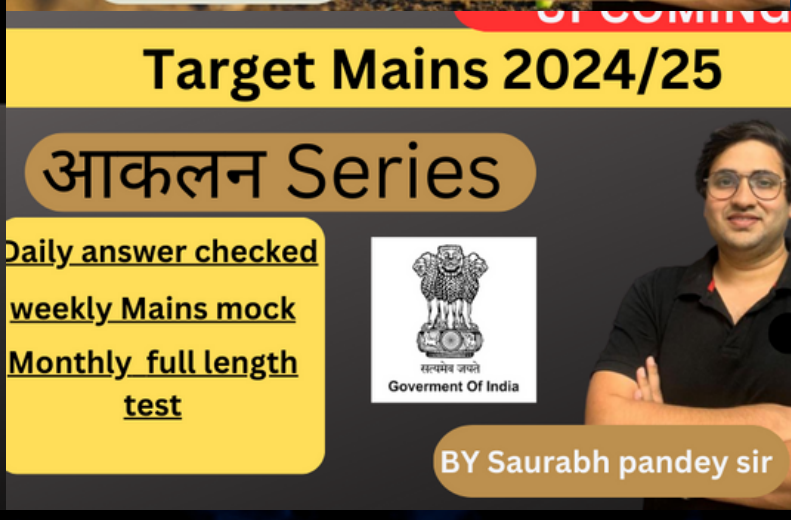
Current Affairs PDF compilation October 2023

Saurabh Pandey CSE



Household Saving

The release of the Reserve Bank of India's (RBI) Monthly Bulletin in September revealed that households' net financial savings had fallen to 5.1% from 11.5% in 2020-21.

Housing loans from Scheduled Commercial Banks (SCBs) grew at double- digit rates in all years between 2018-19 and 2022-23.

Financial liabilities of households rose faster than their assets, with many writers highlighting this trend as an indication of rising indebtedness and increasing distress.

The government, however, countered these claims.

The Finance Ministry explained that while household financial savings may be reducing, it did not imply total savings were falling, since households took advantage of low interest rates after the pandemic to invest in assets such as vehicles, education and homes

Education and vehicle loans from SCBs increased significantly between 2021-22 and 2022-23, growing at 17% and around 25% respectively.

While loans for housing, education and vehicles have no doubt increased, other components of personal loans have risen even faster.

The share of housing loans in total non-food personal loans from SCBs has fallen from 51.08% in 2018-19 to 47.4% in 2022-23.

Climate lawsuit against 32 countries

September 27 marked the beginning of a historic legal battle in the climate action movement.

Six young people from Portugal, aged 11 to 24, are suing 32 European governments (including the U.K., Russia and Turkey) at the European Court of Human Rights in France's

Strasbourg.

What is the lawsuit?

Duarte Agostinho and Others versus Portugal and Others was filed in September 2020, in the aftermath of the wildfires that consumed Portugal's Leiria in 2017. Over 60 people died, and 20,000 hectares of forests were lost.

The recent spate of heatwaves and fires across Greece, Canada and other parts of Europe served as reminders that every increment beyond the 1.5°C temperature threshold would be catastrophic, intensifying "multiple and concurrent hazards," as the Intergovernmental Panel on Climate Change states in its report.

The Portuguese youths claim that European nations have faltered in their climate emission goals, blowing past their global carbon budgets consistent with the Paris Agreement target of limiting global warming under 1.5°C.

The nations have thus violated people's fundamental rights protected under the European Convention on Human Rights, including the right to life, the right to be free from inhuman or degrading treatment, the right to privacy and family life and the right to be free from discrimination.

The European Scientific Advisory Board on Climate Change (ESABCC), a body which provides scientific advice to EU countries, said countries will have to target an emissions reduction of 75% below 1990 levels (as opposed to the EU's current 55%).

It comes down to cause and effect: countries so far have rejected any relationship between climate change and its impact on human health.

For instance, Greece, in its submissions, maintained that the

effects of climate change "do not seem to directly affect human life or human health."

The Hindu

Spyware

Between May and September, former Egyptian MP Ahmed Eltantawy was targeted with Cytrox's Predator spyware sent via links on SMS and WhatsApp.

Apple has since released an update for its products fixing the bug used in the attack.

The attack on Mr. Eltantawy came after he publicly stated plans to run for President in the 2024 Egyptian elections, which is especially concerning since Egypt is a known customer of Cytrox's Predator spyware, Citizen Labs.

What is spyware?

Spyware is loosely defined as malicious software designed to enter a device, gather sensitive data, and forward it to a third party without the user's consent.

While spyware may be used for commercial purposes like advertising, malicious spyware is used to profit from data stolen from a victim's device.

Spyware is broadly categorized as Trojan spyware, adware, tracking cookie, and system monitors.

How have tech companies reacted?

Tech giants including Meta, Google, and Apple have taken concrete steps to address the problem of commercial spyware firms exploiting bugs in their software.

In the case of Mr. Eltantawy, Apple and Google updated their software to fix the bugs exploited by Cytrox's Predator spyware. Apple with its iOS 16 also released a 'Lockdown Mode', which the company called an "extreme protection" designed for

high risk individuals.

While the Lockdown Mode in Apple's software limits the device's functionality, it has proven to be a viable option to protect against spyware attacks.

The Hindu

Hyper concentrated flow

Based on these studies, the researchers have reported that climate- change- related and seismic events ravaging the planet today could create super-floods that could be catastrophic for people in the Gangetic plain, in a paper published in the journal Communications Earth and Environment on August 23.

The findings signal that we need to urgently update India's disaster management strategy

With the Ganga larger particles are restricted to areas around Haridwar and Rishikesh, in Uttarakhand.

Large particles should not be usually found downstream. But in a 2014 study it was found that, around 11,000 years ago, in the Holocene era, there was coarse gravel in the Kosi river some 30--40 km downstream of the current gravel sand transition

The odds of an extreme monsoon event are expected to increase due to climate change.

According to a 2021 study in western Nepal, the chance could increase by as much as 60%. More extreme rains could also mean more landslides, which in turn could mean hyper concentrated flows leading to floods downstream

Extreme events are expected to have occurred along with a complementary cause called hyper concentrated flows.

Hyper concentrated flows occur when some event of a trigger, such as a landslide or a glacial lake

outburst causes the river to carry more sediments than usual.

In such conditions, "high concentrations of sediments are distributed through the water column," according to the paper.

Hyper concentrated flows can change the way rivers flow, so they often have devastating consequences.

"A major landslide combined with a heavy monsoon can generate hyper concentrated flows, which can actually move very large particles further downstream,"

As a result, the river could be clogged, the water level could rise to dangerous levels, and cause a flood.

Hyper concentrated flows can also change the course of the river in a process called avulsion, forcing thousands of people to move

"If we keep looking at these hazards in an isolated and compartmentalized way, we will never be able to understand the entire cascading effect of a disaster," he said.

Instead, we need an "integrated disaster management approach" where the relationship between instances of earthquakes, landslides, and floods along with the individual incidents themselves is used to frame risk mitigation plans.

The Hindu

Karman line

Boundaries play an important role in science because they help differentiate and define things that might otherwise blend together.

One such boundary is the Kármán Line. Located at 100 km above sea level, it is an imaginary line that demarcates the earth's atmosphere from space.

Though not all scientists and

spacefarers accept it, a majority of countries and space organizations recognize this boundary between earth sky and space.

It was established in the 1960s by a record keeping body called Fédération Aéronautique Internationale (FAI).

Anyone individual who crosses this line qualifies as an astronaut.

The Hindu

Yemen cholera epidemic

Genes imparting resistance to multiple antibiotics emerged in the Vibrio cholerae bacterial strains responsible for the ongoing Yemen cholera epidemic around 2018, following changes in antibiotic treatment, according to a study published in Nature Microbiology.

These findings emphasize the importance of tracking pathogen genomes to monitor the emergence of multi drug resistant strains that increase human morbidity and mortality.

The cholera outbreak in Yemen, which began in 2016, is the largest in modern history and antibiotic resistance has become widespread among V. cholerae bacteria since 2018.

The presence of a new plasmid, a small, circular DNA molecule in V. cholerae from late 2018 to the bacterial strains behind the epidemic.

This plasmid introduced genes encoding resistance to multiple clinically used antibiotics, including macrolides (such as azithromycin).

The plasmid became widely spread and was found in all epidemic V. cholerae samples tested by 2019, coinciding with macrolide antibiotics being used to treat pregnant women and children with severe cholera.

Staghorn A genome wide survey of

highly endangered staghorn coral in the Caribbean has identified 10 genomic regions associated with resilience against white band disease, an emergent infectious disease responsible for killing up to 95% of Caribbean Acropora species, including staghorn corals (A. cervicornis).

The findings could be used as a conservation tool to improve disease resistance in the wild and nursery stocks of staghorn corals used to repopulate damaged coral reefs throughout Caribbean waters.

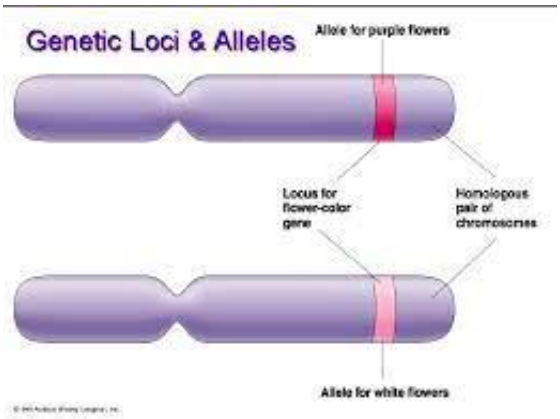
Staghorn coral is found typically in clear, shallow water (15–60 feet) on coral reefs throughout the Bahamas, Florida, and the Caribbean

The Hindu

Adaptative radiation

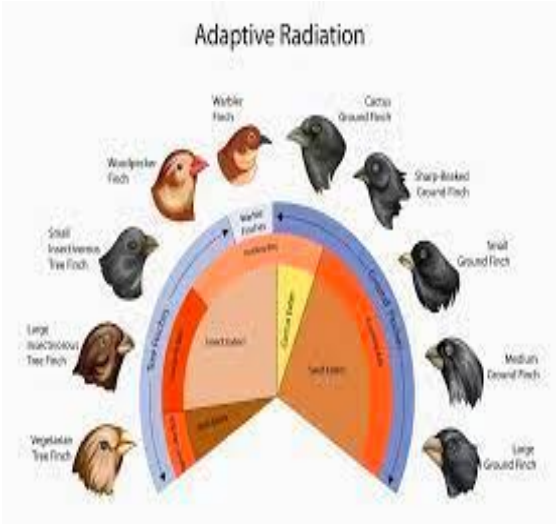
Genome sequencing of nearly 4,000 of Darwin's finches has uncovered how a very small number of genetic loci contribute to the genetic potential for rapid adaptive radiation in these birds.

The findings reveal new insights into the genetic basis of evolutionary change and suggest that loci of large effect may play an underappreciated



role in adaptive evolution.

In evolutionary biology, adaptive radiation is a process in which organisms diversify rapidly from an ancestral species into a multitude of new forms, particularly when a change in the environment makes new resources available, alters biotic



interactions or opens new environmental niches.

The Hindu

Biosafety level

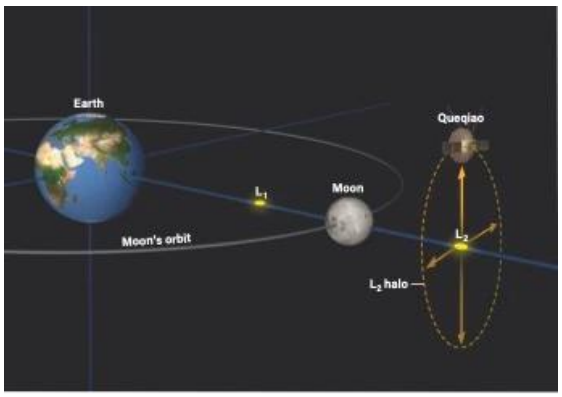
A biosafety level (BSL), or pathogen/protection level, is a set of biocontainment precautions required to isolate dangerous biological agents in an enclosed laboratory facility.

The levels of containment range from the lowest biosafety level 1 (BSL-1) to the highest at level 4 (BSL-4).

The Hindu

Current Affairs 3rd October 2023 by Saurabh Pandey

Lagrange points



Lagrange points are found along the plane of two objects in orbit around their common center of gravity, where their gravitational forces cancel each other, so that a third body of negligible mass will remain at rest between them.

For example, the combined gravitational force between the sun and the earth equals the centrifugal force required by a satellite or an asteroid to orbit the sun- earth center of gravity.

At this Lagrange point, a satellite will keep its position constant relative to both the sun and the earth.

The three-body problem

But Lagrange's most important contributions were related to the so-called 'three body problem', which investigated the motion of three bodies (with mass) relative to each other in space such as the sun, the earth, and the moon.

The problem question itself is: if you know the starting positions of the sun, the earth, and the moon, can you predict their exact locations at a later date as they move under the influence of each other's gravity?

Lagrange found that the problem could be solved if he assumed the third body was much smaller than the other two larger masses.

This eventually led him to describe the famous five Lagrange points that we know today as L1, L2, L3, L4, and L5.

Points of accumulation

Objects stay undisturbed at L4 or L5 because of a 'restoring force' a force acting against any displacement that prevents them from being nudged away from the stable point.

Because of their stability, however,

L4 and L5 also tend to accumulate a lot of interstellar dust and asteroids called Trojans that zip around the points.

Scientists have detected nearly 10,000 Trojans in the L4 and L5 points of the sun- Jupiter system alone, where gravitational and centrifugal forces prompt the space rocks to follow the giant planet's revolution around the sun.

Aditya- L1 is a space- based observatory that ISRO launched on September 2.

It is now enroute to its designated parking slot at L1 in the sun- earth system. Once it reaches L1 at a distance of 1.5 million km away from the earth the probe will settle into a 'halo' orbit around L1 to acquire an unobstructed view of the Sun.

L1 is already home to four other robotic explorers: NASA's Solar and Heliospheric Observatory Satellite, Deep Space Climate Observatory, Advanced Composition Explorer, and the Global Geospace Science Wind satellite. The point will get even more crowded when three U.S. probes Interstellar Mapping and Acceleration Probe, Near Earth Object Surveyor, Space.

The Hindu

BRICS FUTURE

Six new members were inducted into the BRICS grouping, in South Africa.

It does not provide military or security support to various countries, is not involved in the policing of nations, and does not provide peacekeepers.

Compare this to, say, NATO: European Allies and Canada have invested an extra $350 billion since 2014, with eight consecutive years of increased defence spending

Second, two members of BRICS are China and India, which together contain one- third of the world's population.

The two countries are the fastest-growing economies and are

expected to be among the top three economies of the world by 2030.

Both countries understand that globally, bilateral ties have seen a transformation following the formation of economic blocs such as the European Union or ASEAN, as such blocs accelerate trade and investment.

While India and China have bilateral challenges at the political and diplomatic levels since their stand-off at Doklam in 2017, trade between the two countries has continued to grow significantly

Third, there has been some polarisation between the U.S. and other parts of the world.

The search for an alternative such as the Non- Aligned Movement to tackle Cold War challenges has given hope of a new order; thus, many countries are applying for membership to this group. Six new members were inducted in the last meeting

Fourth, the U.S. dollar has been the dominant global currency all this time.

Both India and China are pushing for more trade, investment, and business in their currencies and together, through BRICS, they can push their own currencies as alternative currencies to the dollar

Finally, the continent that promises economic growth this century is Africa.

The way France has intervened in Niger or the manner in which migrants have been treated in Europe provide Africans with a negative image about Europe.

The Hindu

Nobel prize in medicine

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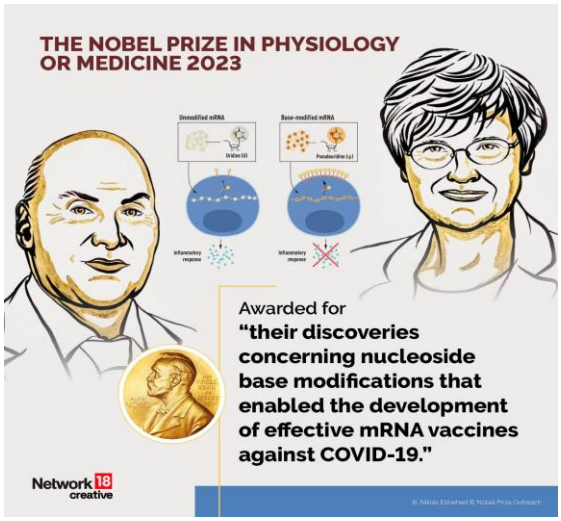
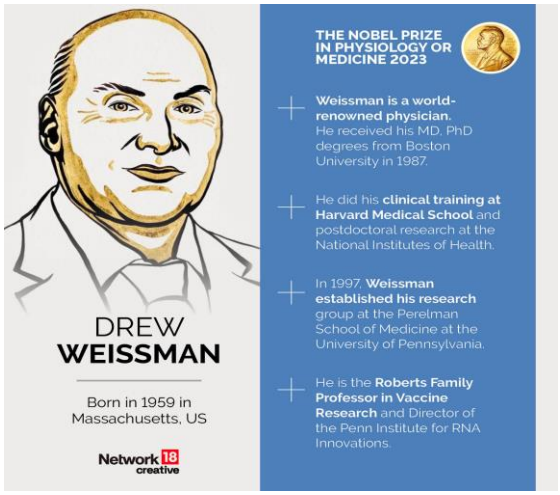
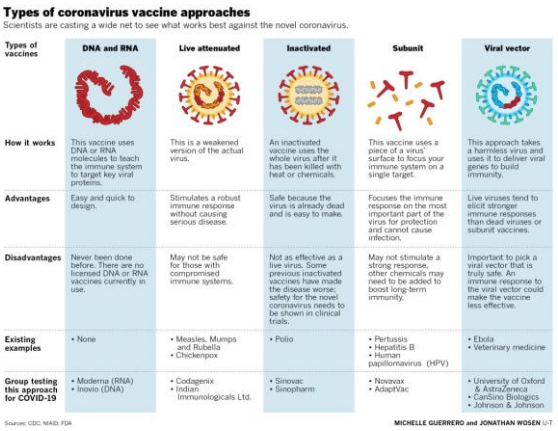
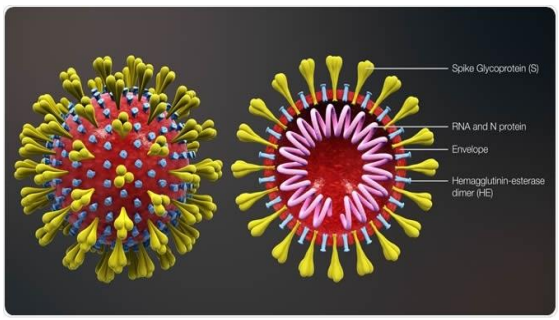




The discoveries by the two Nobel Prize laureates were critical for developing effective mRNA vaccines against COVID-19 during the pandemic that began in early 2020. Through their groundbreaking findings, which have fundamentally changed our understanding of how mRNA interacts with our immune system, the laureates contributed to the unprecedented rate of vaccine development during one of the greatest threats to human health in modern times





Unlike a usual vaccine, RNA vaccines work by the introduction of an mRNA sequence into the host's cells. This mRNA codes for a disease-specific antigen. Once inside a cell, the mRNA instructs the cell to

produce the antigen, which is recognized by the immune system which makes an antibody or cellular response.

It can take years to develop vaccines first in laboratories to show proof-of- concept, then developing a manufacturing process to make stable and a highly pure product to be tested in animals and humans, and finally.

Instead, mRNA vaccine carries the molecular instructions to make the protein in the body through a synthetic RNA of the virus.

The host body uses this to produce the viral protein that is recognized and thereby making the body mount an immune response against the disease.

They are scientifically the ideal choice to address a pandemic because of their rapid developmental timeline.

Considered safe as is non-infectious, non-integrating in nature, and degraded by standard cellular mechanisms.

They are expected to be highly efficacious because of their inherent capability of being translatable into the protein structure inside the cell cytoplasm.

Additionally, mRNA vaccines are fully synthetic and do not require a host for growth, e.g., eggs or bacteria.

Therefore, they can be quickly manufactured in an inexpensive manner under cGMP conditions to ensure their "availability" and "accessibility" for mass vaccination on a sustainable basis.

The Hindu

Norman E Borlaug award for 2023

Swati Nayak became the third Indian agriculture scientist to win the prestigious Norman E Borlaug award for 2023.

Fondly called as “Bihana Didi” (Seed Lady) by local communities in Odisha, Indian agriculture scientist Swati Nayak has perhaps begun to reap the fruits of having lived in tribal villages with farmers and understanding their actual needs.

Nayak became the third Indian agriculture scientist to win the prestigious Norman E Borlaug Award for 2023. The other two Indian recipients are Aditi Mukherjee (2012) and Mahalingam Govindaraj (2022).

The Hindu

Pink Diamond

More than 90% of all the pink diamonds ever found come from a single mine in the Kimberley region of Western Australia: Argyle.

Diamonds are made of carbon atoms arranged in a compact, regular lattice. Clear, perfect diamonds sparkle because light reflects off their internal surfaces.

However, when diamonds are subject to intense pressure deep inside Earth, the lattice of atoms can twist and bend. This causes small imperfections that diffract light and bring colour to the gem.

The Hindu

Indonesia East Java province

Mt Semeru volcano in Indonesia East Java province.

It is the highest mountain on the island of Java. The name "Semeru" is derived from Meru, the central world mountain in Hinduism, or Sumeru, the abode of gods. This stratovolcano is also known as Mahameru, meaning "The Great Mountain" in Sanskrit. It is one of the more popular hiking destinations in Indonesia.

The Hindu

Audit and AI

The Comptroller and Auditor General of India (CAG), Girish Chandra Murmu, who is the chair for the Supreme Audit Institutions (SAIs) of the G20, warned that absolute dependence on Artificial Intelligence (AI) for auditing purposes may lead to inaccurate findings, and emphasized ethics as the cornerstone of responsible AI.

The CAG conducts financial audits, compliance audits, and performance audits. The auditing challenges of AI include ensuring transparency, objectivity, fairness, and avoiding bias.

Responsible AI must be ethical and inclusive. Only ethical AI can add credibility, trust, and scalability to the CAG audit. Data sets must be complete, gathered on time, accurate, available, and relevant.

If integrity of the data fields is not ensured, we will have inaccurate audit findings.

The AI auditor must be extra- vigilant about the risk of inherent AI data bias if data are taken from unauthorized sources like social media, where data manipulation and fabrication are common.

The Hindu

India needs AI regulation

In June, the European Parliament approved the EU AI Act, the first of its kind in the world. The Act ensures that generative AI tools such as ChatGPT will be placed under greater restrictions and scrutiny.

Developers will have to submit their systems for review and approval before releasing them commercially.

Parliament also prohibited real-time biometric surveillance from all public settings and “social scoring” systems. Ensuring the accuracy of vast Internet data mines is a challenge.

The content generated by AI systems may lead to potential copyright

infringement issues, violating intellectual property rights.

Addressing legal implications relating to content ownership is a formidable task.

AI bias is an inherent risk originating from the human bias that is added to the data sets of machine learning.

Elon Musk wants to address these concerns by developing 'Truth GPT', a "maximum truth- seeking AI.

The Hindu

Afghan embassy closed

On September 30, a statement carrying the seal of the Ministry of Foreign Affairs of the Islamic Republic of Afghanistan announced the closure of the Embassy of Afghanistan in Delhi.

The consulates in Hyderabad and Mumbai have not shut down.

The consulates will continue to function as part of a "solemn commitment" towards thousands of Afghan students, refugees and traders.

The Taliban has been urging India to support it with its economic revitalization through projects like electricity generation and road building works. India, however, has not yet indicated that it will review its position on the Taliban.

The Hindu

Nagorno karabakh

What is the history of the conflict?

Nagorno- Karabakh is located within the international borders of Azerbaijan.

It is in the South Caucasus region between eastern Europe and western Asia, spanning the southern part of the Caucasus mountains that

roughly includes modern day

Armenia, Azerbaijan, and Georgia.

The conflict between Azeris and Armenians goes back a century, when the Ottomans attacked the South Caucasus during World War I with the help of Azeris.

They targeted ethnic Armenians during this attack, and the conflict between Azerbaijan and Armenia descended into a full- blown war in 1920.

This war incorporated the region into the Azerbaijan Democratic Republic.

Soon after, both countries became part of the Soviet Republic, and Nagorno-Karabakh was made an autonomous Oblast (administrative region) in Azerbaijan's territory.

When the Soviet Union disintegrated in 1991, full- scale fighting again broke out between the countries as Armenian rebels declared Nagorno -Karabakh an independent territory.

The war lasted till 1994 and killed around 30,000 people. In 1994, Azerbaijan and Armenia entered a ceasefire brokered by Russia, but international borders for the countries were not demarcated.

How did Azerbaijan capture the area?

Experts believe that Turkey had a big role to play in the latest developments in the Nagorno-Karabakh region.

Turkey, however, denied any direct involvement in Azerbaijan's offensive, Reuters reported,

although it is a political and military supporter of Azerbaijan.

Russia's absence in the Caucasus is owed to its war in Ukraine.

As retaliation for Russia's lack of help over the last few years, Armenia voted to join the International Criminal Court (ICC) despite Russia's warnings (the ICC has issued a warrant for the arrest of Russian President Vladimir Putin).

Over 1,00,000 ethnic Armenians from Nagorno-Karabakh, have fled to Armenia in the last one week, the WHO estimates.

The exodus has triggered a massive humanitarian crisis.

The Hindu

Circular migration

Circular migration became quite popular in the 60s and 70s with the advent of globalization and development.

Increased access to modern forms of transport and communication, social networks and the growth of multinational corporations have aided the advent of circular migration.

However, only recently has the phenomenon been given its due as the seasonal movement of migrants was not properly documented or was boxed along with short- term or temporary migration.

According to Philippe Fargues, migration can defined as circular if it meets the following criteria there is a temporary residence in the destination location, there is the possibility of multiple entries into the destination country,

There is freedom of movement between the country of origin and the country of destination during the period of residence,

There is a legal right to stay in the destination country, there is

protection of migrants' rights, and if there is a healthy demand for temporary labour in the destination country.

The Hindu

Armenia to join ICC

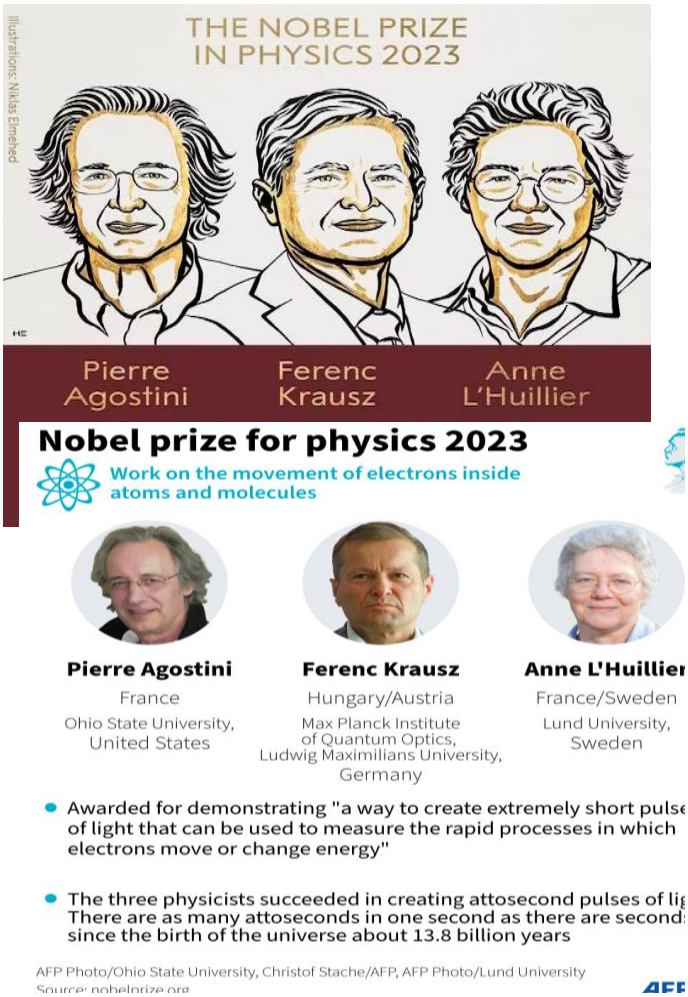
Armenia's Parliament voted on Tuesday to join the International Criminal Court, a move that further strains the country's ties with its old ally Russia after the court issued an arrest warrant for President Vladimir Putin over events in Ukraine.

Moscow last month called Yerevan's effort to join the ICC an "unfriendly step,"

	INTERNATIONAL COURT OF JUSTICE- ICJ	INTERNATIONAL CRIMINAL COURT – ICC
ESTABLISHEMENT YEAR	1946	2002
RELATIONSHIP WITH U.N	Official court of U.N, commonly known as "World Court".	Independent. Not governed by U.N. Can receive referrals from UNSC. Can initiate prosecution without UN action.
HEADQUARTERS	Peace Palace , Hague	Hague
JURISDICTION	U.N Member states. Can give advisory opinions to UN bodies. Cannot try individuals. Applies International Law	Individuals accused of international crimes. Uses International Law, as war crimes violate Geneva Convention.
TYPES OF CASES	Sovereignty, boundary disputes, maritime disputes, trade, natural resources, human rights, treaty violations, treaty interpretation, etc.	Genocide, crimes against humanity, war crimes, crimes of aggression.
DERIVES AUTHORITY FROM	States that ratify the U.N. Charter become parties to the ICJ Statute. Non-UN member states can also become parties to the ICJ by ratifying the ICJ Statute.	Rome Statute
APPEALS	ICJ decision is binding. UNSC can review if states do not comply.	Appeals Chamber, according to Rome Statute.
FUNDING	U.N funded	contribution from state parties to the Rome Statute; voluntary contributions from the U.N; voluntary contributions from governments, international organizations, individuals, corporations and

The Hindu

Nobel prize in physics



Blue Walker 3 satellite

Impact of the prototype Blue Walker 3 satellite on astronomy.

The Blue Walker 3 is a prototype satellite, part of a satellite constellation planned by its owner AST Space Mobile, intended to deliver mobile or broadband services anywhere in the world.

Observations of Blue Walker 3 showed it was one of the brightest objects in the night sky, outshining all but the brightest stars,

Several companies around the world have envisaged such satellite constellations

However, owing to their location closer to the earth location and relatively large size, their potential to disrupt night sky observations is higher, which is why astronomers are raising concerns around these constellations, or groups of satellites.

The Hindu

State population and political and economic significance

Article 81 of the Indian Constitution stipulates that Lok Sabha constituencies in the country should be equal by the size of population.

Based on the 1971 Census, the number of Lok Sabha constituencies for States was determined and frozen for the next 25 years through

the 42nd Amendment Act 1976.

In 2001, through the 84th Amendment Act, the freeze on the number of constituencies for each State was further prolonged until the first Census after 2026.

The population growth rates differ between the non-Hindi speaking southern States and the Hindi-speaking northern States.

Between 1971 and 2011, the proportion of the population of Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Rajasthan, Uttarakhand and Uttar Pradesh increased from 44% to 48.2%, whereas the proportion of population of the five southern States (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana) declined from 24.9% to 21.1%.

If equal size of Lok Sabha constituencies by population is enforced today as in the population projections of 2023, the five southern States will lose 23 seats, while the northern States will gain 37

The attempt to equalize the size of constituencies by population is based on the dictum, “One Person, One Vote”.

In a ‘First- Past- the -Post’ election system, along with a multi-party contest, voters know that only one of the contestants shall win, that is, the winner takes all.

Often, winners are elected even with less than one- third of the votes polled

When family planning and population control are the stated policies of the national and regional governments in India, States that have implemented these policies and effectively controlled their population should not be penalised through reduced political representation in subsequent periods.

Population control happens not only

due to the implementation of family planning programmes but also because of the social change that is engineered by the leaders in the society.

Role of population in fiscal transfers

Once in five years the Union government constitutes a Finance Commission to recommend, among other things, the share of each State in the assigned tax revenue of the Union government.

Every Finance Commission recommends a formula for the horizontal distribution of the Union government's tax revenue among the States.

Population and per capita income of a State are considered to be two important indicators that are always included in the distribution formula with larger weights.

The terms of reference of the Fifteenth Finance Commission openly declared taking the 2011 population in the distribution formula.

With this, the southern States lost the advantage of getting some financial rewards for population control.

Therefore, the southern States have already started facing reduced financial transfers from the Union government as a reward for controlling population growth.

There is another factor that consistently brings in the current population in the distribution formula the per capita income of a State.

The per capita income of a State is considered as a proxy for its ability to raise its own revenue.

The higher the per capita income of a State, the lower its share in the Union tax revenue.

Lower per capita income of a State may be due to higher population for

a given Gross State Domestic Product.

Therefore, the higher the current population of a State, the higher its share in the Union tax revenue.

It is important to note that usually the per capita income is assigned larger weight in the distribution formula favouring the northern States.

The Hindu

Climate 'polycrisis'

The climate 'polycrisis' a term made popular by Adam Tooze refers to the interconnected and compounding crises related to climate change that are affecting the planet not just in a few sectors but across several sectors and domains.

It encompasses the physical impacts of climate change (rising temperatures, sea- level rise, and extreme weather events) and the social, economic, and political challenges that arise from these impacts.

In India, one can see the interconnections between seemingly different sectors such as energy, infrastructure, health, migration and food production that are being impacted by climate change.

Recognizing the complexity and interconnectedness of the climate polycrisis, it is crucial in developing a holistic approach that takes into account the diverse perspectives and priorities of different stakeholders, while ensuring resilience, equity, and justice

A national carbon accounting (NCA) system is both an evolutionary and a revolutionary generalization of these ideas.

It will bring the entire nation, starting from individuals and households, under one carbon accounting framework. This will be a

paradigmatic change in the way we look at all human and non-human "activities" in the world

An NCA will bring the concept of carbon books to the nation and will make it mandatory for businesses and individuals to declare/report their carbon inflows and outflows

An NCA will not only help India meet its commitment to becoming net zero by 2070 but also help it and other countries (if adopted globally) create new livelihoods and new forms of organizing its economy and society.

Everyone understands GDP growth and, more recently, alternative measures such as Gross National Happiness.

The Hindu

Nobel prize in chemistry- quantum dots

The Nobel Prize in Chemistry was awarded on Wednesday to Moungi G. Bawendi, Louis E. Brus and Alexei I. Ekimov for being pioneers of the Nano world.

The Nobel Laureates in Chemistry 2023 have succeeded in producing particles so small that their properties are determined by quantum phenomena.

The particles, which are called quantum dots, are now of great importance in nanotechnology,"

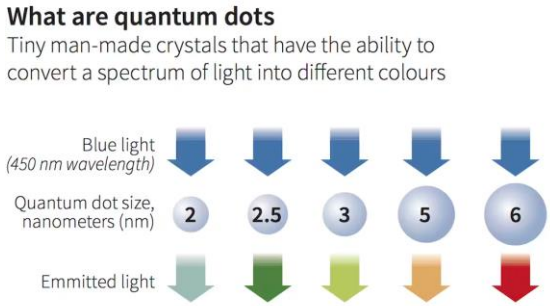
These tiny particles have unique properties and now spread their light from television screens and LED lamps.

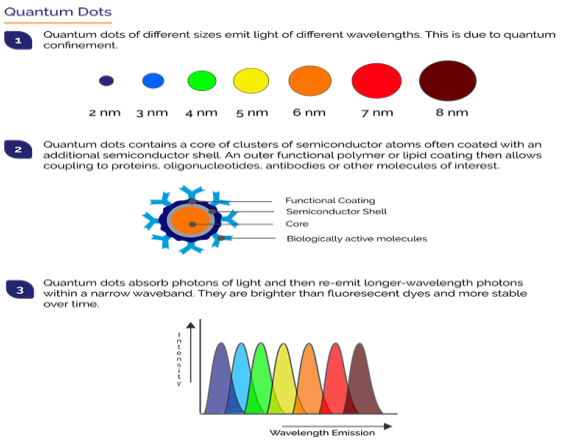
They catalyze chemical reactions and their clear light can illuminate tumors tissue for a surgeon.

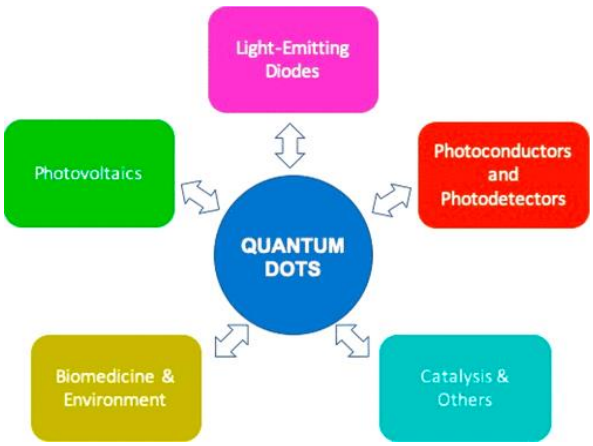
Quantum dots, also called semiconductor nanocrystals, are semiconductor particles a few nanometers in size, having optical and electronic properties that differ from those of larger particles as a result of quantum mechanical

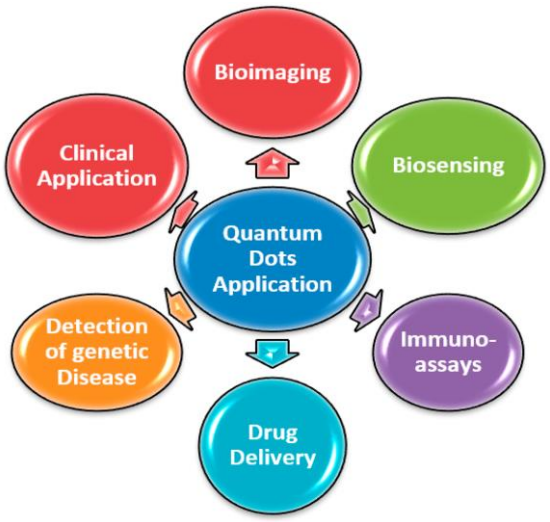
effects.

They are a central topic in nanotechnology and materials science.









Conservation of Foreign Exchange and Prevention of Smuggling Activities Act (COFEPOSA) Act, 1974. Though MISA was repealed in 1978, this law is still in force. COFEPOSA Act 1974 prescribes that the appropriate government shall establish advisory boards to assist the government on matters related to the detention of persons and prepare reports regarding the same. According to this section, the appropriate Government shall form an advisory board to perform the functions mentioned in clauses (4)(a) and (7)(c) of Article 22.

The Hindu

Cabomba furcuta

Popularly called as Pink Bloom due its massive flowering.

The submerged perennial aquatic plant grows in stagnant to slow-flowing freshwater. The fast growing Cabomba is a visual treat but becomes a potential outspread in water bodies by active stem propagation, hindering penetration of light into the water.

Cabomba, which requires a large quantity of oxygen for its growth, will choke water bodies and drainage canals. It causes decline in diversity of native aquatic plants and causes economic losses by affecting yield of freshwater fishes. The key to controlling the species is to mechanically remove them from the waterbody and dry them in terrestrial spaces, the team notes.

The Hindu

Quantum dots

The 2023 Nobel Prize in Chemistry has been awarded to three people who found out what happened.

Technically, they have been selected for discovering and refining quantum dots small crystals a few nanometers wide.

Each quantum dot has only a few thousand atoms (whereas a single droplet of water can have a sextillion).

And because the atoms are packed so closely together in the dot, their electrons are very close to each other.

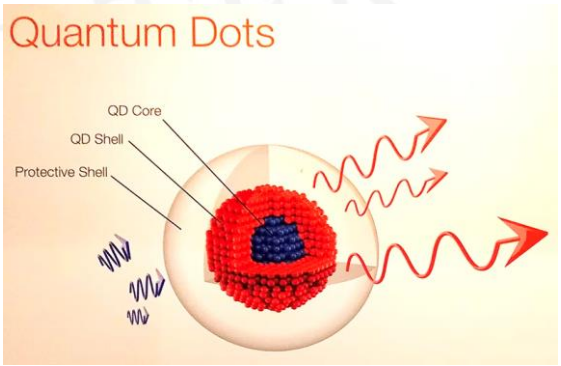
In this setting, the laws of quantum mechanics describe the behaviour of quantum dots so much so that an entire dot can mimic the behaviour of an atom. The dots have another famous property.

If you shine some light on a quantum dot, it will absorb and re-emit that light at a different frequency (or colour) depending on its size.

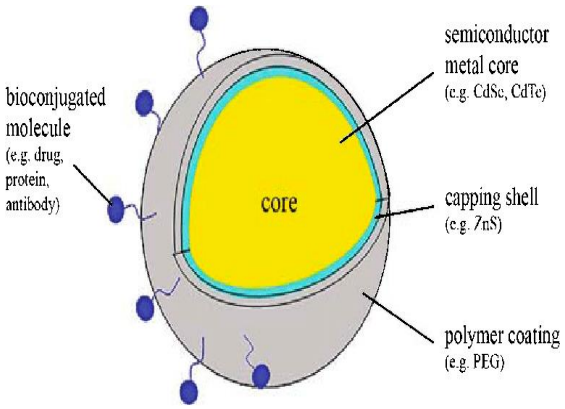
Smaller dots emit light of higher frequency (bluer) and vice versa.

So, a quantum dot made of some material would respond in one way whereas a quantum dot made of the same material but smaller would respond differently.

For these reasons, quantum dots have found many applications in transistors, lasers, medical imaging,

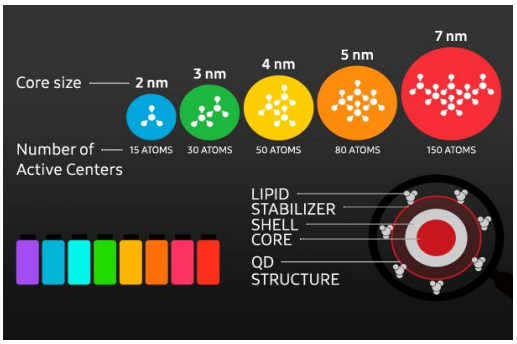


and quantum computing



While quantum dots light up LED screens and the location of a tumors

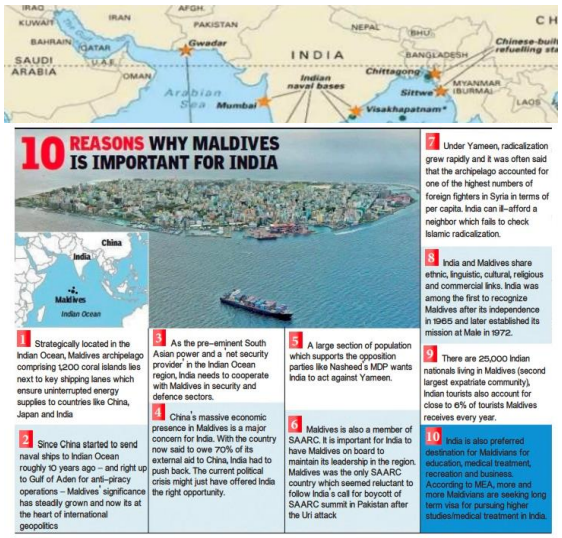
that needs to be removed, it is important not to lose sight of the colors the reds, the greens, and the blues.



The Hindu

Importance of Maldives

India looks forward to engaging the new Maldives government on "all issues", the Ministry of External Affairs (MEA) said on Thursday, responding to the Maldivian President elect Mohamed Muizzu's statement that Indian military personnel would be asked to leave the islands



The Hindu

Global Internet freedom

According to a new report by Freedom House, a Washington-based nonprofit organisation, global Internet freedom has declined for the 13th consecutive year.

The environment for human rights online has deteriorated in 29 countries, with only 20 countries registering net gains.

The report, titled "Freedom on the Net 2023: The Repressive Power of Artificial Intelligence", has raised a

red flag on the increasing use of artificial intelligence by governments for censorship and spread of disinformation.

The report, the 13th edition of an annual study of human rights online, covers developments between June 2022 and May 2023.

It evaluates Internet freedom in 70 countries. As per the report, the sharpest rise in digital repression was witnessed in Iran, where authorities shut down Internet service, blocked WhatsApp and Instagram, and increased surveillance in a bid to quell anti--government protests.

China, for the ninth straight year, was ranked as the world's worst environment for Internet freedom, with Myanmar the world's second most repressive for online freedom.

People faced legal repercussions for expressing themselves online in a record 55 countries this year, and the number of countries where authorities carry out widespread arrests and impose multi-year prison terms for online activity has risen sharply over the past decade, from 18 in 2014 to 31 in 2023.

The report also detailed how elections were a trigger for digital repression.

Ahead of election periods, "many incumbent leaders criminalised broad categories of speech, blocked access to independent news sites, and imposed other controls over the flow of information to sway balloting in their favor," the report noted.

The Hindu

City of Homs

In the central Syrian city of Homs, "armed terrorist organisation" targeted "the graduation ceremony for officers of the military academy"

The Hindu

Sikkim floods

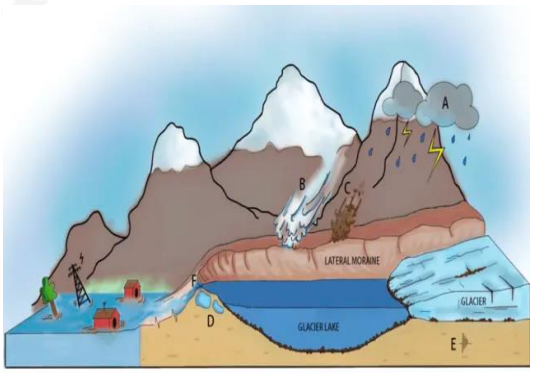


Figure-1: Illustrative graphic showing various reasons for GLOF occurrence
(A) Cloudburst (B) Snow avalanche (C) Landslide (D) Melting of ice in moraine
(E) Earthquake (F) Overflow

The lake outburst occurred in Lhonak lake in North Sikkim, resulting in a sudden and alarming rise in the water level of the Teesta River.

Glacial lakes are formed by melting glaciers and sudden discharge of large volumes of water and debris from them is termed glacial lake outburst flood or GLOF.

The inventory of glacial lakes in Sikkim Himalaya, prepared using temporal satellite data, shows the presence of 320 glacial lakes.

The situation in Sikkim has escalated further with damage to the Chungthang dam, causing a sudden overflow and a significant rise in water levels in the Teesta River.

Apart from the dams, numerous pharmaceutical companies and rampant unnecessary road widening, smart city projects and congested urban planning are putting more pressure on the ecology, he added.

"It is leading us to nowhere but environmental disasters."

According to satellite mapping studies, 21 glacial lakes in Sikkim, including Gurudongmar lake and Kangchung lake, have the potential to cause dangerous outburst floods in the region.

Glaciers in the Himalayan region are considered as the freshwater tower of South and East Asia and are strongly affected by the ongoing climate change.

However, Glacier retreat and mass loss have resulted in a rapid increase of unstable glacial lakes.

The Hindu

NDMA guidelines

Identify and Mapping Dangerous Lakes. Potentially dangerous lakes are often identified. This identification are going to be supported by field observations, past events, geomorphologic and geotechnical characteristics, etc.

Use of Technology:

It is recommended to utilize the Synthetic-Aperture Radar imagery. It will automatically detect changes in water bodies, including new lake

formations, during the monsoon months.

Structural Measures:

It recommends reducing the number of water with various methods to manage lakes structurally.

Methods are pumping or syphoning out water and making a tunnel through the moraine barrier or under an ice dam.

Land Use Planning:

In downstream areas, Infrastructure development should be monitored before, during, and after the construction.

Empowered Local Manpower:

Early Warning System:

Emergency response team

The Hindu

Climate change & Amphibian

Climate change is emerging as one of the biggest threats to frogs, salamanders, and caecilians.

The study titled 'Ongoing declines for the world's amphibians in the face of emerging threats' was published on October 4 in the scientific journal, Nature

The data revealed that two out of every five amphibians are threatened with extinction.

These data will be published on the IUCN Red List of Threatened Species. Between 2004 and 2022, a few critical threats have pushed more than 300 amphibians closer to extinction,

Climate change is especially concerning for amphibians in large part because they are particularly sensitive to changes in their environment, the study said.

"As humans drive changes in the climate and to habitats, amphibians are becoming climate captives, unable to move very far to escape the climate change induced increase in frequency and intensity of extreme heat, wildfires,

Consultative Group on International Agricultural Research (CGIAR)

A four day long conference, hosted by the Consultative Group on International Agricultural Research (CGIAR) and the Indian Council of Agricultural Research (ICAR) to begin here on Monday, will discuss lack of access to women farmers to land rights, farm inputs and the inequality in agriculture.

President Droupadi Murmu will inaugurate the conference, which will be attended by agriculture scientists, farmers and policy makers from about 60 countries

CGIAR is a global partnership that unites international organisations engaged in research about food security. CGIAR

research aims to reduce rural poverty, increase food security, improve human health and nutrition, and sustainable management of natural resources.

Its research is carried out by 15 CGIAR centres in close collaboration with hundreds of partners, including national and regional research institutes, civil society organisations, academia, development organisations and the private sector.

Founded: 1971

Founder: Forrest F. Hill

Type of business: Partnership of funders and international agricultural research centres; Intergovernmental Organization

Formerly called: Consultative Group on International Agricultural Research.

The Hindu

Nobel prize in Peace

The 2023 Nobel Peace Prize has gone to jailed Iranian activist Narges Mohammadi for "her fight against the oppression of women in Iran and her fight to promote human rights and freedom for all."

Mohammadi has long campaigned for women's rights and for the abolition of the death penalty.

The Hindu

Nuclear test ban treaty

Nuclear Test-Ban Treaty, formally Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water, treaty signed in Moscow on August 5, 1963, by the United States, the Soviet Union, and the United Kingdom that banned all tests of nuclear weapons except those conducted underground.

The origins of the treaty lay in worldwide public concern over the

danger posed by atmospheric radioactive fallout produced by the aboveground testing of nuclear weapons.

This problem had become an important public issue by 1955, but the first negotiations to ban nuclear tests foundered on differing proposals and counter proposals made by the United States and the Soviet Union, which were the two dominant nuclear powers at the time.

The Hindu

Inflation and impact

Effects Of Rising Inflation Rates

Lost Purchasing Power

The most obvious impact of inflation is the loss of purchasing power. As purchasing power erodes, many feel the impacts on their budget. But those on a low income or fixed income often feel the effect the most.

Higher Interest Rates

Higher Prices For Everything

When everything is more expensive, the impacts are felt by everyone.

Economic Growth Slows

As inflation runs rampant, the Fed tightens its monetary policy. With the money supply drying up, credit becomes more expensive and credit requirements tighten. The cost to borrow money is intentionally increased with the hope that this will decrease consumer spending and slow inflation.

Anti-Inflationary Measures Can Cause A Recession

If the market isn't ready for the Fed's actions, that can mean lower economic growth for the country. When this happens for one quarter, it is usually referred to as a contraction.

But if this happens for two quarters in a row, it is generally considered the start of a recession.

The Hindu

NEP and SDGs

The United Nations Sustainable Development Goals (SDGs) are a set of 17 goals with 169 targets that all 193 UN member states have agreed to try to achieve by 2030.

The SDGs Report 2023 flagged slow progress and painted a grim picture due to the prolonged effects of COVID19, impacts of the climate crisis, the Russia Ukraine conflict, and a weak global economy.

The Hindu

NEP 2020 and SDGs

Yet, recent actions and policies indicate that India is committed towards realising SDGs.

SDG4 pertains to access to quality education.

It is a prerequisite for the achievement of other goals.

India, with a long standing history of equitable and inclusive education, has accelerated efforts to ensure the achievement of SDGs through various reforms.

Among them, the National Education Policy (NEP) 2020 should be given credit to a great extent.

NEP 2020 calls for changes at all levels of education, priority should be accorded to higher education as it accelerates social mobility, empowers people through creativity and critical thinking, and grants them employment skills.

According to data from the Organisation for Economic

Co-operation and Development (OECD), people with a higher education degree are more employable and earn an average of 54% more than those who only have completed senior secondary education.

A university inclusive education, thus, better protects people against poverty (SDG1), prevents them from hunger (SDG2), supports them for good health and wellbeing (SDG3), promotes gender equality (SDG5), provides them decent work, which in turn drives economic growth (SDG 8), and reduces inequalities (SDG10)

Education produce multitalented people who can pursue research, and find innovative solutions to global challenges such as affordable and clean energy (SDG7), sustainable cities and communities (SDG11), climate change and global warming (SDG13), as well as studying their impact on an economy and the earth.

Sustainable development is possible only if we radically change the way we produce and consume (SDG12).

Innovative solutions and start ups (SDG 9) must be developed in collaboration with private companies.

The Hindu

Current Affairs 8th October 2023 by Saurabh Pandey

Xenotransplantation and Retrovirus

Modifying the pig genomes to remove antigen coding genes, add human genes and eliminate pig viruses, resulted in long- term survival of the monkey recipients, up to around two years.

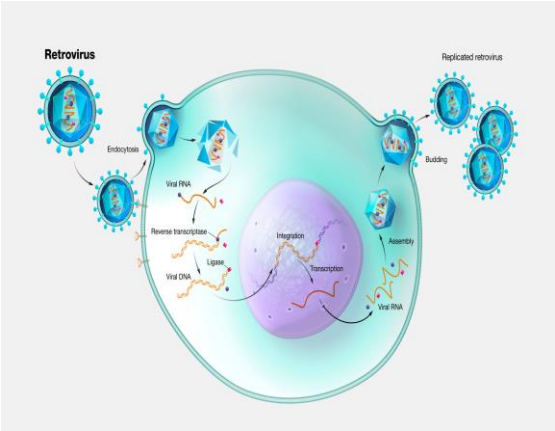
The transplantation of animal organs into humans (xenotransplantation) may offer a solution to the worldwide organ shortage.

Previous work has identified three glycan antigens expressed in pigs that are recognized by human antibodies and attacked, leading to rejection of the organ.

The porcine endogenous retrovirus has also been identified as a risk for transmission into humans.

Retrovirus

A retrovirus is a type of virus that inserts a DNA copy of its RNA genome into the DNA of a host cell that it invades, thus changing the genome of that cell.



LIDAR Technology

Researchers searched 5,315 sq. km of LIDAR survey data and discovered 24 unreported human made earthworks, including fortified villages, in regions across the Amazon basin (Science). But the LIDAR survey data covered only 0.08% of the total area of Amazonia.

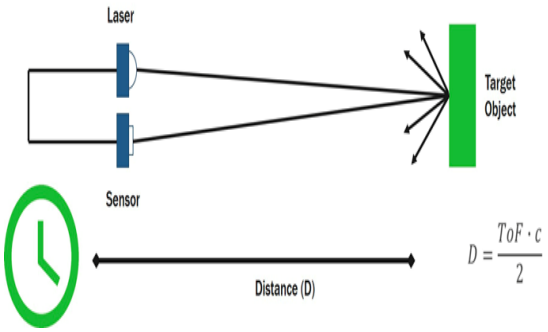
LiDAR is an acronym for Light Detection and Ranging. In LiDAR, laser light is sent from a source (transmitter) and reflected from objects in the scene.

The reflected light is detected by the system receiver and the time of flight (TOF) is used to develop a distance map of the objects in the scene.

The Hindu

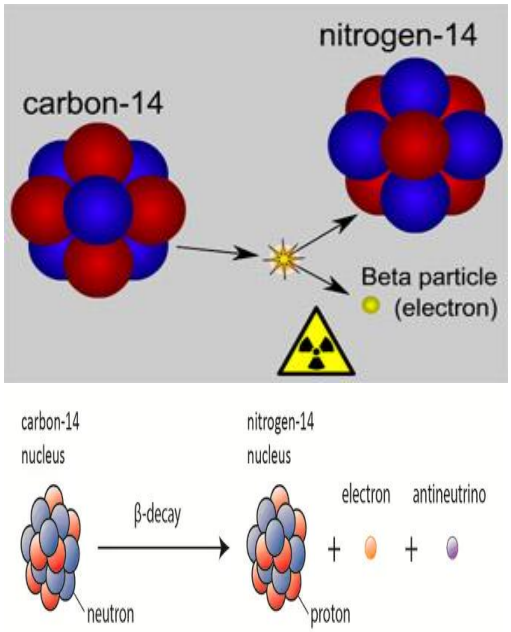
Carbon 14

New radiocarbon (Carbon14) and optically stimulated luminescence ages have confirmed the controversial antiquity of the ancient human footprints discovered in



White Sands National Park, and reported in a study in 2021.

Carbon-14, the longest-lived radioactive isotope of carbon, whose decay allows the accurate dating of archaeological artifacts. The carbon-14 nucleus has six protons and eight neutrons, for an atomic mass of 14.



The Hindu

White Sands National Park

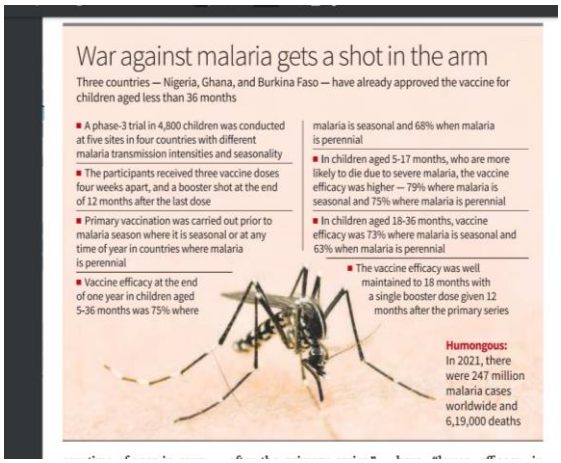
White Sands National Park is an American national park located in the state of New Mexico and completely surrounded by the White Sands Missile Range.

The Hindu

Malaria vaccine

A malaria vaccine R21/MatrixM developed by the University of Oxford, manufactured by the Pune- based Serum Institute of India and tested in a phase- 3 trial at five sites in four countries Mali, Burkina Faso, Kenya, and Tanzania in Africa was recommended (but yet to be pre-qualified) by the WHO on October 2.

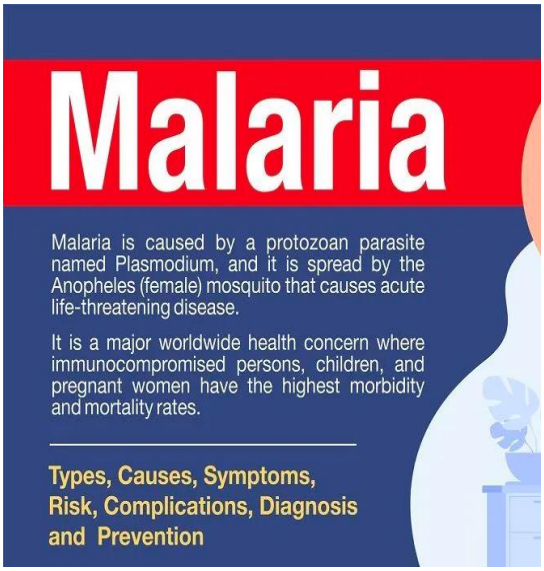
Three countries Nigeria, Ghana, and Burkina Faso have already approved the use of the vaccine to immunize children aged less than 36 months.


War against malaria gets a shot in the arm

Three countries — Nigeria, Ghana, and Burkina Faso — have already approved the vaccine for children aged less than 36 months

- A phase-3 trial in 4,800 children was conducted at five sites in four countries with different malaria transmission intensities and seasonality
- The participants received three vaccine doses four weeks apart, and a booster shot at the end of 12 months after the last dose
- Primary vaccination was carried out prior to malaria season where it is seasonal or at any time of year in countries where malaria is perennial
- Vaccine efficacy at the end of one year in children aged 5-36 months was 75% where malaria is seasonal and 68% when malaria is perennial
- In children aged 5-17 months, who are more likely to die due to severe malaria, the vaccine efficacy was higher — 79% where malaria is seasonal and 75% where malaria is perennial
- In children aged 18-36 months, vaccine efficacy was 73% where malaria is seasonal and 63% when malaria is perennial
- The vaccine efficacy was well maintained to 18 months with a single booster dose given 12 months after the primary series

Humongous: In 2021, there were 247 million malaria cases worldwide and 6,19,000 deaths



The Hindu

Plastic pollution

It was in 1907 that the Belgian scientist Leo Baekeland synthesized the first plastic using formaldehyde and phenol, called it

Bakelite, mass produced it and marketed it.
The UN Environment Programme (UNEP) points out that every day, the equivalent of 2,000 garbage trucks full of plastic are dumped into the world's oceans, rivers, and lakes. Plastic pollution is a global problem. Every year, 19-23 million tonnes of plastic waste leaks into aquatic ecosystems, polluting lakes, rivers and seas.

Plastic pollution can alter habitats and natural processes, reducing ecosystems' ability to adapt to climate change, directly affecting millions of people's livelihoods, food production capabilities and social well-being.

The UNEP points out that the environmental, social, economic and health risks of plastics need to be assessed alongside other environmental stressors, like climate change.
Recycling of plastics is a method for production of the vital resource of liquid and gaseous fuels.
Thermal and catalytic degradation, and gasification are alternative methods for recycling of plastic waste to produce fuel having properties similar to commercial fuels.

The Hindu

Umami as sixth taste

Japanese scientist Kikunae Ikeda first proposed umami as a basic taste in addition to sweet, sour, salty and bitter in the early 1900s.
About eight decades later, the scientific community officially agreed with him.
Now, scientists have evidence of a sixth basic taste.
In a study published recently, researchers have found that the tongue responds to ammonium chloride through the same protein receptor that signals sour taste.
Scientists have for decades recognized that the tongue responds strongly to ammonium chloride.
That protein, called OTOP1, sits within cell membranes and forms a channel for hydrogen ions moving into the cell.

The Hindu

Sikkim flood

The voluminous outflow has destroyed the Chungthang dam, which is critical to the Teesta 3 hydropower project, and rendered several hydropower projects along the river dysfunctional.

What is a glacier lake outburst?

Technically called a Glacier Lake Outburst Flood (GLOF), these are instances of large lakes formed from the melting of glaciers, suddenly breaking free of their moraine natural dams that are formed from rock, sediment and other debris.

The South Lhonak glacier, located in north Sikkim, is reportedly one of the fastest retreating glaciers.

The National Disaster Management Agency reports that "...the primary reason for the sudden surge appears to be a likely combination of excess rainfall and a GOLF event.

There is speculation that heavy rainfall might have tipped the moraine to collapse and trigger the flood but meteorological records don't reveal any evidence of such heavy rain

There is also a suggestion that a series of earthquakes in Nepal on October 3, in the afternoon (whose tremors jolted several in the Delhi National Capital Region) might have played a role.

While the Teesta river is a source of hydropower generation for several power projects, the risk of GLOF-like events requires greater care in planning and executing dams and other infrastructure projects, which account for the huge amount of water that can potentially gush through the mountains. Early warning systems are implementable.

The Hindu

Digital India Act 2023 (DIA)

The recent announcement of the Digital India Act 2023 (DIA) represents a significant step towards establishing a future ready legal framework for the country's burgeoning digital ecosystem.

The primary motivation behind the DIA is to bring India's regulatory landscape in sync with the digital revolution of the 21st century.

The IT Act of 2000, crafted during a time when the internet was in its infancy, has struggled to keep pace with the rapid changes in technology and user behaviour.

Since its inception, India's internet user base has exploded from a mere 5.5 million to a staggering 850 million.

Key provisions

Firstly, it places a strong emphasis on online safety and trust, with a commitment to safeguarding citizen's rights in the digital realm while remaining adaptable to shifting market dynamics and international legal principles.

Secondly, recognizing the growing importance of new age technologies such as artificial intelligence and block chain, the DIA provides guidelines for their responsible utilization.

Through this, it aims to not only encourage the adoption of these technologies but also to ensure that their deployment is in line with ethical and legal principles.

Thirdly, it upholds the concept of an open internet, striking a balance between accessibility and necessary regulations to maintain order and protect users

Lastly, it contemplates a review of the "safe harbor" principle, which presently shields online platforms from liability related to user-generated content, indicating a

potential shift in online accountability standards.

The myriad challenges

One key concern is the potential impact on innovation and the ease of doing business. Stricter regulations, particularly in emerging technologies, could inadvertently stifle entrepreneurial initiatives and deter foreign investments.

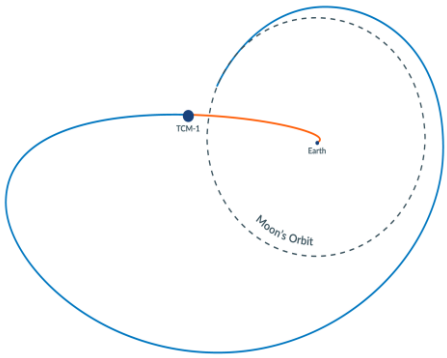
Additionally, the review of the "safe harbor" principle, which shields online platforms from liability for user- generated content, could lead to a more cautious approach among these platforms, possibly impinging on freedom of expression.

Furthermore, the DIA's success hinges on effective enforcement, which will require substantial resources, expertise, and infrastructure.

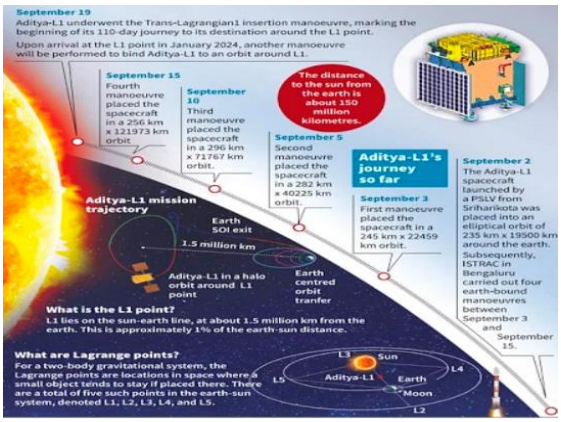
The Hindu

Trajectory correction of Aditya L1

The Indian Space Research Organisation (ISRO) has performed a trajectory correction man oeuvre on the Aditya-L1 spacecraft which is headed to the Lagrangian-1 (L1) point between sun and earth.



It was needed to correct the trajectory evaluated after tracking the Trans-Lagrangian Point 1 Insertion (TL1I) maneuver performed on September 19, 2023, it added.



The Hindu

Dhole

The dhole or Asiatic wild dog (Cuon alpinus) is the only endangered wild pack- living canid in the tropical Indian forests and is considered at high risk of extinction.

The study through camera traps by Urjit Bhatt and Salvador Lyngdoh at Manas National Park in Assam also revealed that the diurnal activity of the dholes had the highest temporal overlap with leopards and the lowest with clouded leopards.

Sympatric refers to animals, plant species, and populations within the same or overlapping geographical areas.

Dholes were once widespread across southern and eastern Asia.

Factors such as habitat loss, declining prey availability, persecution, disease, and inter specific competition have contributed to the ongoing fragmentation of its populations.

The global population of adult dholes, now classified as endangered on the International Union for Conservation of Nature's Red List, is estimated to be between 949 and 2,215.

The hypotheses included conflict with humans on the periphery of protected areas as the primary threat to dholes, higher habitat utilization where small- medium prey species such as rodents, hares, and rhesus macaques are found, and a negative relationship between dhole habitat use and other large carnivores

Listed under the Endangered category of the IUCN Red List, the dhole is a wild canid found in the forests of central, south, and southeast Asia.

Dholes have historically been overlooked, with very few studies that document their ecology and conservation requirements.

Dhole population face threats primarily from human disturbances and habitat loss. Other threats include prey base reduction and

retaliatory killings in some parts of North East India and Southeast Asia.

The Hindu

Consanguinity & Autosomal recessive Disorder

Consanguinity is the characteristic of having a kinship with a relative who is descended from a common ancestor.

Many jurisdictions have laws prohibiting people who are related by blood from marrying or having sexual relations with each other

Consanguinity is the kinship of two individuals characterized by the sharing of common ancestor(s).

Consanguinity is both a social and genetic concept.

Generally, it refers to marriage or a reproductive relationship between two closely related individuals.

The degree of relatedness between two individuals defines the proportion of genes shared between them.

The offspring of consanguineous couples are at increased risk for autosomal recessive disorders due to their increased risk for homozygosity by descent.

Autosomal recessive is a pattern of inheritance characteristic of some genetic disorders. “Autosomal” means that the gene in question is located on one of the numbered, or non-sex, chromosomes.

“Recessive” means that two copies of the mutated gene (one from each parent) are required to cause the disorder.

In a family where both parents are carriers and do not have the disease, roughly a quarter of their children will inherit two disease-causing alleles and have the disease.

By contrast, an autosomal dominant disorder requires only a single copy of the mutated gene from one

parent to cause the disorder. Sickle cell anemia is an example of an autosomal recessive genetic disorder.

The Hindu

Phono taxis

The click of crickets in the evening or frogs croaking during the monsoon might sound random or even annoying, but they have a good reason for making these sounds.

Scientists call it phonotaxis: the movement by an animal in response to a sound. It has mostly been observed among crickets, moths, frogs, toads, and a few other creatures.

There are two types of phonotaxis: positive and negative. The purpose of positive phonotaxis is attraction.

It usually happens when the females of a particular species including those of crickets and frogs are attracted to the sounds made by the males.

Negative phonotaxis, on the other hand, serves to repel or warn, such as when the sound of a predator nearby signals to an animal that it needs to move away

The Hindu

Current Affairs 10th October 2023 by Saurabh Pandey

Scheduled area

India's 705 Scheduled Tribe (ST) communities making up 8.6% of the country's population live in 26 States and six Union Territories.

Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.

Article 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram.

The Sixth Schedule applies to these States as per Article 244(2).

What are Scheduled Areas?

Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh

How are Scheduled Areas governed?

The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.

They will advise the Governor on matters referred to them regarding ST welfare.The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

The national government can give directions to the State regarding the administration of Scheduled Areas.

The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.

The Governor can also make regulations for a Scheduled Area,

especially to prohibit or restrict the transfer of tribal land by or among members of the STs, and regulate the allotment of land to STs and money- lending to STs.

Panchayats (Extension to Scheduled Areas) Act, or PESA, in 1996 - PESA empowered the gram sabhas to exercise substantial authority through direct democracy, and stated that structures "at the higher level do not assume the powers and authority" of the gram Sabha.

Who decides a Scheduled Area?

The Fifth Schedule confers powers exclusively on the President to declare any area to be a Scheduled Area.

In 2006, the Supreme Court held that "the identification of Scheduled Areas is an executive function" and that it doesn't "possess the expertise … to scrutinise the empirical basis of the same".

In 2016, the Jharkhand High Court dismissed a challenge to the notification of a Scheduled Area because the ST population there was less than 50% in some blocks.

The court observed that the declaration of a Scheduled Area is "within the exclusive discretion of the President".

How are Scheduled Areas identified?

Neither the Constitution nor any law provides any criteria to identify Scheduled Areas. However, based on the 1961 Dhebar Commission Report, the guiding norms for declaring an area as a Scheduled area are preponderance of tribal population; compactness and reasonable size of the area; a viable administrative entity such as a district, block or taluk; and economic backwardness of the area relative to neighboring areas.

No law prescribes the minimum percentage of STs in such an area nor a cut-off date for its identification.

This said, the 2002 Scheduled Areas

and Scheduled Tribes Commission had recommended that “all revenue villages with 40% and more tribal population according to the 1951 Census may be considered as Scheduled Area (sic) on merit”.

The Bhuria Committee recognized a face -to- face community, a hamlet or a group of hamlets managing its own affairs to be the basic unit of self-- governance in Scheduled Areas.

But it also noted that the most resource rich tribal- inhabited areas have been divided up by administrative boundaries, pushing them to the margins.

Therefore, determining the unit of the area to be considered whether a revenue village, panchayat, taluka or district, with an ST- majority population gave way to arbitrary politico- administrative decisions.

The Hindu

Multimode AI

On September 25, ChatGPT-maker OpenAI announced that it had enabled its GPT-3.5 and GPT-4 models to study images and analyse them in words, while its mobile apps will have speech synthesis so that people can have full-fledged conversations with the Chabot.

The Microsoft-backed company had promised multimodality in March, during the release of GPT-4 and kept the addition on the backburner.

Applications of multimodal AI Some of the earlier multimodal systems combined computer vision and natural language processing models or audio and text together to perform some of the simpler but rather important functions like automatic image caption generation etc.

And even if these multimodal systems weren’t an all- powerful model like GPT-4 gunning for the ultimate dream of artificial general intelligence (AGI), they carried enough value to address very real -world problems

Meta announced a new open

-source AI multimodal system called Image Bind that had many modes text, visual data, audio, temperature and movement readings.

The Hindu

James web telescope

Since beginning operations last year, the James Webb Space Telescope has provided an astonishing glimpse of the early history of our universe, spotting a collection of galaxies dating to the enigmatic epoch called cosmic dawn.

James Webb Space Telescope (JWST)

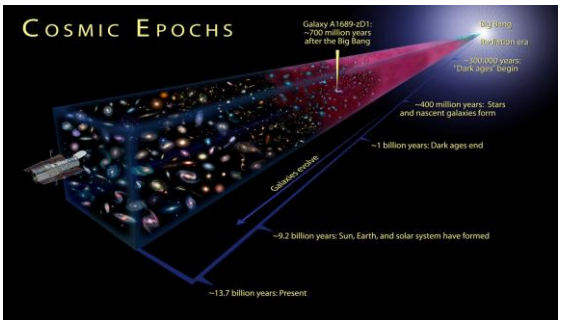
The James Webb Space Telescope (JWST) is a space telescope designed primarily to conduct infrared astronomy.

The U.S. National Aeronautics and Space Administration (NASA) led development of the telescope] in collaboration with the European Space Agency (ESA), and the Canadian Space Agency (CSA).

The JWST was launched 25 December 2021 on an ESA Ariane 5 rocket from Kourou, French Guianaand is intended to succeed the Hubble Space Telescope as NASA's flagship mission in astrophysics.

The telescope is named after James E. Webb, who was the administrator of NASA from 1961 to 1968 during the Mercury, Gemini, and much of the Apollo programs.

It provides improved infrared resolution and sensitivity over Hubble, viewing objects up to 100 times fainter than the faintest detectable by Hubble.



The Hindu

Cosmic Dawn

One of the most important gaps in our understanding of our Universe's history is the "Cosmic Dawn."

The period from about 50 million years to one billion years after the Big Bang when the first stars, black holes, and galaxies in the Universe formed.

One of the best ways to observe this era is with low-frequency radio telescopes, which can observe the "spin-flip" radiation from the hydrogen that pervades the Universe during the Cosmic Dawn.

Nobel prize in economics

The Nobel Prize for economics was awarded to Harvard University professor Claudia Goldin on Monday for her research that has advanced the understanding of the gender gap in the labour market.

Ms. Goldin is just the third woman to win the prize out of 93 economics laureates.

She has studied 200 years of women's participation in the workplace, showing that despite continued economic growth, women's pay did not continuously catch up to men's and a divide still exists despite women gaining higher levels of education than men. Goldin's research does not offer solutions, but it allows policymakers to tackle the entrenched problem.

What happens in people's homes reflects what happens in the workplace, with women often taking jobs that allow them to be on call at home work that often pays less. "Ways in which we can even things out or to create more couple equity also leads to more gender equality," she said.

In Ms. Goldin's analysis, a woman's role in the job market and the pay she receives aren't influenced just by broad social and economic changes. They also are determined partly by her individual decisions about, for example, how much education to get.

Often young girls make decisions about future work by looking at their own mother's participation, each generation "learning from the

successes and failures of the preceding generation.

The Hindu

Myanmar border

An advanced smart fencing system of 100 km along the Myanmar border is in the pipeline to strengthen the existing surveillance system, the 2022-23 annual report of the Ministry of Home Affairs (MHA)

Unfenced border and unregulated migration from Myanmar have been attributed as some of the factors responsible for the ethnic violence in Manipur. Manipur is affected by the activities of Meitei, Naga, Kuki, Zomi, Hmar insurgent groups.

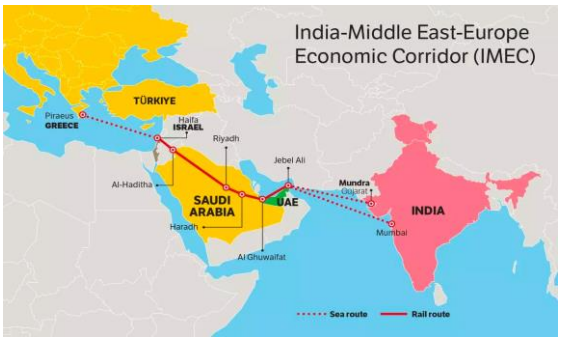
A total of 23 UG [underground] outfits under two conglomerates [United Peoples' Front [UPF] -8 and Kuki National Organisation [KNO] -15] are under Suspension of Operation [SoO] pact with the Government of India since August 2008," the report said."

The MHA said that a Free Movement Regime (FMR) exists between India and Myanmar.

"Under the FMR, every member of the hill tribes, who is either a citizen of India or a citizen of Myanmar and who is resident of any area within 16 km on either side of the Indo-Myanmar border can cross the border on production of a border pass (one-year validity) issued by the competent authority and can stay up to two weeks per visit.

The Hindu

IMEC and Israel-Hamas conflict



Current Affairs 10th October 2023 by Saurabh Pandey

The extraordinary level of hostilities between Israel and Hamas is expected to cast a shadow on two of the major initiatives that the country has launched with India and other stakeholders.

A highly placed source here said that both the I2U2 (India, Israel, U.S. and United Arab Emirates) and IMEC (India Middle East EU Economic Corridor) that were aimed at creating new partnerships for India's post-COVID economic plans are expected to suffer because of the Hamas attack on Israel.

"Both I2U2 and IMEC are expected to be impacted,"

Hamas had placed a question mark on Israel's ability to provide stable conditions for mega infrastructure and financial initiatives.

I2U2 was started in October 2021 and it found concrete expression when leaders of the four participating countries issued

The I2U2 was planning to begin food parks in Gujarat and Madhya Pradesh and was expected to focus on a hybrid renewable energy project in Gujarat.

The July 2022 statement mentioned that the U.S. would invest $2 billion in Indian projects that are backed by Israeli technology.

The ambitious initiative was being viewed as an outcome of the Abraham Accords of September 15, 2020 that was aimed at creating conditions of cooperation between Israel and Arab states like the United Arab Emirates and Bahrain.

The Hindu

Nobel prize in economics

The most significant of her observations was that female participation in the labour market did not exhibit an upward trend over the entire period, but rather a U -shaped curve.

In other words, economic growth ensuing in varied periods did not translate to reducing gender differences in the labour market.

She demonstrated that several factors have historically influenced and still influence the supply and demand for female labour. These include opportunities for combining paid work and a family, decisions (and expectations) related to pursuing education and raising children, technical innovations, laws and norms, and the structural transformation in an economy

She also observed that prior to the advent of industrialisation in the nineteenth century, women were more likely to participate in the labour force.

This was because industrialisation had made it harder for married women to work from home since they would not be able to balance the demands of their family.

Even though her research held that unmarried women were employed in manufacturing during the industrial era, the overall female force had declined.

The beginning of the twentieth century marked the upward trajectory for female participation in the labour force.

According to Professor Goldin, technological progress, the growth of the service sector and increased levels of education brought an increasing demand for more labour.

However, social stigma, legislation and other institutional barriers limited their influence.

Two factors are of particular importance here, namely, "marriage bars" (the practice of firing and not hiring women once married) and prevalent expectations about their future careers.

The former, according to Professor Goldin, peaked during the 1930s' Great Depression and the ensuing years — preventing women from continuing as teachers or office workers.

About expectations, Professor Goldin notes that women at varied points were subject to different circumstances when deciding on their life choices

According to Professor Goldin, pay discrimination (that is, employees being paid differently because of factors such as colour, religion or sex, among others) increased significantly with the growth of the services sector in the twentieth century.

This was surprising at a time when the earnings gap between men and women had decreased and when piecework contracts were being increasingly replaced with payments on a monthly basis.

The Hindu

WACE Pattern

Climate scientists also use the term 'secular trend', which is to say that a variable has been increasing for a certain period within a longer span, such as for 30 years in a 100year period.

Then there is 'decadal variability', a common term that isn't entirely distinct from a shift.

Decadal variability refers to an oscillation from a positive to a negative phase on the order of tens of years

Cyclone Genesis – or cyclogenesis – is an indicator that denotes the

chance of a cyclone forming.

It depends on some parameters, including the sea surface temperature, the ocean heat content, change in winds from the surface into the upper atmosphere (or the vertical shear), and rotation of winds near the surface.

If these conditions line up, they will sow the seed for a cyclone, but we still don't fully understand why some seeds sprout and grow into cyclones and some don't.

This said, all these factors except for wind rotation have seemingly favoured a higher cyclone formation potential since the 1990s. The crucial question is why this rapid increase occurred around this time.

The present study notes that the rapid increase in the cyclogenesis potential over the Arabian Sea coincides with a shift in the so-called 'Warm Arctic, Cold Eurasian', or WACE, pattern.

Again: a shift rather than a trend.

WACE is a pattern of warm surface temperatures over the Arctic and a large blob of cold surface temperatures over Eurasia. This pattern is associated with upper level circulation changes that reach into the Indian Ocean sector.

Global warming also experienced a slowdown around the same time (although this continues to be debated).

More interestingly, scientists have argued that a so-called 'regime shift' occurred in the same period as well.

Such shifts are not unheard of; a similar event was noted in the mid1970s.

The expectations with which we invest in resources to adapt to future climate risks are vexed by many difficulties, including those

arising from uncertainties in climate risk at the level of specific regions across the country, visavis sea level rise, heavy rain, drought, heatwaves, and cyclones.

Of course, given our limited financial resources, climate adaptation remains a considerably monumental socioeconomic and political challenge.

The Hindu

Rainbow pattern

If the rain has been heavy, the bow may spread across the sky and its two ends seem to rest on the earth below.

The cause of this interesting phenomenon is the reflection and refraction of the sun's rays as they fall on drops of rain.

As a ray passes into a drop of rain, the water acts like a tiny prism.

The ray is bent, or refracted, as it enters the drop and is separated into different colours.

As it strikes the inner surface of the drop, it is further reflected and dispersed.

Each colour is formed by rays that reach the eye at a certain angle, and the angle for a particular colour never changes.

The higher the sun the lower the bow. If the Sun is higher than 40 degrees, no bow can be seen.

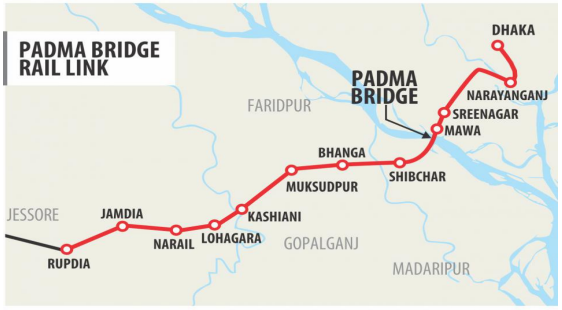
The Hindu

Padma Bridge

Bangladesh Prime Minister Sheikh Hasina inaugurated the 82km Padma Bridge Rail Link, the country's largest infrastructure project built under China's Belt and Road Initiative.

Ms. Hasina unveiled the Dhaka

Bhanga section of the rail route between Dhaka and Jashore through the Padma Bridge from Mawa Railway Station in Munshiganj



The Hindu

Sonobuoy

A sonobuoy is a small device used for underwater acoustic surveillance. It contains hydrophones that detect underwater sounds, especially those made by submarines. These devices are deployed from aircraft or ships and transmit real-time acoustic data, helping pin-point potential submarine threats.

The Hindu

Amended the Information Technology Rules, 2021

In April this year, the Ministry of Electronics and IT (MEiTY) promulgated the 2023 IT Rules, which amended the Information Technology Rules, 2021, and allowed the Ministry to appoint a fact checking unit.

What does the amendment say?

The amendment brings about significant changes to Rule 3(1)(b)(v) of the IT Rules, 2021, which deals with the responsibilities of intermediaries.

They are now under an obligation to make "reasonable efforts" to ensure that users do not "host, display, upload, modify, publish, transmit, store, update, or share any information" which is "identified as fake or false or misleading by a fact check unit of the Central government" in respect of "any business of the Central government."

Failure to comply with this puts intermediaries at risk of losing the safe harbour protection provided under Section 79 of the IT Act, 2000. The safe harbour safeguard exempts intermediaries from liability for any third-party information made available or hosted by them.

What did the High Court say?

Early on in the proceedings, in April, the Bombay High Court observed that the amended Rules, no matter how well-intentioned, lack necessary safeguards.

The Court expressed the opinion that prima facie, the Rules do not seem to offer protection for fair criticism of the government like parody and satire.

Highlighting the ambiguity surrounding the term "any business of the Central government," the Court wondered if speeches made ahead of the 2024 Lok Sabha

elections would fall within its ambit.

It then enquired if publications questioning the veracity of such political speeches would be covered by the amendment, thus empowering the government to identify "fake.

The Hindu

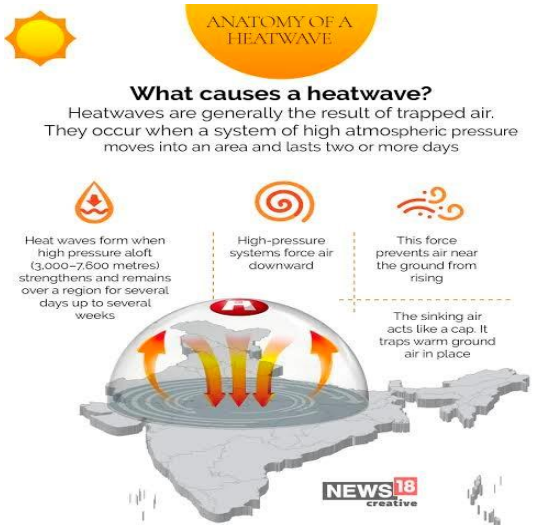
Surgical site infection

What is a surgical site infection?

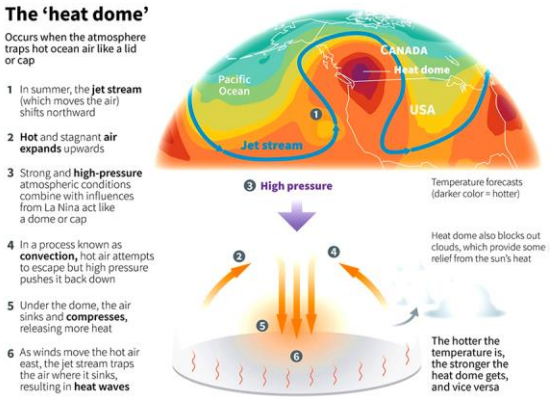
A surgical site infection is a common complication in surgeries worldwide. It is an infection that occurs at the site of a surgery in the body. It could be a superficial skin infection or a deeper one, involving tissues. About 11% of patients who undergo surgery contract such infections, according to a 2018 WHO report. A substantial number of surgical site infections occur in semi -urgent and emergency surgeries, and the financial burden associated with these infections is significant for patients in India, where insurance coverage is low and out -of -pocket expenses are high.

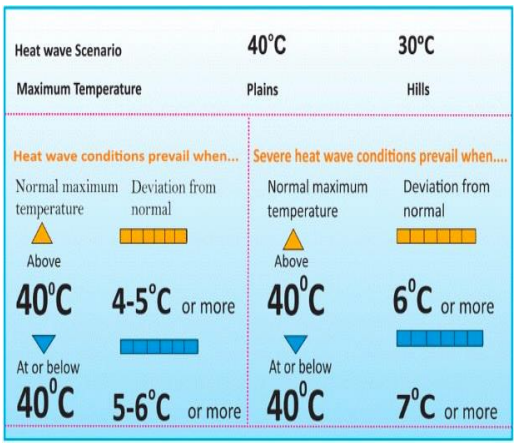
The Hindu

Heat waves



When maximum temperature reaches **40°C in plains** and at least **30°C in hilly Regions.**
i) Based on Departure from Normal ➢ **Heat Wave:** Departure from normal is **4.5°C to 6.4°C.** ➢ **Severe Heat Wave:** Departure from normal is **>6.4°C** or **more.**
ii) Based on Actual Maximum Temperature ➢ **Heat Wave:** When actual maximum temperature **≥ 45°C.** ➢ **Severe Heat Wave:** When actual maximum temperature **≥47°C.**
iii) Criteria for describing Heat Wave for coastal stations When maximum temperature departure is **4.5°C or more** from normal, Heat Wave may be described provided actual maximum temperature is **37°C or more.**





Billions of people could struggle to survive in periods of deadly, humid heat within this century as temperatures rise, particularly in some of the world's largest cities, from Delhi to Shanghai, according to research published.

Towards the higher end of warming scenarios, potentially lethal combinations of heat and humidity could spread further including into areas such as the U.S. Midwest, the authors of the report said

It found that around 750 million people could experience one week per year of potentially deadly humid heat if temperatures rise 2 degrees Celsius above pre- industrial levels.

At 3C of warming, more than 1.5 billion people would face such a threat

The world is on track for 2.8 C of warming by 2100 under current policies, according to a 2022 United Nations report.

While India, Pakistan, and the Gulf have already briefly touched dangerous humid heat in recent years, the study found it will afflict major cities from Lagos to Chicago if the world keeps heating up.

The Hindu

BRI

India is likely to skip China's third summit marking President Xi Jinping's signature Belt and Road Initiative (BRI), which, Beijing announced on Wednesday, will be held on October 17 in the Chinese capital. China's Belt and Road Initiative (BRI), sometimes referred to as the New Silk Road, is one of the most ambitious infrastructure

projects ever conceived. Launched in 2013 by President Xi Jinping, the vast collection of development and investment initiatives was originally devised to link East Asia and Europe through physical infrastructure. In the decade since, the project has expanded to Africa, Oceania, and Latin America, significantly broadening China's economic and political influence. Some analysts see the project as an unsettling extension of China's rising power, and as the costs of many of the projects have skyrocketed, opposition has grown in some countries.

The Hindu

Fish Mint

The herb which is believed to be a native of Southeast Asia grows easily on moist soils and is resistant to flooding. A herb with beautiful white flowers and broad, heart-shaped leaves. Unlike its appearance, it has a fish-like taste and smell. Hence, the name, fish mint.

One is the Chinese variety which is common to China and Vietnam. It

has a strong, coriander-like aroma and the roots are used as a vegetable. The second is the Japanese variety, which is distributed from Nepal to Japan. This one has a lemon-ginger like aroma and is used in salads and fish recipes. In India, fish mint is used in the Northeastern states and is known by different names across the region. In Meghalaya, it is known as ja mardoh whereas it is commonly called tokning-khok in Manipur. The herb is used in vegetables and salads in both the states. In Assam, where the herb is known as masunduri, the tangy leaves are believed to be rich in

vitamins and help to alleviate symptoms of jaundice, pneumonia or simple stomach infections.

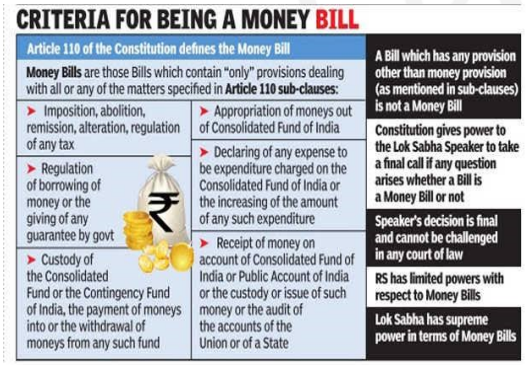
The Hindu

Money bill

The seven judge Bench is hearing the Money Bill question based on a reference made in November 2019 by a five judge Bench headed by then Chief Justice Ranjan Gogoi in the case of Rojer Mathew vs. South Indian Bank Ltd.

The cardinal issue is whether such amendments could be passed as a Money Bill, circumventing the Rajya Sabha, in violation of Article 110 of the Constitution.

A Money Bill is deemed to contain



only provisions dealing with all or any of the matters under clauses (a) to (g) of Article 110(1), largely including the appropriation of money from the Consolidated Fund of India and taxation.In other words, a Money Bill is restricted only to the specified financial matters.The question of passage of laws after dressing them up as Money Bills had come up in the Aadhaar case too. However, the top court had, in a majority verdict in 2021, refused to review its 2018 judgement (K. Puttaswamy case) upholding the validity of the Aadhaar Act and its certification as a Money Bill.

The Hindu

India stand on palestine

India believes in its long-standing support for the establishment of a "sovereign, independent and viable" state of Palestine.

"Our policy has been long standing and consistent. India always advocated the resumption of direct negotiations towards establishing a sovereign, independent and viable state of Palestine, living within secure and recognised borders, side by side at peace with Israel. I think that position remains the same,"

India's support for the Palestinian cause is an integral part of the nation's foreign policy.

In 1974, India became the first Non-Arab State to recognize Palestine Liberation Organization (PLO) as the sole and legitimate representative of the Palestinian people. In 1988, India became one of the first countries to recognize the State of Palestine.

In 1996, India opened its Representative Office to Palestine in Gaza City, which was later shifted to Ramallah in 2003.India has always played an active role in extending support for the Palestinian cause across various multilateral forums.

India co-sponsored the draft resolution on "the right of Palestinians to self-determination" and voted in favour of it during the 53rd session of the United Nations General Assembly (UNGA).

India also voted in favour of the UNGA Resolution in October 2003 against construction of the Separation Wall by Israel.

In 2011, India voted in favour of including Palestine as a full member of UNESCO.

India was one of the 128 countries that voted in favour of the UNGA Resolution on December 21, 2017 regarding the status of Jerusalem in the backdrop of American decisions to (i)recognize Jerusalem as the capital of Israel and (ii) shift the US Embassy from Tel Aviv to Jerusalem. India also voted in favour of the UNGA resolution Protection of the Palestinian Civilian Population on June 13, 2018.

Prime Minister Shri Narendra Modi paid a historic visit to Palestine on February 10, 2018, which was the first-ever visit by an Indian Prime Minister to Palestine.

Former President Shri Pranab Mukherjee paid a historic visit to

Palestine in October 2015, which was the first ever visit by an Indian President to Palestine.

There is also the responsibility to fight the menace of terrorism in all its forms and manifestations."

The first flight from Israel to bring back Indian citizens, under 'Operation Ajay', will land in India today.

The Hindu

Operation Litani

Operation Litani

In March 1978, Israel invaded southern Lebanon to push the

Palestinian militants north of the Litani River.

The attack came a few weeks after the Coastal Road massacre in which Palestinian militants hijacked a bus and killed 38 Israelis.

Israel pushed the Palestinian militants out of southern Lebanon and handed the territories to the South Lebanon Army, an Israeli proxy, and pulled back later in 1978.

But as attacks into Israel continued from southern Lebanon, Israel decided to invade Lebanon again, in 1982, but this time, it set ambitious goals for itself.

Israel wanted to eject the Palestinian Liberation Organisation (PLO) from Lebanon, remove Syrian influence from the country and establish a pro Israel government (of Bashir Gemayel) in Beirut

IIP

The Index of Industrial Production (IIP) is an index which shows the growth rates in different industry groups of the economy in a stipulated period of time.

The IIP index is computed and published by the Central Statistical Organisation (CSO) on a monthly basis.

IIP is a composite indicator that measures the growth rate of industry groups classified under,

1. Broad sectors, namely, Mining, Manufacturing and Electricity

2. Use-based sectors, namely Basic Goods, Capital Goods and Intermediate Goods.

Base Year for IIP is 2011-2012.The eight core industries of India represent about 40% of the weight of items that are included in the IIP.

Global Innovation Index (GII) 2023

Switzerland for a 13th year ranks first in the index.

Sweden is now second and the United States in third, followed by the United Kingdom (4th) and Singapore (5th), which enters the top 5.

According to the report, China, the sole middle-income economy within the top 30 is now ranked 12th while Japan is 13th.

India has retained its 40th spot in the latest Global Innovation Index 2023 released by the World Intellectual Property Organisation (WIPO). The index tracks the innovation ecosystem performance of 132 global economies and the most recent global innovation trends. In 2015, India stood at 81st spot and has been rising in the past eight years.

Industry	Weight (In percentage)
Petroleum & Refinery production	28.04
Electricity generation	19.85
Steel production	17.92
Coal production	10.33
Crude Oil production	8.98
Natural Gas production	6.88
Cement production	5.37
Fertilizers production	2.63

The Hindu

Current Affairs 14th October 2023 by Saurabh Pandey

SC ON Anti defection law

The Supreme Court on Friday slammed Maharashtra Assembly Speaker Rahul Narwekar for reducing the anti defection proceedings against Chief Minister Eknath Shinde and other MLAs to a "charade", saying that he cannot "merrily" defer hearings and has to decide before the next elections

Chief Justice D.Y. Chandrachud, heading a three judge Bench, said the Speaker has disregarded the court's order on September 18 to prepare a time schedule to complete the disqualification proceedings under the Tenth Schedule of the Constitution against the Shinde camp

"Somebody has to advise the Speaker that he cannot defeat the orders of the Supreme Court like this…

He is acting as an election tribunal when he is hearing disqualification petitions under the Tenth Schedule. He is amenable to the jurisdiction of this court...,

SC Judgements on anti defection law

In Keshavananda Bharati and Others v. State of Kerala and Another, judicial review was held to be a basic feature of the Constitution and the Constitution cannot be amended so as to violate its basic structure.

In Ravi S Naik v. Union of India case it has been held that the rules relating to anti-defection laws are merely procedural in nature and any violation of these, being a procedural irregularity, was immune from judicial scrutiny.

In Kihoto Hollohon v. Zachilhu and Others case it was held that the law is valid in all respects except on the matter pertaining to judicial review, which was held to be unconstitutionalThe Court also held that the Speaker, while deciding

cases pertaining to defection of party members, acts as a tribunal and nothing more than that, and that his/her decisions are subject to the review power of the High Courts and the Supreme Court.

In Rajendra Singh Rana and Others v. Swami Prasad Maurya and Others case the Supreme Court held that the power of judicial review can be used: (a) when the Speaker fails to act on a complaint of defection, (b) When the Speaker accepts the claim of splits or mergers without any finding and reason, or (c) when the Speaker fails to act as per the Tenth Schedule.

It also held that ignorance of a petition for disqualification is not a mere irregularity on the part of the Speaker but amounts to violation of a Constitutional duty.

The Hindu

What is a Curative Petition?

A curative petition is a judicial innovation and a new concept in the Indian legal system.

It is the last and final resort to the judicial remedy of any grievances which is not normally given an open-court hearing.

The origin of curative petitions

The concept originated from the 2002 case of Rupa Ashok Hurra Vs. Ashok Hurra and Anr. over the question whether an aggrieved person is entitled to any relief against the final judgement/order of the Supreme Court after the dismissal of a review petition.

The court used the Latin maxim “actus curiae neminem gravabit”, which means that an act of the court shall prejudice no one. Thus, it applies when the court is bound to undo a wrong done to a party by the act of court itself.

Current Affairs 14th October 2023 by Saurabh Pandey

The Supreme Court held that it may reconsider its judgements in order to prevent abuse of its process and to cure gross miscarriage of justice.Curative Petition is also supported by Article 137 of the Indian Constitution.A curative petition is needed to provide a final recourse of correcting any errors in judgement where technical difficulties or other apprehensions over reopening a case prevents from reviewing judgements.

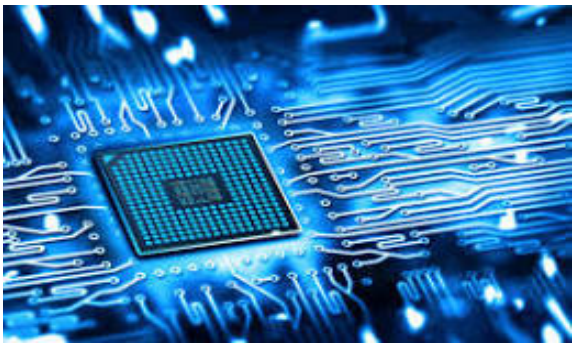
Curative petitions are heard by the top three judges including the Chief Justice of India plus the judges who dismissed the review petition.

The Hindu

All About semiconductors

Six working groups, which had been formed to mull the Indian government's artificial intelligence (AI) roadmap, have submitted the first edition of their report, Minister of State for Electronics and Information

The report's recommendations included public private partnerships to make semiconductors for AI applications.In addition to this, the PPP model would be leveraged to build so-called "GPU clusters", masses of resource intensive



graphics processors that are used by AI applications.

These clusters would be made available to Indian startups and researchers.Semiconductors are a critical part of almost every modern electronic device, and the vast majority of semiconductors are made in Taiwan.

Increasing concerns over the

reliance on Taiwan for semiconductors especially given the tenuous relationship between Taiwan and China

What is a semiconductor?

Generally speaking, the term semiconductor refers to a material like silicon that can conduct electricity much better than an insulator such as glass, but not as well as metals like copper or aluminium.

But when people are talking about semiconductors today, they are usually referring to semiconductor chips.These chips are typically made from thin slices of silicon with complex components laid out on them in specific patterns. These

patterns control the flow of current using electrical switches called transistors

What do semiconductors do?

Semiconductors are how electronic devices process, store and receive information.

For instance, memory chips store data and software as binary code, digital chips manipulate the data based on the software instructions, and wireless chips receive data from high-frequency radio transmitters and convert them into electrical signals.

These different chips work together under the control of software.

The Hindu

P20

The Ninth P20 Summit will be hosted by Parliament of India in cooperation with IPU on 13-14 October 2023 in New Delhi.

The Summit will be preceded by a

Parliamentary Forum on 12 October 2023.

The theme of the Summit is Parliaments for One Earth, One Family, One Future, which draws inspiration from the ancient Indian philosophy of Vasudhaiva Kutumbakam (The World is one Family).

The Summit will host four high-level sessions on Accelerating SDGs; Sustainable Energy Transition; Women led Development; and Transformation in Peoples' Lives through Public Digital Platforms.

A Parliamentary Forum will also be organised on 'LiFE' (Lifestyle for Environment) as a pre-Summit event to promote adoption of sustainable lifestyles and sustainable patterns of production and consumption.

The Hindu

Clean energy projects of US

Clean energy projects in seven states from Pennsylvania to California have been selected by the Biden administration for a $7 billion program to kickstart development and production of hydrogen fuel, a key component of President Joe Biden's agenda to slow climate change.

The Hindu

Current Affairs 15th October 2023 by Saurabh Pandey

Deep learning

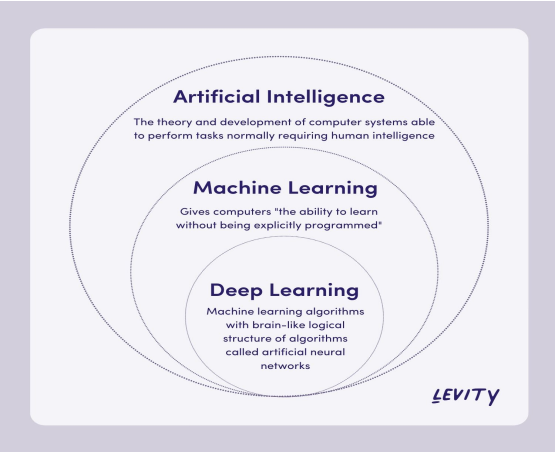
A method to quickly classify central nervous system (CNS) tumours, combining rapid sequencing and deep learned AI models, may enable molecular diagnosis in less than 90 minutes, according to a study published in Nature.

The Netherlands and others used a technology called nanopore sequencing.

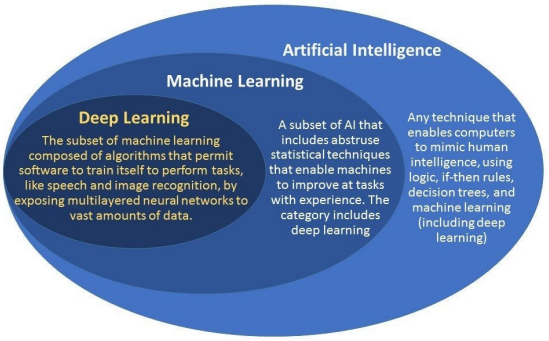
This method is faster, but the data generated has much less coverage of genetic sites .

To enable molecular classification of CNS tumours with such sparse data, the researchers developed a neural network tool named ‘Sturgeon’.

“We developed Sturgeon, a patient agnostic transfer learned neural network, to enable molecular sub classification of central nervous system tumours based on such sparse profiles,



Deep learning is part of a broader family of machine learning methods,



which is based on artificial neural networks with representation learning. The adjective "deep" in deep learning refers to the use of multiple layers in the network.

The Hindu

Human brain

Researchers have developed an atlas of the human and nonhuman

primate brain at the celltype level in unprecedented detail.

The researchers' collective efforts characterised more than 3,000 human brain cell types, revealing features that distinguish us from other primates in some.

Understanding the human brain at such resolution will not only help scientists pin down which cell types are affected by mutations, leading to neurological diseases –

Arctic system and climate change

Arctic ecosystem impacts grey whale population

Even highly mobile, large, and long-lived species are sensitive to dynamic and changing conditions as the Arctic warms.

As per a new study, population swings in eastern North Pacific grey whales, some of which have resulted in recent mass mortality events, are driven by changing prey biomass and ice cover in the Arctic.

Climate change is driving rapid change in Arctic ecosystems, including the shallow basins of the Pacific Arctic, which are critical marine areas that support various migratory marine species.

The Hindu

Synchrotron imaging

Homo erectus had expanded beyond the lowland savanna environments of East Africa and into the high altitude regions of the Ethiopian highlands, where they produced both Oldowan and Acheulean tools, according to a new study.

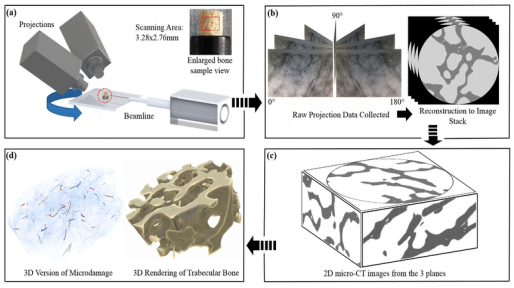
The study presents a reanalysis of an early hominin fossil.

Using synchrotron imaging to examine the internal morphology of the unerupted teeth in the Garba IV mandible, researchers confirm that it belonged to H. erectus.

The Hindu

SYNCHROTRON IMAGING

Synchrotron imaging has a long history, dating back to the 1800s. Modern synchrotron radiation (SR) sources such as Diamond Light Source have dramatically fostered the use of SR-based X-ray imaging.



Vital information such as density, chemical composition, chemical states, structure, and crystallographic perfection can be mapped in two, or, increasingly, in three dimensions.

The ongoing developments in this field have led to a dramatic increase in both the speed and resolution of X-ray imaging techniques pushing spatial resolution down towards the nanoscale.

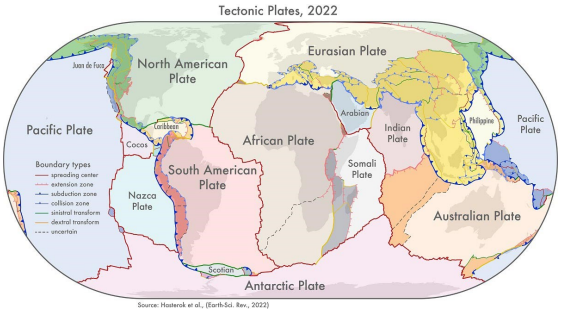
X-ray imaging visualises samples, frequently the internal or hidden components of a sample and is applicable to nearly all fields of science from the life sciences to engineering to archaeology.

It can probe the interior structure of materials, cells and molecules to address problems in areas such as cell biology, nanomagnetism, chemical identification and molecular identification, environmental science and soft matter.

Why an earthquake in afghanistan?

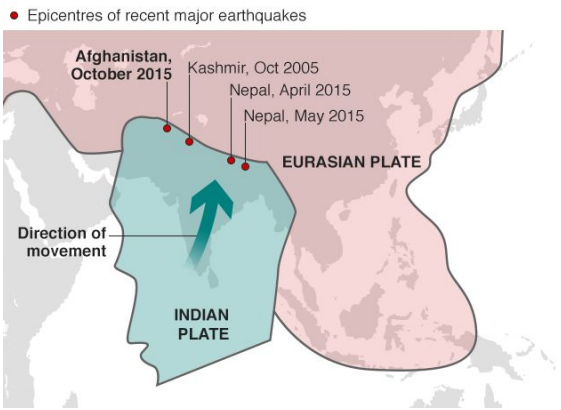
What can be termed as unusual, a

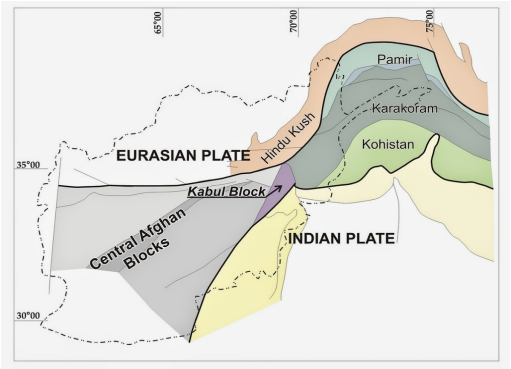
shallow focus (14 km depth) earthquake of 6.3 magnitude struck about 40 kms northwest of Herat in Afghanistan at around 11:00 am

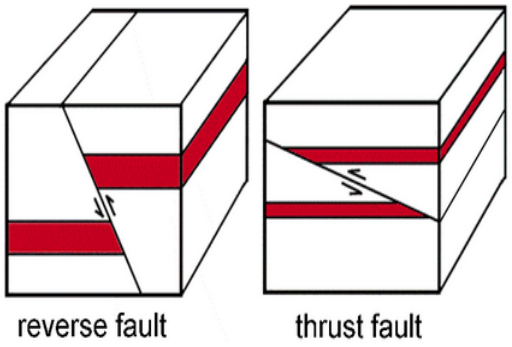


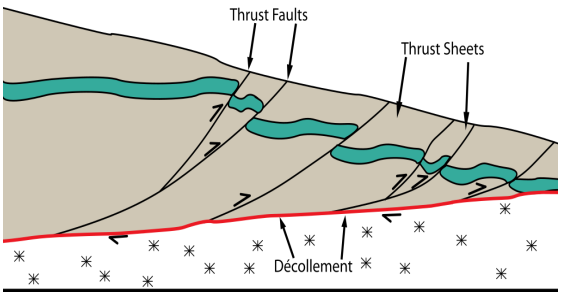
local time on October 7 (Saturday).

The earthquake occurred as the result of thrust faulting near the far western terminus of the Hindu Kush Mountain range.









earthquakes occurred on eastwest striking fault planes that dip to either the north or south. The earthquakes occurred within the Eurasia plate in an intracontinental mountain belt".

All three earthquakes have been thrust faults, otherwise known as reverse faults. Thrust faults form due to horizontal compressive stresses and so cause shortening of the crust.

Here one block or wall (the hanging

wall) moves up relative to the other (called the footwall)

“To call a quake and aftershock, the magnitude has to be lesser than the magnitude of the main event [quake],”

A quake of 6.3 magnitude was followed by another of the same magnitude. This can happen when a fault at one place ruptures resulting in an earthquake that releases the stress.

The release of stress in one fault results in the loading of stress at another fault.

The loading of stress can result in another earthquake which can be of similar magnitude or even higher magnitude.

But the magnitude will not be smaller than the first quake.”

“In subduction zones and in the Himalayas where there is interaction between two continental plates, the fault lengths can be very large and also very wide.

That is the reason why an earthquake in the fault can trigger another in the same fault,” he says.

The second earthquake occurred quite close to the first one (about 20 km distance) in the same fault

Earthquakes are quite common in Afghanistan due to active interactions between three tectonic plates the Arabia, Eurasia, and India plates.

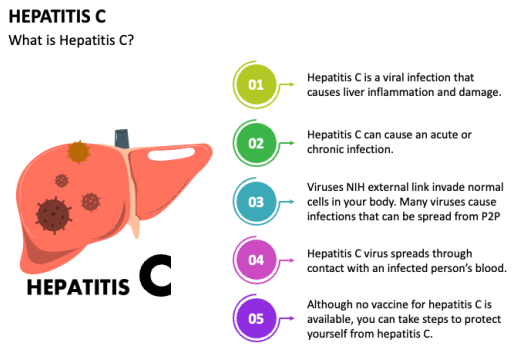
According to the USGS, earthquakes in western and central Afghanistan are “primarily influenced by the northward movement of the Arabia plate relative to the Eurasia plate

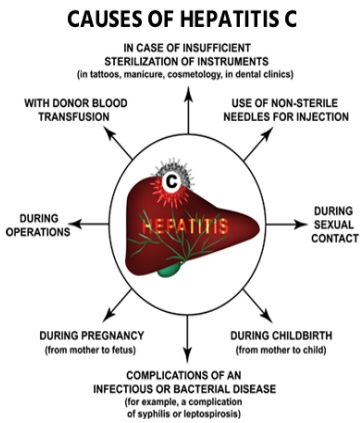
“Shallower crustal earthquakes in the PamirHindu Mountains occur primarily along the Main Pamir Thrust and other active Quaternary faults, which accommodate much of the region’s crustal shortening.

The western and eastern margins of the Main Pamir Thrust display a combination of thrust and strike slip mechanisms.

The Hindu

Hepatitis c





On October 9, WHO announced that Egypt had made "unprecedented progress" towards eliminating hepatitis C.

According to the WHO, Egypt became the first country to achieve "gold tier" status on the path to elimination of hepatitis C as per the global health body criteria.

The "gold tier" status to reach the stated goal of eliminating hepatitis C includes meeting specific criteria such as ensuring 100% blood and injection safety, maintaining a minimum of 150 needles/syringes per year for people who inject drugs (PWID),

Diagnosis of over 80% of people living with chronic hepatitis C virus (HCV), treating of over 70% of individuals diagnosed with HCV, and the establishing of a sentinel surveillance programme for hepatitis sequelae, including liver cancer.

Hepatitis C infection is unevenly distributed globally, with these regions accounting for the most European (22%), SouthEast Asia (20%) and the Eastern

Mediterranean (17%).

According to a 2023 WHO document, in 2019, there were 1.5 million new infections, with one third of new HCV infections occurring in the Eastern Mediterranean Region.

The Hindu

Indian ocean rim association (IORA)

'Inforcing Indian Ocean Identity' was the banner theme at the Indian Ocean Rim Association's (IORA) Council of Ministers (COM) held in Colombo on October 11, that was attended by foreign ministers and senior officials of the 23nation grouping of countries.

This year's conference was marked by a lot of interest from other countries, especially those who are "dialogue partners' ' or would like to become dialogue partners, putting a spotlight on the 26 year old organisation, believed to be the brainchild of former South African President Nelson Mandela.

What is the IORA and how was it formed?

The Indian Ocean Rim Association includes 23 countries from Africa, West Asia, South Asia, South East Asia, Australia and littoral states situated in and around the Indian Ocean.

The grouping, whose apex body is the Council of Foreign Ministers that meet once a year, moves by rotation through members every two years.

Sri Lanka took charge as Chair this year from Bangladesh, and India is ViceChair, meaning that the troika of IORA is within the South Asian region.

IORA's membership includes 23 countries: Australia, Bangladesh, the Comoros, France, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, the Maldives, Mauritius,

Mozambique, Oman, Seychelles, Singapore, Somalia, South Africa, Sri Lanka, Tanzania, Thailand, the UAE and Yemen.

It also has 11 dialogue partners: China, Egypt, Saudi Arabia, Germany, Italy, Japan, South Korea, Russia, Türkiye, the U.K. and the U.S.

While the IORA was formed in 1997 (then called the Indian Ocean RegionAssociation for Regional Cooperation) in Mauritius, its genesis came from a speech Nelson Mandela gave in Delhi in 1995.

He was invited by then Prime Minister P.V. Narasimha Rao as the guest for Republic Day, and said at a ceremony that India and South Africa should explore "the concept of an Indian Ocean Rim of socioeconomic cooperation and other peaceful endeavours" that could help developing countries within multilateral institutions "such as the United Nations, the Commonwealth and the NonAligned Movement

Why does the Indian Ocean Region matter?

A third of the world's population (2.6 billion people) live in the region, and 80% of global oil trade, 50% of the world's containerised cargo and 33% of its bulk cargo passes through it.

The region produces a combined total of $1 trillion in goods and services and intraIORA trade is billed at around $800 billion.

India's other regional organisations, like SAARC (South Asian Association for Regional Cooperation) and BIMSTEC (Bay of Bengal Initiative for MultiSectoral Technical and Economic Cooperation), face their own challenges.

While the QUAD (Quadrilateral Security Dialogue), has made progress, it remains U.S.led, along with military allies Australia and Japan.

Meanwhile, China is actively trying to rope in India's neighbours with groupings like the Belt and Road Initiative (BRI), China Indian Ocean Region Forum on Development Cooperation, China South Asian Countries Poverty Alleviation and Cooperative Development Centre, which exclude India.

IORA, however, remains a "safe space" for India and other countries of the region that wish to keep out the constant challenge of big power rivalries.

IORA membership is based on consensus, and Pakistan has not been admitted to the grouping since it first applied in 2001, on the basis that it has not extended MFN (most favoured nation) status to India, making the IORA a less contentious space for India as well, compared to groupings like the Shanghai Cooperation Organisation (SCO).

The Hindu

Current Affairs 16th October 2023 by Saurabh Pandey

International law on war

What are the laws of war?

There are two separate and independent international law questions related to wars.

First, under what conditions or when can countries use force in their international relations?

This is known as jus ad bellum, regulated by the United Nations (UN) Charter. Second, how is a war to be fought, that is, what military actions are permissible?

This is known as jus in bello.

Assuming a country is justified under the UN Charter to use force, it still must ensure that it satisfies jus in bello obligations.

Justification to use force does not relieve a country of its obligations to use such force in accordance with international law.

The 'how' of using force or the law of war is known as international humanitarian law (IHL), which provides the rules that must be followed during an armed conflict.

IHL is contained in customary international law, the Geneva Conventions of 1949 and the Additional Protocols of 1977. It regulates the conduct of the parties or groups engaged in an armed conflict.

Its primary objective is to protect civilians and reduce the suffering a war unleashes

International law classifies armed conflicts into two categories: international armed conflict (IAC) and non- international armed conflict (NIAC).

According to Common Article 2 of the Geneva Conventions, IAC includes all cases of declared war or any other armed conflict between two or more countries.

NIAC includes non-governmental

forces (Hamas) involved in battle with governmental forces (Israel).

Common Article 3 of the Geneva Convention applies to NIAC. Thus, Israel and Hamas are obliged to abide by IHL.

The Hindu

UNSC on Haiti

A round a year after Haiti approached the United Nations seeking urgent help to combat deadly gang violence, the United

Nations Security Council (UNSC) has approved international intervention in the form of a foreign security mission, led by Kenya, to restore security, protect critical infrastructure and control spiralling violence in the country. Haiti has experienced a surge in violence over the past year as armed groups took control of large parts of the country, including the capital Port- au -Prince.

Why is the UN sending a mission to Haiti?

Haitian Prime Minister Ariel Henry first sought international support to assist the national police in October last year after the country plunged into a crisis when a group of gangs called "G9 and Family" seized control of the entry of the main fuel port Varreux in the capital protesting the PM's decision to cut fuel subsidies.

The blockade brought the country to a standstill and led to massive shortages. The lack of gas and diesel adversely affected transportation and forced several hospitals and other medical institutions that relied on fuel- powered generators to halt operations.

The Hindu

Current Affairs 16th October 2023 by Saurabh Pandey

Jailbreaking

Jailbreaking is the process of exploiting the flaws of a locked-down electronic device to install software other than what the manufacturer has made available for that device.

Jailbreaking allows the device owner to gain full access to the root of the operating system and access all the features.

It is called jailbreaking because it involves freeing users from the 'jail' of limitations that are perceived to exist.

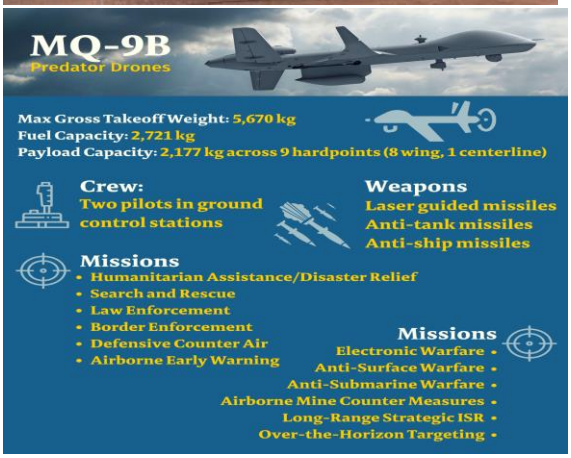
The term jailbreaking is most often used in relation to the iPhone: it is considered the most 'locked down' mobile device currently on sale.

Early versions of the iPhone did not have an app store, and the iOS interface was considered more limited for users than it is today.

31MQ9B

The Ministry has only accorded the Acceptance of Necessity to acquire 31 MQ 9B HALE Drones. Only the United States has these drones. China has been trying to acquire it but has not been able to do so.

India has formally requested the acquisition of 31 top-grade MQ-9B Reaper or Predator-B drones from the United States.



Current Affairs 16th October 2023 by Saurabh Pandey

RCEP

Four years after India walked out of the Regional Comprehensive Economic Partnership (RCEP) agreement, neighbors Sri Lanka and Bangladesh are now considering their chances of membership in the 15- nation trading bloc.

Radiation detection equipment (RDE)

Radiation detection equipment (RDE) will soon be installed at eight land crossing points along India's borders with Pakistan, Bangladesh, Myanmar and Nepal to check the trafficking of radioactive materials for its possible use in making nuclear devices, officials said. The RDE will be installed at the integrated check posts and land ports of Attari (Pakistan border), Petrapole, Agartala, Dawki and Sutarkandi (all on the Bangladesh border), Raxaul and Jogbani (Nepal) and Moreh (Myanmar). The Union government has taken the initiative to install the RDE so that the trafficking of radioactive materials across international borders can be checked.

The Hindu

Aestivation

Felt the urge to sleep through a hot

day? Some animals do exactly that to beat the heat, but for a whole season. This is called estivation (or aestivation). It is a biological phenomenon whereby the animal enters a long period of dormancy, or inactivity, in response to high temperature or maybe even drought -like conditions.

It is a survival strategy that helps the animal conserve energy and water in a difficult time. During estivation, the animal often seeks shelter in a cool underground burrow, crevice or cocoon, where it will remain in a state of reduced metabolic activity, which in turn reduces the rate at which the body consumes energy.

Estivation can also be a way to avoid desiccation extreme dryness of the skin and also lower the risk of being preyed on by a predator.

For example, the West African lungfish (Protopterus annectens) burrows into the mud of a drying water body and secretes a cocoon of mucus around itself during a drought.

Desert tortoises (Gopherus agassizii) dig burrows and retreat into them in hot summer months.

The Hindu

Pauli principles

Physicists in Germany have come up with a way to convert the energy difference between two quantum states of a group of atoms into work.

The device adapts the principles of the familiar classical engine to the subatomic realm, giving physicists a way to study the nascent field of quantum thermodynamics in more detail as well as, possibly, build better quantum computers.

Pauli's principle All subatomic particles can be classified as either fermions or bosons. Fermions are the building blocks of matter; bosons are particles that carry the forces acting between them.

Now, when a bunch of particles are cooled to very nearly absolute zero, so that their quantum nature comes to the fore, they would all like to have the lowest energy possible but they can't.

This is known as Pauli's exclusion principle. All particles in a system are distinguished by four quantum numbers, sort of like their Aadhaar numbers.

The values of the four numbers together tell us something about how much energy a particle has.

The exclusion principle states that, in a given system, no two particles can have the same four quantum numbers, that is, they can't occupy the same energy level.

Fermions are particles that are bound by this rule. Bosons are not bound by the exclusion principle: they can all occupy the same lowest energy level at a given low temperature.

Fermions to bosons and back Classical engines convert heat into work. For example, the internal combustion engine in a car uses the heat released by the combustion of petrol or diesel to push a piston. Overall the engine has four steps: the fuel is compressed, ignition causes the fuel air mix to expand and push the piston out, the mix cools and stops expanding, and the piston is brought back to the first step.

The quantum engine, or what the researchers are calling a 'Pauli engine', has a similar set of four steps. First, the atoms collected in the trap are compressed and kept in a bosonic state. Second, the strength of a magnetic field applied on the atoms is increased by a small amount.

Interactions between the atoms and the field cause the former to slip into a fermionic state:

They are forced to move out of the lowest energy level and

progressively occupy higher levels.

Third, the compression applied in the first step is eased.

Fourth: the magnetic field strength is reduced to its original value.

The energy of the atoms increases during the third step and this can be converted to work.

The Hindu

Azerbaijani president raises national flag in Karabakh

The Hindu

Current Affairs 17th October 2023 by Saurabh Pandey

Cancer cells

A characteristic feature of cancer cells is that they divide rapidly, in uncontrolled fashion.

Anti-cancer drugs i.e. chemotherapeutic agents work by stalling or blocking this proliferation.

When the division of a cancer cell is arrested, it generally responds by triggering a pathway of programmed cell death, called apoptosis.

So in this way, chemotherapy eliminates the cancer cells without affecting other non-cancerous cells nearby that are not dividing.

But this is also why chemotherapy deals a lot of collateral damage.

Any tissue with a significant number of normal cells that are also dividing such as cells in the digestive tract, the bone marrow, and hair follicles are also affected by chemotherapeutic agents and suffer apoptosis.

This cell death underlies the unpleasant side- effects of chemotherapy, such as painful inflammation of the oral cavity and the gut, and nausea, diarrhoea, anaemia, and hair loss

An oncologist's challenge is to find the dose of a drug that effectively kills cancer cells but whose side-effects are not unbearable for the patient.

One way researchers have tried to achieve this is by developing antibody -drug conjugates (ADCs) against some cancers.

An ADC is a drug attached to an antibody that recognizes a protein found only on, or at least preferentially on, the cancer cells.

This way, the antibody guides the chemotherapeutic drug to the cancer cells, where the drug begins its work

A small subset of cancer cells can still escape confrontation with the anti-cancer drug.

This happens when these cells express elevated levels of a protein called P-gp short for permeability glycoprotein.

For a cell to produce P-gp, it uses information encoded in a gene called ABCB1.

To identify what tethered the ABCB1 gene to the nuclear envelope in sensitive cells, the researchers turned different genes 'off' to see which one affected the proteins that the cell uses to make the envelope.

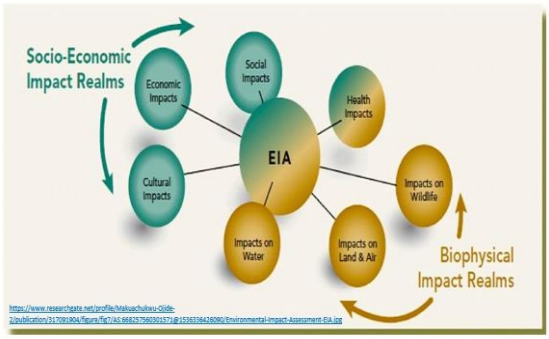
They zeroed in on a protein called lamin B receptor (LBR).

According to the researchers, when the LBR protein was absent, a cell could activate the ABCB1 gene when it was exposed to Taxol.

But when they deleted the gene used to make LBR, the cells didn't increase ABCB1 expression right away; they had to be exposed to Taxol as well.

The Hindu

Environment impact assessment



Environment Impact Assessment (EIA) is one such process defined by the United Nations Environment Programme (UNEP) as a tool to identify the environmental, social, and economic impacts of a project

before it is implemented.

This tool compares various alternatives for the proposed project, predicts and analyses all possible environmental repercussions in various scenarios

The EIA process would need comprehensive, reliable data and would deliver results only if it is designed to seek the most appropriate, relevant and reliable information regarding the project.

In India, a precursor to the EIA began in 1976-77 when the Planning Commission directed the Department of Science and Technology to assess the river valley projects from the environmental point of view.

On January 27, 1994, the Union Ministry of Environment, Forests and Climate Change under the Environment (Protection) Act 1986 (EPA), promulgated the first EIA notification making Environmental Clearance (EC) mandatory for setting up some specified new projects and also for expansion or modernization of some specific activities.

The notification of 1994 saw 12 amendments in 11 years before it was replaced by the EIA 2006 notification.

The hallmark of the 2006 notification was the decentralization of the process of EC. State governments were also given powers to issue EC in certain cases.

The 2006 notification has also been amended, in the name of fine-tuning the process several times.

The EIA 2006 notification lays down the procedure as well as institutional set-up to give environmental clearance for the projects that need such clearance as per this notification.

Only projects enumerated in the

schedule attached to the notification require prior EC.

An EIA is not required for many projects as they do not fall within the ambit of this notification.

This notification has categorized projects under various heads such as mining, extraction of natural resources and power generation, and physical infrastructure.

Despite all levels of government being acutely aware of the special needs of the Indian Himalayan Region (IHR), the region's vulnerabilities and fragility have not been considered separately

Even the draft 2020 notification which was floated for public discussion does not treat the IHR differently than the rest of the country and is not cognisant of the special developmental needs of IHR.

The Indian regulatory system uses a graded approach, a differentiated risk management approach depending on whether a project is coming up within a protected forest, a reserved forest, a national park, or a critical tiger habitat.

Despite this understanding of the fragility and vulnerability of the Himalayas, there is no mention of a different set of environmental standards needed if the project is located in the IHR.

The needs of these mountains could be addressed at all four stages of the EIA screening, scoping, public consultation, and appraisal.

The Hindu

LIMITATION OF EIA

There is no regulator at the national level, as suggested by the Supreme Court of India in 2011 in Lafarge Umiam Mining (P) Ltd.; T.N. Godavarman Thirumulpad vs Union of India to carry out an independent, objective and transparent appraisal and approval

of the projects for ECs and to monitor the implementation of the conditions laid down in the EC

The EIA process now reacts to development proposals rather than anticipate them.

Due the fact that they are financed by the project proponent, there is a veering in favour of the project.

The process now does not adequately consider cumulative impacts as far as impacts caused by several projects in the area are concerned.

The Hindu

AI RISK

Yuval Noah Harari has expressed concerns about the amalgamation of AI and biotechnology, highlighting the potential to fundamentally alter human existence by manipulating human emotions, thoughts, and desires

Essential infrastructure such as water and electricity increasingly rely on AI.

Any malfunction or manipulation of such AI systems could disrupt these pivotal services, potentially hampering societal functions and public wellbeing.

Similarly, although seemingly improbable, a 'runaway AI' could cause more harm such as the manipulation of crucial systems such as water distribution or the alteration of chemical balances in water supplies, which may cause catastrophic repercussions even if such probabilities appear distant

The evolution to human- level AI that is capable of outperforming human cognitive tasks will mark a pivotal shift in these risks.

Such AIs might undergo rapid self-improvement, culminating in a super-intelligence that far outpaces human intellect.

The challenge lies in aligning AI with universally accepted human values.

The lack of a unified global approach to AI regulation can be detrimental to the foundational objective of AI governance to ensure the long term safety and ethical deployment of AI technologies

One of the most celebrated regulations out of these is the European Union's AI Act.

It adopts a 'risk based' approach, tying the severity of risk to the area of AI deployment.

This makes sense when considering AI applications in critical infrastructures, which demand heightened scrutiny

While the area specific approach is valuable, a more holistic view of AI risks is necessary to ensure comprehensive and effective regulation and oversight.

However, there is a conspicuous absence of collaboration and cohesive action at the international level, and so long term risks associated with AI cannot be mitigated

The confluence of technology with warfare amplifies long term risks. Addressing the perils of military AI is crucial.

The international community has formed treaties such as the Treaty on the Nonproliferation of Nuclear Weapons to manage such potent technologies, demonstrating that establishing global norms for AI in warfare is a pressing but attainable goal. Treaties such as the Chemical Weapons Convention are further examples of international accord in restricting hazardous technologies.

Nations must delineate where AI deployment is unacceptable and enforce clear norms for its role in warfare

Current Affairs 17th October 2023 by Saurabh Pandey

Collegium vs government

The Court has been vocal about the Centre's selective treatment of its recommendations.

There are instances of the government returning names that had been reiterated more than once.

In recent times, it has shown that it can have its way by merely ignoring some of the Collegium's decisions.

For instance, it ignored the proposal to appoint Justice S. Muralidhar, now retired, as CJ of the Madras High Court for so long that the Collegium ultimately rescinded its recommendation.

In the case of Justice T. Raja, who was Acting CJ in Madras for an unusually long period, the recommendation to transfer him to the Rajasthan High Court was ignored by the government until his retirement.

The conflict between the government and the Collegium over the appointment process is quite pronounced and often reaches a flashpoint.

It is time the process was streamlined to give effect to the Supreme Court's April 2021 order that set timelines for the government to process names recommended by the Collegium and express its reservations, if any.

Once the Collegium reiterates any recommendation, it should be implemented within three to four weeks.

The Hindu

Pygmy hogs

It is the smallest species of pig in the world.

Populations of pygmy hogs were once widespread in the tall, dense, wet grasslands in a narrow belt of the southern Himalayan foothills from north-western Uttar Pradesh

to Assam, through southern Nepal and North Bengal, and possibly extending into contiguous habitats in southern Bhutan. Due to human encroachment and destruction of the pygmy hogs' natural habitat, the species was thought to have gone extinct in the early 1960s.

With an estimated population of less than 250 mature individuals, the pygmy hog is listed as an Endangered species on the IUCN Red List, and conservation efforts such as captive breeding and re-release programs are currently being employed.

The Hindu

Sycamore tree

The sycamore tree was located in a dip between two hills, at a gap in the Hadrian Wall, an old stone structure that is close to the border between England and Scotland in Northumberland, northern England.

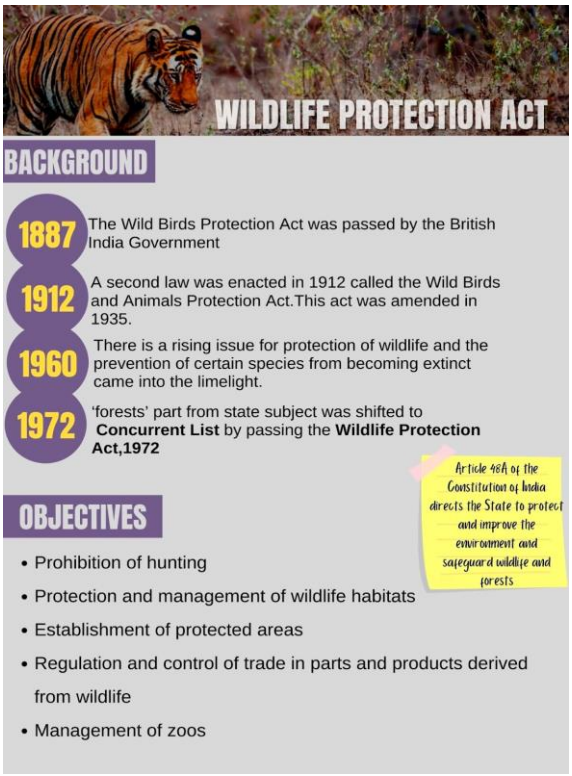
They are commonly found in the UK and have leaves similar to that of a maple tree.

The Hindu

Current Affairs 18th October by Saurabh Pandey

Wildlife protection act

Schedule I and part II of schedule II	Animals which are in the category of **endangered species. These are given absolute protection from hunting. Eg Tiger**
Schedule III and IV	These also have roughly the same provisions of Section I and II, but cover animals that are not in danger of becoming extinct.
Schedule V	Delineates animals that can be hunted **like ducks and deers** with the prior permission of **chief wildlife warden. (Vermins)**
Schedule VI	Concerns cultivation and plant life and gives teeth to setting up more protected animal parks.



Schedule 1, which confers the highest protection, contains about 600 species of vertebrates and hundreds of invertebrates, while Schedule 2 contains about 2,000 species (with 1,134 species of birds alone).

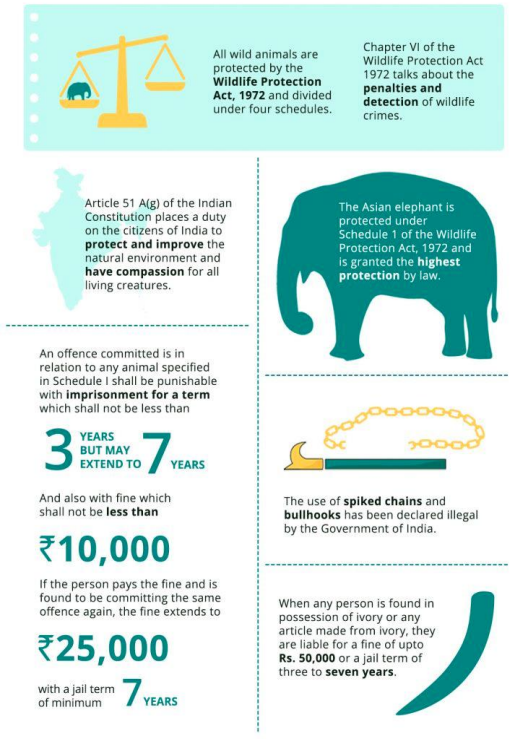
The WLPA was originally intended to regulate the use of various species (including hunting), restrict trade, and police the trafficking of species.

The new Act goes one step further by aligning itself with CITES, and including the CITES appendices as well.

Listing hundreds of species of mammals and over 1,000 species of birds and innumerable other taxa means that it is unclear where resources should be allocated on the basis of this list.

The same level of protection is offered to tigers and jackals, to the great Indian bustard and common barn owls, to the king cobra and rat snakes

Current Affairs 18th October by Saurabh Pandey



Consequence of listing has been the presence of the spotted deer (chital) in Schedule 1.

Common throughout India, these are invasive in the Andaman Islands and have caused untold harm to the vegetation and herpetofauna.

But they cannot be legally culled or removed because of the WLPA.

Various Schedule 1 species pose enormous physical, mental and economic harm to people.

Crocodiles in the Andamans, leopards in certain pockets, and elephants everywhere kill people, destroy their livelihoods, and leave lasting psychological impacts.

And yet people are told glibly by elite conservationists that they should learn 'coexistence'.

The WLPA serves to enforce this viewpoint.

The new Act elevates wild pigs and nilgai to Schedule 1, which means that the few States that have now allowed

limited culling of problematic animals may not be able to retain that policy.

The third issue is that despite the support of many individuals in the forest bureaucracy, the paperwork involved in getting permits for research is tedious and time consuming.

Environmental NGOs will have a harder time getting permits for research and conservation, even of common species such as barn owls.

List of Environmental Acts in India		
S. No	Act	Action
1	National Green Tribunal Act, 2010	Environmental protection and conservation of forests and other natural resources
2	Biological Diversity Act, 2002	To provide for conservation of biological diversity
3	The Environment (Protection) Act, 1986	Providing for the protection and improvement of the environment.
4	Forest (Conservation) Act, 1980	Check deforestation and encourage afforestation of non-forest areas.
5	Water (Prevention and control of pollution) Act, 1974	Provides maintenance and restoration and quality of all types of surface and groundwater.
6	Wildlife Protection Act, 1972	Providing protection to wild animals and birds.

SDGS

Lack of progress on various Sustainable Development Goals (SDGs), world leaders at the SDG Summit in New York on September 18 and 19, once again reaffirmed their shared commitment to eradicate poverty and end hunger.

They recognised that the world was on track to meet only 15% of its 169 targets that make up the 17 goals and

have committed to an SDG stimulus of $500 billion annually.

A 2023 report of the United Nations Conference on Trade and Development estimated the investment gap in SDGs in developing countries to be greater than $4 trillion.

Of this, nearly $2 trillion needs to be directed towards energy transition alone.

Five types of (dis)synergies that can be estimated along the value chain of an SDG intervention those arising from resource allocations; creation of enabling environments; cobenefits; cost effectiveness; and saturation limits.

A recently launched UN Expert Group Report, entitled 'Synergy Solutions for a World in Crisis: Tackling Climate and SDG Action Together', also laments the lack of synergistic action in the face of significant (modelled) evidence.

Every new investment we initiate today leading to a high carbon outcome will likely result in higher dis-synergies or tradeoffs in our ability to achieve our energy and climate goals.

Establishing the domestic energy resources, we have for reasons of enhancing resilience to shocks is a worthwhile goal but exploiting those resources without a full cost estimation including weighing

India's own vulnerability to climate change impacts of alternative pathways with their synergistic opportunities is detrimental to both national and global efforts.

On the other hand, investing in clean energy options could have a significant synergistic impact on air pollution and human health,

increasing the attractiveness of such interventions.

The Hindu

Dolorimeter

A dolorimeter is an instrument used to measure pain threshold and pain tolerance. Dolorimetry has been defined as "the measurement of pain sensitivity or pain intensity".

Dolorimeters apply steady pressure, heat, or electrical stimulation to some area, or move a joint or other body part and determine what level of heat or pressure or electric current or amount of movement produces a sensation of pain.

The Hindu

SC ON Same sex marriage

A Constitution Bench of the Supreme Court on Tuesday held that only the legislature can recognize or regulate samesex marriage.

The Bench reasoned that since there was no fundamental or unqualified right to marry, the courts cannot intervene.

However, the Bench failed to reach a consensus on providing even long abiding relationships between same-sex couples the status of a legally recognised “civil union

“An entitlement to legal recognition of the right to union akin to marriage or civil union, or conferring legal status upon the parties to the relationship can be only through enacted law”

The Hindu

Protons and electrons

Electrons are the negatively charged particles of an atom. They zoom around the denser nucleus. Before being able to study them directly,

scientists understood their properties through average.

The movement of an atom in a molecule can be studied with the very shortest pulses produced by a laser. These movements and changes in the atoms occur on the order of femtoseconds a millionth of a billionth of a second. But electrons are lighter and interact faster, in the attosecond realm. An attosecond if a billionth of a billionth of a second.

All light consists of waves of electric and magnetic energy. Each wave has a sinusoidal shape starting from a point, go.

The Hindu

Current Affairs 19th October 2023 by Saurabh Pandey

Torres Strait

Australians were asked to vote on whether to establish an Aboriginal and Torres Strait Islander Voice to Parliament.

The Voice was proposed as a means of recognising Aboriginal and Torres Strait Islander peoples as the First Peoples of Australia in the Constitution.

Voting is compulsory in Australia. Every eligible Australian citizen over 18 years of age is obliged to vote in elections and referendums.

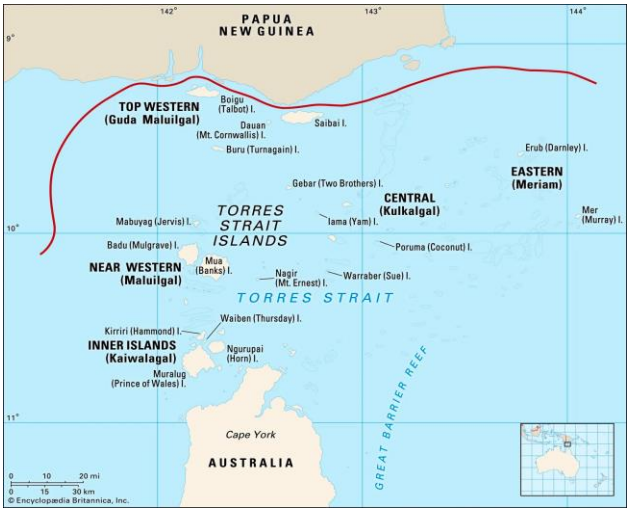
It's very difficult to achieve constitutional change in Australia.

Since federation in 1901, 45 questions have been put to Australian voters in referendums.

Only eight of those have succeeded.

Torres Strait Islanders

Torres Strait Islanders are the Indigenous Melanesian people of the Torres Strait Islands, which are part of the state of Queensland, Australia.



Quantum computers vs classical computer

An algorithm is a sequence of logically connected mathematical steps that solve a problem.

A quantum algorithm is also a series of steps, but its implementation requires quantum gates. Some problems may need fewer steps on the part of a quantum algorithm than the number of steps required by a classical algorithm.

That is, the quantum algorithm can speed up the computation. One factor that controls this speedup is the possibility of superposition of the states of quantum bits, or qubits, that encode information.

Whereas a classical computer uses semiconductor based gadgets as bits to encode information, quantum computers use qubits.

In both cases, the bit or the qubit can have two distinct states, 0 or 1; but qubits have the additional ability to be partly 0 and partly 1 at the same time.

One of the earliest quantum algorithms is the factorization algorithm developed by Peter Shor.

It requires fewer steps to factorise a number than one that operates with classical principles.

Shor's algorithm identifies the factors of a given integer.

Another popular quantum algorithm is the quantum search algorithm developed by Lov Grover.

It looks for a numerical pattern in a large list of numbers.

The Hindu

AI and wildlife

When scientists want to measure reforestation, they can survey large tracts of land with tools like satellite and lidar.

But determining how fast and abundantly wildlife is returning to an area presents a more difficult challenge sometimes requiring an expert to sift through sound recordings and pick out animal calls

Bioacoustics, which uses sound to learn more about animal life and habitats.

It is a longstanding research tool, but more recently is being paired with computer learning to process large amounts of data more quickly.

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Cognitive warfare

Cognitive warfare truly ranks alongside other elements of modern warfare such as the domains of maritime, air and space.

Cognitive warfare puts a premium on sophisticated techniques that are aimed at destabilizing institutions, especially governments, and manipulation, among other aspects, of the news media by powerful non- state actors.

It entails the art of using technological tools to alter the cognition of human targets, who are often unaware of such attempts.

The end result could be a loss of trust apart from breaches of confidentiality and loss of governance capabilities.

Even more dangerous is that it could alter a population's behaviour using sophisticated psychological techniques of manipulation

As firms, large and small, spend billions of dollars to migrate to the Cloud, and more and more sensors constantly send out sensitive information, the risks go up in geometrical progression.

All this portends a dark, rather than a brave, new world order that we hope to inhabit.

Hence, digital uncertainty is morphing into radical uncertainty and rather rapidly.

Today, government and government agencies are spending significant resources to undo the impact of misinformation and disinformation, but this may not be enough.

There is not enough understanding of how the very nature of information is being manipulated and the extent to which AI drives many of these drastic transformations.

All this contributes to what can only be referred to as 'truth decay'

The Hindu

The emergence of AGI

As growing numbers of people cognitively and psychologically become dependent on digital networks, AI is able to influence many critical aspects of their thinking and functioning.

What is simultaneously exhilarating and terrorizing is the fact that many

advances in AI are now being birthed by the machine itself.

Sooner rather than later, we will witness the emergence of Artificial General Intelligence (AGI) Artificial Intelligence that is equal and or superior to human intelligence, which will penetrate whole new sectors and replace human judgement, intuition and creativity

It has an inherent capacity to flood a country with fake content masquerading as truth, and for imitating known voices with false ones that sound eerily familiar.

This could lead to a breakdown of the concept of trust of what is said, read, or heard and could lead to overturning the trust pyramid with catastrophic consequences.

AGI will enable highly autonomous systems that outperform humans in many areas, including economically (valuable) work, education, social welfare and the like.

AGI systems will have the potential to be able to make decisions that are unpredictable and uncontrollable which could have unintended consequences, often with harmful outcomes

Digital data could in turn become converted into digital intelligence, enlarging the scope for disruption and the reining in of entire sectors.

It would enhance inequalities and exacerbate social disparities, and worsen economic disparities

AGI could prove to be as radical a game changer in the world of the 21st century as the Industrial Revolution was in the 18th century.

It is almost certain to lead to material shifts in the geopolitical balance of power, and in a way never comprehended previously.

The spectre of digital colonisation looms large with AGI based power centres being based in a few specific locations.

Consequently, AGI driven disruption could precipitate the dawn of the age of digital colonialism. This would lead to a new form of exploitation, viz., data exploitation.

Israel's massive intelligence failure is attributed by some experts to an overindulgence of AI by it, which was skillfully exploited by Hamas.

AI depends essentially on data and algorithms, and Hamas appears to have used subterfuges to conceal its real intentions by distorting the flow of information flowing into Israeli AI systems.

The Hindu

OBOR Summit

The Third Belt and Road Forum for International Cooperation that was convened in Beijing, China (October 1718) has put the spotlight back on Chinese President Xi Jinping's signature initiative.

BRI to China's Marshall Plan, stating that it was a gateway for China to transition from a regional power with global influence to a global power with comprehensive strength

China's bid to reboot globalization and rectify its shortcomings.

A rising China also felt the need to develop new transport and trade arteries as alternatives, since rivals could put the squeeze on the Strait of Malacca the jugular vein for China's economy

Beijing was also putting its money where its mouth was with the establishment of the Asian Infrastructure Investment Bank with a $100 billion war chest, challenging other lending institutions.

The Chinese government's white paper on BRI released this month ("The Belt and Road Initiative: A Key Pillar of the Global Community of Shared Future") revealed that over 200 BRI cooperation pacts had been inked with over 150 nations

According to the World Bank, 675 million people are without electricity globally, around 2.3 billion lack potable water, and 450 million live beyond the coverage of a broadband signal.

The lending institution calculates that bridging the infrastructure gap will need capital infusion of $1.5 trillion annually through 2030, which is approximately 4.5% of the GDP of low and middle-income countries.

Under China's Marshall Plan, motorways, power plants, ports, railway networks, and digital infrastructure have been built.

A report from the ISEASYusof Ishak Institute on the BRI has highlighted

issues related to ecological damage, displacement of people, disputes over payouts and labour unrest.

The findings detail case studies of Indonesia, where things came to a head over anxieties related to Chinese labourers filling up positions earmarked for locals.

Issues have tarnished the reputation of brand BRI, especially its tagline of 'win win cooperation' as there are perceptions that it is a win for China twice over at the cost of other stakeholders.

The Joe Biden administration announced the 'Build Back Better World' (B3W) initiative that seems to have been reorganized as the Partnership for Global Infrastructure and Investment, which aims to channelize private capital into climate change and energy security, health care and health security, digital technology, and gender equity.

Here, it must be noted that India has steadfastly opposed CPEC over issues related to sovereignty and had raised concerns over issues of unsustainable debt.

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The G20 Delhi summit posited yet another alternative in the form of the India Middle East Europe Corridor (IMEC) that seeks to link India, West Asia, and Europe through railways and shipping lines.

In addition to the trade connectivity, electricity and digital infrastructure as well as a pipeline for clean hydrogen export have been envisioned.

The Hindu

Working women

If the country is to grow into a $5 trillion economy, women must be included.

There are two specific ways to get here: women's work, often care work, must be appropriately valued, and women must be adequately supported to participate in economic activity outside the home.

All women work, but not all of them get paid

India's first national Time Use Survey released in 2020 by the National Statistical Office, finds that 81.2% of all women are engaged in unpaid domestic services, compared with 26.1% of men.

It finds that men spend 42 hours on average on activities within the production boundary, i.e. what is traditionally counted as economic activity, whereas women spend 19 hours.

However, women spend 10 times more time on household maintenance and care for children, the sick and the elderly 34.6 hours versus 3.6 hours.

There are two implications for this: working women face the dreaded "double burden", where working outside the home and contributing to family income does not come with a commensurate reduction in household responsibilities

When uncounted, women's work remains invisible, which has implications for labour and employment policies.

For example, statistical invisibility pushes household labour "outside the realm of protective labour legislation," which limits the work day and regulates labour conditions. Women in India work 1.5 hours longer a day than men, mostly unpaid

Anganwadi system, which reaches 80 million children of up to six years of age through 1.4 million centres. These centres function best in a rural setting, where community members participate together.

A fast urbanising India needs different models to support its women.

Today, the women's labour force participation rate (FLFPR) in India is 32.8% according to government sources and 24% according to the World Bank, compared to China's 61%, Bangladesh's 38%, Nepal's 29% and Pakistan's 25%

The Hindu

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Special and Local Laws (SLLs)

Tabling of Bills on criminal laws has become a causa celebre.

Bills do well to amend the substantive criminal law as codified in the Indian Penal Code (IPC), Code of Criminal Procedure (CrPC) and Indian Evidence Act (IEA).

The offences and procedures outlined in the IPC or CrPC represent just one facet of a general criminal law and its vital to recognize that the most critical offences and procedures are encompassed within the Special and Local Laws (SLLs)

- **Nearly 39.9% of all cognisable offences registered in 2021 were under SLLs.**
- **SLLs such as the Unlawful Activities (Prevention) Act, 1967 (UAPA) and the Maharashtra Control of Organized Crime Act, 1999 (MCOCA) suffer from glaringly deficient, ambiguous and vague definitions of offences and terms such as 'terrorist act', 'unlawful activity', 'organized crime', 'organized crime syndicate' etc.**
- **The Protection of Children from Sexual Offences Act, 2012 is increasingly being criticized for its applicability to consensual sexual activities between minors.**
- **The IPC today is criticized for the retention of an archaic morality as well as the colonial roots which underpins many of its offences**
- **All SLLs which criminalize/seek to criminalize a conduct should find a place as separate chapters within the larger structure of the penal code.**
- **All SLLs which create a separate procedure for reporting of offences, arrest, investigation, prosecution, trial, evidence and bail must be included either as separate procedures within the CrPC or as exceptions to the general provisions provided therein.**
- **Non inclusion of the substantive and procedural aspects of the SLLs in the ongoing reform project is a serious limitation.**

The Hindu

European Union's top human rights prize

- **Mahsa Amini, the 22 year old Kurdish Iranian woman who died in police custody**

in Iran last year, sparking worldwide protests against the country's conservative Islamic theocracy, was awarded the European Union's top human rights prize on Thursday.

- The EU award, named for Soviet dissident Andrei Sakharov, was created in 1988 to honor individuals or groups who defend human rights and fundamental freedoms. Sakharov, a Nobel Peace Prize laureate, died in 1989.

The Hindu

AI in health

- There are certain aspects of artificial intelligence that make it particularly useful in medicine.
- For instance, AI can analyse data from sensors and predict when equipment or machinery will require maintenance, reducing downtime.
- This, as you can imagine, will be massively useful in hospitals and clinics, particularly in procedures and diagnostics, where we constantly use some form of machinery to treat patients.
- Additionally, AI can be used, with machine learning, to analyse and interpret images and videos, making it useful in reading and coming up with interpretations of scans and other diagnostics, based on the data we have fed it already.
- Already, robotics has been employed in precision surgery, with good outcomes, and faster recovery periods.
- AI has made significant advancements in the field of ophthalmology, offering a range of potential applications that can improve patient care and enhance the efficiency of eye disease diagnosis and treatment.
- In fact, we are among the early adopters of AI for health care, and some of the key uses are:
- Retinal disease diagnosis
- Automated screening: A
- AI is also being used to discover new drugs for ophthalmic conditions by analyzing vast datasets to identify potential therapeutic targets and compounds and in predicting whether individuals may develop eye

diseases, based on their health records, lifestyle factors, and genetic data.

The Hindu

Draft Menstrual hygiene policy

- The Menstrual Hygiene Policy officially aims at addressing the longstanding challenges associated with menstruation in our country.
- The document records: "Historically, this biological phenomenon has been overlooked, resulting in negative impact on girls, women, families and the environment.
- This policy is essential for effectively addressing the needs of all who menstruate and promote a positive transformation within our society.
- First and foremost, it affects the mental health of the women, impacts on their confidence, development and So, if there is a policy that will be seriously implemented, and improve women's access to hygiene and privacy, then it is a welcome measure," she adds.
- The policy will adopt a "life cycle "approach and attempt to provide comprehensive support throughout the menstrual journey from menarche to menopause.
- The Menstrual Hygiene Policy document online reiterates its commitment to align with India's aspirations to achieving the Sustainable Development Goals — particularly in relation to good health and wellbeing, quality education, gender equality, and clean water and sanitation.
- It has also pledged to make menstrual products more accessible and affordable, in addition to creating hygienic toilets in public areas, workplaces, and schools.
- The policy vows to serve as a catalyst to raise awareness, challenge societal norms and foster a society that embraces menstrual hygiene as a natural and normal part of life.

The Hindu

Climate justice and India & federalism

- The G20 summit that was held in Delhi (September 910) agreed on tripling renewable energy capacity and a voluntary

doubling of the rate of energy efficiency improvement by 2030.

- **Any energy transition initiative must embrace two normative ideals: first, internalizing cost requires those who emit greenhouse gases to pay the social and environmental costs.**
- **Climate justice is a concept that encompasses the just, fair and equitable distribution of the burdens of climate change and the efforts to mitigate it, and the responsibilities of countries, corporations and other groups to address and prevent the effects of climate change.**
- **Second, climate justice requires compensation for those who are harmed.**
- **Often, those who contribute to climate change are not the ones who are affected by it.**
- **Therefore, any mitigation effort must invert this carbon injustice by making the richer countries or richer classes within a country pay for the energy transition.**
- **India's stance on the matter has largely been framed through the lens of foreign policy and its approach to common but differentiated responsibilities (CBDR) in international negotiations, which allows developing countries in the global south to prioritise economic growth and development over climate mitigation**
- **It is now well documented across the world that climate change and energy transition disproportionately affect the poor.**
- **The climate induced problems and droughts have compounded the agrarian crisis and allied economic activities**
- **Addressing both environmental and socio-economic inequalities simultaneously is essential for sustainable and equitable development.**
- **It is now evident that less equitable societies tend to have higher emission outputs per unit of economic activity.**
- **Given its highly unequal economic structure, India is falling in that trap.**
- **Global experience suggests that societal responses which are necessary to address climate change (such as public action and**

state capacity), are impeded in more unequal settings.

Challenge for India

- India's Nationally Determined Contributions (NDC) aim to ensure that 40% of the total installed power generation capacity is clean energy.
- The country has pledged to achieve NetZero emissions by 2070.
- Such an ambitious target necessitates careful study of its implications.
- As of 2021, coal was the major contributor to the total energy supply in India (accounting for 56.1%), followed by crude oil (it accounts for 33.4%).
- Similarly, the industrial sector was the largest consumer of energy, using more than half, i.e., 51% of the total final energy consumption, followed by transport (11%), residential (10%), and agriculture (3.6%) sectors.
- Data show that manufacturing is far more energy and carbon intensive than agriculture and services.
- Consequently, any increase in energy price is likely to lead to a contraction of manufacturing, which India cannot afford given its already low manufacturing level.
- Thus, a just transition entails a holistic approach that considers economic, social, and regional inequalities.
- While renewable energy adoption is crucial, this shift should not exacerbate existing disparities
- Transitioning to renewables requires a deliberate focus on protecting livelihoods, offering alternative job opportunities, and ensuring that vulnerable communities are not adversely impacted
- The emphasis in the Paris Agreement (2015) is: "taking into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs per nationally defined development priorities".
- The skill sets required and the jobs generated per unit of output in renewable vastly differ from fossil fuel industries.

The Hindu

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Federalism and energy transition

- **Coal, the cheapest source of energy, is located in the poorer regions in eastern and central India while renewable energy hubs, powered by wind and solar photovoltaics (PV) technologies, are located in the relatively wealthy southern and western India.**
- **Despite the pollution it causes, the coal sector, owned by the public sector miners (85%), is the main source of revenue via taxes, royalties, and mining fees and employment for the State governments in Odisha, Jharkhand, and Chhattisgarh.**
- **India's energy transition strategy must pay attention to these regional inequalities, transfer funds to States dependent on coal, and carve out State specific programmes for reskilling development and local rehabilitation needs.**
- **Thus, the Green Deal needs to have a federal deal.**
- **India's federal governance structure implies that subnational governments play a significant role in addressing climate concerns. However, their priorities can differ significantly from those of the Union government.**
- **Examining subnational responses reveals how State entities are vital in tackling the challenge of climate inequality mitigation.**

The Hindu

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The Hindu

India food system

- The primary goal of a food system is to ensure nutrition security for all, it can only be achieved sustainably if the producers producing the food make reasonable economic returns that are resilient over time.
- India faces a double burden of malnutrition
- A sizable proportion of Indians exhibit nutrient deficiencies. As in the National Family Health Survey, 201921, 35% of children are stunted, and 57% of women and 25% of men are anaemic.
- At the other end, due to imbalanced diets and sedentary lifestyles, 24% of adult women and 23% of adult men are now obese.
- India has been stepping up efforts to reduce malnutrition, which has included even the Prime Minister calling for a mass movement to eradicate it.
- On the production side, farm incomes are insufficient to meet the ends of marginal and small farmers.

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- According to a report by the Transforming Rural India Foundation, more than 68% of marginal farmers supplement their incomes with nonfarm activities.
- The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and other forms of casual labour are picking up the slack,
- Further, depleting natural resources and changing climate are making India's food production highly vulnerable.
- As in the 2023 soil health survey, almost half the cultivable land in India has become deficient in organic carbon, which is an essential indicator of soil health. Groundwater, the largest source of irrigation, is rapidly declining.
- In States such as Punjab, more than 75% of the groundwater assessment locations are overexploited, threatening the resilience of farm incomes

Steps needed

- First, consumer demand needs to be shifted towards healthy and sustainable diets. We need to shift to a food plate that is healthier for people and the planet.
- Second, to ensure resilient incomes, we must support farmers' transition towards remunerative and regenerative agricultural practices.
- The National Mission on Natural Farming is a step in this direction, but the overall funding for sustainable agriculture is less than 1% of the agricultural budget
- Third, shift farm to fork value chains towards more sustainable and inclusive ones.
- A critical approach to enhance rural (farm) incomes is to enable more value addition of agricultural produce in rural areas.
- Middlemen, such as corporations supplying raw and processed food to consumers, should prioritise direct procurement from farmers, incentivise procurement of sustainably harvested produce, and implement well established approaches such as fair trade.

The Hindu

Why Earthquakes are prone to Afghanistan

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How do earthquakes occur?

- The earth is made up of chunks of solid rocks called tectonic plates.
- Discontinuities in these rock masses, along which they have moved, are called fault lines.
- These fractures are a result of tectonic forces and stress that builds up in the earth's lithosphere, causing the rocks to break and slip.
- An earthquake occurs when blocks of lithosphere suddenly slip past one another, releasing energy and sending seismic waves through the ground.
- The surface where the lithosphere chunks slip becomes a fault plane.
- The point within the earth where the fault rupture starts and produces an earthquake is called the focus or the hypocentre.
- The point on the surface of the earth directly above it is called the epicenter.
- Tectonic plates are slow moving but are always in motion, mostly due to the heat energy generated inside the earth.
- The edges of these plates are called plate boundaries and consist of faults this is where most earthquakes occur.

Why do frequent earthquakes occur in Afghanistan?

- Afghanistan is located over multiple fault lines in the region where the Indian and the Eurasian tectonic plates meet.
- These plates collide often, leading to significant tectonic activity. Afghanistan is located on the Eurasian plate.
- Towards western Afghanistan, the Arabian plate sub ducts northward under Eurasia, and towards eastern Afghanistan the Indian plate does the same.
- In southern Afghanistan, the Arabian and Indian plates adjoin and both sub duct northward under the Eurasian plate.
- The Hindu Kush mountain range and the Pamir Knot are geologically complex regions where tectonic plates meet.
- The collision and convergence of the Indian Plate and the Eurasian Plate result in the folding and faulting of the Earth's crust.

- **This geological complexity contributes to the occurrence of earthquakes in the region.**
- **The ongoing northward movement of the Indian Plate towards the Eurasian Plate also results in compression, leading to the uplift of the Himalayas and the transmission of tectonic stress across the entire region, including Afghanistan.**
- **The compression causes the crust to deform, and creates faults and fractures that can slip and generate earthquakes. These interactions at plate boundaries generate significant tectonic stresses and result in earthquakes.**
- **Afghanistan is also crisscrossed by various active fault systems like the Chaman Fault and the Main Pamir Thrust.**

The Hindu

Current Affairs 21st October by Saurabh Pandey

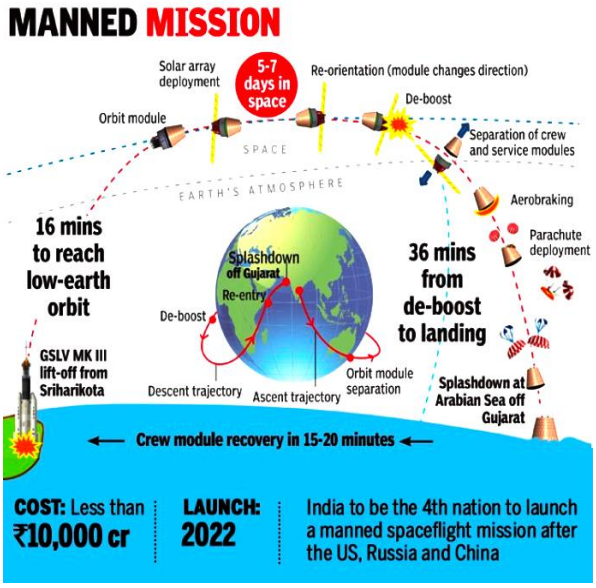
Meri Maati Mera Desh

The initiative is part of the 'Meri Maati Mera Desh' [My soil, my country] campaign being organised by the Ministry of Culture as "a tribute to the Veers and Veeranganas [bravehearts] who have made the supreme sacrifice for the country".

- Around 20,000 volunteers with kalash (urn) containing the soil in their possession will reach Delhi to participate in events culminating in the year long Azadi Ka Amrit Mahotsav.
- According to official sources, volunteers would collect the soil from every household as a mark of respect to the people who had sacrificed their lives for the nation.
- In cases where the soil was not available, people can contribute a grain of rice.

The Hindu

Test Vehicle Abort Mission 1 (TVD1)



The Indian Space Research Organisation (ISRO) on October 21 will conduct the Gaganyaan's first Flight Test Vehicle Abort Mission 1 (TVD1), which will demonstrate the

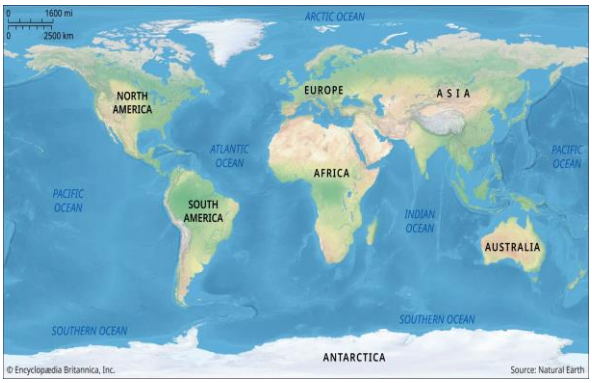
performance of the Crew Escape System.

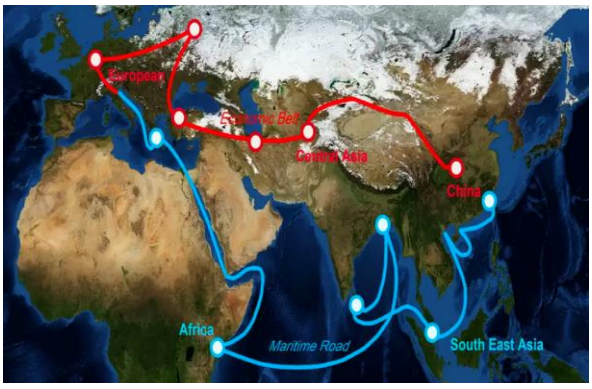
The TVD1 will lift off at 8 a.m. from the first launch pad of the Satish Dhawan Space Centre in Sriharikota. According to ISRO, the test vehicle developed for this abort mission is a single stage liquid rocket.

- The payloads consist of the Crew Module (CM) and Crew Escape Systems (CES) with their fast acting solid motors, along with CM fairing (CMF) and Interface Adapters.
- The CM is where the astronauts are contained in a pressurized earthlike atmospheric condition during the Gaganyaan's mission
- The objectives of this mission is flight demonstration and evaluation of test vehicle sub systems, evaluation of CES including various separation systems and CM characteristics and deceleration systems demonstration at higher altitude and its recovery.

The Hindu

OBOR & Srilanka

- 

- 

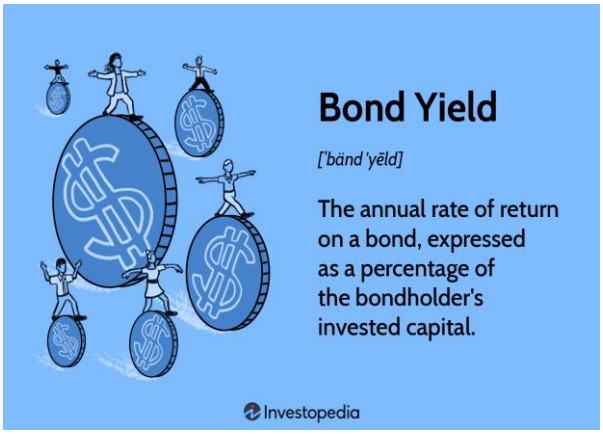
- Noting that Sri Lanka was among the first group of countries to join China's ambitious connectivity project, Mr. Xi said China would work with Sri Lanka to "jointly promote high quality Belt and Road cooperation" and push for new progress in "developing China Sri Lanka strategic

cooperative partnership featuring sincere mutual assistance and lasting friendship."

- The two sides pledged greater collaboration on international and regional affairs, oppose politicisation of the human rights issue and bloc confrontation, and safeguard common interests of the two countries and developing countries,
- Mr. Wickremesinghe's office mentioned Mr. Xi's assurance of "friendly, practical and timely support for Sri Lanka's debt optimisation programme," but the statement from the Chinese side made no mention of debt owed by Sri Lanka,

Global uncertainties and economy

- Interest rates will remain high, and any change will depend on the way the world evolves, Reserve Bank of India Governor Shakti kanta Das said on Friday, highlighting emerging uncertainties in the global economy in the fortnight
- Existing uncertainties have been exacerbated, he noted, like the rise in crude oil prices and the persistent volatility in financial markets
- Slowdown across economies "creates other challenges for financial stability.



- The Hindu

Monetary policy

Current Affairs 21st October by Saurabh Pandey

- Controlling inflation and while also boosting household consumption to support growth remained the main concern at the most recent Monetary Policy Committee (MPC).
- Risks to inflation had marginally increased and "a small shortfall in rainfall coupled with the spatiotemporal dispersion could cause volatility in food prices
- Willingness to consume at the cost of reducing savings is important because it is household consumption that has been propping up the economy in the face of headwinds from fiscal consolidation, weak external demand, and tepid capital investment.
- The Hindu

Current Affairs 22nd October 2023 by Saurabh Pandey

Avian influenza

A recent study published in Nature reveals major changes in the ecology and evolution of highly pathogenic avian H5 influenza viruses, including a shift in global distribution.

The findings suggest that the epicentre of these viruses has extended beyond Asia to new regions including parts of Africa and Europe.

Highly pathogenic avian H5N1 virus activity has intensified globally since 2021, infecting and killing increasing numbers of wild birds and poultry, as well as posing a risk to mammals (including humans).

Increasing persistence of avian influenza in wild bird populations is driving the evolution and spread of new strains.

"These results highlight a shift in the Highly Pathogenic Avian Influenza (HPAI) H5 epicentre beyond Asia and indicate that increasing persistence of HPAI H5 in wild birds is facilitating geographic and host range expansion.

The Hindu

Serotonin

A study published recently in the journal Cell, researchers from the University of Pennsylvania, Philadelphia, who led the study, have found reduced levels of serotonin, a neurotransmitter, being associated with Long COVID.

Memory problems, brain fog, and the inability to focus on tasks that people with Long COVID seem to suffer from might be due to reduced serotonin, the authors say.

Serotonin

The scientific name for serotonin is 5-hydroxytryptamine (5-HT) and is present in the nervous system, bowels, and blood platelets.

Serotonin is a neurotransmitter, and some also consider it a hormone. The body uses it to send messages between nerve cells.

Serotonin has a wide variety of functions in the human body. People sometimes call it the "happy" chemical because it contributes to well-being and happiness.

Serotonin appears to affect mood, emotions, appetite, and digestion. As the precursor for melatonin, it helps regulate sleep-wake cycles and the body clock.

The Hindu

Cicada emergence

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence.

The cicadas are a superfamily, the Cicadoidea, of insects in the order.

The Hindu

Hemiptera

The study found that when insect - eating birds have prey in the form of cicadas and thus shift their focus away from their usual repast leaf - eating caterpillars the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

The Hindu

Maximum temperature and nesting

Maximum temperature extremes reduce the nesting success of birds across the United States by nearly 50% in agricultural landscapes but not forests.

The findings show that future warming may exacerbate the negative effects of habitat conversion on bird fitness, among species of conservation concern in human dominated landscapes.

By removing insulating tree canopies or other complex microhabitats, many forms of habitat conversion can expose species to more pronounced climate extremes.

The Hindu

FRBs and Redshift movement

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FRBs and Redshift movement

An unusually high energy fast radio burst from a high redshift galaxy has offered new insights into the distant universe, challenging current models of FRB emission.

FRBs are brief pulses of radio emission originating from distant extragalactic sources.

Researchers have localised the source of the particularly luminous

burst FRB 20220610A to a galaxy with a complex morphology located at redshift about 1.01.

This FRB is higher than what is predicted by the Macquart relation.

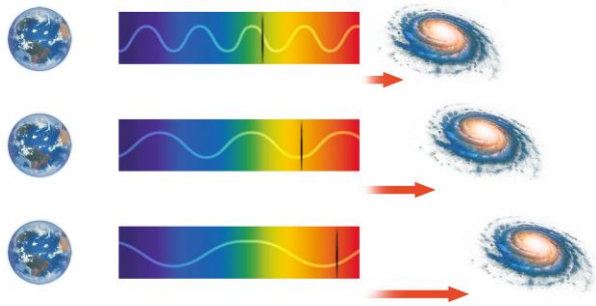
What are FRBs??

In radio astronomy, a fast radio burst (FRB) is a transient radio pulse of length ranging from a fraction of a millisecond to 3 seconds, caused by some high-energy astrophysical process not yet understood.

Astronomers estimate the average FRB releases as much energy in a millisecond as the Sun puts out in three days.

Radio waves are a type of electromagnetic radiation with the longest wavelengths in the electromagnetic spectrum, typically with frequencies of 300 gigahertz (GHz) and below.

What is redshift in astronomy?



The Universe is expanding in the aftermath of the Big Bang explosion 13.7 billion years ago.

During the time that light from an astronomical object has been travelling across space to the Earth, the Universe has grown in size.

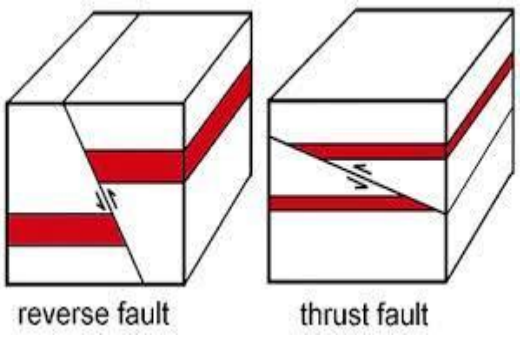
The effect of this is to stretch the 'wavelength' of the light, much as a wave drawn on the fabric of a balloon would be stretched if the balloon were inflated.

The wavelength of red light is about twice that of blue light, so the stretching of visible light shifts it towards the red end of the spectrum: thus the term 'redshift'.

Macquart relation: This relation has been used to measure the cosmic baryon fraction and the expansion rate of the Universe.

The Hindu

Multiplete - earthquake



All four earthquakes occurred on east west striking fault planes that dip to either the north or south.

The earthquakes occurred within the Eurasia plate in an intracontinental mountain belt.

Aftershocks, by default, have magnitudes less than the main event. However, all the four earthquakes near Herat have the same magnitude

Two subsequent earthquakes [on October 11 and October 15] are all approximately the same magnitude, we would call them 'multiplets' rather than main shocks, foreshocks, or aftershocks,"

All the four earthquakes occurred due to thrust faulting, where one block moves up relative to the other, the area where the earthquakes had occurred would experience upliftment.

The Hindu

Mars Quake

The quake, which had a magnitude of 4.7 and caused vibrations to reverberate through Mars for at least six hours, was recorded by

NASA's Insight lander on May 4 2022.

Because its seismic signal was similar to previous quakes known to be caused by meteoroid impacts, the team believed that this event (dubbed 'S1222a') might have been caused by an impact, and launched an international search for a fresh crater.

They conclude that the event was instead caused by the release of enormous tectonic forces within Mars' interior. The results (Geophysical Research Letters), indicate that the planet is much more seismically active than previously thought.

The Hindu

Sikkim floods

What triggered the floods?

Experts point out that the floods in the Teesta river in Sikkim and West Bengal was triggered by a phenomenon called GLOF (Glacial Lake Outburst Flood).

GLOF is a sudden release of water from a lake fed by glacier melt that has formed at the side, in front, within, beneath, or on the surface of a glacier

South Lhonak lake is one of the most studied lakes for GLOF. Sikkim government point out that the collapse of the hydel power dam at Chungthang added to the devastation.

Central Water Commission while approving the project had said that it would be a concrete gravity dam whereas the dam constructed was a rock filled dam that would not be able to withstand huge floods.

The Chungthang dam, which has a majority stake of the State government under Sikkim Urja, has stopped generating electricity and has filed an insurance claim

87 hydroelectricity projects (HEP) of installed capacity of 22,982 (MW) are operational across the Himalayan belt.

Another 30 large HEPs (above 25 MW) with an installed capacity of 11,137 MW are being developed across the Himalayan belt.

Five projects are proposed in Sikkim on the Teesta and other rivers. In Sikkim, the assessed hydro power potential is of 4,248 MW of which about 53.7 % (2,282 MW) has been developed and 24.4 % (1,037 MW) is being constructed, according to a PIB release of March, 2023.

The Hindu

New Safety Dams

India has almost 6,000 large dams and about 80% of them are more than 25 years old and carry safety risks.

A new Dam Safety Act (DSA) was passed in late 2021. O

What are the provisions of the Act?

The Dam Safety Act was tabled in the Rajya Sabha in December 2021, as a response to deficient surveillance and maintenance causing dam failure related disasters.

The Act listed key responsibilities and mandated that national and State level bodies be established for implementation.

It said a National Committee on Dam Safety would oversee dam safety policies and regulations;

A National Dam Safety Authority would be charged with implementation and resolving State level disputes;

The Chairman of the Central Water Commission (CWC) would head dam safety protocols at the national level.

A State Committee on Dam Safety (SCDS) and State Dam Safety Organisation (SDSO) would be set up.

Sikkim formed an SCDS on August 17 with nine members and experts in hydrology and dam design.

What do the States need to do?

Provisions require States to classify dams based on hazard risk, conduct regular inspections, create emergency action plans, institute emergency flood warning systems, and undertake safety reviews and period risk assessment studies.

Importantly, States were asked to report and record incidents of dam failures.

Until now, no statutory provision required systemic reporting of failures and no single agency was tasked with tracking this data.

Is any action taken for failing to comply?

Failure to comply with any provision of the Act is punishable with imprisonment and/or fines, and "if such obstruction or refusal to comply with directions results in loss of lives or imminent danger thereof, [entity] shall be punishable with imprisonment for a term which may extend to two years.

The Sikkim GLOF reveals poor compliance at all levels, from the dam's design to the spillway capacity (which controls the release of water from a reservoir).

The Hindu

Current Affairs 23rd October 2023 by Saurabh Pandey

Earning post pandemic

There has been a rise in the proportion of women working as unpaid family helpers, with the share of rural working women in this form of employment rising from 37.9% to 43% between 201819 and 2022-23.

Between 2019 and 2023, only casual workers both men and women, across both rural and urban sectors saw a net increase in their average real monthly earnings.

Wage workers as a whole have seen real earnings grow slower than output, indicating a reduction in the share of wages even though growth remains healthy.

The Hindu

Bat immunity

Bats are extraordinary organisms in many ways.

They are the only mammals on the earth that can maintain sustained flight.

They also have relatively long life-spans and are relatively more protected from a variety of diseases, including cancer.

They also have a unique ability in echolocation, whereby they use sound to navigate and locate objects, freeing them from being constrained by the availability of light like humans are.

By population, bats make up 20% of all mammals

There are more than 1,400 species of bats today around the world; more than 60 are endangered and 170 odd are classified as vulnerable.

The bumblebee bat weighs only 2 grams whereas the flying foxes, which have a wingspan of 1.5 metres, weigh up to 1.6 kg.

In all, bats play crucial roles in maintaining the ecological balance, and are essential for pollination, insect control, et

Bats do host a wide variety of pathogens, including ones deadly to other mammals, but they themselves don't get infected.

One watershed moment came in 2013. In a paper published in the journal Science, scientists compared the genomes of a fruit eating and an insect eating species and found that genes involved in metabolism and immune response had been positively selected.

The ambitious Bat1K global genome consortium to sequence all the 1,400 or so species' genomes is also currently underway.

Emerging evidence also suggests that a set of immune related genes have been undergoing positive selection in bats, adapting them to control the spread of viruses while mitigating the antiviral inflammatory response

One of the first Bat1K genome consortium papers described six high quality bat species genomes in the journal Nature.

It suggested that echolocation, loss of pro inflammatory genes, and expansion of antiviral genes are ancestral traits of bats.

This suggests that bats have molecular mechanisms that allow them to host a range of deadly viruses but evade clinical disease

Long read sequencing technologies are those that can 'read' thousands to tens of thousands of bases of a genome at a time.

With their advent, it has become possible today for scientists to quickly assemble the nearly complete whole genomes of organisms.

Another benefit to them is that they no longer had to use more complex, time consuming, and expensive molecular technologies in the pursuit of building complete genomes

The researchers reported that subsets of genes involved in mounting an immune response which encode proteins called interferons (IFN) had contracted significantly.

This in turn changed the relative proportions of two subsets, interferon alpha (IFNα) and interferon omega (IFNω), relative to each other.

The researchers attributed bats' immune properties to these changes. By shedding the genes for IFNα, bats can dampen the pro inflammatory response against a number of viruses, thus protecting themselves from clinical disease.

The Hindu

Fluorescence

Matter and radiation interact in a variety of ways.

The sky is blue because air molecules scatter light, and they scatter light of shorter wavelengths more strongly.

Since blue light has the shortest wavelength (in the visible spectrum), it is scattered the most and the sky appears blue. This is called Rayleigh scattering.

But clouds are white because of Mie scattering, which is due to light scattered by larger particles like water droplets.

Another form of interaction is fluorescence when an object absorbs some light of higher energy (like blue colour) and releases it at lower energy (like red colour).

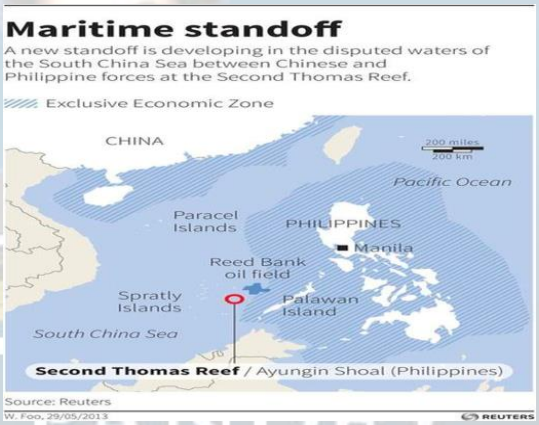
It usually happens when an electron absorbs a photon, or a particle of light, jumps to a higher energy level, before releasing that energy and jumping back down.

The Hindu

Second Thomas Shoal

Beijing and Manila traded blame on Sunday for two collisions between Chinese vessels and Philippine boats on a resupply mission to Filipino troops on a remote outpost in the disputed South China Sea.

The incidents happened near Second Thomas Shoal in the Spratly Islands, a hotly contested region where Beijing deploys ships to assert its claims over almost the entire sea.



The Hindu

TVD1

Mission Definition

"In-flight Abort Demonstration of Crew Escape System (CES)" at Mach number 1.2 with the newly developed Test Vehicle followed by Crew Module separation & safe recovery.

Mission Objectives:

Flight demonstration and evaluation of Test Vehicle sub systems.

Flight demonstration and evaluation of Crew Escape System including various separation systems.

Crew Module characteristics & deceleration systems demonstration at higher altitude & its recovery

Mission Highlights

TV Mission Pilbox	• Mach 1.2 • Altitude 11.7 km • Flight path angle 60° • Dynamic Pressure 22.6 kPa
CM-CES separation	• Mach 0.5 • Altitude 17 km • Dynamic pressure 2-3 kPa
Drogue Parachute deployment	• Altitude 16.7 km
Main Parachute	• Altitude ‹ 2.5 km

TV-D1 Vehicle:

The Liquid propelled single stage Test Vehicle uses a modified VIKAS engine with Crew Module (CM) and Crew Escape System (CES) mounted at its fore end.

'Global Tax Evasion Report 2024

Pointing out that tax evasion is enabling billionaires to enjoy effective tax rates equivalent to 0% to 0.5% of their wealth, the European Union Tax Observatory in its 'Global Tax Evasion Report 2024' has called for a global minimum tax on billionaires equal to 2% of their wealth.

This would both address evasion and "generate nearly $250 billion from less than 3,000 individuals", the report stated.

Current Affairs 23rd October 2023 by Saurabh Pandey

Health of Himalaya

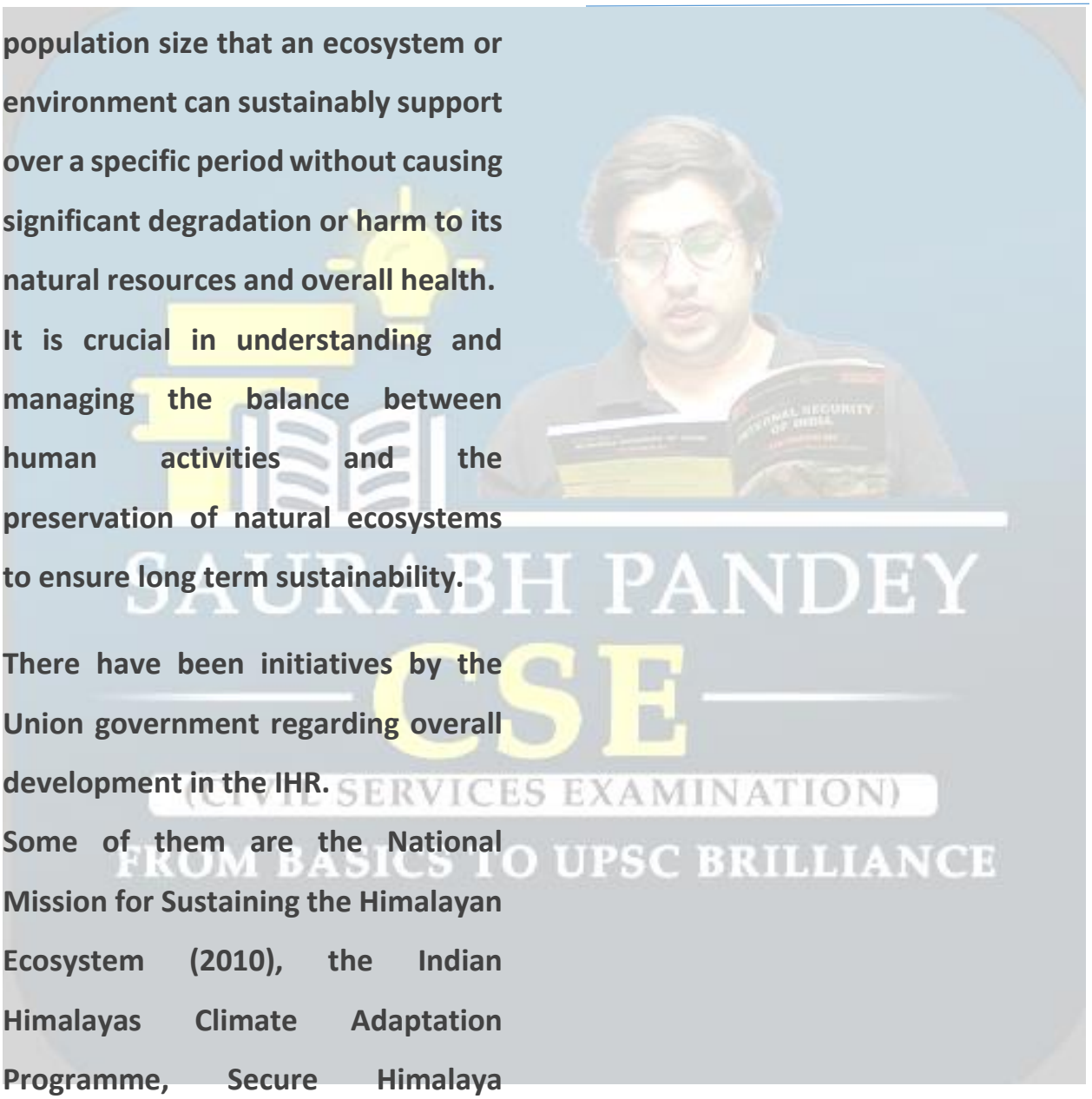
In technical terms, carrying capacity of a region is based on the maximum population size that an ecosystem or environment can sustainably support over a specific period without causing significant degradation or harm to its natural resources and overall health.

It is crucial in understanding and managing the balance between human activities and the preservation of natural ecosystems to ensure long term sustainability.

There have been initiatives by the Union government regarding overall development in the IHR.

Some of them are the National Mission for Sustaining the Himalayan Ecosystem (2010), the Indian Himalayas Climate Adaptation Programme, Secure Himalaya Project, and the recent guidelines on 'Carrying Capacity in the IHR' circulated on January 30, 2020.

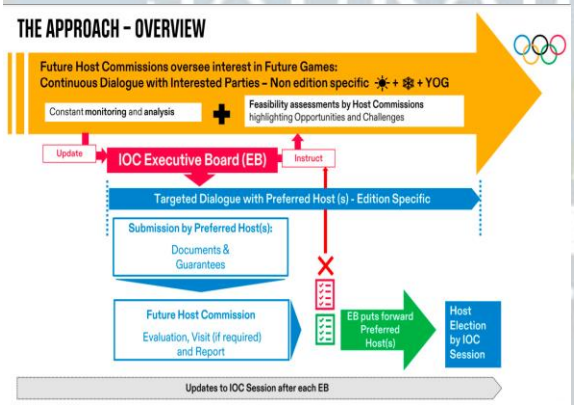
The Hindu



How Olympic cities selected?

Prime Minister Narendra Modi publicly declared India's intention to host the Olympic Games, preferably in 2036, during the opening ceremony of the 141st International Olympic Committee (IOC) session in Mumbai on October 14.

- He also mentioned India's ambition to host the Youth Olympics in 2029 although the quadrennial event is currently scheduled for 2030.
- Only three Asian countries have ever hosted the Olympics China, South Korea and Japan, with Japan hosting the games twice in 1964 and 2020
-



What was the new approach?

The new process placed emphasis on three main aspects flexibility, sustainability and costeffectiveness with the motto being 'The Games adapt to the region, the region does not adapt to the Games'.

How has the process become more flexible?

- With respect to flexibility, the seven-year rule was done away with and there has been greater flexibility in deciding the hosts the IOC has said that the 2036 edition could be decided even as late as after 2030.
- There is now a two stage process a continuous dialogue and a targeted dialogue without any fixed deadlines, to assess, discuss and guide potential hosts.
- The continuous dialogue is a non committal stage not specific to any particular edition.
- It is basically a discussion between the IOC's Future Hosts Commission (FHC) and interested parties about the hosts' vision for the Games, its purpose and long term legacy.
- This is followed by putting together a master plan and working out logistical details, with every potential host free to work out their own template.
- Also, unlike the past, the Games can be planned to be held across cities or

even in conjunction with another country.

- The FHC includes athletes, international federations, national Olympic committees and the international paralympic committee.
- Once there is seriousness in a bid to progress to the next level, it will enter the 'targeted dialogue' phase with the interested parties termed 'preferred host'.
- However, unlike in the past when a party, once rejected, would be discouraged from bidding again, now the other interested parties can continue continuous dialogue for future events.
- In a targeted dialogue, the bids become more determined.
- While there is again no timeframe for a targeted dialogue, it is anticipated to not exceed 12 months.
- It explores the proposals to host a specific edition of the Olympic Games and brings the IOC's executive board into the picture for detailed discussions.
- This is where each of the 'preferred hosts' answer the FHC's questions and provides guarantees on infrastructure, accommodation, security and public services among others and makes the final submission.
- The FHC then prepares an advisory report for the executive board which has the power to either recommend a single host or shortlist more than one for elections by the IOC members.

What about sustainability and cost effectiveness?

- In order to ensure the long term sustainability of the infrastructure and to avoid any public backlash, hosts are encouraged as far as possible to use existing and temporary venues.
- Any new venues built must be in line with existing developmental plans and have a long term justification irrespective of the Games.
- All editions of the summer/winter/youth Olympic Games from 2030 onwards must also adhere to the IOC's climate positive commitment.

The Hindu

SIM Cards

What is a SIM card?

- 'SIM' stands for 'subscriber identification module'. Specifically, it is an integrated circuit, or a microchip, that identifies the subscriber on a given network.
- Imagine each cellular network is a city whose residents are identified by a number, called the international mobile subscriber identity (IMSI). The SIM card is a subscriber's ID card in this city.

What is an eSIM?

- Over the years, the SIM card has shrunk from the SIM to the mini SIM to the micro SIM to the nano SIM.
- The latest on this path is the eSIM, with specifications defined by the GSM Association.
- In the eSIM paradigm, the SIM software is loaded on to a UICC that is permanently installed in the mobile equipment in the factory itself, that it can't be removed. (This is called the eUICC.)
- Users using mobile equipment with this capability such as the Google Pixels 2, 3, and 4 or the iPhone 14 series don't have to bother with physically replacing their SIM cards when they join or switch networks. Instead, the network operator simply has to reprogram the eSIM, which can also be done remotely.

An eSIM has two immediate advantages.

- First, it is considered to be environmentally friendlier than a physical SIM: its reprogrammability means no need for more plastic and metal for a new SIM.
- Second, if a malicious person gains access to your phone, they won't be able to separately access the SIM application nor be able to duplicate it.

There are also at least two disadvantages.

- First, in some countries, including the U.S., eSIMs can be programmed by subscribers themselves. But this process might be difficult for those with low digital literacy, such as the elderly.
- Second, an eSIM can in theory allow network operators to track subscribers' data, including inside apps on the device, especially in the absence of data privacy laws.

The Hindu

Lyapunov time

- Deterministic chaos essentially means that the future can be predicted only if the present is known with a great degree of accuracy.
- However, if the present is known only approximately, the future can't be predicted.
- This is also what the term 'butterfly effect' stands for: that some system is highly sensitive to its starting conditions.
- Even a small change in these conditions can produce disproportionately large changes in the way the system evolves.
- The duration for which the system's evolution will be predictable depends on a few things, such as how accurately and precisely its present state is known, the amount of uncertainty that it can tolerate, and a time factor determined by the dynamics of the system, called the Lyapunov time.
- For example, in a chaotic electrical circuit, the Lyapunov time is about 1 ms. For weather systems, it is a few days, and for the inner solar system, it can be 45 million years.
- The Lyapunov time mirrors the limits of the predictability of the system.
- By convention, it is defined as the time for the distance between nearby trajectories of the system to increase by a factor of *e*.
- Quantum mechanics is probabilistic, not chaotic, as far as we know.
- This is because there are no point like locations of subatomic particles in space, so it is meaningless to determine their exact locations at some time and then attempt to determine their locations at a later point.
- In atoms, electrons exist in a cloud that hovers around the nucleus.
- An atom by itself can't be chaotic but it can be disturbed by applying an electric or a magnetic field.
- Quantum physics takes care of such mild disturbances using perturbation theory
- In mathematics and applied mathematics, perturbation theory comprises methods for finding an approximate solution to a problem, by starting from the exact solution of a related, simpler problem.
- A critical feature of the technique is a middle step that breaks the problem into "solvable" and "perturbative" parts.

The Hindu

The Rydberg atom

- If an electron is excited to a sufficiently high energy even when it is still a part of an atom, a group of energy levels could get close to each other in a continuous manner – almost creating a continuous energy level.
- An atom excited in this way, to have a continuum of energies, is called a Rydberg atom, and we can apply the principles of classical mechanics to describe it.
- The Rydberg atom is like a link that connects the classical and the quantum domains.

The Hindu

Ball lightning

What is ball lightning?

- One of the most rare and mysterious forms of lightning is ball lightning.
- It is a ball of luminosity that usually occurs near the impact point of a flash and moves horizontally at a speed of a few centimeters per second.
- It can penetrate closed windows, is usually accompanied by a hissing sound, and has a lifetime of several seconds.

- The colour is quite variable and the ball often ends with an explosion.
- However, it is not usually destructive.
- Also called globe lightning, it occurs at times of intense electrical activity in the atmosphere.
- These balls are said to be plasmas.
- Plasma is a completely ionized state of matter, at high temperature, in which positive and negative ions freely move about.

The Hindu

GLOF in Himalaya region

The enormity of the challenge is seen in the National Remote Sensing Centre's (NRSC) Glacial Lake Atlas of 2023.

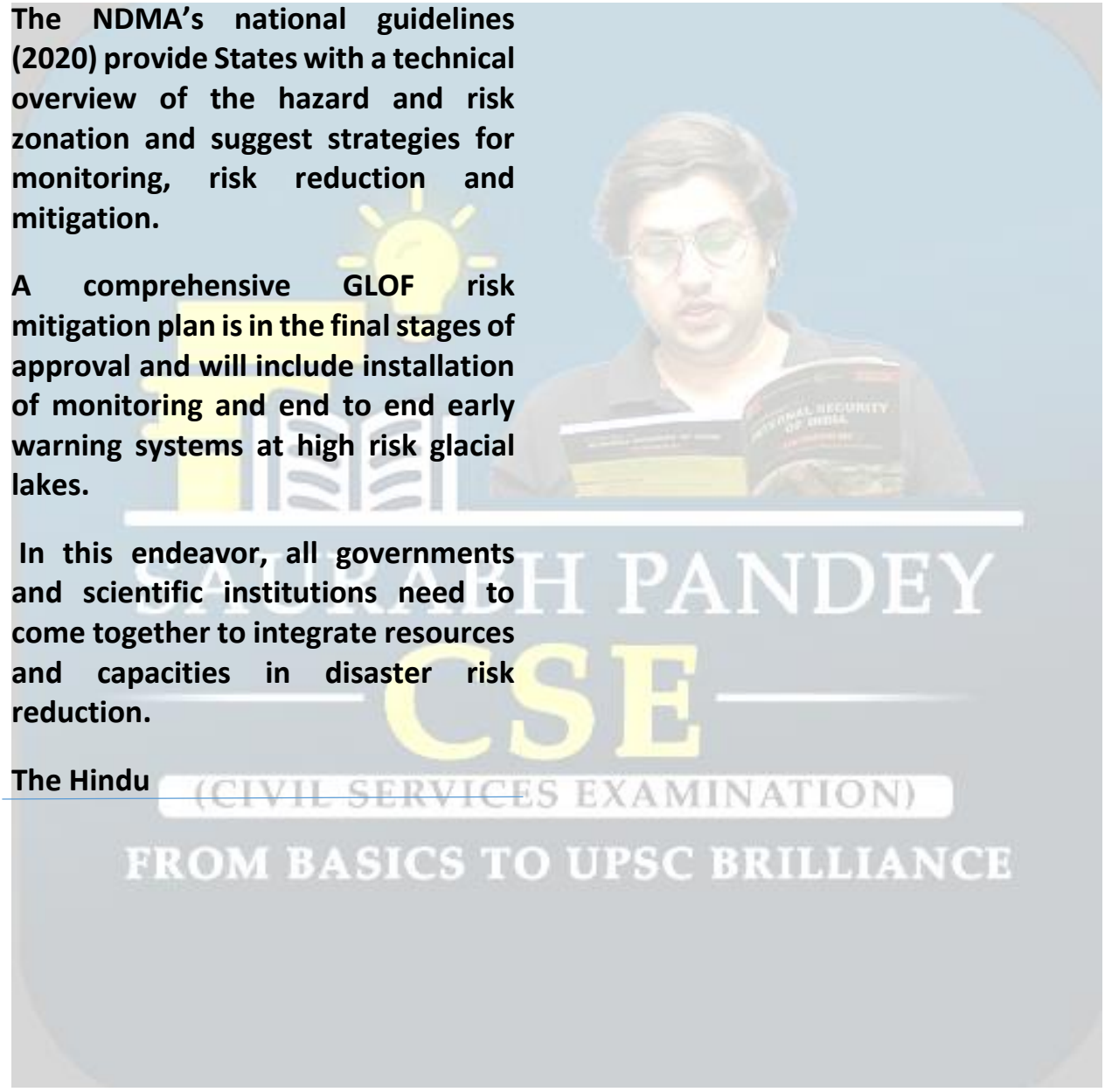
Three major river basins, of the Indus, Ganga, and Brahmaputra, are host to 28,000 glacial lakes greater than 0.25 hectares in area, in five countries.

- **Of these, 27% are in India, in six States and Union Territories.**
- **This region has witnessed catastrophic GLOF events in the past few decades.**
- **Many geotechnical solutions for mitigation of GLOFs have been tried globally, including excavating channels for regulated discharge, drainage using pipes and pumps, spillway construction, and setting up small catchment dams to cut the speed of outflow.**
- **But in practice, conditions above 5,000 metres above mean sea level create formidable challenges such as inaccessibility, impossibilities in transporting and retaining excavation equipment, strong winds, difficulties in sourcing power and connectivity, and vandalism.**
- **These measures are arduous and labour intensive, yet need to be implemented across high risk lakes.**
- **The most significant risk of such a disaster is to downstream hill communities and authorities who get a very short lead time to respond.**
- **They stand to suffer serious damage to life, property, and livelihood.**
- **Such events bring permanent changes in morphology, topography and stream hydrology.**
- **Interviews show that people downstream are mostly unaware of the risks posed by sudden glacier - melt and cascading hazards.**
- **Risks from glacial melting, slope shifting, landslides, intense precipitation, and heatwaves, among other hydro meteorological and geo-physical hazards, are rising.**
- **While meeting the development needs of hill communities, disaster**

and climate resilience principles need to be assimilated into government policy and practice as well as private investment.

- **The NDMA's national guidelines (2020) provide States with a technical overview of the hazard and risk zonation and suggest strategies for monitoring, risk reduction and mitigation.**
- **A comprehensive GLOF risk mitigation plan is in the final stages of approval and will include installation of monitoring and end to end early warning systems at high risk glacial lakes.**
- **In this endeavor, all governments and scientific institutions need to come together to integrate resources and capacities in disaster risk reduction.**

The Hindu



Current Affairs 26th October 2023 by Saurabh Pandey

Gender gap earning

Men consistently earn more than women in all forms of work, with the greatest gender gap observed among self-employed individuals.

- **The gender gap in earnings has increased for self-employed workers but decreased for regular wage workers.**
- **A focus on weekly hours worked reveals that women, on average, work fewer hours than men, with the largest gap in self employment.**
- **The rise in the gender gap in hours worked is attributed to increasing Labour force participation rates (LFPRs) among rural women in self employment, but with many of these jobs being part time in nature.**
- **In terms of hourly earnings, the gap is significantly reduced for regular wage workers, with men earning 24% more in 2023 and working 19% longer hours.**
- **Inequality in hourly earnings remains higher in other forms of work, such as casual labor and self- employment.**

The Hindu

Phalgu River

- **The Phalgu or Falgu, a river that flows past Gaya, India in the Indian state of Bihar, is a sacred river for Hindus and Buddhists.**
- **Lord Vishnu's Temple Vishnupad Mandir is situated on the bank of Phalgu river also called Niranjana river.**

The Hindu

International solar alliance

- **The International Solar Alliance (ISA) is an action-oriented, member-driven, collaborative platform for increased deployment of solar energy technologies as a means for bringing energy access, ensuring energy security, and driving energy transition in its member countries.**
- **The ISA strives to develop and deploy cost-effective and transformational energy solutions powered by the sun to help member countries develop low-carbon growth trajectories, with particular focus on delivering impact in countries categorized as Least Developed Countries**

(LDCs) and the Small Island Developing States (SIDS).

- Being a global platform, ISA's partnerships with multilateral development banks (MDBs), development financial institutions (DFIs), private and public sector organizations, civil society and other international institutions is key to delivering the change its seeks to see in the world going ahead
- The ISA was conceived as a joint effort by India and France to mobilize efforts against climate change through deployment of solar energy solutions.
- It was conceptualized on the sidelines of the 21st Conference of Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris in 2015. With the amendment of its Framework Agreement in 2020, all member states of the United Nations are now eligible to join the ISA.

The Hindu

Japan on Transgender

- Japan's Supreme Court ruled that a law requiring transgender people to undergo sterilisation surgery in order to officially change their gender is unconstitutional.
- The decision, which requires the government to reconsider the law, is a first step toward allowing transgender people to change their identity in official documents without getting sterilized.

The Hindu

Wilkes region

- Antarctica has not always been a desolate land of ice and snow.
- The earth's southernmost continent once was home to rivers and forests teeming with life. Using satellite observations and ice penetrating radar, scientists are now getting a glimpse of Antarctica's lost world.
- This landscape, located in East Antarctica's Wilkes Land region bordering the Indian Ocean, covers an area roughly the size of Belgium.
- Marriage and Labour force participation
- World Bank estimates (2022) show that the worldwide LFPR for women was 47.3% in 2022.
- Despite the remarkable advancements observed in the global economies, there has been a persistent decline in the labour force participation rate (LFPR) of women in developing nations.
- The estimations also indicate that female labour force participation in India between 1990 and 2022 has decreased from 28% to 24%.

- **This fall has impeded their growth and hindered their ability to achieve their maximum capabilities.**
- **The issue is made considerably dire when married women express a desire to participate in the labour market.**
- **After marriage, there is a tendency for women's LFPR to decrease due to many variables.**
- **These factors encompass women's limited educational attainment, less mobility as a result of increasing family obligations, and societal disapproval associated with women in employment outside the domestic sphere.**
- **The institution of marriage amplifies domestic obligations for women while concurrently imposing many social and cultural impediments that affect their participation in the workforce**
- **The labour market entry of women is influenced by a range of individual and societal factors, perhaps impacting married women to a greater extent than their unmarried counterparts.**
- **Several variables contribute to limited labour participation for women, such as their religious and caste affiliations, geographical location, the wealth of their household, and prevailing societal norms surrounding women's employment outside the house.**
- **It has been observed that women of the upper strata tend to adhere to stringent societal standards by predominantly assuming domestic roles.**
- **Conversely, women from the lower strata are more inclined to engage in the labour market, primarily driven by economic constraints that stem from poverty.**
- **It is imperative to look at suitable solutions in order to promote women's empowerment in the phase of high economic growth.**
- **The absence of adequate daycare services frequently acts as a disincentive for female labour force participation.**
- **Therefore, it is imperative to enhance the quality and accessibility of daycare services/crèches for employed women across various socioeconomic strata, encompassing both formal and informal sectors.**
- **The government has enacted initiatives such as the National Crèche Scheme for The Children of Working Mothers.**
- **The implementation of such schemes is imperative in both the public and private sectors.**

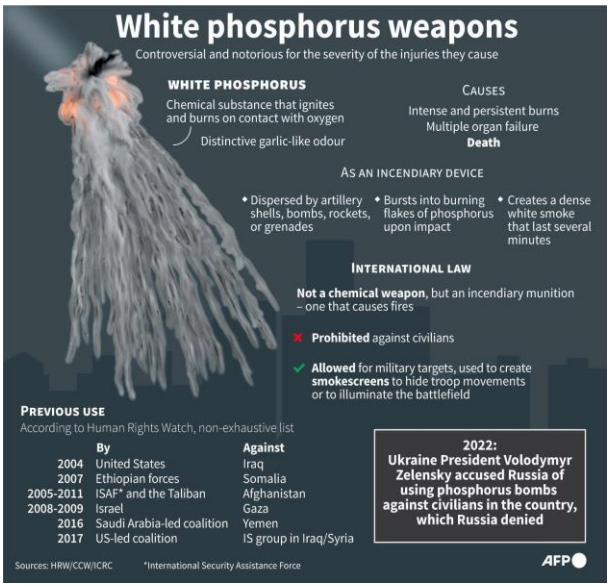
The Hindu

Urbanization and health risk

- **India's urban population is estimated to reach 675 million in 2035, the second highest in the world.**
- **Although there is widespread recognition that cities have been fuelling India's rapid rise to economic superpower status, almost all are failing their inhabitants in terms of delivering on health, environmental and equity targets.**
- **India's urban inhabitants experience multi-scalar health risks including the world's highest levels of air and noise pollution, limited greenery, lack of access to sidewalks and parks that limit active lifestyles, archaic modes of transport that contribute to air pollution, pernicious access to nutritionally dense unhealthy foods and unprecedented exposure to toxic chemicals and heavy metals.**
- **This concatenation of exposures dramatically magnifies health risks for heart disease and diabetes, referred to as cardio metabolic disease, especially when combined with a lack of physical activity.**

The Hindu

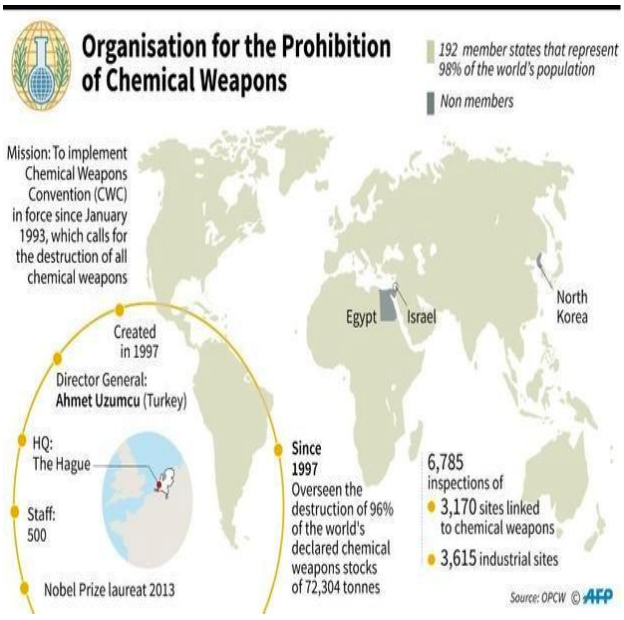
White Phosphorus and CWC



- **White phosphorus has a wide range of applications. It is useful in military operations.**
- **But it also poses environmental dangers.**
- **White phosphorus can be employed to create dense smoke screens in the context of combat, hindering visibility and providing cover for military manoeuvres.**
- **Additionally, it can be used in incendiary devices such as grenades and artillery shells, which can result in persistent and intense fires, effective against people, equipment, and structures**
- **The Convention on Certain Conventional Weapons (CCW) imposes restrictions on the use of incendiary weapons, including white phosphorus, with the aim of safeguarding civilians.**
- **In addition, white phosphorus use is subject to the rules and principles of**

international humanitarian law, which aims to minimize harm to both civilians and combatants in armed conflicts.

- **This includes the principles of distinction, which require differentiation between combatants and civilians, and proportionality, ensuring that military actions do not cause excessive harm to civilians compared to the military advantage sought.**
- **International humanitarian law also prohibits indiscriminate attacks that may disproportionately harm civilians and civilian objects.**
- **Protocol III under the CCW specifically deals with incendiary weapons.**
- **Article 1 of this protocol defines an "incendiary weapon" as a weapon or munition primarily designed to set fire to objects or to cause burn injury to persons through the action of flame, heat, or combination thereof, produced by a chemical reaction of a substance delivered on the target.**
- **Article 1(b)(i) includes an exemption in this classification for munitions that may cause unintended incendiary effects, such as illuminants, tracers, smoke, or signaling systems.**
- **White phosphorus munitions are primarily intended to produce illuminating and smokescreen effects, with the incendiary aspects being secondary or unintentional**
- **The Chemical Weapons Convention (CWC) is a treaty that establishes a comprehensive ban on the use of chemical weapons.**
- **White phosphorus, although a chemical agent and toxic, is not covered by the CWC.**
- **When employed as an incendiary weapon and not for chemical warfare, white phosphorus falls under the regulations of Protocol III of the CCW.**




Countries that have ratified the Chemical Weapons Convention, 2022
Our Wor in Data
Chemical weapons are chemicals used to cause death or harm through their poisonous properties. The convention bans developing, producing, acquiring, possessing, transferring, and using chemical weapons and requires countries to destroy them.
No data
neither signed nor ratified
signed
ratified
Data source: United Nations (2022)
OurWorldInData.org/biological-and-chemical-weapons | CC B

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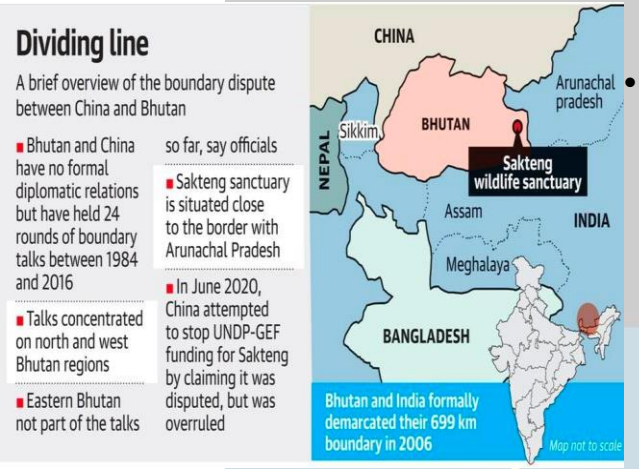
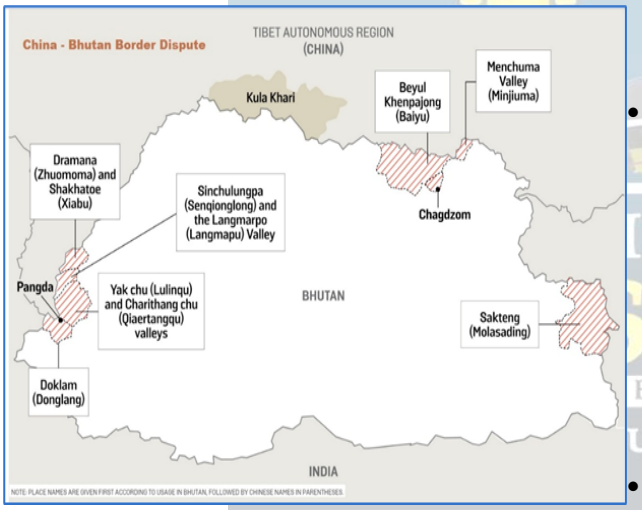
China-Bhutan border dispute





China and Bhutan held their 25th round of boundary talks in Beijing and signed a Cooperation Agreement on the "Responsibilities and Functions of the Joint Technical Team (JTT) on the Delimitation and Demarcation of the Bhutan China Boundary."

- **Since 1984, Bhutan and China had held 24 rounds of talks to resolve the disputes until 2016, but the 25th round appeared to have been held up after the Doklam Standoff between Indian and Chinese armies in 2017, and then the COVID19 pandemic in 2019-2021.**
- **The 3 Step Roadmap involves first, agreeing to the border "on the table"; then visiting the sites on the ground; and then formally demarcating the boundary**
- **New Delhi is watching the demarcation discussions over Doklam, as amongst the proposals China has placed on the table is an agreement to "swap" areas in Doklam under Bhutanese control with areas in Jakarlung and Pasamlung which China claims.**

- **The Doklam trijunction cuts very close to India's Siliguri corridor a narrow area that connects the North Eastern States to the rest of India and India would not like to see China gain access to any area closer to it.**
- **Since the Doklam standoff in 2017, China has doubled down on its control of the Doklam plateau, and according to a recent Pentagon report, has continued to build "underground storage facilities, new roads , and new villages in disputed areas in neighboring Bhutan," erasing many of the strategic gains that New Delhi had hoped for after China agreed to step back from the standoff point in 2017.**
- **Finally, India's worry is over China's demand for full diplomatic relations with Bhutan, and opening an Embassy in Thimphu.**
- **Given India's challenges with Chinese projects and funding in other neighboring countries including Bangladesh, Nepal, Sri Lanka and the Maldives, any Chinese presence in a small country like Bhutan would be problematic.**

The Hindu

Project tiger, NTCA, Anamalai tiger reserve

Many conservation areas were created to make sure that no human could enter the area and do any harm to the tiger or its habitat.

Project Tiger was first initiated in the year April 1, 1973, and is still going on. This project was started to save tigers.

The much-needed project was launched in Jim Corbett National Park, Uttrakhand under the leadership of Indira Gandhi.

The objectives of the Project Tiger was clear- saving Royal Bengal Tigers from getting extinct.

The major cause of their depletion is humans, and so all the conservation areas are made human free. They made sure that the place that tigers lived in was also safe and secure.

The main objectives behind Project Tiger are to reduce the factors which cause the diminishing of tigers and also to manage them and ensure a viable tiger population in the case of economic, scientific, ecological, and cultural values.

The body administrating is National Tiger Conservation Authority and there are 8 Conservation units:

Sundarbans Conservation Unit

Northeast Conservation Unit

Western Ghats Conservation Unit

4. Shivalik-Terai Conservation Unit
5. Eastern Ghats Conservation Unit
6. Sariska Conservation Unit
7. Central India Conservation Unit

   Kaziranga Conservation Unit
8. About NTCA
9. **The National Tiger Conservation Authority (NTCA) has been constituted under section 38 L (1) of Wildlife (Protection) Act, 1972.**
10. **Further, as per the section 38 L, sub section 2 of the said Act, the authority consists of the Minister in charge of the Ministry of Environment and Forests (as Chairperson), the Minister of State in the Ministry of Environment and Forests (as Vice-Chairperson), three members of Parliament, Secretary, Ministry of Environment and Forests and other members.**

The authority derives its power from section 38 O (1) of WLPA, 1972 and functions under the guidance of Chairperson, Vice-Chairperson and members.

About Anamalai Tiger reserve

- **Anamalai Tiger Reserve is carved out of the Tamil Nadu portion of the Anamalais.**
- **The Tamil Nadu part of the reserve is called as Anamalai Tiger Reserve (ATR).**
- **It lies South of the Palakkad gap in the Southern Western Ghats.**
- **The Anamalai Tiger Reserve falls within the Western Ghats mountain chain of South West India, a region designated as one of 25 Global Biodiversity Hotspots. The biogeographical classification of the country includes Western Ghats which are considered as one of eight "hottest hot spots"**

The Hindu

Ethics vs privilege committee

- **A Presiding Officers' Conference held in Delhi in 1996 first mooted the idea of ethics panels for the two Houses.**
- **Then Vice President (and Rajya Sabha Chairman) K R Narayanan constituted the Ethics Committee of the Upper House on March 4, 1997, and it was inaugurated that May to oversee the moral and ethical conduct of members and examine cases of misconduct referred to it.**
- **The Rules applicable to the Committee of Privileges also apply to the ethics panel.**
- **In the case of Lok Sabha, a study group of the House Committee of Privileges, after visiting Australia, the UK, and the US in 1997 to look into**

practices pertaining to the conduct and ethics of legislators, recommended the constitution of an Ethics Committee, but it could not be taken up by Lok Sabha

- The Committee of Privileges finally recommended the constitution of an Ethics Committee during the 13th Lok Sabha. The late Speaker, G M C Balayogi, constituted an ad hoc Ethics Committee in 2000, which became a permanent part of the House only in 2015.

Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint.
- It makes its recommendations after evaluating the complaint.
- The Committee presents its report to the Speaker, who asks the House if the report should be taken up for consideration. There is also a provision for a half-hour discussion on the report.

Privileges Committee

- The work of the Ethics Committee and the Privileges Committee often overlap.

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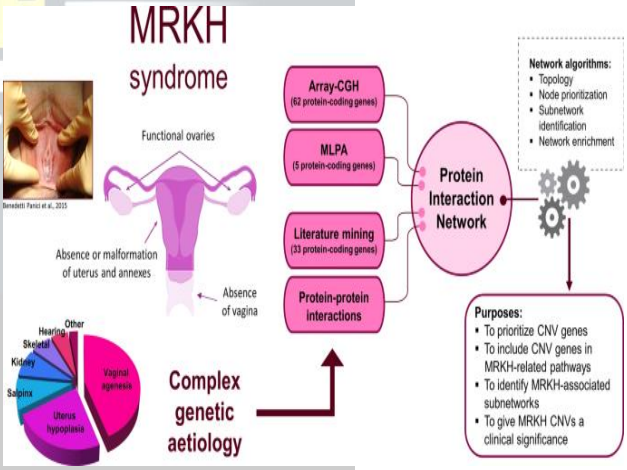
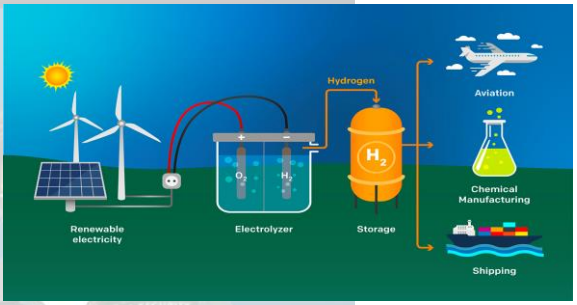
- **An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.**
- **The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".**
- **These privileges are enjoyed by individual Members as well as the House as a whole.**
- **An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and dignity of the House.**
- **The Ethics Committee can take up only cases of misconduct that involve MPs.**
- **SC on Surrogacy MRKH (Mayer Rokitansky Kuster Hauser syndrome)**
- **The Supreme Court has protected the right of parenthood of a woman, suffering from a rare medical condition, by staying the operation of a law which threatened to wreck her hopes to become a mother through surrogacy.**
- **The woman has the Mayer Rokitansky Kuster Hauser syndrome. Medical board records showed she has "absent ovaries and absent uterus, hence she cannot produce her own eggs/ oocytes"**



- **A government notification on March 14 this year amended the law, banning the use of donor gametes.**

- **It said "intending couples" must use their own gametes for surrogacy.**
- **d) of the Surrogacy (Regulation) Rules, 2022, by ruling out the use of donor eggs, had made it impossible for his client and her husband to continue with the process of surrogacy to achieve parenthood.**
- **He argued that the 2023 amendment contradicted Sections 2(r) and 4 of the Surrogacy Act, 2021, which recognised the situation when a medical condition would require a couple to opt for gestational surrogacy in order to become parents.**
- **The government's contention that the surrogate child should be "genetically related" to the couple, the court said the child would be related to the husband.**
- **"In this regard, it may be noted that the expression 'genetically' related to the intending couple has to be read as being related to the husband when Rule 14(a) applies,"**
- **The Hindu**

Green hydrogen and carbon emission



- **India's plans to produce so called 'green hydrogen' where the gas is produced without resulting in fossil fuel emissions may end up worsening pollution if proper checks and balances are not in place, according to a study by environmental and energy think tank, Climate Risk Horizons (CRH).**
- **The National Green Hydrogen Mission, piloted by the Ministry of New and Renewable Energy (MNRE),**

expects to manufacture five million tonnes by 2030.

- This would require the installation of renewable energy capacity worth 125 GW and the use of 250,000 giga watt hour units of power, equivalent to about 13% of India's present electricity generation.
- As of August 2023, India's total renewable energy (RE) capacity stood at 131 GW.
- The 2030 green hydrogen plan thus envisages adding an equivalent RE capacity by 2030.
- This is over and above the 500 GW of RE capacity that India has committed to install by 2030 as part of the Paris Agreement.
- To put that in perspective, India installed only 15 GW of new solar and wind capacity in 2023, against the 45 GW per year needed to reach the 2030 target.
- The MNRE has defined green hydrogen as hydrogen produced in a way that emits no more than two kg of carbon dioxide per kg of such hydrogen.
- Currently, producing one kg of 'grey hydrogen', as it is known, ends up emitting nine kg of carbon dioxide
- The main concern is that if electrolysers were run 24x7, they would be expected to operate even at night when no solar power is available.
- **"Where will the electricity come from?**
- If it comes from India's coal powered grid in general, it will in fact increase carbon emissions, since about 70% of the electricity on the grid is coal

generated more in no daylight hours when solar generation is nil,"

The Hindu

SC on abortion

- The Supreme Court this month rejected a woman's plea for abortion.
- The woman 26 weeks pregnant, married, with two children, and dealing with postpartum psychosis requested termination because she was "physically, emotionally, mentally, financially and medically unable to carry, deliver or raise a child."
- Denying her request, the three judge Bench headed by the Chief Justice of India said the Court's recognition of a woman's autonomy cannot eclipse the "rights of the unborn child".
- For the law, a pregnant woman is a unique subject. The foetus is intimately associated with the body of the woman, in a way that is different from all other situations that the law regulates.
- Any form of recognition of the foetus will, therefore, most likely grievously invade women's legally recognised rights.
- When we contemplate the legal (as opposed to ethical, moral or religious) status of the foetus, a strong case can be made that the impact on women has to be a consideration
- Empirical evidence suggests that restrictive abortion laws do not protect foetuses; they push women toward unsafe abortions.
- If foetal protection is the aim, better alternatives exist: comprehensive sex education, access to contraception, reducing violence against women,

and providing childcare support, which reduce rate of abortions.

- **The pregnant woman's rights were seen as extending only as far as they did not harm a viable foetus**
- **Abortion cases are seen as involving the right to privacy. However, abortions are also necessary to guarantee women equality.**
- **Being denied abortions has a socio-economic impact on women. It also entrenches stereotypical assumptions about women's role as mothers, leading to abortion stigma and provider bias.**

The Hindu

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Dark pattern

What is problematic is the tactics that compel users to pay without their knowledge or in ways that entice users to do something that they normally would not have done.

- Dark patterns are unethical tactics from companies to entice users to pay up for things, and services they would normally not have shelled out money for. Such tactics involve unethical user interface designs that may make your internet experience harder than it should be in order to even exploit you.
- Tech firms often use deceptive tactics to make users accept, for example, certain terms and conditions or products and services.
- For this, tech firms or other companies may flood your inbox with promotional emails or tweak their websites or apps in a way that users may think acceptance or certain conditions is the only way forward.
- Social media companies and tech giants like Facebook, Apple, Amazon, Skype, LinkedIn, Microsoft and Google have used dark patterns.
- Amazon faced heat in the European Union (EU) over its multi-step cancellation process for Amazon Prime subscriptions. It was reportedly noted by the EU that if a user wished to subscribe to Prime, the process was much simpler as opposed to if he wanted to unsubscribe.
- This year, Amazon made the cancellation process simpler for its customers in Europe.

The Hindu

Ejecta halo

- Chandrayaan3's lander module, Vikram, had generated an "ejecta

halo" on the lunar surface while making the historic touchdown on the south pole of the moon.

- The Vikram lander of the Chandrayaan3 mission landed near the south pole of the moon on August 23.
- During the action of descent stage thrusters and the consequent landing, a significant amount of lunar surficial epi regolith material got ejected, resulting in a reflectance anomaly or ejecta halo,"

The Hindu

Women in family vs GDP

- A woman's work in the family contributes to the wellbeing of humans in society: it does not add to the growth of the economy and GDP.
- Ms. Goldin's research reveals that women, who also attend to the caring work required for families at home, are considered less valuable in economic enterprises because they cannot commit to continuously working full time for their employers, which men can.
- Gig economy and the informal sector. Even in large industrial establishments, jobs are on short term contracts.
- These trends in the future of work are a special challenge for India, which has the largest numbers of youth in the world.
- They are finding fewer opportunities for dignified work with adequate income and social security even

though the Indian economy is among the fastest growing in the world.

- Moreover, India, which ranks 132 out of 191 countries in human development, needs to invest more in caregiving services. Sadly, care-giving work is not valued in the money economy.
- The millions of women providing domestic services, and millions more who are providing care in communities as ASHA workers (Accredited Social Health Activist) and anganwadi workers in primary health and education, are very poorly paid.
- The Indian Prime Minister has called upon the G20 to support human - centric development going beyond GDP.
- The vision of globalization so far has been "One Earth, One Economy, One Future". India has called for a different vision at the G20: Vasudhaiva Kutumbakam: "One Family, One Earth, One Future".
- GDP is a monetary measure of only the economic component of a society. GDP does not value care-giving work.
- Therefore, to pursue its ambitions to become a "$10 trillion dollar GDP" economy, policymakers, even in India, want to pluck women out of their families and from informal work, and push them into more efficient, industrial form establishments to contribute to GDP.
- The 17 Sustainable Development Goals (SDG), to be achieved by 2030, cover a range of environmental, social, and economic problems that must be solved simultaneously to make progress more inclusive and sustainable.

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- The G20 has assessed that, at the midway point to 2030, the global progress on SDGs is off track with only 12% of targets on track.
- The masculine view of the economy is a production machine driven by competition.
- A feminine view of the economy is a society of human beings who care.
- Mainstream economics, so far dominated by men, has created a Tragedy of the Commons.
- Nobel Laureate Ostrom showed how local communities, often with women at their center, cooperatively govern their local resources equitably and sustainably.
- Ms. Ostrom proposed a different paradigm, based on cooperation, equity, and sustainability, for realising the Promise of the Commons, which is the urgent need of this millennium.

Article 244

- The President of India notifies India's Scheduled Areas.
- Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh. In 2015, Kerala proposed to notify 2,133 habitations, five gram panchayats, and two wards in five districts. It awaits the Indian government's approval.
- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding

the administration of Scheduled Areas.

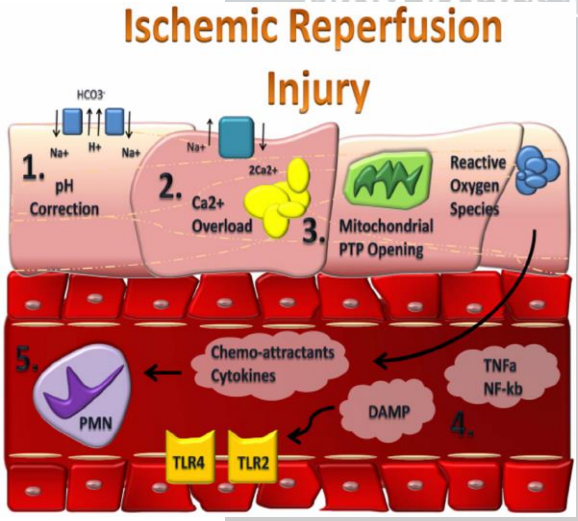
- **The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make regulations for a Scheduled Area, especially to prohibit or restrict the transfer of tribal land by or among members of the STs, and regulate the allotment of land to STs and money-lending to STs.**

The Hindu

Current Affairs 29th October 2023 by Saurabh Pandey

Ischemia/reperfusion injury

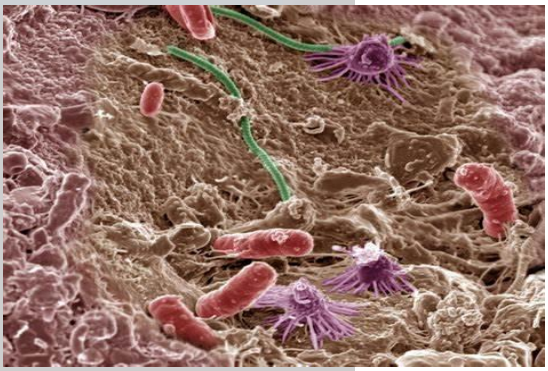
- Researchers has discovered a mechanism that contributes to ischemia/reperfusion injury (IRI) in the lung, one of the leading causes of poor outcomes, in transplant recipients.
- Their data show how the channel TRPV4 is activated in IRI in a mouse model, suggesting that TRPV4 of the pathway could offer targets for researchers seeking to boost the survivability of transplanted lungs.
- TRPV4 (Transient Receptor Potential Cation Channel Subfamily V Member 4) is a Protein Coding gene.
- Diseases associated with TRPV4 include Metatropic Dysplasia and Hereditary Motor and Sensory Neuropathy, Type lic.



The Hindu

Microbiome

- Parsing data from two clinical trials, researchers have mapped out how the gut microbiome can impact how people respond to teplizumab, a drug that can delay the onset of type 1 diabetes.
- Patients with stronger immune responses against three different gut microbes tend to benefit more from the drug's disease delaying effects. The results show how the immune system's relationship with the microbiome can shape the progression of type 1 diabetes.
- The microbiome is the collection of all microbes, such as bacteria, fungi, viruses, and their genes, that naturally live on our bodies and inside us.
- Although microbes are so small that they require a microscope to see them, they contribute in big ways to human health and wellness.



The Hindu

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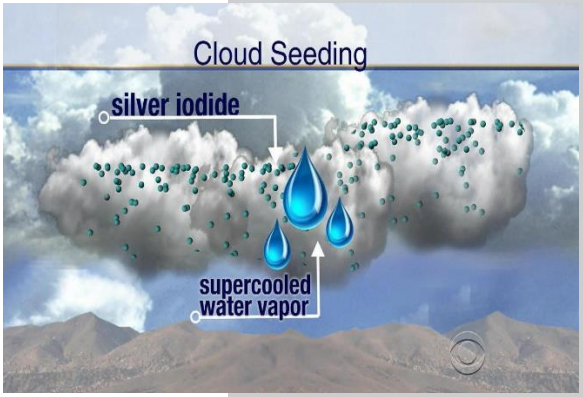
Cloud seeding

- Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX phase4) was a scientific investigation conducted in Solapur city during the summer monsoon period of 2018 and 2019.
- The primary objective was to investigate the efficacy of hygroscopic seeding in deep convective clouds and to develop a cloud seeding protocol.
- Calcium chloride flare was used for seeding the clouds.
- A cloud seeding flare releases these particles when triggered.
- The seeding was done at the base of the warm convective clouds and at a time when the clouds were in their growing stage so that the seed particles could enter the clouds with minimum dispersion.



The Hindu

Internal structure of mars

- Mars's liquid iron core is likely to be surrounded by a fully molten silicate layer, according to a pair of studies published in Nature.
- These results offer a new interpretation of the interior of Mars, suggesting its core is smaller and denser than previously proposed.
- Seismological study of Mars to understand the interior of the red plant was carried out in 2019.
- The Insight Mars Lander used an instrument called the Seismic Experiment for Interior Structure (SEIS) to record seismic waves passing through Mars's interior
- The analysis of measurements from the NASA Insight Lander's Seismic Experiment for Interior Structure (SEIS) project in 2021 suggested the presence of a large but low-density core, composed of liquid iron and lighter elements such as Sulphur, carbon, oxygen and hydrogen
- The core has a higher proportion of lighter elements than is feasible according to estimates of the abundances of these elements early in Mars's formation history
- The two studies found that the liquid iron nickel core of Mars is surrounded by an approximately 150 km thick

layer of near molten silicate rock, the top of which was previously misinterpreted as the surface of the core.

- The Criminal Procedure (Identification) Act (CrPI)
- In April 2022, the Criminal Procedure (Identification) Act (CrPI) was passed by Parliament.
- The Act enables police and central investigating agencies to collect, store and analyse physical and biological samples including retina and iris scans of arrested persons.

Why was the legislation brought in?

- The CrPI Act repealed the Britishera Identification of Prisoners Act, 1920 whose scope was limited to collecting and recording finger impressions, footprint impressions and photographs of certain category of convicted persons and impressions of non convicted persons on the orders of a Magistrate.
- The government said the new Act made provisions for the use of modern techniques to capture and record appropriate body measurements.

What is the role of the NCRB?

- The central body has been entrusted with the task to "store, process, share, disseminate and destroy records of measurements."
- Impressions taken at any police station will be stored in a common database maintained by the NCRB.
- The database could be accessed by authorized police and prison officials across the country.
- The NCRB will prescribe the specifications of the equipment's or devices to be used for taking measurements in digital and physical format,
- the method of handling and storing measurements by the State police in a format compatible with the NCRB database and also the information technology system to be used for taking the measurements.

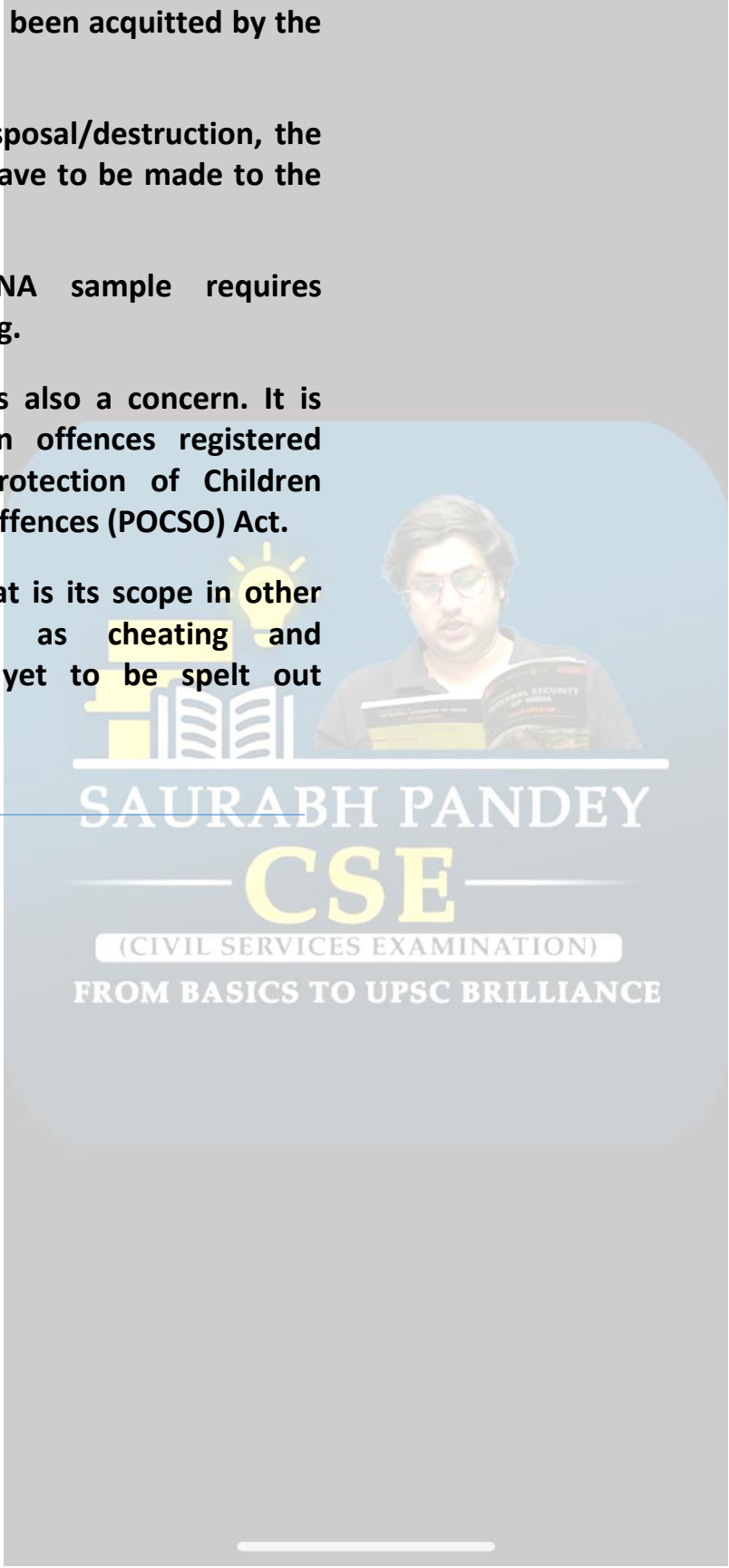
What are the challenges?

- When the Bill was being debated in Parliament, Opposition members argued that it violated fundamental rights, including the right to privacy.
- With plans to include DNA samples and facial recognition technology, questions arose about the protection of such data.
- It takes the onus of destruction and disposal of records of an individual from the central database in case a person has been falsely implicated in

a crime or has been acquitted by the court.

- For such a disposal/destruction, the request will have to be made to the nodal officer.
- "Handling DNA sample requires proper training.
- The storage is also a concern. It is compulsory in offences registered under the Protection of Children from Sexual Offences (POCSO) Act.
- However, what is its scope in other crimes such as cheating and snatching is yet to be spelt out clearly."

The Hindu



Indian Railway

- **The Indian Railways (IR) has been on a spending spree with respect to capital expenditure (capex), particularly after the government merged its rail budget with the main budget.**
- **However, its operating ratio, which is the ratio of ordinary working expenses to the gross traffic receipts, has shown no improvement.**
- **A lower ratio implies better profitability and surplus for capital investment.**
- **Since the IR continues to have a total lack of surplus, it has been augmenting the funds raised through Gross Budgetary Support (GBS) and Extra Budgetary Resources (EBS).**
- **The merging of budgets helped this cause as GBS from the central government could be increased without much scrutiny.**
- **However, with respect to EBS, there is a price to pay.**
- **The IR's spending on repayment of principal and interest is pegged at ₹22,229 crores and ₹23,782 crores respectively, which together make it 17% of revenue receipts, a sharp rise from less than 10% till 201516.**
- **It appears that this debt liability was noticed as capex relied almost entirely on GBS in this year's budget.**

- **Despite this, the unprecedented rise in capex appears to be predicated on the premise that the IR's operating and financial performance should not be viewed in isolation but along with its role as an engine for the growth of the country's economy.**
- **Investment in railways boosts manufacturing and services, tax revenue for the government and allows for more job opportunities**

Identifying the problem

- **The IR's freight segment is profitable whereas the passenger segment makes huge losses.**
- **The Comptroller and Auditor General of India (CAG) report presented in Parliament on August 8, 2023 states that there was a loss of ₹68,269 crores in all classes of passenger services during 202122, with all the profit from freight traffic nullified in cross subsidizing passenger services.**
- **The 11 commodities in the IR's transport basket account for 90% of tonnage and revenue, of which coal is around 45% and iron ore and cement are around 10% each.**
- **Although these three still account for two thirds of the IR's total freight volume, the share of the IR in their transport has reduced over the years.**
- **For example, coal consumption was 602 and 978 million tonnes (MT) in 2011 and 2020 respectively while the rail transport share was 420 and 587 MT respectively**
- **Further adding to the woes of the IR is the constantly fluctuating key index of Net Tonne Kilometres (NTKM), which fell for two successive years in 201516 and 2016-17 by 4% and 5% over the preceding years first time such a fall has happened for two consecutive years**

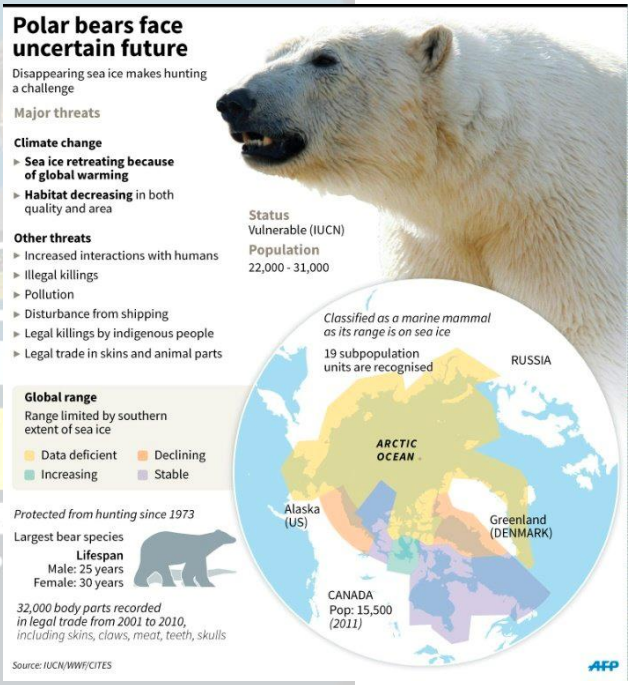
The Hindu

US – Venezuela

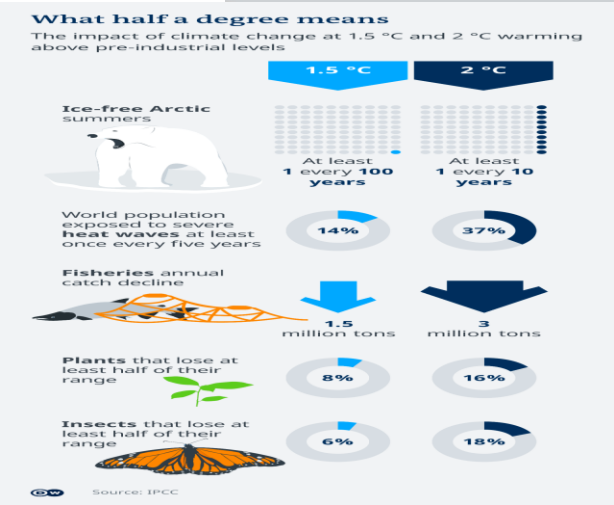
- **Part of the explanation for the re-engagement between Washington and Caracas lies in the challenges presented by the shifts in geopolitical realities consequent to the ongoing war between Russia and Ukraine.**
- **Within weeks of the February 2022 invasion, the Biden administration**

dispatched top officials to negotiate with Caracas, the country with the world's largest oil reserves, so as to smooth the effects of the energy crisis issuing from the conflict.

- Another dimension to the re-engagement were the apprehensions over the potential regional security implications of Moscow's backing of its Latin American allies in the event of a deepening conflict between the two superpowers.
- Caracas has more or less weathered the consequences of the U.S. and EU sanctions on its energy sector, thanks to crucial support from Cuba, China, Russia and Iran.
- For President Maduro, the revival of ties with Washington could mean the beginning of the end to his government's disastrous international isolation



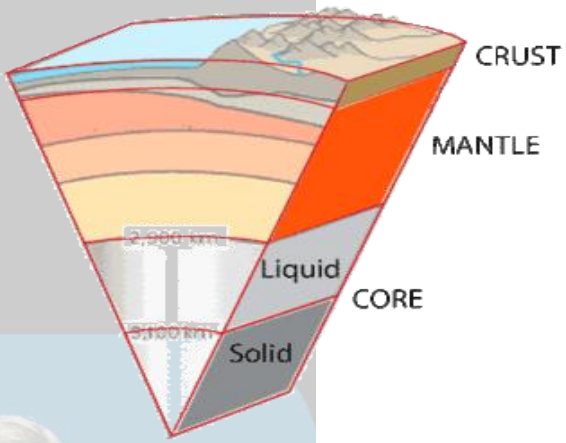
Impact of high temperature

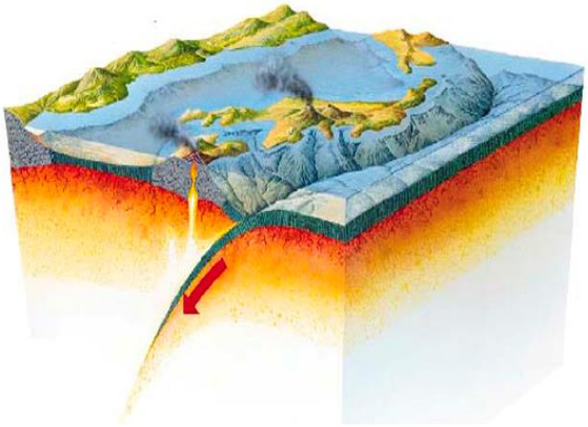


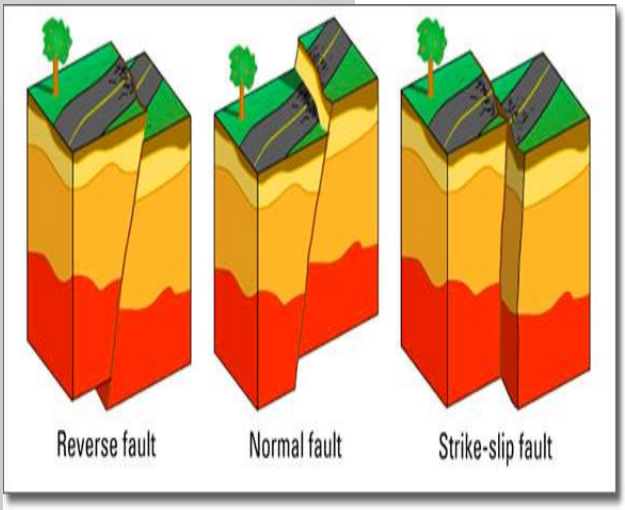
- Developed countries responsible for three fourths of existing carbon emissions will end up emitting 38% more carbon in 2030 than they have committed to, going by current trajectories, shows a study published last week by the Delhi - based think tank Council for Energy Environment and Water (CEEW).

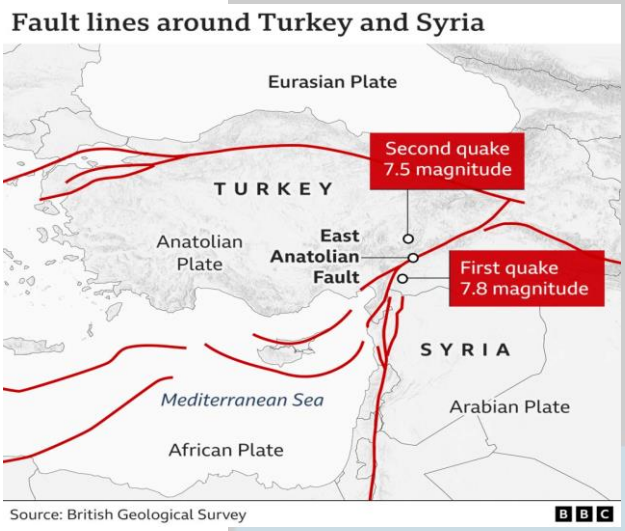
- **The CEEW study noted that the NDCs of developed countries already fall short of the global average reduction of emissions to 43% below 2019 levels that is needed to keep temperatures from rising above 1.5 degrees Celsius.**
- **Instead, developed countries' collective NDCs only amount to a 36% cut.**
- **For a fighting chance at keeping warming below critical tipping points, decades of negotiations have obliged developed countries to lead global efforts to reduce greenhouse gas emissions with legally binding targets.**
- **To keep temperatures below 1.5 degrees Celsius, developed countries need to cut emissions to 43% below their 2019 level.**
- **However, the CEEW study found that based on their current emissions trajectories, their cuts would likely amount to only 11% by 2030.**
- **Except for two countries Belarus and Norway none of the developed countries seem to be on the path to meet their 2030 targets, though Japan and Kazakhstan are close, and are expected to miss their targets by only a single percentage point.**

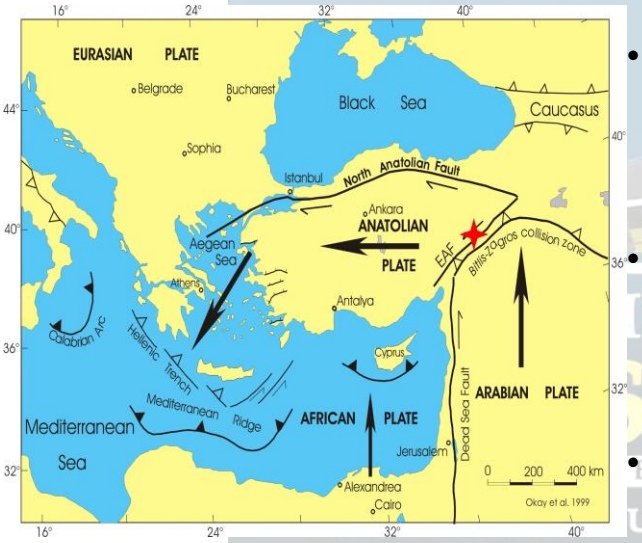
Why earthquake in Turkey?

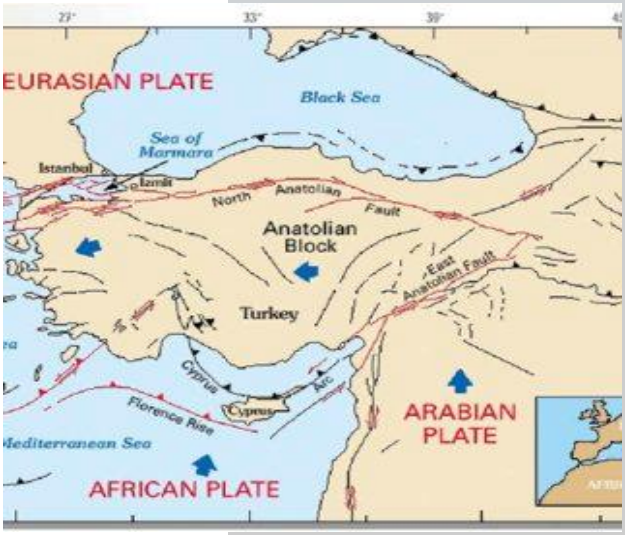












- **A Chinese communist party delegation has visited the Solomon Islands, calling the "flourishing" cooperation between China and the Pacific nation a show of how diplomatic ties were in their peoples' interest.**
- **China had signed a policing pact with the Solomon Islands in July, as both countries upgraded their ties to a "comprehensive strategic partnership"**
- **The earth's crust consists of tectonic plates. Fault lines form where these plates interact, as they collide, pull apart or slide past each other.**
- **When these plates abruptly grind and slip past each other, they release pent-up pressure, leading to earthquakes.**
- **The earthquakes in Turkey occurred along the East and North Anatolian Fault Lines, which run 700 km and 1,500 km long, respectively**
- **The unusual interaction initiated a cascade of ruptures, resulting in a larger than usual total rupture length and a more tremendous potential for destruction.**
- **The Narlı Fault and Çardak–Sürgü Fault Zone are also primarily located in eastern Turkiye.**

- They extend from the southern part of Turkiye to the northeastern part, roughly parallel to the border with Armenia.
- They both experienced separate earthquakes. The ground near the coast some 200 km to the southwest began to move like a liquid work in Science was distinguished by two methods: kinematic slip inversion and fault property modelling.
- Kinematic slip inversion is like rewinding an earthquake video to understand how fault surfaces moved, indicating what might have occurred underground.
- In fault property modelling, researchers estimate the characteristics of the fault, like friction and material properties, to predict how an earthquake is likely to spread along it.
- These predictions are then compared to real earthquake data to gain insights.

The Hindu

Gravitational constant

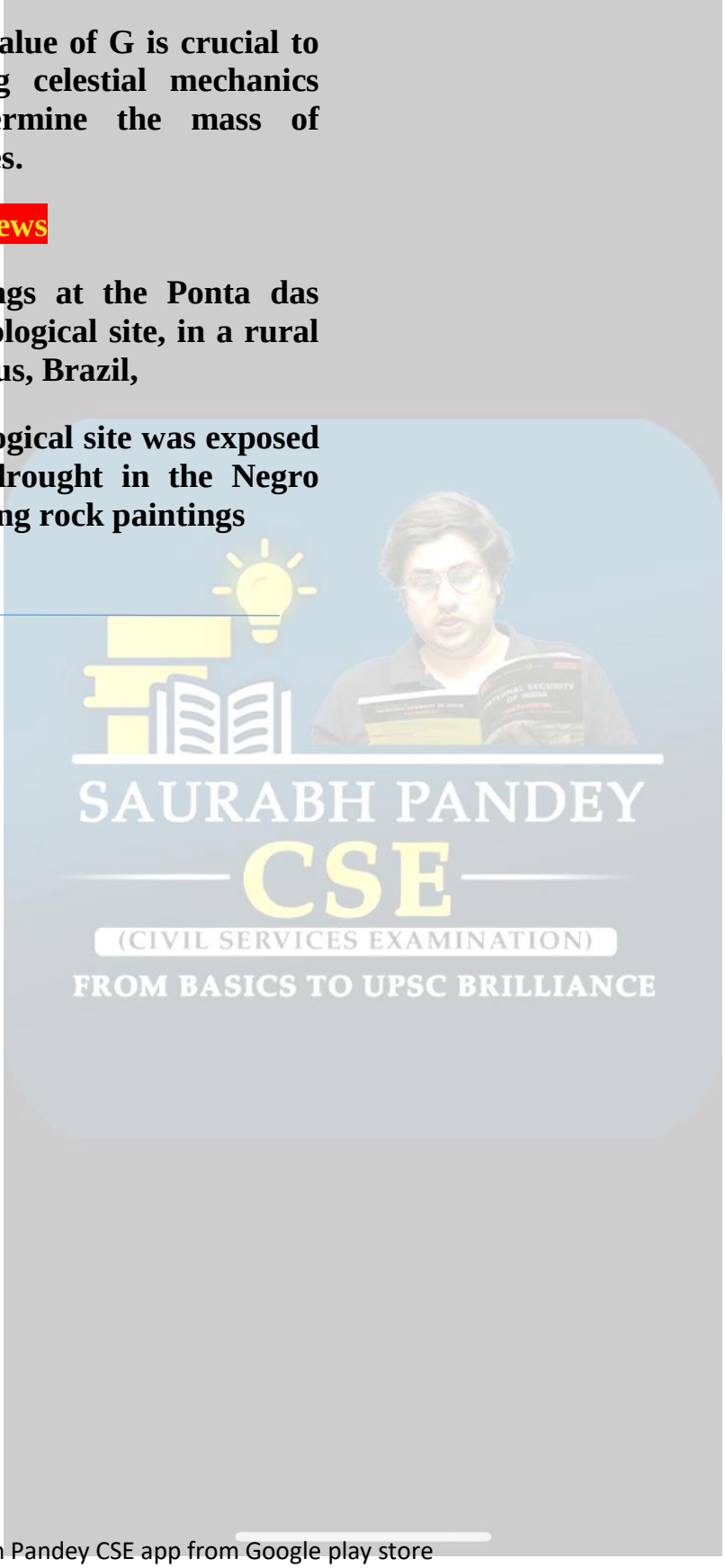
- Any mass warps the fabric of space-time around itself.
- The more the mass, the more the warping.
- The force that an object feels when travelling along this warped path is called gravity. It tends to move the object towards the mass.
- The strength of this force depends on the gravitational constant. Denoted by a 'G', it is a fundamental physical constant.
- It was first accurately determined by Henry Cavendish in 1797.
- G is an essential component of both Isaac Newton's law of universal gravitation and Albert Einstein's theory of general relativity.
- In Newton's theory, the gravitational force between two objects is directly proportional to the product of their masses and inversely proportional to the square of the distance between them. G is the proportionality constant.
- In Einstein's theory of general relativity, G appears in the equations that describe the curvature (or the 'warping') of spacetime in the presence of mass and energy.
- This theory provides a more accurate description of gravitation, particularly in extreme conditions, such as near massive celestial objects.

- **The precise value of G is crucial to understanding celestial mechanics and to determine the mass of celestial bodies.**

Mapping in news

- **Rock paintings at the Ponta das Lajes archaeological site, in a rural area of Manaus, Brazil,**
- **The archaeological site was exposed following a drought in the Negro River, unveiling rock paintings**

The Hindu



Current Affairs 31st October 2023 by Saurabh Pandey

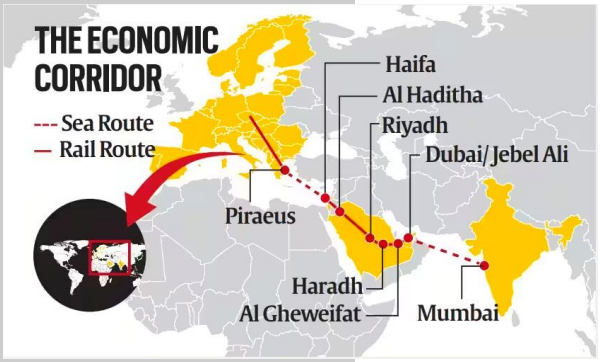
New fungi species

A tiny, fragile looking mushroom sporting a honey yellow 'cap' found on the campus of the Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) at Palode in Thiruvananthapuram has been identified as a new species.

The new species has been named Candolleomyces albosquamosus 'albosquamosus' for the white woolly scale like structures on its pileus or cap. Delicate in build, the mushroom grows to a height of just about 58 mm.

The Hindu

India- and Israel Palestine



India has explained its decision to abstain at last week's vote at the UN General Assembly (UNGA) for a ceasefire in the Israel Palestine conflict as its way of protesting the omission of any "explicit condemnation" of the heinous October 7 terror attack by Hamas militants on Israel.

India's principled stand on terrorism, which the Deputy Permanent Representative to the UN articulated, cannot be questioned.

India's abstention indicates a shift in the Modi government's stand, seeking a 'safe' position, rather than taking a stand on the violence in Israel and Palestine.

This is a departure from India's UNGA vote in 2018 that called for Israel to cease "excessive force" in retaliatory strikes on Gaza at the time, and is more in line with its decision to abstain on votes at the UN in 2021 on resolutions

critical of Russia's war in Ukraine.

The government lost an opportunity to make India's voice heard in the growing geopolitical conflict.

Abstaining on a matter of global importance without making efforts to forge a consensus is out of sync with a desire to be the voice of the Global South, or for a seat at the global high table.

While we have always stood for a two state solution, India has rightly been wary of the fallout of terror acts in Israel on its neighborhood.

India is in sync with the Arab world in its normalisation with Israel, with groupings such as the I2U2 (India, Israel, the United Arab Emirates, and the United States).

While we do not have a direct role yet, since it is time the U.S. and the West and the Gulf and the Arab world showed leadership first, any regional fall-out will affect us.

Therefore, going forward, it is important for India to come out not just against terrorism but also more forcefully against the human tragedy playing out in Gaza. In this, its proximity with Israel and the U.S. will only be an asset.

China USA

China has undoubted influence on Iran, which virtually controls the Hezbollah in Lebanon.

The Hezbollah's entry into the war in Gaza could really complicate the situation in the region

The U.S. is currently speaking from a position of strength. Its economy is doing well while that of China is stumbling.

In foreign policy, the Biden administration has been able to revive America's traditional alliance in Europe on account of the Ukraine war, and strengthen the hubandspoke alliances into a larger matrix covering the Indo Pacific.

This involves strengthened ties with India, upgraded ties with Australia, Vietnam and Japan,

and revived ties with the Philippines.

But the Biden administration has not relented on the tough line it adopted towards Beijing from the outset.

It maintains the Trumpera tariffs, and initiated a policy of export restrictions designed to hobble the growth of the Chinese high tech industry. Its National Security Strategy of last October said that China was "the only competitor with both the intent to reshape the international order and, increasingly, the economic, diplomatic, military and technological power to advance the objective."

The U.S. continues to tighten its export controls to Beijing and is talking tough on the China Philippines standoff at the Second Thomas Shoal in the South China Sea.

It is also tightening controls on its outward investment to China and restricting Chinese investments in the U.S.

China's stance

China believes that the U.S. remains a formidable military power but is in inevitable decline.

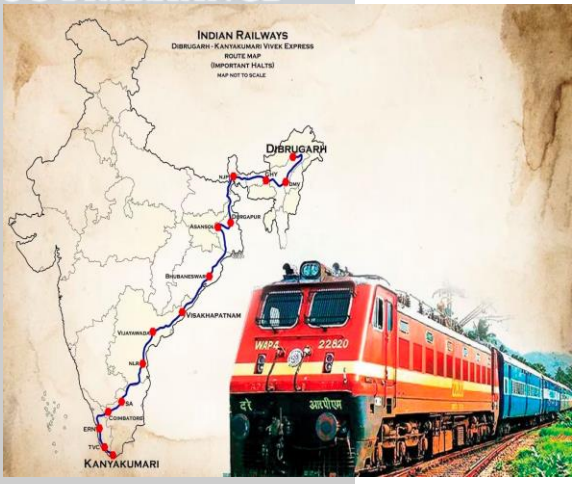
But it would like to maintain the façade of cooperation and peaceful coexistence rather than deal with the competitive and confrontational posture that the U.S. has adopted.

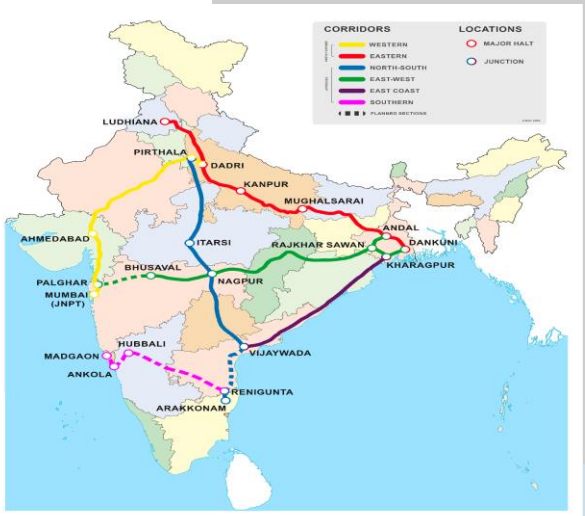
China has long sought U.S. acceptance of its economic and political system, which means the supremacy of the Chinese Communist Party.

Militarily and politically, China has sought to establish its regional dominance in the western Pacific.

But its neighbours such as Japan, the Philippines, and Vietnam, which are backed by the U.S., contest this. Taiwan occupies a difficult position in this situation.

Indian Railway cargo





DEDICATED FREIGHT CORRIDORS OF INDIA

Identifying infrastructure investment in the sector as a key thrust area, the Government of India has formulated two policies the PM Gati Shakti (PMGS) policy for a National Master Plan (NMP) and the National Logistics Policy (NLP). The PMGS aims to bring synergy to create a seamless multimodal transport network in India, with the NMP employing technology and IT tools for coordinated planning of infrastructure.

The NLP focuses on building a national logistics portal and integrating platforms of various ministries

In PMGS In reference to the Indian Railways (IR), the Department for Promotion of Industry and Internal Trade's website mentions three things: integration of postal and railway networks, one station one product and the introduction of 400 Vande Bharat trains without anything about increasing the IR share in moving cargo.

Increasing bulk cargo

The IR has taken some initiatives in the bulk cargo arena.

It relaxed block rake movement rules to provide a facility to load from/to multiple locations, permitted mini rakes, introduced private freight terminals (PFTs) and relaxed conditions in private sidings.

The Gati Shakti Terminal (GCT) policy has eased the stipulations for the operation of these terminals and progressively all PFTs and private sidings are being converted into GCTs.

The IR has also partnered with freight operators in recent years, encouraging them to invest in wagons for movement of their cargo thus helping in the induction of more than 16,000 privately owned wagons to facilitate specialised traffic like automobiles and fly ash.

A railway siding is a capital - intensive high cost proposition and only large industries can manage them with others having

to cover large distances to load their cargo.

This increases the logistics costs and hence the reluctance to patronise the IR.

There is an immediate need to develop common user facilities at cargo aggregation and dispersal points in mining clusters, industrial clusters and large cities.

The knowledge of these clusters rests with the States and not the IR or other central ministries, and thus collaboration with State governments is a sine qua non.

There is an immediate need to develop common user facilities at cargo aggregation and dispersal points in mining clusters, industrial clusters and large cities.

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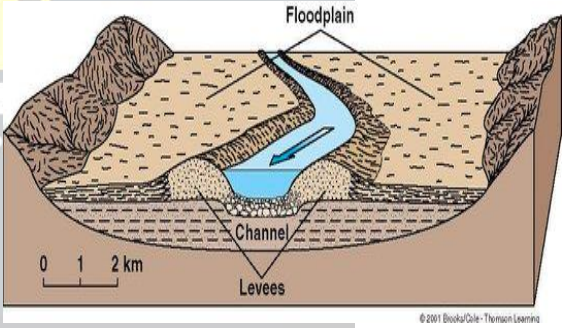
Environmental constraints

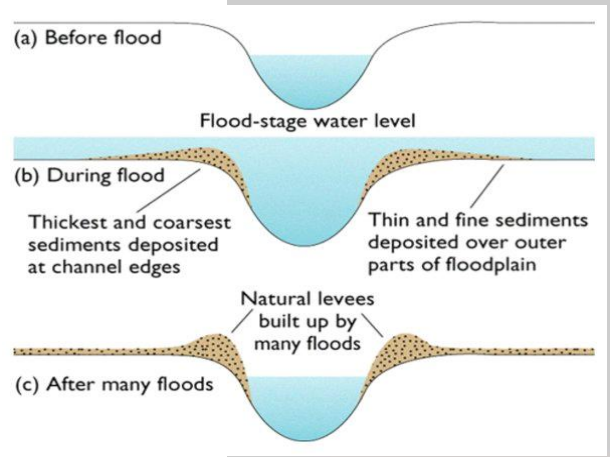
The IR must also look at new commodities like fly ash environmental considerations are constraining loading by the IR. As per recent government regulations, environmental clearance for rail loading/unloading facilities has been made mandatory but the same has not been imposed on road loading/unloading facilities.

These restrictions have made some users move cargo by road due to high transaction costs involved with environmental clearances.

Such instructions should be mode agnostic, based on the quantity of cargo loaded and the potential for environmental degradation.

Flood plain





India's urban areas have been flooding more and more often, destroying lives and livelihoods.

Yet, according to a study led by the World Bank and published in Nature on October 4, flood risk in many cities is rising because they are expanding into flood prone areas.

According to the paper, since 1985, human settlements in flood prone areas have more than doubled.

Experts say the findings spotlight the risk of unsustainable urbanization in India.The study also found that middle income countries like India have more urban settlements in flood prone zones than low and high income countries.

How is India at risk?

India isn't among the 20 countries whose settlements are most exposed to flood hazards, but it was the third highest contributor to global settlements, after China and the U.S., and also third after China and Vietnam among countries with new settlements expanding into flood prone areas, all from 1985 to 2015

When environmental regulations are applied to new constructions, they are often applied only to big infrastructure projects and not to medium and small scale modifications of localities.

This contradicts the notion that certain localities are more flood prone and that flooding and flood risk are locality level issues

What is to be done?

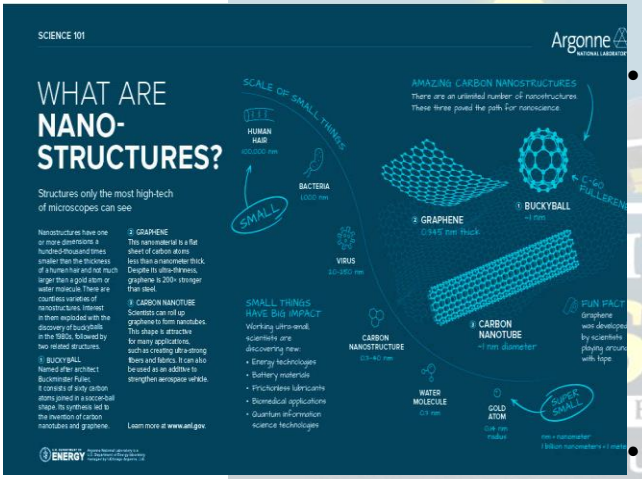
Market forces tend to push expansion into flood prone areas," sustainable urban planning urban governments

need to make housing in such areas more flood resilient and protect low income housing.

Example of riverside settlements that use stilt houses, like those used by the Mishing and the Miyah communities along the Brahmaputra.

The Hindu

Nano florets



- **Carbon nanostructure that was "blacker than black",**
- **The structure of the silicon particles 501,200 nanometers in size resembled spikes arranged around a sphere**

- **The carbon nanoflorets' high efficiency comes from three properties. First: the nanoflorets absorb three frequencies in sunlight infrared, visible light, and ultraviolet.**
- **Other common materials for solar thermal conversion, like photovoltaic materials used in solar panels, absorb only visible and ultraviolet light. More than half of the energy in sunlight arrives to the earth as infrared radiation.**
- **So the nanoflorets can absorb much more energy from the sun.**
- **The other two properties responsible for the material's high light heat conversion efficiency are a result of its shape.**
- **As light falls on the material, the carbon cones ensure that very little is reflected back. Instead, most light is reflected internally.**

- **Second, one risk with a material that can convert sunlight into heat is that it can also lose it to its environment.**
- **The carbon nano florets don't, however, thanks to long range disorder: parts of the structure at some distance from each other possess different physical properties. A**
- **the researchers reported that a 1 m sq. coating of carbon nanoflorets on a surface could vaporize 5 liters of water in an hour.**
- **"India is a country that is blessed with a lot of light, but also has areas that have low temperatures,"**
- **In such regions, the nanofloret coatings can help heat up housing and sterilize surfaces in hospitals**
- **Given that the material can be coated on a vast variety of surfaces, it can heat up those using sunlight. If one were to use a coating of this material to heat up their homes, they would be doing so in an ecologically sound way while reducing the carbon footprint.**
- **The nano florets pose no risk of inhalation: "once coated, the adhesion is nearly as good as paint on a wall**

The Hindu