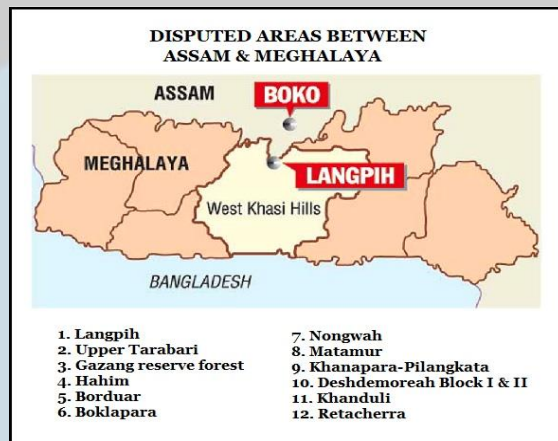
- The officer in charge appointed by the Union government is empowered to ‘intercept, open or detain’ any postal article on the aforementioned grounds.

- Such an item can also be disposed of by the government in a manner it deems appropriate.

The Hindu

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Assam - Meghalaya border dispute



WHY THE DISPUTE?

- Assam and Meghalaya share an 885-km border.
- In 1970, Meghalaya was carved out of Assam as an autonomous state.

In 1972, Meghalaya became a full-fledged state following the Assam Reorganisation (Meghalaya) Act of 1969.

- This was the beginning of the border problem as the Meghalaya government found the Act unacceptable.
- As many as 12 land dispute points, along the border of these two states, have been a bone of contention.
- These include Langpih, Upper Tarabari, Gazang reserve forest, Hahim, Borduar, Boklapara, Nongwah, Matamur, Khanapara-Pilangkata, Deshdemoreah Block I and Block II, Khanduli and Retacherra.
- Six of these areas have found some type of resolution in recent times after a memorandum of understanding (MoU) was signed between the two states.
- Among the 12 areas, Langpih in the West Garo Hills bordering the Kamrup district of Assam is a major flashpoint.
- Langpih was part of the Kamrup district during the British colonial period, but post-Independence, it became part of the Garo Hills and Meghalaya.
- Meghalaya claims that the border problem in Langpih has been created by Assam, which has often set up police posts there.

RESOLVING THE ISSUE

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- In 1983, a joint official committee was formed to address the border issues.
 - The panel recommended that the Survey of India should re-delineate the border, teaming up with both the states.
 - An independent panel, spearheaded by Justice YV Chandrachud, was set up in 1985. Meghalaya rubbished the report.
 - In 1991, about 100 km of the border was demarcated with the help of the Survey of India, but Meghalaya cried foul.
 - In 2011, the Meghalaya Assembly passed a resolution for intervention of the Centre and the establishment of a boundary commission.
 - The Centre asked the two governments to appoint nodal officers to discuss the dispute.
 - In 2019, Meghalaya urged the Supreme Court to direct the Centre to resolve the dispute but the petition was turned down.
 - On January 29 this year, Assam and Meghalaya signed a draft resolution. It was the first step towards resolving a 50-year-old dispute.
 - On March 29, a historic MoU was signed between Assam Chief Minister Himanta Biswa Sarma and his Meghalaya counterpart Conrad K Sangma in the presence of Home Minister Amit Shah in New Delhi.
 - The agreement sought closure in six disputed sectors that were taken up for resolution in the first phase
 - On August 22 this year, the second phase of border talks was held with the two states deciding to form three regional committees to resolve issues regarding the remaining six disputed areas
 - Five principles are considered while resolving the border disputes: historical facts, ethnicity, administrative convenience, willingness and sentiments of the people concerned and the contiguity of the land, preferably with natural boundaries such as rivers, streams, and rocks.
 - The Hindu
-

(PM-DevINE)

- Prime Minister's Development Initiative for North Eastern Region (PM-DevINE), was announced as a new Central Sector scheme, with 100% Central funding, in the Union Budget 2022-23 with initial list of seven projects and an initial allocation of Rs. 1500 crore.
- The approval of the Cabinet was accorded for the PM-DevINE scheme on 12 October, 2022.

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- The scheme has an outlay of Rs.6,600 crore for the 4 year period from 2022-23 to 2025-26 (remaining years of the 15th Finance Commission period).
 - The objectives of PM-DevINE scheme are to:
 - (i) fund infrastructure convergently, in the spirit of PM GatiShakti;
 - (ii) support social development projects based on felt needs of the NER;
 - (iii) enable livelihood activities for youth and women; and
 - (iv) fill the development gaps in various sectors.
 - Keeping in view the objectives of the scheme, eleven projects amounting to Rs 1503.44 crore including the seven projects announced in Budget 2022-23, have been selected for sanction in FY 2022-23 and an amount of Rs 121.10 crore has been disbursed. State-wise, project wise list of projects approved during FY 2022-23.
 - The Hindu
- Palna scheme
- The Women and Child Development Ministry said it aimed to establish 17,000 creches in anganwadis across the country.
 - The Ministry added that 5,222 creches had been approved until now, and it planned to depute two additional creche workers in each anganwadi.
- These initiatives are being taken under the 'Palna' scheme to address the need for quality daycare facilities or creches for children of working women by providing a safe and secure environment for the nutritional, health and cognitive development of the children, thereby enabling more women among all socioeconomic groups to take up gainful employment in the organised and unorganised sector
 - About Rare earth elements
 - China, the world's top processor of rare earths, banned the export of technology to extract and separate the strategic metals, as it overhauled a list of technologies deemed key to national security.
 - It also banned the export of production technology for rare earth metals and alloy materials as well as technology to prepare some rare earth magnets.
 - The move comes as Europe and the U.S. scramble to wean themselves off rare earths from China, which accounts for 90% of global refined output
 - All about Rare earth elements
 - The rare earth elements (REE) are a set of seventeen metallic elements.
 - These include the fifteen lanthanides on the periodic table plus scandium and yttrium.

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- Rare earth elements are an essential part of many high-tech devices
- Rare-earth elements (REE) are necessary components of more than 200 products across a wide range of applications, especially high-tech consumer products, such as cellular telephones, computer hard drives, electric and hybrid vehicles, and flat-screen monitors and televisions.
- Significant defense applications include electronic displays, guidance systems, lasers, and radar and sonar systems.
- Although the amount of REE used in a product may not be a significant part of that product by weight, value, or volume, the REE can be necessary for the device to function.
- For example, magnets made of REE often represent only a small fraction of the total weight, but without them, the spindle motors and voice coils of desktops and laptops would not be possible.
- In 1993, 38 percent of world production of REEs was in China, 33 percent was in the United States, 12 percent was in Australia, and five percent each was in Malaysia and India.
- Several other countries, including Brazil, Canada, South Africa, Sri Lanka, and Thailand, made up the remainder.
- However, in 2008, China accounted for more than 90 percent of world production of REEs, and by 2011, China accounted for 97 percent of world production.
- Beginning in 1990 and beyond, supplies of REEs became an issue as the Government of China began to change the amount of the REEs that it allows to be produced and exported.
- The Chinese Government also began to limit the number of Chinese and Sino-foreign joint-venture companies that could export REEs from China."

The Hindu

Reindeer Behaviour

- Researchers have discovered that the more time reindeer spend ruminating, the less time they spend in non-rapid eye movement (non-REM) sleep.
- EEG recordings revealed that reindeer's brainwaves during rumination resemble the brain waves present during non REM sleep, and these brainwave patterns suggest that the reindeer are more "rested" after ruminating.



- Lightdark cycles are absent in the Arctic during winter and summer, and previous studies showed that Arctic dwelling reindeer don't display circadian behavioural rhythms during these seasons, though they tend to be more active during the daytime during the spring and autumn equinox, when lightdark cycles are present.
- They found that reindeer slept approximately the same amount during winter, summer, and autumn,

despite the fact that they were much more active during the summer.

- This is in contrast to other species that change the amount they sleep in response to environmental conditions.
- One possible strategy is the opportunity for rest during rumination the rechewing of partially digested food, which is an important component of digestion for reindeer and other ruminants.
- The Hindu

AEROGEL



- Inspired by the structure of polar bear fur, researchers present a knittable aerogel fibre with exceptional thermal and mechanical properties.
- The fibers are washable, dyeable, durable, and well-suited to be used in advanced textiles.

- This allowed the researchers to test them in a sweater that demonstrated impressive thermal insulation, among other features.
- Aerogels are an ideal material for thermal insulation.
- Encapsulated aerogel fibre has excellent thermal insulation while also being mechanically robust.

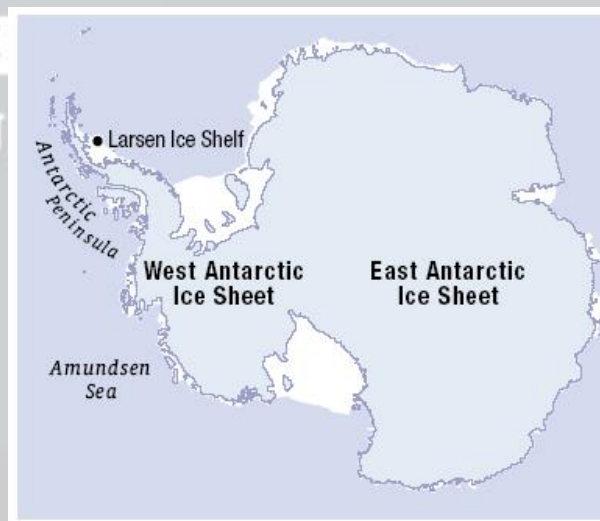
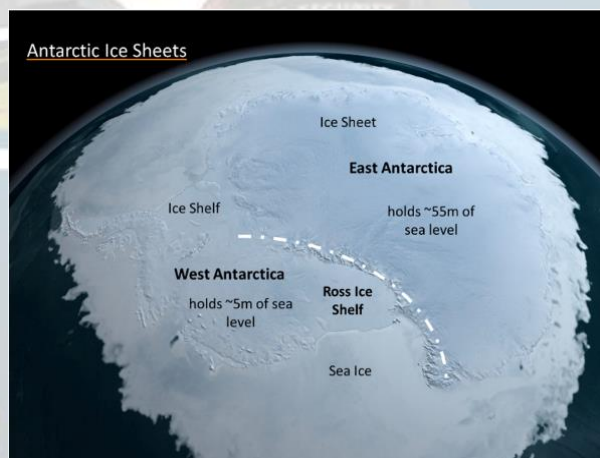
Aerogel

- Aerogels are among the lightest solid materials known to man.
- They are created by combining a polymer with a solvent to form a gel, and then removing the liquid from the gel and replacing it with air.
- Aerogels are extremely porous and very low in density.
- They are solid to the touch. This translucent material is considered one of the finest insulation materials available.
- Although aerogels were first invented in the 1930s, NASA's Glenn Research Center in Cleveland has invented groundbreaking methods of creating new types of aerogels that could change the way we think about insulation.



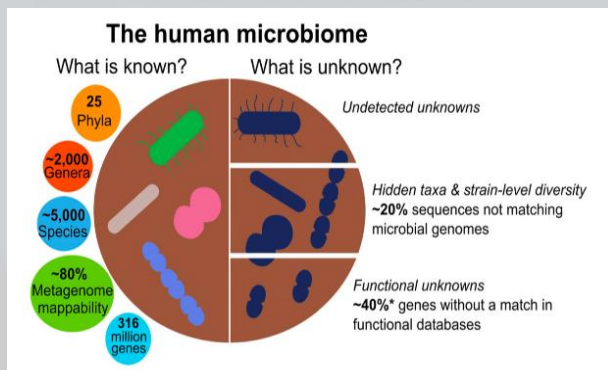
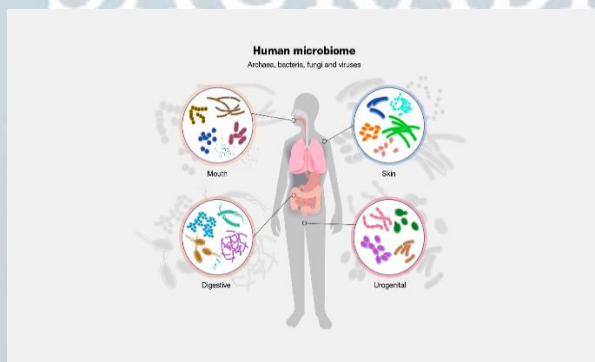
The Hindu

West Antarctic Ice Sheet



- Genetic analyses of an Antarctic octopus show that the West Antarctic Ice Sheet (WAIS) collapsed during the Last Interglacial about 1,29,000 to 1,16,000 years ago when temperatures were only about 1-degree C warmer than pre industrial levels.
- The findings suggest that WAIS collapse and resultant sea level rise could be caused by even the minimal temperature rises. Total WAIS collapse would have devastating global ramifications it could raise the global sea level by roughly 3 to 5 meters.
- The Hindu

Microbiome



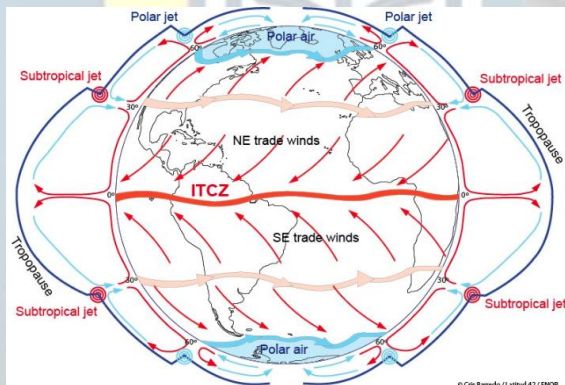
What is a microbiome?

- A genome is the entire set of DNA instructions found in a cell.
- In humans, the genome consists of 23 pairs of chromosomes located in a cell's nucleus. A biome refers to the species that are present in a location.
- In our case, the ocular microbiome refers to the bacteria, fungi and viruses that are present in the eye.
- The microbes in a healthy ocular microbiome act like a barrier, preventing invasion by harmful pathogens.
- The ocular microbiome is also significantly different in the conjunctiva (the thin, clear membrane that protects the eye) and the cornea (the outermost clear layer that helps in focusing and refraction of the eye) of patients with infectious diseases such as fungal keratitis when compared to healthy eye microbiomes
- The prevailing levels of air pollution, due to very high amounts of dust all over the country, have made many people suffer from 'pink eye' (conjunctivitis), itching and swelling of the eye, and blurry vision (when the lens is affected), or sensitivity to bright light.

The Hindu

**India Meteorological Department
(IMD)**

- The 2023 northeast monsoon was in an active phase during this episode, characterised by the presence of an east-west trough (or ITCZ).
- The unprecedented heavy rainfall on December 18 was associated with an easterly wave with an embedded cyclonic circulation that moved from the southwestern Bay of Bengal across southern Tamil Nadu and Kerala into the southeastern Arabian Sea between December 16 and December 19.



- There was a large scale, intense convergence of winds with the influx of abundant moisture into the region.
- Most of the recent rains fell in the early morning hours of December 18, supported by the climatological diurnal pattern over the region.
- The north south running hills along the Tamil Nadu Kerala border are also

likely to have contributed to the dynamics of the heavy rains.

- The India Meteorological Department (IMD) had predicted extreme rainfall (more than 20 cm of rainfall in 24 hours) for December 18 about 48 hours in advance and issued a red level warning.
- But rainfall of more than 50 cm was not expected at all. Compared to a tropical cyclone, this weather system was weaker.
- A review of the available numerical weather prediction (NWP) model forecasts showed that no model could predict the intensity of this heavy rainfall event.
- For the prediction of extremes, a probabilistic approach is generally used extensively to calculate the probability of such extreme events occurring in each region.
- These probabilistic forecasts can be generated using an ensemble approach, where we generate a larger number of forecasts (3040 forecasts) with perturbed initial conditions.
- The Indian Institute of Tropical Meteorology (IITM) in Pune has developed such a prediction system for making probabilistic forecasts.

Current Affairs 24th December 2023 by Saurabh Pandey

- This ensemble forecasting system was able to suggest the high probability of occurrence of extreme rainfall events in southern Tamil Nadu almost three days in advance.
- Probabilistic forecasts provide more lead time, which can be used for better preparation.
- End users should be trained to use probabilistic methods for proper mitigation of such extreme events
- More research is required for a better understanding of the physical processes of these extreme events.
- Public awareness and education also play a crucial role in building resilience.
- Communities should be educated about the risks associated with extreme precipitation events and receive information on how to prepare and respond effectively.

Multifaceted approach

- In the face of increasing extreme rainfall events, we must take a multifaceted and proactive approach to mitigate the impact and strengthen the resilience of our communities.
 - To meet the challenge of climate change, a comprehensive strategy that includes robust early warning systems, sustainable urban planning, ecosystem conservation, global climate action and community engagement is essential to effectively mitigate the impacts of increasing extreme precipitation events.
 - The robust early warning system is very vital, but it is only one component of this comprehensive strategy.
 - The Hindu
-

India-Maldives (hydrology)

- The Maldives Cabinet decided against renewing a Memorandum of Understanding (MoU) with India for cooperation in hydrography.
- The agreement, which was signed in 2019, is due to expire in 2024

What is hydrography?

- It is the science of studying oceans, seas, and other water bodies, by compiling and analyzing data, maps, and charts.
- Branching off from applied sciences, it looks at measuring and describing the physical attributes of water bodies and predicting how they might change over time.

- While it is said to be undertaken primarily for safety of navigation, it also supports other activities, such as economic development, security and defence, scientific research, and environmental protection.
- Hydrographical measurements include tidal, current and wave information. Maldives is a member of the Colombo Security Conclave, an initiative aimed at enhancing Indian Ocean maritime security, that includes India, Sri Lanka, and Mauritius.
- However, earlier this month, the Maldives skipped the latest round of the Conclave's NSA level meet held in Mauritius.
- Notably, it coincided with Maldivian Vice-President Hussain Mohamed Latheef's visit to China, to attend the China Indian Ocean Region Forum on Development Cooperation, where he said the Maldives was "eager to explore novel avenues of collaboration and cooperation with China"
- The MEA's response to the termination of the Maldives's joint hydrographic initiative with India, pointed to New Delhi's belief that its neighbours should tap the "benefits" of India's expertise.
- **The Hindu**

Concern telecom bill

- Contentious clauses is the requirement that all users have to be identified through the use of "verifiable biometric based identification as may be prescribed" by telecommunication service providers.
- Further, it requires that no user shall furnish any false particulars or suppress material information. This could impede whistleblowers as well as journalists who operate under anonymity.
- If users fail to comply, they will be charged a hefty penalty from ₹25,000 to ₹1,00,000 for some provisions.
- Most of the contentious provisions are contained in Chapter IV, which grants emergency powers to the Central government in the interest of public safety and national security.
- Section 19 (f) empowers the Central government to notify "standards and conformity assessment measures" in respect of encryption and data processing in telecommunication, which has raised eyebrows given that most internet communication is increasingly being pushed towards encryption to evade national state surveillance programmes.

Current Affairs 24th December 2023 by Saurabh Pandey

- The government's interest in breaking up encryption of WhatsApp and Signal has to be seen in the backdrop of a controversy over Israeli company NSO Group's Pegasus spyware targeting 300 mobile phone numbers for illegal surveillance.
- It also allows the Central or a State government during a public emergency, including disaster management, and in the interest of public safety to take "temporary possession of any telecommunication service or network".
- It can take over control and management of such services or networks.

[The Hindu](#)

SAURABH PANDEY

CSE

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

New revised criminal laws

- Union Home Minister Amit Shah introduced three revised Bills in the Lok Sabha to replace British era criminal laws: the Indian Penal Code (IPC) will be replaced by the Bharatiya Nyaya (Second) Sanhita Bill, 2023;
- The Code of Criminal Procedure (CrPC) by the Bharatiya Nagarik Suraksha (Second) Sanhita, 2023; and the Indian Evidence Act by the Bharatiya Sakshya (Second) Bill, 2023.
- British-era
Bharatiya Nyaya (Second) Sanhita Bill, 2023
- Section 113 of the revised Bill has modified the definition of the crime of terrorism to entirely adopt the existing definition under Section 15 of the Unlawful Activities (Prevention) Act, 1967 (UAPA).
- The UAPA, is defined as a terrorist act 'with intent to threaten or likely to threaten the unity, integrity, economic security, or sovereignty of India or with intent to strike terror or likely to strike terror in the people or any section of the people in India or any foreign country.'

Accordingly, even nonviolent speech could be categorized as a terrorist act under this definition.

- However, the new definition differs from the UAPA's definition in one respect UAPA includes the production or smuggling or circulation only of high quality counterfeit Indian paper currency, coin, or any other material within the ambit of terrorism,
- Whereas the revised Bill widens this definition to cover the same activities concerning any counterfeit Indian paper currency, coin or of any other material.
- Further, possessing property derived from or through a terrorist act is punishable only if held knowingly.
- Similarly, harbouring a terrorist is punishable if it is done both voluntarily and knowingly.
- The offence of recruiting and training persons to engage in terrorist acts has been introduced, mirroring sections 18A and 18B of the UAPA.
- Notably, the Explanation to this section allows an officer not below the rank of Superintendent of Police to decide if the prosecution of a terrorist act should continue under the UAPA or section 113 of this Bill.
- The offense is punishable by death or imprisonment for life

Cruelty defined

- Another addition to the revised Bill is that it proposes to define “cruelty” against a woman by her husband and his relatives, which is punishable with a jail term of up to three years.
- The Hindu

Court proceedings

- The newly inserted section 73 stipulates that those who print or publish ‘any matter’ concerning court proceedings in rape or sexual assault cases without permission would be punished with a two year jail sentence and a fine.
- The original Bill made mob lynching and hate crime a separate category of murder for the first time.
- The offence dealt with cases where murder is committed by five or more persons acting in concert with one another, on grounds of race, caste or community, sex, place of birth, language, personal belief, or any other ground.

‘Petty organised crime’

- The revised Bill includes a more precise definition of ‘petty organised crime’: Whoever, being a member of a group or gang, either singly or jointly, commits any act of theft, snatching, cheating, unauthorised selling of tickets, unauthorised betting or gambling, selling of public examination question papers or any

other similar criminal act, is said to commit petty organised crime.’

Bharatiya Nagarik Suraksha (Second) Sanhita, 2023

- The original Bill introduced the concept of ‘community service’ as a form of punishment for petty offences
- This punishment has now been defined under Section 23 of the revised Bill.
- Community service is ‘work which the court may order a convict to perform as a form of punishment that benefits the community, for which he shall not be entitled to any remuneration.
- In another change, the power of the police to use handcuffs has been expanded beyond the time of arrest to include the stage of production before court as well.

Conduct of court

- The original Bill permitted the conduct of court proceedings the audio-visual means.
- Police custody
- Section 187(3) of the Bill, which corresponds to Section 167 (2)(a) of the CrPC, does not contain the phrase ‘otherwise than in the custody of the police’ implying that the prescribed 15 day period of police custody can now be an aggregate of shorter

periods of custody sought over the entire period of an investigation lasting 60 or 90 days (depending on the nature of the offence.)

- The Hindu

Bharatiya Sakshya (Second) Bill, 2023

- Revised to state that the admissibility of an electronic record is subject to section 63.
- requirement for a certificate under section 63 (corresponding to the requirement of a certificate under section 65B of the Indian Evidence Act).

Existing concerns

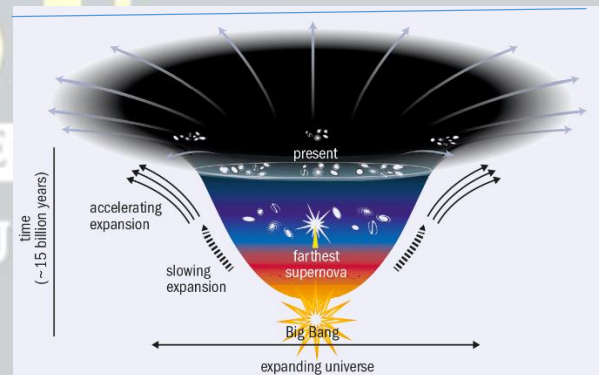
- Experts have flagged that the three revised Bills present a missed opportunity to rectify extensive over criminalization and wider police powers that aggravate State control.
- Pointing out that the provision of the Bharatiya Nagarik Suraksha (Second) Sanhita, 2023, which permits police custody beyond the initial 15 days of arrest endangers civil liberties,
- The BNSS expands the maximum limit of police custody under general criminal law from 15 days to either 60 days or 90 days (depending on the nature of the offense).

- The Hindu

• Cosmological constant

- Space as Einstein taught us is not a state of “nothingness”.
- It is a bendable, stretchable medium that we occupy, much like water is for fish.
- Add energy uniformly across a patch of space and that patch will expand
- Dark energy dictates the rate at which space expands.
- From this we can estimate how much dark energy is present in any volume of space, by considering the size and age of the universe.
- The universe is wider than billions of light years and older than 10 billion years, so the dark energy is actually as dilute as one sugar crystal in a cubic kilometre

- The Hindu



What is Cosmological constant??

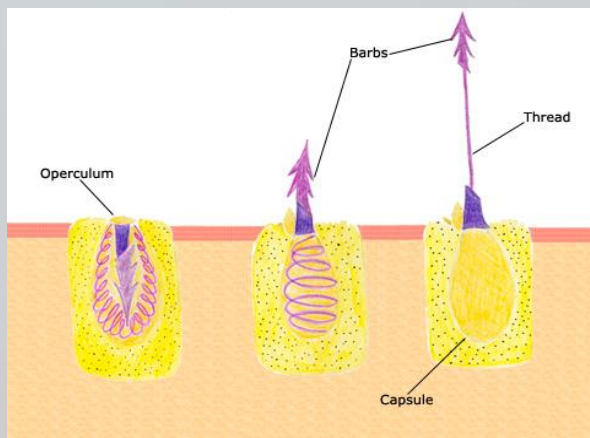
- The cosmological constant is presumably an enigmatic form of matter or energy that acts in opposition to gravity and is

considered by many physicists to be equivalent to dark energy.

- Nobody really knows what the cosmological constant is exactly, but it is required in cosmological equations to reconcile theory with our observations of the universe.
- The Hindu

Nematocyst

- Evolution has come up with many strange ways to help animals defend themselves.
- One is a specialised cell called a nematocyst.
- Nematocysts are found in some animals, but especially jellyfish, corals, sea anemones, and hydras, that serve as potent weapons to hunt prey and fend off predators.
- Each nematocyst consists of a capsule containing a coiled, thread-like tubule and a bulbous structure with toxins.



- When stressed, the nematocyst rapidly ejects the tubule, often with an acceleration surpassing that of a bullet.
- Indeed, this mechanism is one of the fastest processes in the animal kingdom.
- Nematocysts play a crucial role in the feeding and defence strategies of cnidarians in particular.
- Cnidarians are animals that contain cells called cnidocytes.
- When potential prey comes into contact with a cnidocyte, specialised sensory structures on the cell's surface trigger the release of the nematocyst.
- The tubule then unfurls, piercing the prey's outer layer or injecting toxins into its body.
- The toxins in nematocysts also have different effects.
- Employment and prevalent macroeconomic changes
- At the outset, it is useful to distinguish the two types of employment that prevail in an economy such as India.
- The first is wage employment which is a result of labour demanded by employers in their pursuit of profits.
- The Indian economy has historically been characterized by the presence

of both open unemployment (out of work jobseekers) as well as high levels of informal employment consisting of the self-employed as well as casual wage workers.

- The last is also called “disguised unemployment” because, being similar to open unemployment, it also indicates a lack of adequate employment opportunities in the formal sector.
- This lack of opportunities is reflected by a more or less stagnant employment growth rate of salaried workers in the nonagricultural sector in the last four decades
- Under any given level of technological development, labour demand in the formal sector rises when demand for output rises.
- Second, labour demand depends on the state of technology that dictates the number of workers that firms need to hire to produce one unit of output.
- Introduction of labour saving technologies enables firms to produce the same amount of output by hiring a lower number of workers.
- As an economy grows, it is generally seen that it also becomes more productive.
- That is, in the process of producing a greater amount of total output, firms

become capable of producing more output per worker.

- Different frameworks was the presumption that increasing the output growth rate in the non-agricultural sector would be a sufficient condition for increasing the employment growth rate in the formal sector.
- But the evidence suggests that the employment challenge can no longer be met only through more rapid GDP growth.
- Rather, a separate policy focus is needed on employment in addition to the focus on GDP growth.
- Such employment policies will need both demand side and supply side components.
- For example, to the extent firms in India find it easier to automate due to a lack of adequate skilled labour, increasing the quality of the workforce through better public provisioning of education and health care, as well as bridging the skills gap, are important.
- On the demand side, direct public job creation will be needed.
- Financing such expenditures while maintaining debt stability requires the reorienting of the current macroeconomic framework in a significant way, including increasing

the direct tax to GDP ratio by reducing exemptions and improving compliance, and a more imaginative use of macro policy to pursue a constructive employment agenda.

- **Colombo security conclave**

COLOMBO SECURITY CONCLAVE (CSC)

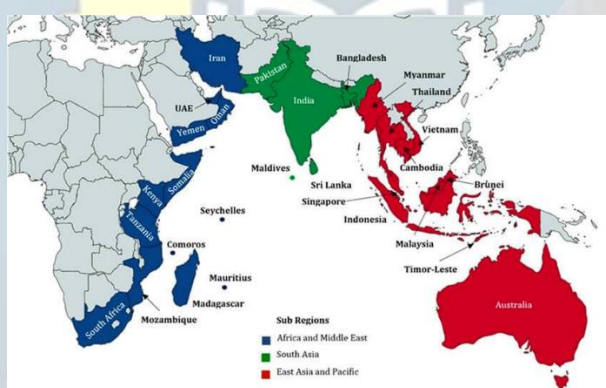
Regional security grouping initially formed in 2011 as a trilateral Indian Ocean maritime security grouping of India, Sri Lanka and the Maldives

MEMBERS

India
Sri Lanka
Maldives
Mauritius

OBSERVERS

Bangladesh
Seychelles



- India's National Security Adviser (NSA), Ajit Doval, took part in the sixth NSA meeting of the Colombo Security Conclave (CSC).
- The meeting reviewed the developments and progress made by the CSC in the last year and agreed upon a road map for the year 2024 to promote a safe, secure, and stable Indian Ocean.
- The meeting also included member states, Mauritius and Sri Lanka, and

observer states, Bangladesh and Seychelles.

- The Maldives, now under a new dispensation, was the only member state that was absent, underscoring the impact of domestic politics over regional collaboration. I

Changing dynamics

- The CSC underscores the evolving dynamics of the Indian Ocean.
- The organisation came into its own in 2011, with Sri Lanka joining India and the Maldives for a trilateral maritime security grouping but came to a standstill after 2014 due to rising tensions between India and the Maldives.
- In 2020, India not only pushed for the revival and institutionalisation of the organisation but also expressed interest in expanding the CSC to Mauritius, the Seychelles, and Bangladesh.
- The push for the CSC demonstrates India's evolving strategic vision for the Indian Ocean.
- The Indian Ocean is at the heart of an evolving multipolar world today, with extra regional powers competing to make inroads in the region.
- This competition will further increase as the Indo Pacific's importance grows.

- For India, a traditional power in the region, the CSC offers an opportunity to strengthen its leadership and security architecture.
- Since its independence, India has played an increasing role in promoting security in the Indian Ocean.
- The lack of capacity of island nations to secure the seas and counter transnational threats has continued to motivate India to assist them in defence and security related capacity building, infrastructure development, and equipment provision.

A revival that is linked to the China factor

- China is another crucial reason for the revival of CSC.
- Since the early 2000s, Beijing has invested substantively in the Indian Ocean with its Belt and Road Initiative (BRI) projects, helping it access the Indian Ocean.
- Beijing's outreach to the Indian Ocean is to control the crucial sea lines of communication and trade and to limit India's influence and presence.
- Today, China is not only strengthening its naval capabilities; it also maintains strong defence relationships with states in the Indian

Ocean region and also conducts regular maritime exercises in the Ocean. It has established a base in Djibouti and controls Sri Lanka's Hambantota port.

- It continues to use scientific ships to map the Indian Ocean bed.
- Finally, it also wants to counter the prevailing security architecture in the Indian Ocean by institutionalising its presence through platforms such as the Indian Ocean Region Forum on Development Cooperation.
- Despite expressing concerns about some of these developments, India realises that many regional countries do not necessarily consider China a threat.
- They are also too dependent on China to have an overt anti-China policy.
- As a result, the CSC has focused on five pillars maritime security and safety; countering terrorism and radicalisation; trafficking and transnational crime; cyber cybersecurity and protecting critical infrastructure, and humanitarian assistance and disaster relief.
- It is with these sectors of cooperation that India hopes to better understand and respond to threats from the Indian Ocean and continue being a preferred partner for the Indian Ocean states.

- This strategic accommodation and flexibility is, in fact, contributing to the security of the Indian Ocean.
- Since 2021, the CSC has investigated terrorism and terror financing, narcotics trafficking, cybercrime and security, marine pollution, maritime law, and coastal security. In 2022, for the first time, the organization held a conference of oceanographers and hydrographers and another conference on coastal security.
- The Hindu

Climate change and health

- On December 3, the inaugural Health Day at COP28 highlighted the vital link between climate and health, underscoring that combating climate change is integral to advancing global health.
- The context to the day and the urgency to address the root cause of climate crisis fossil fuel use was set in early November with health leaders representing more than 46 million health professionals globally issuing an open letter calling on the COP28
- Presidency and world governments to “commit to an accelerated, just and equitable phase out of fossil fuels as the decisive path to health for all”.
- Over 1,900 health professionals at this year’s COP propelled the

momentum to prioritise human health and wellbeing in climate decisions, taking centre stage.

- The COP28 Presidency, WHO, the UAE Ministry of Health and Prevention, and a group of champion countries also hosted the first ever climate health ministerial, which brought together nearly 50 Ministers of Health and 110 high level health ministerial staff.
- Ministers of health, environment, finance, and other related sectors set out a “roadmap and opportunities for action to address the rapidly growing burden of climate change on healthcare systems and capture the vast socio economic benefits from better health and wellbeing through climate action”.
- An assessment of extreme weather events’ brought out by Down To Earth magazine and the Centre for Science and Environment, India has seen a disaster nearly every day in the first nine months of this year from heat and cold waves, cyclones and lightning to heavy rain, floods, and landslides.
- These disasters have “claimed 2,923 human lives, affected 1.84 million hectares (ha) of crop area, destroyed over 80,563 houses and killed close to 92,519 livestock”.

- According to the Reserve Bank of India's most recent report, as much as 4.5% of the country's GDP could be jeopardised by 2030 due to the impact of extreme heat and humidity on labour hours, emphasizing the economic risks associated with heat-related challenges alone.
- Not to miss India's notoriety on its record on rising air pollution that caused at least 1.6 million premature deaths in 2019.
- Major public health challenges, including malaria, malnutrition, and diarrhoea, further compound the situation.

The Hindu

SAURABH PANDEY

— CSE —

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

14th Amendment

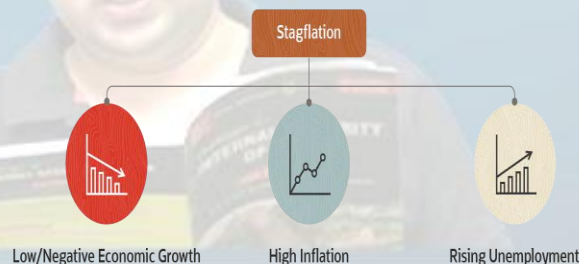
- The Colorado Supreme Court ruled Donald Trump ineligible for the 2024 presidential ballot based on the 14th Amendment, Section 3, citing his involvement in the January 6, 2021, insurrection.
- The reason is the 14th Amendment to the Constitution, ratified in 1868, three years after the Civil War ended
- Section 3 disqualifies individuals from holding office if they engaged in insurrection against the United States, emphasising governance through constitutional politics, not force.
- It applies to all federal and state offices, requiring adherence to the oath to uphold the Constitution and ensuring that office holders respect the rules of governance.
- The provision targets those resorting to violence when ballots fail to achieve desired outcomes, emphasising the significance of democratic principles over force.
- However, there's a possibility of redemption through congressional action (by a two-thirds vote of each House) to remove the disqualification in exceptional cases.
- The Hindu

Stagflation

- Reserve Bank of India (RBI) officials believe the risk of stagflation a portmanteau of economic stagnation with high inflation has lowered further to 1% compared with 3% in August based on data.

What Is Stagflation?

Stagflation is the combination of poor economic growth and high inflation, usually accompanied by rising unemployment.



Stagflation hits an economy when its growth slows while inflation rises—economic trends that contradict each other in normal times.

The Hindu

AITGA

ABOUT ASEAN

The Association of Southeast Asian Nations, or ASEAN, was established on 8 August 1967 in Bangkok, Thailand, with the signing of the ASEAN Declaration (Bangkok Declaration) by the Founding Fathers of ASEAN: Indonesia, Malaysia, Philippines, Singapore and Thailand. Brunei Darussalam joined ASEAN on 7 January 1984, followed by Viet Nam on 28 July 1995, Lao PDR and

Myanmar on 23 July 1997, and Cambodia on 30 April 1999, making up what is today the ten Member States of ASEAN.



ASEAN India Trade in Goods Agreement (AITGA)

- The ASEAN-India Trade in Goods Agreement (the “Agreement”) is a trade deal between the ten member states of ASEAN and India.

ASEAN and India signed the Agreement at the 7th ASEAN Economic Ministers-India Consultations in Bangkok, Thailand in 2009. The Agreement, which came into effect in 2010, is sometimes referred to as the ASEAN-India Free Trade Agreement.

The Agreement has led to steadily increasing trade between ASEAN and India since its signing. In 2019-20, trade between India and ASEAN was worth US\$86 billion.

- Though this represented a decline from US\$97 billion in 2018-19 because of the COVID-19 pandemic, it was an increase from US\$81.3 billion in the 2017-18 financial year.
- The Agreement covers trade in physical goods and products; it does not apply to trade in services.
- ASEAN and India signed a separate ASEAN-India Trade in Services Agreement in 2014.
- Along with the ASEAN-India Investment Agreement, the three agreements collectively form the ASEAN-India Free Trade Area.
- Once the Agreement came into force in 2010, it established one of the world’s largest free trade areas, covering a combined market of close to 1.8 billion people. Under the Agreement, ASEAN and India have committed to progressively eliminating duties on 76.4 percent of goods and to liberalize tariffs on over 90 percent of goods.
- India and the ten-member Association of South-East Asian Nations (ASEAN) will begin negotiations in February to “modernise” their decade and a half-old free trade agreement (FTA) to bring more balance in the pact currently weighed against New Delhi.

- But new areas like labour, environment, Small and Medium Enterprises (SMEs) and gender, are likely to be kept out, sources have said.
- India has long been pressing for a review of the AITGA, which was signed in August 2009 and implemented in January the following year, as the pact resulted in disproportionate benefits for the ASEAN.
- India's trade deficit with the region was at \$7.5 billion per annum when the pact was implemented.
- This has ballooned to \$43.57 billion in FY23
- Modernizing the AITGA will include incorporating changes in the Rules of Origin (ROO), which can work in favour of India by increasing market access for some items as well as blocking possible re-routing of goods by China through the ASEAN countries.
- The modernised AITGA will also have a chapter on trade remedies, which will seek to provide a safety net for domestic industry against unfair trade practices or unforeseen surges in imports of goods, he added.

- But no new areas, such as environment, labour, MSMEs or gender, will be added to the AITGA.

- The Hindu

Arecibo message

- The Arecibo message is an interstellar radio message carrying basic information about humanity and Earth that was sent to the globular cluster Messier 13 in 1974.
- It was meant as a demonstration of human technological achievement, rather than a real attempt to enter into a conversation with extraterrestrials.
- The message was broadcast into space a single time via frequency-modulated radio waves at a ceremony to mark the remodeling of the Arecibo Telescope in Puerto Rico on 16 November 1974.
- The message was aimed at the current location of M13, about 25,000 light years from Earth, because M13 was a large and relatively close collection of stars that was available in the sky at the time and place of the ceremony
- Messier 13 or M13, also designated NGC 6205 and sometimes called the Great Globular Cluster in Hercules or the Hercules Globular Cluster, is a globular cluster of several hundred

thousand stars in the constellation of Hercules.



The Hindu

Geography of Taiwan



• It runs through the Tropic of Cancer. Also known as Formosa,

• The island of Formosa (or Taiwan) was formed about 4.5 million years ago from a Geosyncline. It is part of an island arc.

• It was formed when the Eurasian Plate slid under an old chain of volcanic islands in the Philippine Mobile Belt.

• At the northern end of the island, the Philippine Mobile Belt sank under the Eurasian Plate

• Island arcs are those well-known series of islands with volcanoes (such as the Ring of Fire).

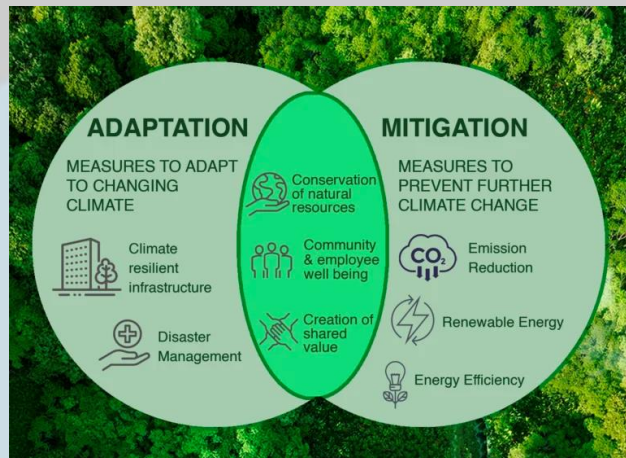
• They are usually caused by tectonic plate boundaries passing over geologic hot spots in the Earth's crust.

• In geology, a hotspot or hot spot is a portion of the Earth's surface which is volcanic. This may be caused by a rising mantle plume or some other cause.

• Hotspots may be far from tectonic plate boundaries.

• The Hindu

• Global Goal on Adaptation (GGA)



- The 28th meeting of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), in Dubai, was notable in terms of stopping the lackadaisical approach of the international community to the adaptation concern.
- Guided by the Paris Agreement on Global Goal on Adaptation (GGA), the efforts put in at COP 26 and COP 27 were what culminated in the adoption of the framework for GGA at COP28.
- The Hindu

Challenges in GGA implementation

- The framework of the GGA is expected to influence what type of adaptation action will be prioritised.
- A main target in the GGA includes the Parties to the Paris Agreement having “conducted up-to-date assessments of climate hazards, climate change

impacts and exposure to risks and vulnerabilities and have[ing] used the outcomes of these assessments to inform their formulation of national adaptation plans, policy instruments, and planning processes and/or strategies”, by 2030.

- By 2027, all the Parties have to establish multi hazard early warning systems, climate information services for risk reduction and systematic observation to support improved climate related data, information and services.
- A significant point remains to be answered whether it will advance adaptation.
- The GGA is an encouraging development as it contains a number of developments that are very useful for the cause of adaptation.
- But it still falls woefully short in terms of treating adaptation on a par with mitigation as it lays stress on holding the increase in the global average temperature well below 2° C and 1.5° C essential for ensuring the continued availability of the largest number of adaptation options and also adds greater levels of mitigation that will reduce the need for additional adaptation efforts.
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The Hindu



SAURABH PANDEY

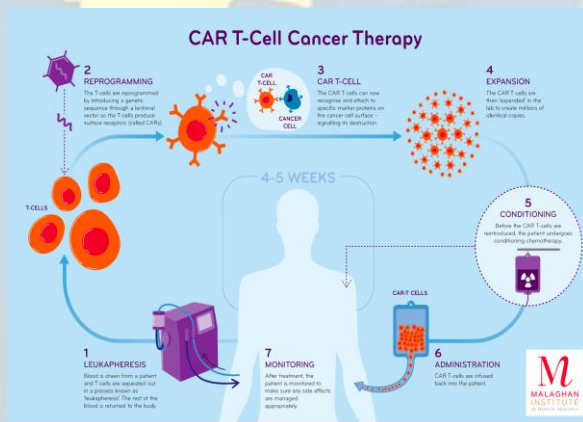
CSE

(CIVIL SERVICES EXAMINATION)

FROM BASICS TO UPSC BRILLIANCE

CAR-Therapy

- **Chimeric antigen receptor (CAR) T-cell therapy** is a way to get immune cells called **T cells** (a type of white blood cell) to fight cancer by changing them in the lab so they can find and destroy cancer cells.
- CAR T-cell therapy is also sometimes talked about as a type of **cell-based gene therapy**, because it involves altering the genes inside T cells to help them attack the cancer.



- The immune system recognizes foreign substances in the body by finding proteins called **antigens** on the surface of those cells.
- Immune cells called **T cells** have their own proteins called **receptors** that attach to foreign antigens and help trigger other parts of the immune system to destroy the foreign substance.

- The relationship between antigens and immune receptors is like a lock and key. Just as a lock can only be opened with the right key, each foreign antigen has a unique immune receptor that is able to bind to it.
- In CAR T-cell therapies, T cells are taken from the patient's blood and are changed in the lab by adding a gene for a receptor (called a **chimeric antigen receptor** or **CAR**), which helps the T cells attach to a specific cancer cell antigen.
- The CAR T cells are then given back to the patient.
- Since different cancers have different antigens, each CAR is made for a specific cancer's antigen.

About Rare Disease

- 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.
- As per an estimate, there are 7,000 known rare diseases with an estimated 300 million patients in the world; 70 million are in India.

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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)
- 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 patient 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.

Employment data

- Official data shows a decline in the national unemployment rate from 6.1% in 2017-18 to 3.2% in 2022-23.
- Despite a decline in overall unemployment rates, highly educated youth face disproportionate challenges in securing employment, remaining a

consistent structural issue in India's economy.

- The analysis spanning from 1993-94 to 2022-23 demonstrates that individuals with higher education face consistently higher unemployment rates, notably reaching 13% in 2022-23 for graduates.
- Young graduates aged 18 to 29 encountered particularly high unemployment rates, with around 36% facing long spells of unemployment in 2017-18, declining to 27% by 2022-23 but still higher than previous periods.

The Hindu

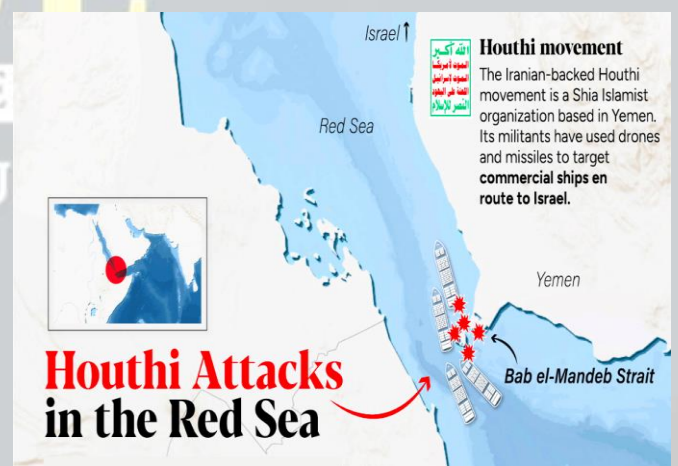
Economy and inclusiveness

- Investing in education and skills for "high end" manufacturing and services will not benefit the masses if they cannot be employed.
- Richness of economic activity within local webs will create more sustainable growth than policies to participate in long, international supply chains when barriers are rising.
- The Indian state has limited financial capacity.
- It cannot afford to misspend it, by reducing taxes and duties and giving

incentives to investors, with the expectation that benefits will gush down to the masses.

- More imports will not increase the wellbeing of Indian citizens if they do not have more incomes to buy.
- Foreign direct investment will not boost growth if it does not increase employment soon.
- The mould in which economics was cast in the later part of the 20th century must be broken. Policymakers must reimagine the path for India's growth.
- They must get down to the basics of inclusive economic growth.
- There are no shortcuts.
- The global economy is not growing like it was when China became the factory for the world.
- Producers everywhere are looking for new markets.
- India, with its unmet needs is very attractive for them. India's policies must take advantage of this opportunity and make more for India in India, thus growing both jobs and incomes for India's masses.
- The Hindu

Red sea conflict'



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Chinese Central Economic Work Conference (CEWC)

- The 2023 Chinese Central Economic Work Conference (CEWC) recently concluded, highlighting a stability focused pathway for the nation's 2024 economy.
- Key directives include shifting from export led to domestic demand-led growth, enhancing high-quality production, striving for tech self-reliance while cooperating with trade partners, and maintaining financial discipline.
- While echoing previous goals, this agenda emphasizes the need for structural reforms, necessitating a departure from entrenched Chinese party state practices to shape the country's economic future

How is China strategically addressing the challenges?

- The first key area is dual circulation.
- As global demand has continued to decline amidst heightened sentiments of protectionism and 'de-risking', the country is now looking inwards to boost domestic consumption and only allow for a complimentary relationship with international demand.

- Chinese President Xi Jinping has referred to this as the "New Pattern of Development," and is an ambitious structural reform for a country known as the world's manufacturing hub.
- Key areas of emphasis included the "New Pattern of Development" centered on boosting domestic consumption while maintaining a complementary relationship with international demand.
- High-quality economic growth, focused on addressing the primary contradiction of inadequate development versus the population's increasing need for a better life, became a priority.

The Hindu

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Huntington's disease

What is Huntington's disease
Huntington's disease is a genetic disorder that affects the brain and causes the breakdown of nerve cells over time, leading to problems with movement, cognition, and behavior.

- Huntington's disease (HD) is an inherited disorder that causes nerve cells (neurons) in parts of the brain to gradually break down and die.
- The disease attacks areas of the brain that help to control voluntary (intentional) movement, as well as other areas.
- People living with HD develop uncontrollable dance-like movements (chorea) and abnormal body postures, as well as problems with behavior, emotion, thinking, and personality.
- For example, uncontrolled movements in the person's fingers, feet, face, or torso.
- These movements are signs of chorea.
- They can get more intense when the person is nervous or distracted; as HD progresses, the person's movements can become more extreme and obvious.

Who is more likely to get Huntington's disease?

- HD is an inherited disorder. It is passed from parent to child through a mutation (a change) in a particular gene.
 - When a parent has HD, each child has a 50% chance of inheriting the copy of chromosome 4 that carries the HD mutation.
 - If a child does not inherit the HD mutation, he or she will not develop the disease and cannot pass it on to future generations. When HD occurs without a family history, it is called sporadic HD.
 - HD is caused by a mutation in the gene for a protein called huntingtin. The defect causes the building blocks of DNA called cytosine, adenine, and guanine (CAG) to repeat many more times than they normally do.
 - The Hindu
- Glutamine repeats
- The patient's misfortune is that they carry a mutated version of a gene called HTT.
 - The HTT gene codes for a protein called huntingtin, or Htt.

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- Nerve cells in the human body require the Htt protein for their normal functioning and survival.
- The mutated gene, however, encodes an abnormal Htt protein that instead destroys the neurons that regulate movement, thinking, and memory.
- The normal HTT gene contains a stretch of DNA that specifies the number of times the amino acid glutamine is repeated in the Htt protein.
- This number varies from 11 to 31. In the mutant versions of the HTT gene, this stretch is expanded to encode 35 or more repeats. Researchers have even found variants with more than 150 repeats.
- The team investigated 32 genes and found that excessive expression – or overexpression – of one, called Yod1, removed all of the disease like effects in the flies, including neurodegeneration, impediments to motor activity, and lower viability and longevity.

The Hindu

Climate milestone in 2023

- **Hottest year:** The year is all but set to be declared the hottest in history.
- **Highest sea surface temperature ever:** Marine heatwaves periods

when ocean temperatures are warmer than 90% of prior observations for a given time of year were widespread in 2023.

- **Lowest Antarctic sea ice extent:** Sea ice extent is the area of ice covering the Antarctic Ocean at a given time.
- **Record carbon dioxide levels:** Global carbon dioxide emissions are expected to have hit a new high in 2023, up 1.1% from 2022.
- **Loss and damage fund:** The world's first loss and damage fund for the impacts of climate change was created in 2023, at the start of the COP28 climate talks in the U.A.E. in early December

Impact of food systems:

- For the first time in the history of climate summits, 134 countries at COP28 pledged to tackle the climate impact of the food industry.
- These countries represent over 5.7 billion people, 70% of the food we eat, nearly 500 million farmers, and 76% of total emissions from the global food system.
- Smart Lander for Investigating Moon (SLIM)
- Japan's Smart Lander for Investigating Moon (SLIM) spacecraft entered into orbit around the moon

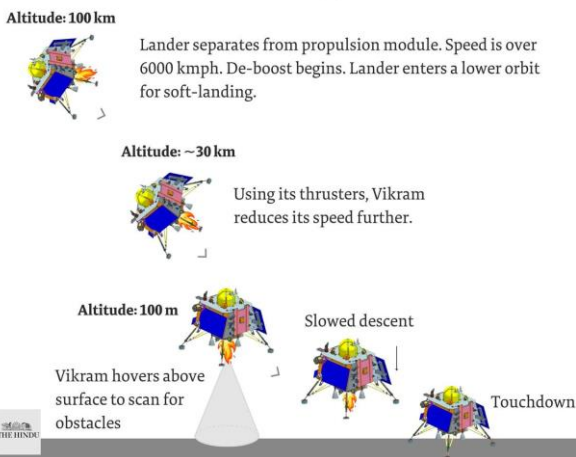
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after a months-long journey, and ahead of its planned moon landing attempt on January 19.

- If the attempt succeeds, Japan will become only the fifth country to soft land a robotic craft on the natural satellite, months after India succeeded with its Chandrayaan 3 mission in August



The soft-landing process



What is SLIM?

- SLIM is a spacecraft built and launched by the Japan Aerospace Exploration Agency (JAXA) on

September 7, 2023, from the Tanegashima spaceport.

- It weighed only 590 kg at launch, which is almost one-seventh of Chandrayaan3, which weighed 3,900 kg at launch. Of course, the latter mission also carried a larger suite of instruments.
- SLIM was launched together with XRISM, a next generation X-ray space telescope, onboard an H2A rocket.
- The HAKUTOR M1 lander, built by Japanese company ispace, crashed in late April after its engines shut down too soon during the landing.
- How did SLIM get to the moon?
- SLIM is lighter because it carried much less fuel. Of Chandrayaan3's 3.9 tonnes, the propulsion module alone weighed 2.1 tonnes.
- This is why the mission was launched on July 14 and could reach the moon less than a month later, by following a route called the Hohmann transfer orbit.
- On the other hand, SLIM took four months because it followed a longer but more fuelthrift route based on weak stability boundary theory.
- Once it was launched into an orbit around the earth, SLIM swung around the planet multiple times,

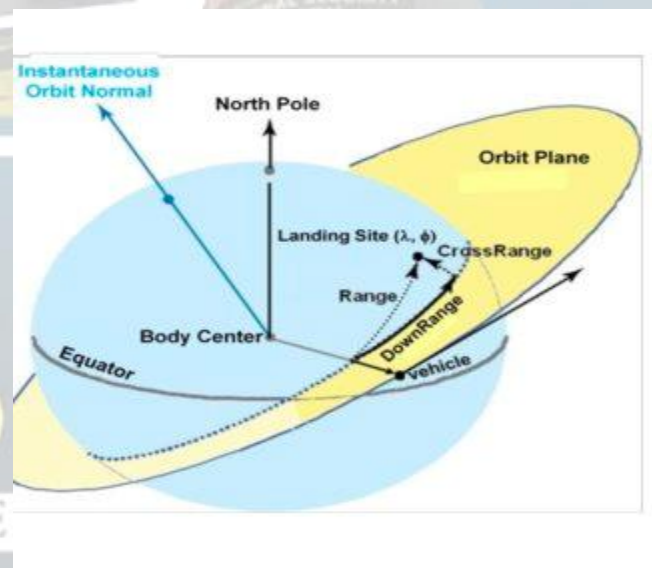
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building up its kinetic energy with each swing.

- Once it was travelling fast enough, it shot up towards the moon's orbit.
- Chandrayaan3 followed a qualitatively similar path until this point. Once it got close to the moon, Chandrayaan3 applied its brakes – which consume fuel in space – so that it could slow down enough to be captured by the moon's weaker gravity.
- But once SLIM got near the moon, instead of slowing down and being captured by the moon's gravity, it allowed itself to be deflected in the moon's direction even as it shot past lunar orbit, deeper into space
- This deflection is the result of the combined forces exerted by the earth and the moon. Physicists worked it out in the late 1980s for another JAXA mission, called 'Hiten'.
- **What will SLIM do on the moon?**

- All this said SLIM's standout feature is its reputation as the "moon sniper" a title derived from what it will do on the moon on January 19: it will try to land within 100 metres of its chosen landing site.
- This is an unusually tight limit given the history of moon-landing missions.

- For example, the 'Vikram' lander of Chandrayaan3 was designed to descend in an elliptical area that was 4 km long downrange and 2.5 km wide cross-range, and it eventually landed at a spot 350 metres away from a predetermined one.
- (Downrange means in the direction of the craft's motion and cross-range means to either side.
- In effect, these distances specify how much the craft's path can deviate in these two directions.)



Benefit for India

- The first mission of its third phase is the Lunar Polar Exploration (LUPEX) mission, a.k.a. Chandrayaan 4.
- LUPEX will be an Indian Japan joint enterprise (however, while JAXA has approved LUPEX, India is yet to) with an earliest launch date in 2026. It will explore an area closer to the moon's

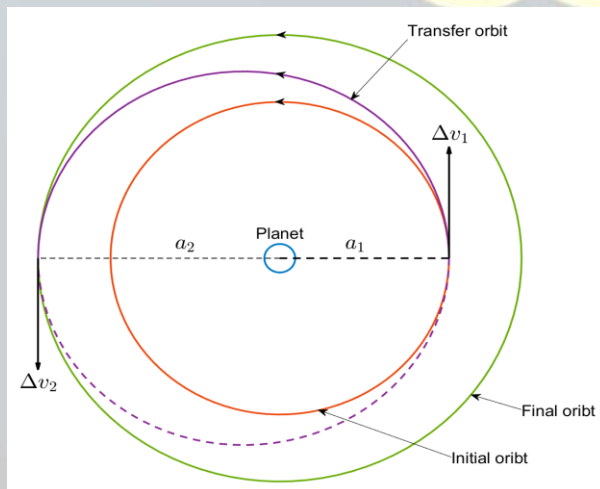
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south pole than Chandrayaan 3 did – and this makes all the difference.

- The technologies JAXA will test with SLIM, but especially a feature-matching algorithm and navigation systems, will be crucial for this aspect of LUPEX.
- For now, JAXA is expected to provide the launch vehicle and the lunar rover while India will provide the lander module.
- The Hindu

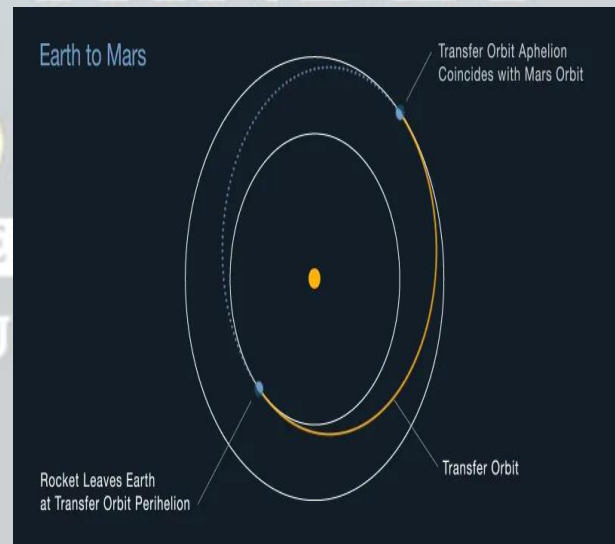
The Hohmann transfer orbit

- The Hohmann transfer orbit is an orbital maneuver used to transfer a spacecraft between two orbits of different altitudes around a central body. Examples would be used for travel between low Earth orbit and the Moon, or another solar planet or asteroid.



Hohmann Transfer Orbits

- To launch a spacecraft from Earth to an outer planet such as Mars using the least propellant possible, first consider that the spacecraft is already in solar orbit as it sits on the launch pad.
- This existing solar orbit must be adjusted to cause it to take the spacecraft to Mars: The desired orbit's perihelion (closest approach to the Sun) will be at the distance of Earth's orbit, and the aphelion (farthest distance from the Sun) will be at the distance of Mars' orbit. This is called a Hohmann Transfer orbit. The portion of the solar orbit that takes the spacecraft from Earth to Mars is called its trajectory.



The Hindu

Houthi attack and trade in Red sea

- Liberian flagged merchant vessel Chem Pluto heading to Mangalore port was hit by a projectile about 271 miles from Porbandar in Gujarat, just outside the Indian Exclusive Economic Zone (EEZ).
- This comes in the backdrop of a sharp rise in missile and drone attacks on commercial shipping in the Red Sea by Houthi rebels in Yemen in the last couple of weeks following Israel's offensive against Hamas in Gaza.

Alternative shipping route avoiding Red Sea

Using Red Sea/Suez Canal	Around Cape of Good Hope
10,000 nautical miles (18,520km)	13,500 nautical miles (25,002km)
25.5 days*	34 days*

*Based on ultra large container vessel's average speed of 16.48 knots



How do these events impact India and the world?

- Threats to shipping in the Gulf of Aden and the region are not new as seen with episodes of Somalian

pirates and the global anti-piracy efforts by several countries.

- However, the recent events represent a serious escalation that can potentially disrupt supply chains and impact economics. The Red Sea is a key shipping artery for global commerce and the Bab el Mandeb is a critical choke point.
- Following the October 7 terror attacks on Israel by Hamas and the subsequent offensive by Israeli Defence Forces, the Houthi rebels have declared they would target all maritime commerce linked to Israel
- “About 12% of global trade passes through the Red Sea, which accounts for billions of dollars of goods and about 30% of the world's container shipping.
- Access to the Red Sea requires passage through the Bab el Mandeb a narrow strait about 20 miles wide with Djibouti to the west and Yemen to the east,”



- Following the attacks, several global shipping majors have announced their decision to avoid the route and take a longer route through the Southern Indian Ocean adding to both fuel and operating costs in addition to the time.
- For instance, shipping industry giant Maersk had begun re-routing vessels around Africa via the Cape of Good Hope.
- The avoidance of the Red Sea route has substantial implications, potentially adding one to two weeks to voyages, disrupting shipping schedules, and subsequently elevating fuel and insurance costs,”
- From the Indian side, both the Navy and Coast Guard have increased their presence and surveillance in the region.
- Since October 2008, the Indian Navy has continuously deployed at least one ship on antipiracy patrol in the Gulf of Aden and since 2017 under Mission Based Deployments has deployed one capital warship each at all the critical maritime choke points into the IOR.
- Indian Navy's Information Fusion Centre for Indian Ocean Region (IFC-IOR) located in Gurugram is actively monitoring the region and coordination in the back end to facilitate communication where required, like between the Navy and the company when m. v. Ruen was hijacked recently in the Gulf of Aden.

What is being done to address this?

- To counter the attacks and protect the free flow of commerce in the Red Sea, on December 18, U.S. Secretary of Defence Lloyd J. Austin announced the establishment of Operation Prosperity Guardian (OPS), an “important new multinational security initiative under the umbrella of the Combined Maritime Forces and the leadership of its Task Force 153, which focuses on security in the Red Sea.”
- Since the announcement of OPS, several companies in the last few days announced their decisions to review the re-routing.

In real time

The Navy's Information Fusion Centre-Indian Ocean Region (IFC-IOR) in Gurugram is the single-point centre linking all coastal radar chain networks along the 7,500-km Indian coastline and in some neighbouring countries

■ The IFC tracks and monitors 75,000 - 1.5 lakh shipping vessels in real time round-the-clock

■ The IFC actively interacts with the maritime community and has already built linkages with 18 countries and 15 multinational and maritime security centres



■ The major centres with which regular exchange of maritime security information is being undertaken include Virtual Regional Maritime Traffic Centre, Maritime Security Centre- Horn of Africa, Regional Cooperation Agreement on Combating Piracy and Armed Robbery, Information Fusion Centre-Singapore, and International Maritime Bureau-Piracy Reporting Centre

Variant vs strain

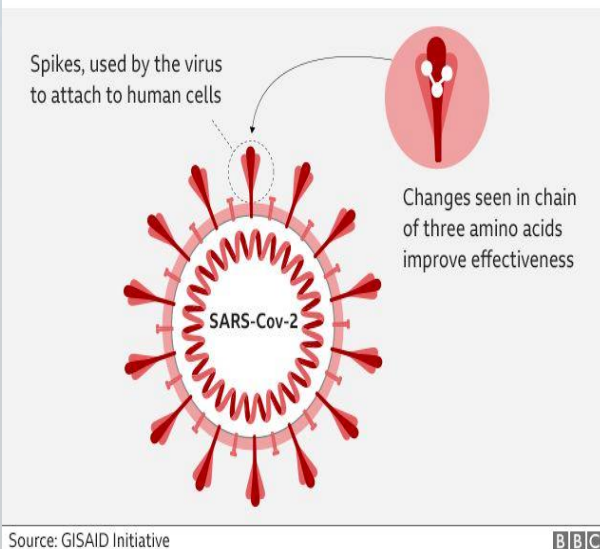
What causes the coronavirus to mutate, and how is its spike protein involved?

The spike (S) protein is one of the key biological characteristics of SarsCoV-2.

This protein allows the virus to penetrate into the cells of its host (human beings) and cause the infection.

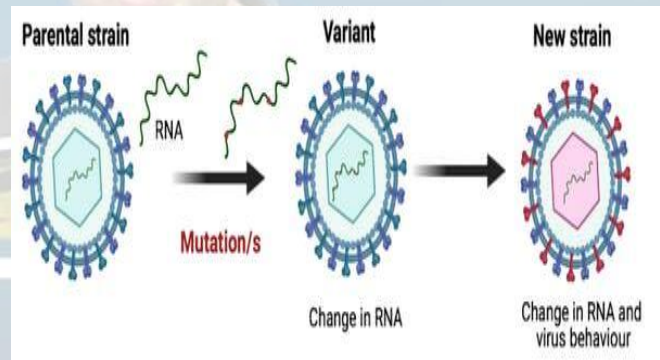
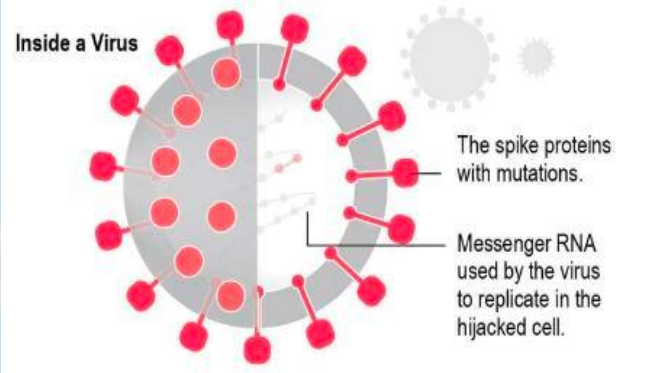
This means that without the S protein, the virus would not be able to infect human beings, and so, this is a protein that is of interest to scientists making vaccines and anti-viral drugs

One coronavirus mutation has become dominant



The new coronavirus variant

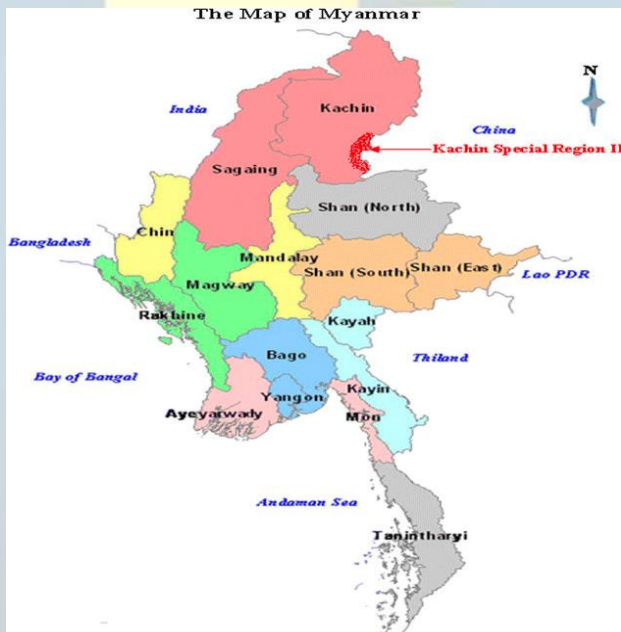
The new variant of the virus that causes COVID-19 has several mutations on its spike proteins. These spikes are used by the virus to attach to and infect cells. They also are what vaccines and antibody drugs target.



The Hindu

Leave District on Myanmar border





The Hindu

Illegal migration and donkey –route

- Agents who facilitate the migration take Indians through the “donkey route”, which involves moving from one country to another till migrants reach either Canada or Mexico, after which they cross the US border on foot.

- The most popular donkey route is through Latin American countries like Ecuador, Bolivia or Venezuela which provide visas on arrival for Indian citizens,”
- Gujarat and Punjab account for the highest number of illegal migrants to the US, reason for this was not clear but the huge Indian diaspora in Canada could be a factor.
- “The donkey route is full of uncertainties and even the agents who arrange the travel only take responsibility till the migrants reach the borders,



The Hindu

Agreement with ULFA

- Union Home Minister Amit Shah hailed as “a golden day” for Assam and its people, the pro-talks faction of the United Liberation Front of Asom (ULFA) signed a peace accord Friday with the governments at the Centre and state, agreeing to shun violence, disband the organization and join the democratic process.
- Shah, Assam Chief Minister Himanta Biswa Sarma, and representatives of the ULFA faction signed the accord in New Delhi, raising hopes and strengthening efforts to end decades of insurgency in the state.
- Due to the tripartite agreement being signed today between the Central government, the Assam government and ULFA, the government has achieved success in eliminating all the violent groups in Assam.
- Today’s agreement is very important for peace in Assam and the entire North-East. Under today’s agreement, ULFA representatives have agreed to abjure the path of violence, lay down all their arms and ammunition, and disband their armed organisation,
- The ULFA, Shah said, has also agreed to vacate all camps occupied by its armed cadres, engage in the peaceful democratic process

established by law, and maintain the integrity of the country

WHAT IS ULFA AND WHY IT WAS FORMED?

- The ULFA was formed on April 7, 1979, to seek the “restoration of Assam’s sovereignty”, a topic that now remains only on the agenda of the Paresh Baruah-led ULFA(I).
- The outfit has been involved in subversive activities that led to the central government declaring it a banned outfit in 1990.
- The Hindu

Disaster relief

Disaster management		
Prevention – Preparedness (Pre-disaster phase)	Response - Intervention (Disaster)	Restoration - Recovery (Post-disaster phase)
<ul style="list-style-type: none">• Strengthening research capacity• Hazard - vulnerability assessment• Risk assessment• Vulnerability reduction• Compilation of regulations – codes• Spatial planning – urban planning• Institutional framework• Financial resources• Strengthening resources and means• Volunteers education and training• Education – informing general public• Communication planning – media• Compilation of operational plans• Table-top exercises• Field training exercises• Strengthening preparedness	<ul style="list-style-type: none">• Decision making system – mobilization• Coordination of involved authorities• Communications• Assessment of extent of disaster impact• Search and rescue operations• First-aid treatment and medical care• Immediate care of injuries• Mitigation of damage induced by geodynamic phenomena• Evaluation of aftershock sequence and related phenomena• Informing affected population – media• Volunteers coordination and cooperation• International assistance	<ul style="list-style-type: none">• Relief measures• Temporary housing• Social support• Financial assistance to the affected population• Informing affected population• Control of rumor diffusion• Reopening of public services• Management of public health issues• Psychological support of affected population• Proposals for interventions• Actions for special sectors (industry, tourism, environment)• Evaluation of actions – improvement of operational plans• Insurance against earthquakes and natural disasters

State governments design, develop, and deliver disaster response and assistance programs within their own jurisdictions. In doing so, they establish the financial assistance criteria they consider appropriate for response and recovery. Finance

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assistance is intended to support the provinces in:

- Providing or reinstating the necessities of life to individuals, including help to repair and restore damaged homes; re-establishing or maintaining the viability of small businesses and working farms; repairing, rebuilding and restoring public works and the essential community services specified in these Guidelines to their pre-disaster capabilities; and funding limited mitigation measures to reduce the future vulnerability of repaired or replaced infrastructure.
- The Hindu

15th Finance Commission

- Disaster risk management: The Commission recommended retaining the existing cost-sharing patterns between the center and states for disaster management funds.
- The cost-sharing pattern between centre and states is: (i) 90:10 for north-eastern and Himalayan states, and (ii) 75:25 for all other states. State disaster management funds will have a corpus of Rs 1.6 lakh crore (center's share is Rs 1.2 lakh crore).

As per Finance minister -

- the central government does not declare any natural disaster a

national disaster. It is only after an assessment by its team that any natural disaster is classified as a disaster of severe nature as seen in the 2013 floods in Uttarakhand and 2018 floods in Kerala.

- In such a case, there is additional financial assistance from the National Disaster Response Fund (NDRF).
- So, there is no question of calling the floods in Tamil Nadu as a “national disaster”. The central government should ensure clear guidelines when it comes to relief. It should also consider revising its position on excluding long-term or permanent restoration works from the ambit of the SDRF/NDRF.

The Hindu

Judicial overreach

- Excessive interference of the judiciary with the legislature and the executive is known as Judicial Overreach.
- Pertaining to the judicial activism in India, It is said that it allows unelected judges to thwart the will of the people expressed through their elected representatives; a written Constitution like that of ours, which gives courts the power to strike down laws made by Parliament and state legislatures, this is undemocratic and

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against the rules laid down by our forefathers.

- When judges start to infringe from the separation of power in lieu of judicial activism, then it is considered overreach.
- The real explanation of 'judicial overreach' is that, since authority grows by what it feeds on, judicial authority often appears to grow by consolidation; by the ignorance or the sheer incompetence of legislative bodies set up to enact laws and decide on important matters of state, being unable to do so properly.
- The direct effect of legislative and executive negligence or inability is 'judicial overreach'.
- Weak and injudicious results, not only in the making of laws, but also in their application.
- Therefore, when the judiciary oversteps its mandate, they are said to overreach.
- A few examples of overreach by the Indian judiciary have been stated in the next segment of the paper.

• Rajmudra of shivaji

- The Navy unveiled the new design of epaulets for admirals, with the octagon in the new design drawn from the naval ensign and inspired by raj-mudra of Chhatrapati Shivaji.

- The Navy said the new design is a “true reflection of our rich maritime heritage”.

- The new epaulettes have the golden Navy button top, followed by an octagon, an Indian sword and a telescope crossed, followed by stars indicating the ranks.

The Hindu

Rajmudra of shivaji

- After the Muslim invasion of India, the Raj mudras were mostly made in Arabic, Persian or Urdu languages.
- But when Shivaji Maharaj founded the Hindu Empire, then after many years for the first time he made his Rajmudra which was in Sanskrit.
- Chhatrapati Shivaji Maharaja's Rajmudra and Sanskrit verses inscribed on Rajmudra
- The Sanskrit verse on the Rajmudra of Chhatrapati Shivaji
प्रतिपच्चन्द्रलेखेव वर्धिष्णुर्विश्ववन्दिता।
शाहसूनोः शिवस्यैषा मुद्रा भद्राय राजते॥



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There are four parts in the Rajmudra.

1. प्रतिपच्चन्द्रलेखा इव
वर्धिष्णुः Pratipachchandralekha
Eva Vardishnu:

Ascending like the moon after new moon day

2. विश्ववन्दिता Vishvavandita

worshipped by the world. (That is, whom the whole world has worshipped.)

3. शाहसूनो: शिवस्य Shahasuno:
Shivasya

Shahaji's son Shivaji's

4. एषा मुद्रा भद्राय राजते Esha Mudra
Bhadraya Rajate.

This mudra (Rajmudra) is for welfare. (That is, for the welfare of the people.)

Public welfare

Rajmudra says – Mudra Bhadraya
Rajate.

- That is, this Rajmudra is for public welfare.
- This is a very revolutionary idea. Because that was the period when the Sultans of different places used to oppress the subjects.

- No one else imagined that a king's kingdom should be for the welfare of the subjects.

• [The Hindu](#)

Xposat

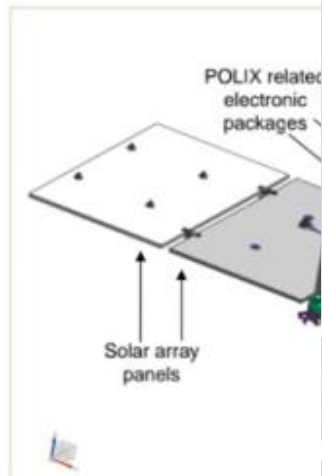
- The Indian Space Research Organisation has announced a plan to launch its first Xray Polarimeter Satellite (XPoSat) to investigate the polarisation of intense Xray sources.
- The ISRO said that while space based Xray astronomy had been established in India focusing on imaging, time domain studies, and spectroscopy, the XPoSat mission marked a major value addition.

• [The Hindu](#)

XPoSat Mission

- To measure polarization (degree and direction) of celestial sources of interest in the energy band 5-30 keV
- Mission Life – 5 years, Platform – Modified IMS-2
- Payload – Polarimeter Instrument in X-rays (POLIX)
- Orbit – Circular LEO (500-700 km), Inclination – 30°

Deployed View of XPoSat



X-ray POLarimeter SATellite (XPoSat)

First mission devoted to X-ray polarisation studies of celestial objects has been launched by ISRO.

Polarimeter Instrument in X-rays (POLIX) payload is developed by **Raman Research Institute (RRI)**.

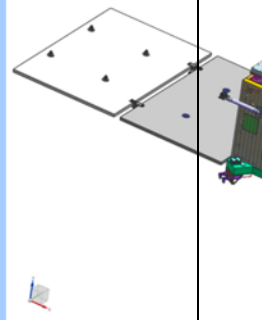
POLIX will study the degree and angle of polarization of X-ray sources (5-30 keV).

Modified IMS-2 bus

Pointing accuracy : 0.1 degree

Slow rotation : 0.2 to 0.5 rpm

Low altitude orbit (~600 km) with a low inclination (< 30 degree)



- The satellite will be launched by the Polar Satellite Launch Vehicle

X-ray Astronomy ~ High energy

- X-ray astronomy is an **observational branch** of astronomy which deals with the study of X-ray observation and detection from astronomical objects.
- High energy Astronomy, because probing x-ray emissions from several astronomical sources is equivalent to probing high energy processes occurring within the system.

"If you want to be a budding time-domain astronomer, you have to be wavelength agnostic" – Prof. Mansi M. Kasliwal

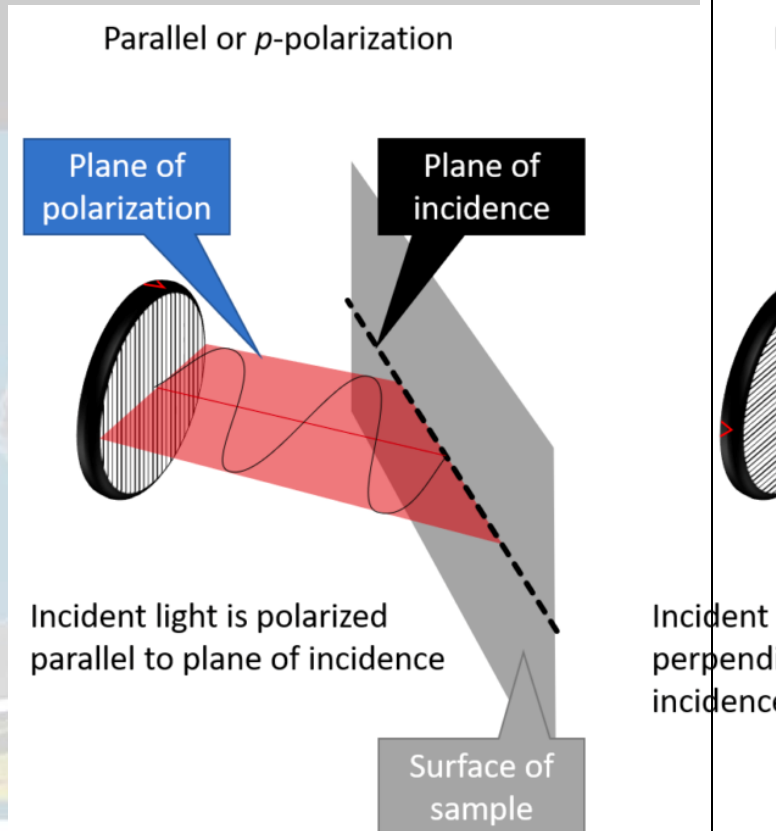
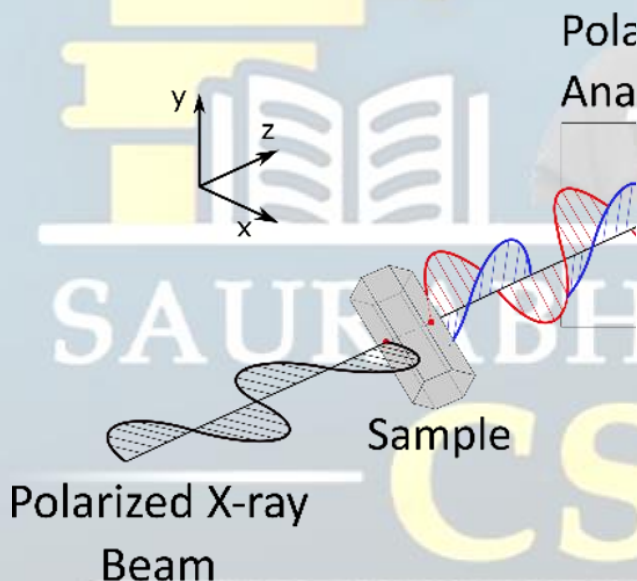


What is polarisation of light ?

Polarization: A light wave that is vibrating in more than one plane is referred to as unpolarized light.

Polarized light waves are light waves in which the vibrations occur in a single plane.

The process of transforming unpolarized light into polarized light is known as polarization.



- The XPoSat is designed for observation from a low earth orbit (nonsun synchronous orbit of 650km altitude, low inclination of approximately six degrees) and will carry two scientific payloads.

- With these two payloads, the mission is capable of simultaneous studies of temporal, spectral, and polarisation features of the bright Xray sources.

- The mission objectives include the measurement of Xray polarisation in the energy band of 830 keV emanating from Xray sources and longterm spectral and temporal

studies of cosmic X-ray sources in the energy band of 0.815 keV.

- The mission life is expected to be approximately five years.
- The primary payload, POLIX (Polarimeter Instrument in X-rays), is designed to measure polarimetry parameters, specifically the degree and angle of polarization, in the medium X-ray energy range of 830 keV photons originating from astronomical sources.
- The secondary payload is the XSPECT (X-ray Spectroscopy and Timing) payload, which will provide spectroscopic information within the energy range of 0.815 keV.



WHAT?

Established in 2009, BRICS represents the collective voice of the Global South.

MEMBERS

Brazil, Russia, India, China and South Africa as its members.

WHY IN NEWS?

The chair of BRICS 2021 is India. The 13th BRICS Summit is, 'BRICS Intra-BRICS Cooperation for Consolidation and Consensus'.

OTHERS

There are two components that form the financial architecture of BRICS: - New Development Bank (NDB) (Development Bank) - Contingent Reserve Arrangement

BRICS Expansion



- In a **landmark decision**, current members of the BRICS (Brazil, Russia, India, China, and South

Africa) declared that the grouping would welcome six new countries into the fold.

- Prime Minister Narendra Modi said, towards the end of the 15th BRICS summit in Johannesburg, that the addition of new members would strengthen the grouping and increase confidence in the idea of a multipolar world order.
- (1) Gross Domestic Product
- By the end of 2022, the current (and original six) members of BRICS constituted of 25.77% of the Global GDP, according to the data provided by World Bank (in current U.S. dollar prices). After the expansion, there are now five countries in the grouping whose GDP is over the trillion-dollar-mark.
- (2) Oil production
- Of the four metrics chosen, the BRICS grew the most in its share of oil production after its expansion. It grew from per-day production share of 20.4% to 43.1%.
- (3) Exports of Goods and Services
- By the end of 2022, the original members of BRICS contributed to 18.28% of the global export of goods and services. With the addition of the six new economies, BRICS would now represent 20.58%
- 4) Population
- The grouping went from having a 40.9% share of the global population to 46%. India and China are two of the world's most populous nations.

Among the new entrants, Ethiopia and Egypt have the largest populations.

Recent case of Argentina

- Argentine President Javier Milei has sent letters to BRICS leaders to formalize his decision to reject an invitation to join the grouping of major emerging economies, the presidency said on Friday.
- The bloc made up of Brazil, Russia, India, China, and South Africa in August announced it was admitting six new members in a bid to counter the Western-led global order.
- The membership of Argentina, Ethiopia, Iran, Saudi Arabia, Egypt, and the United Arab Emirates was due to take effect from January 1, 2024.
- During his election campaign, Mr. Milei said "Our geopolitical alignment is with the United States and Israel. We are not going to ally with communists."

UPSC BRILLIANCE

(GDF15)

- The majority of pregnancies (70%) are affected by nausea and vomiting, which can progress to a severe form known as hyperemesis gravidarum (HG).
- The hormone growth differentiation factor 15 (GDF15) has previously been implicated in morning sickness in previous literature; however, the underlying mechanism has yet to be described.
- The Hindu

Health tax

Improving health outcomes using sin tax

Currently, sugar sweetened beverages (SSB) attract 28% GST plus a 12% cess, while high fat, salt and sugar (HFSS) products only attract 12% GST

- While the global average consumption of sugar is 22 kg per person per year, it is 25 kg per year per person in India
- Free sugar consumption in India is five times the WHO recommended threshold
- For SSBs, a health tax of 10-30% could result in 7-30% decline in demand
- For HFSS, 10-30% health tax could result in 5-24% decline in demand
- If sugar costs ₹100 base price, with current GST at 18% it costs ₹118. With a proposed additional tax increase of 10-30%, estimated price to consumers will be ₹128-148

Precedent: Up to 70 countries have imposed a health tax on SSBs and HFSS products.

- For SSBs with a ₹100 base price, current GST at 18% plus 12% additional cess, the price to consumers is ₹140. This will increase to ₹150-170 with a proposed additional tax of 10-30%
- For HFSS products with a ₹100 base price and GST at 12%, the price to consumers is ₹112. This will increase to ₹122-142 with additional tax of 10-30%

ta, confectionery manufacturers purchase up to 55% all other factors driving the demand remaining are currently taxed di rently. While sugar c

The Hindu

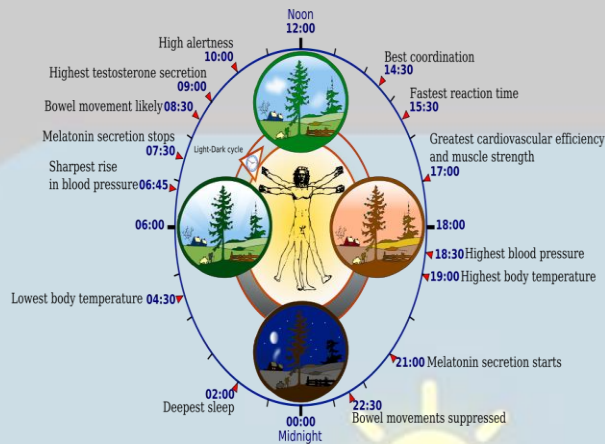
Colour variation in frogs

- Ambient light does not only allow us to see, it also influences our sleep-wake rhythm.

- A study in mice in 2019 suggested that yellowish light has a stronger influence on the internal clock than bluish light.
- In humans, the main effect of light on the internal clock and sleep is probably mediated via the light sensitive ganglion cells.
- To understand the effects of the different light stimuli on humans, in the sleep laboratory the researchers determined whether the internal clock of the participants had changed depending on the colour of the light.

- The study found that the human circadian clock is relatively insensitive to shifts in light colour towards warmer colour temperatures at constant melanopic illumination.

- Melanopic illuminance defines the magnitude of human circadian light responses under a wide range of conditions.



The Hindu

India's position on the waterfront

India's position

- India's positions, which are largely aligned with those of the Global South, are driven by both its specific interests and the larger trends it sees in the global dynamics.
- In the case of Ukraine, it condemned the war and called for talks and a ceasefire without naming any party.
- Even under heavy pressure, it was careful not to let the crisis affect its multifaceted strategic partnership with Russia.
- In the case of Gaza, it repeatedly condemned the Hamas attack on Israel, an important bilateral partner, while also reiterating its traditional position in support of the two state solution.

- , India joined the global chorus calling for a ceasefire.

- The U.S. seems less in control of the geopolitical developments unfolding in its spheres of interests Europe and West Asia.

- Its efforts to weaken Russia are not rewarding and it is unable to control a vengeful Israel, which is affecting its reputation in the Arab World, and the Global South in general.

- China is focused on its immediate periphery and is wary of risks. Russia is the weakest among the three great powers.

- So India, itself a strong proponent of a multipolar world, sees the global order in flux.

- It appears to be careful not to align with any great power, while maximizing its interest through multi engagement and trying to be a voice of the Global South.

The Hindu