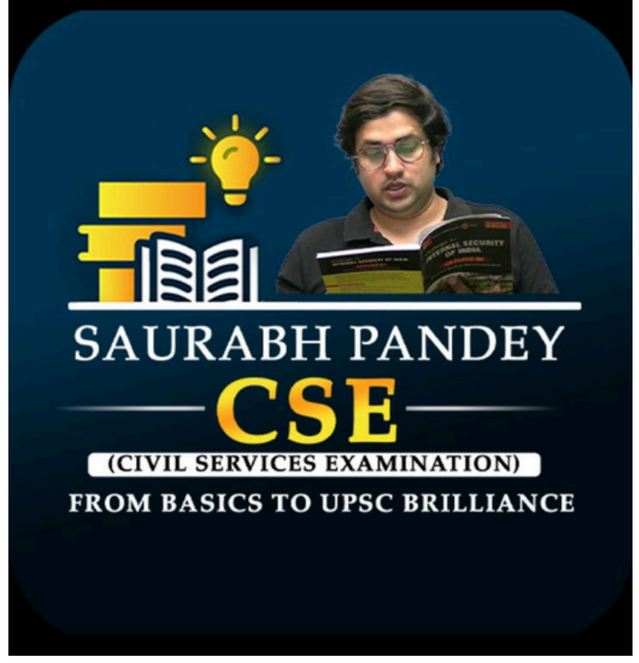
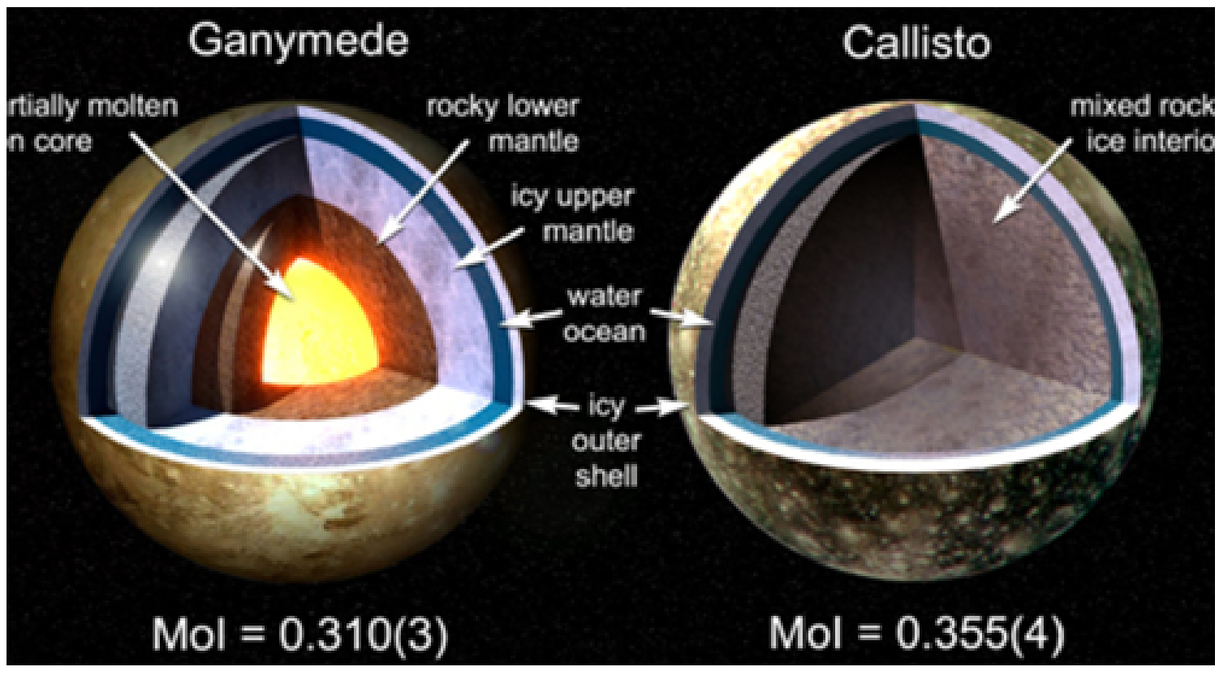
MONTHLY MAGAZINE GES REPORTER APRIL 2024

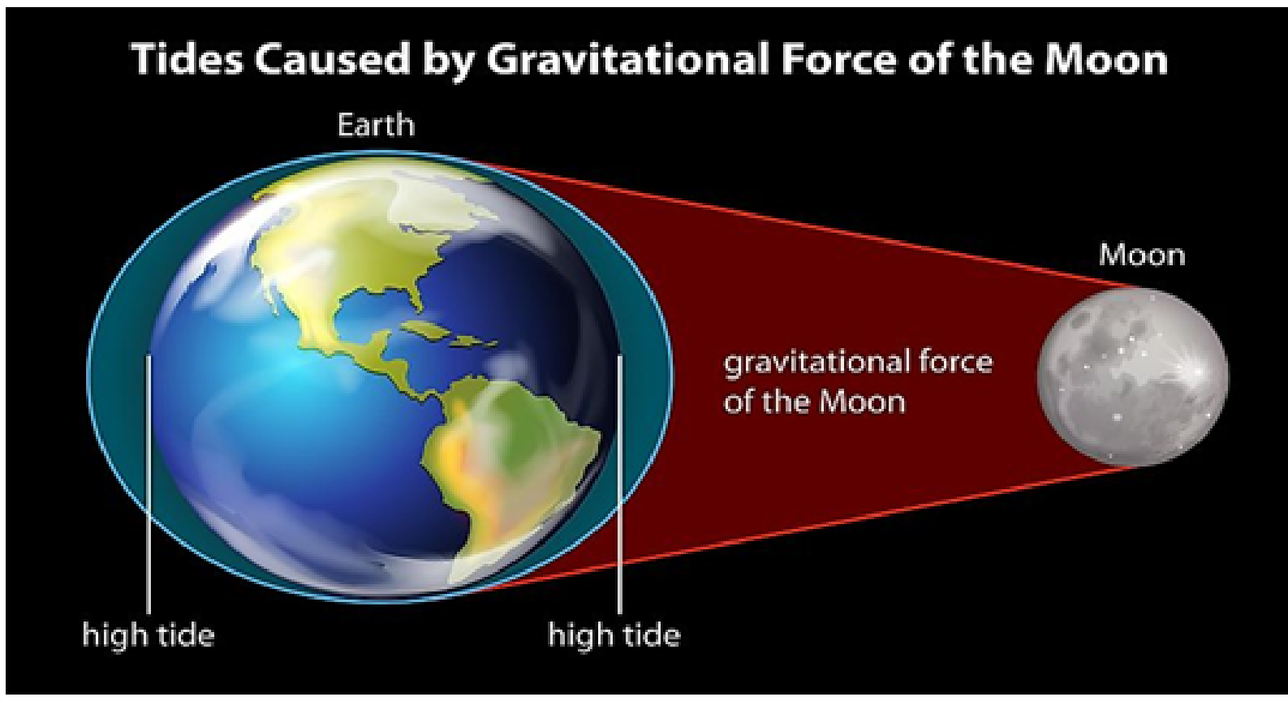


By Saurabh Pandey Sir

For Civil services exam

Geography, environment , science andTechnology current affairs





SAURABH PANDEY MENTOR

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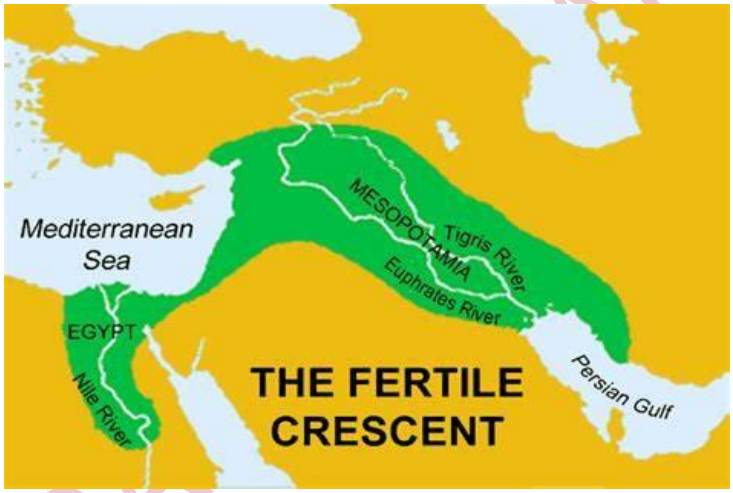
The Fertile Crescent

The Fertile Crescent is a crescent-shaped region in the Middle East, spanning modern-day Iraq, Israel, Jordan, Lebanon, Palestine, and Syria, together with northern Kuwait, south-eastern Turkey, and western Iran. Some authors also include Cyprus and northern Egypt. The Fertile Crescent is believed to be the very first region where settled farming emerged as people started the process of clearance and modification of natural vegetation to grow newly domesticated plants as crops.

Early human civilizations such as Sumer in Mesopotamia flourished as a result. Technological advances in the region include the development of agriculture and the use of irrigation, writing, the wheel, and glass, most emerging first in Mesopotamia



Key Characteristics

1. **Agricultural Development**
2. Early Civilizations
3. **Writing Systems**
4. **Technological and Cultural Innovations**
5. Geography and Climate

This region includes parts of modern-day countries such as Iraq, Syria, Lebanon, Jordan, Israel, Palestine, Egypt, and Turkey.

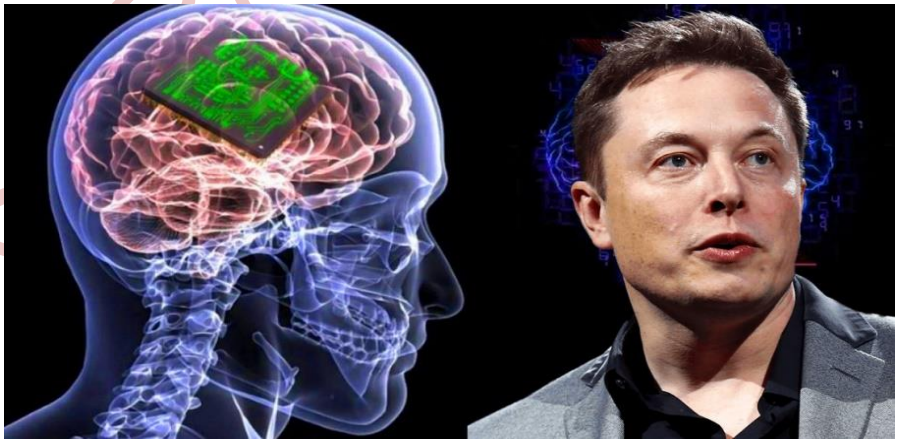
War impact

Research stations in the Arctic are part of an Arctic monitoring network. One country that makes up almost half of it is Russia, but since it invaded Ukraine, foreign scientists haven't had access to data from Russian field stations. Global collaborations with Russia have collapsed Lack of data from the Russians creates a 'blind spot'. Excluding data from

Russia heavily biases climate data which 'decreases the ability to either describe or track Arctic changes'. Current biases in the estimation of ecosystem variables after excluding Russian data showed a change similar to what is expected after 80 years of climate change.

N1 IMPLANT

Elon Musk's N1 implant, introduced to facilitate operating devices by just intending it in the brain, has jolted many into realizing how far seemingly exotic neuroscience has been put to practical, commercial use. While the implant may be the outlier in neuroscience, what's common and par for the course today is mapping the brain to understand and predict human responses with data and real insight.



Katchatheevu ISLAND DISPUTE

When did Katchatheevu become a part of Sri Lanka?

During June 2628, 1974, the then Prime Ministers of India and Sri Lanka, Indira Gandhi, and Sirim R.D. Bandaranaike, signed an agreement to demarcate the boundary between the two countries in the historic waters from Palk Strait to Adam's Bridge.

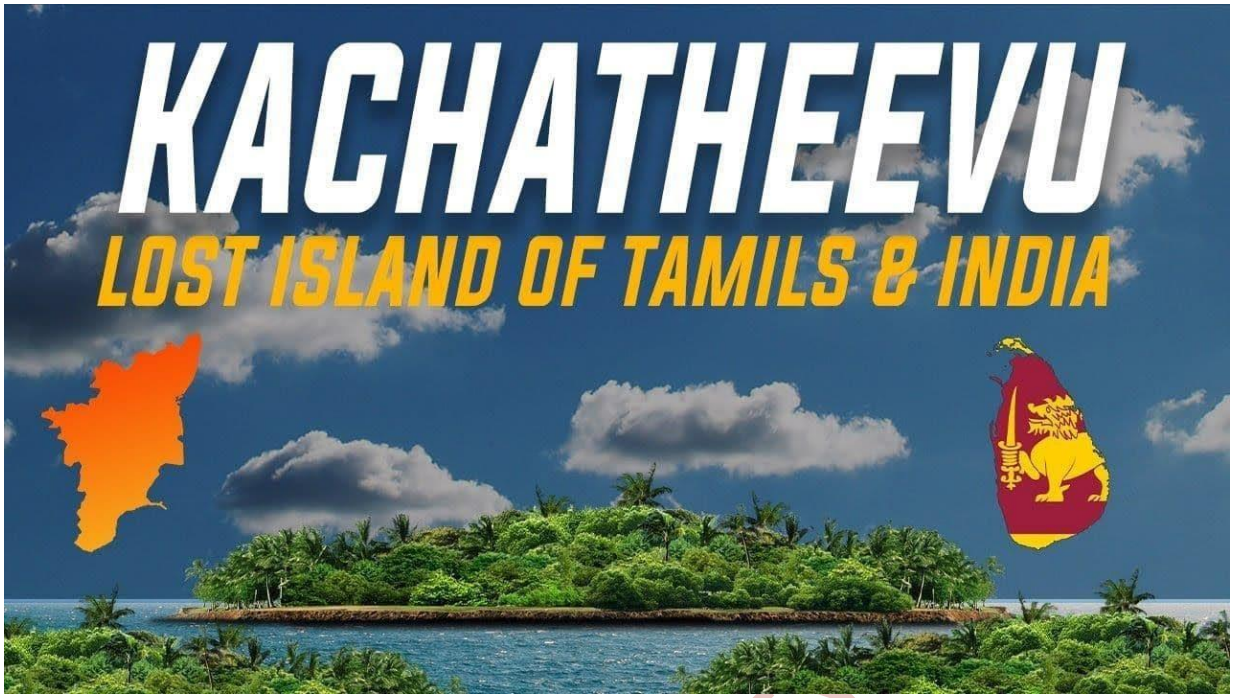
How important is Kachatheevu?

Fisher folk of the two countries have been traditionally using the islet for fishing. Though this feature was acknowledged in the 1974 agreement, the supplemental pact in March 1976 made it clear that fishermen of the two countries "shall not engage" in fishing in the historic waters, territorial sea, and exclusive zone or exclusive economic zone of either of the countries "without the express permission of Sri Lanka or India."

While certain sections of political parties and fisher folk in Tamil Nadu believe that the retrieval of Katchatheevu would resolve the problem of fishermen having to illegally cross the International Maritime Boundary Line.

What triggered the negotiations between India and Sri Lanka?

Sri Lanka claimed sovereignty over Kachatheevu on the ground that the Portuguese who had occupied the island during 1505-1658 CE had exercised jurisdiction over the islet. India contended that the erstwhile Raja of Ramnad [Ramanathapuram] had possession of it as part of his zamin.



Ozone in Jupiter's moon

An international team of scientists, including from India, has discovered strong evidence indicating the presence of ozone on Jupiter's moon, Callisto's, shedding light on the complex chemical processes taking place on icy celestial bodies in the Solar System.

researchers' investigation into the chemical evolution of 'SO2 astrochemical ice', which is ice primarily composed of sulphur dioxide (SO2) in the presence of ultraviolet irradiation. This shed light on the chemical processes and composition of the surface of Callisto.

The importance of ozone

The earth has life not just because it found a way to originate here; it also has the resources to thrive, evolve, and diversify. These resources include sunlight containing the "right" frequencies of radiation, water, a stable atmosphere providing a stable supply of the requisite gases at the right temperature, and various compounds required for the life forms' biochemical processes. This said, not all emissions from the sun are good for organisms on Earth. Ultraviolet radiation in particular is harmful to many species (but also useful to some others).

Two of its components, called Ultraviolet-B and Ultraviolet-C, of wavelengths 290–320 nanometres and 100-280 nanometres respectively, can damage DNA, trigger mutations, and

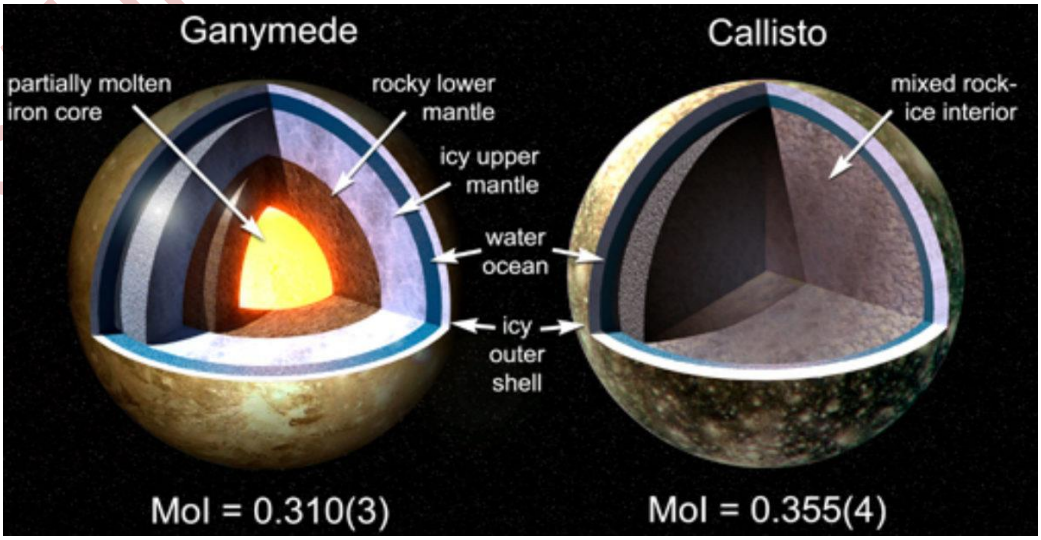
increase the risk of skin cancer and cataracts in humans.

Ultraviolet light has also been known to inhibit plant growth and have detrimental effects on various organisms. This is why the ozone layer is a crucial part of the Earth's atmosphere: it completely absorbs Ultraviolet-B and Ultraviolet-C radiation. The ozone molecule is composed of three oxygen atoms bonded together. The ozone layer, found in the lower part of the earth's stratosphere, around 15–35 km above ground, serves as a shield. Without the ozone layer, ultraviolet radiation levels would be much higher on the planet's surface, rendering it uninhabitable for many species and disrupting entire ecosystems

Callisto and its unique environment

After Saturn, Jupiter has the most moons in the Solar System. Callisto is one of Jupiter's largest moons and the third-largest moon in the Solar system Ganymede and Titan. Callisto, despite its impressive size, is distinguished by its composition. Despite being as big as the planet Mercury, it has less than half as much mass. Callisto is primarily composed of water ice, rocky materials, sulphur dioxide, and some organic compounds.

These substances make the moon a potential candidate for supporting life in the solar system beyond the Earth. Callisto's surface is heavily cratered, indicating a long history of being struck by asteroids and comets. It also lacks the extensive seismic activity seen on some of Jupiter's other moons, such as Io and Europa.The presence of relatively few geological features suggests Callisto's surface is geologically inactive. In other words, its surface has likely been relatively stable for a long time. This stability could be vital to preserve any subsurface ocean or potential habitats beneath the icy crust.



Why protest in Ladakh?

Sonam Wangchuk's hunger strike in Leh calls for Ladakh's Statehood and inclusion in the Sixth Schedule of the Indian Constitution to empower locals in decision-making, following the reorganization of Jammu and Kashmir into separate Union Territories in 2019. In August 2019, the State of Jammu and Kashmir was split into two UTs: Jammu and Kashmir and Ladakh. It ended people's exclusive rights to land and jobs. Under the Jammu and Kashmir Reorganisation Act, of 2019, Ladakh became a UT without a legislature.

People view points

"Our UT is administered by a Lieutenant Governor, who is not a Ladakh resident, and yet is appointed to take decisions for our future," Several bureaucrats in key positions, influencing decisions for the region's future, were also not residents of Ladakh, Sajjad Kargil,

What are the pressures on local resources?

According to recent data from the Ministry of Tourism, Ladakh is witnessing a high influx of domestic tourists. Rapid urbanization and increasing tourist footfall are exerting significant pressure on resources in Ladakh, particularly water.

A study published in 2020 estimated that Ladakh has 192 glacial lakes. Several research articles also state that due to increasing temperatures caused by global warming, the number and sizes of glacial lakes in the Himalayas are increasing, and glaciers are shrinking.

This trend has increased the threat of possible GLOFs in Ladakh, especially from glacial lakes that are formed at the edge of glaciers. "The increased temperatures are also resulting in permafrost degradation and are causing mudflows in Ladakh, Despite the challenges posed by climate change, mining, and renewable energy companies are eyeing Ladakh, and tourism-related activities are on a rise. With significant tourist influx, pollutants from vehicular traffic (like black carbon) will settle on snow and ice and expedite melting.

What is Havana Syndrome?

The mysterious illness is also sometimes referred to as an "Anomalous Health Incident" (AHI) by U.S. officials. Symptoms include extreme headaches, dizziness, nausea, and ear pain. Two

major National Institutes of Health studies published last month found no evidence of brain injury among patients believed to have Havana Syndrome. David Relman, a Stanford University scientist who's led previous research into the condition, took issue with the findings in an accompanying editorial, noting they contradict some earlier studies.

Where has Havana Syndrome been reported?

The ailment was dubbed "Havana syndrome" after reports of American officials falling ill were first documented at the U.S. Embassy in Cuba in 2016.

What causes it?

There are a few theories. A 2020 National Academies of Sciences, Engineering, and Medicine report proposed that the neurological symptoms could be the result of a radio frequency energy of radiation that includes microwaves. Some lawmakers have also suggested the cases are a result of directed energy attacks.

PMLA 1988, held the United Nations Convention against Illicit Traffic in Narcotic

Drugs and Psychotropic Substances.

All countries were urged to take urgent steps to prevent the laundering of the proceeds of drug crimes and other connected activities. Subsequent to this, seven major industrial nations held a summit in Paris (July 1989) and established the Financial Action Task Force (FATF) to examine the problem of money laundering and recommend measures to tackle this menace.

Thereafter, in 1990, the United Nations General Assembly adopted a resolution, namely, the Political Declaration and Global Programme of Action which called upon all member countries to enact suitable pieces of legislation to effectively prevent the laundering of drug money.

In pursuance of this resolution of the UN General Assembly, the Government of India used the recommendations of the FATF to formulate legislation to prevent drug money laundering. As drug trafficking is a trans-border operation, the UN held a special session on June 10, 1998, on the theme ‘Countering World Drug Problem Together’ and made another declaration on the urgent need to combat money laundering.

Accordingly, the Indian Parliament enacted the Prevention of Money Laundering Act in 2002. But it was brought into force in 2005.

The PMLA's enactment Further, the PMLA was enacted by India's Parliament under Article 253 which empowers it to make laws for implementing the international conventions. This Article indicates that a law Parliament makes to implement any decision of an international body will be confined to the subject matter of that decision.

Item 13 in the Union list of the Seventh Schedule of the Constitution is specific on this point. Thus, the law on money laundering enacted under Article 253 and Item 13 of the Union list in the context of the UN resolution referred to above can only be on drug money.

Various amendments made in this Act at different times bloated the schedule which now contains such offences which are either ordinary offences listed in the IPC or for which there are special laws in force. Since money laundering as an offence is linked to one of the scheduled offences, the offences contained in the schedule become the starting point of the whole process of operationalization of the PMLA.

One such example is the Prevention of Corruption Act, 1988 which is aimed at curbing corruption among public servants. This Act was added to the schedule of offenses in 2009. The PMLA now applies with all its rigor to public servants.

Thus, a public servant charged with corruption and a hard-core drug trafficker are treated alike. A fundamental principle of Anglo-Saxon jurisprudence is that a person is presumed innocent until proven guilty. PMLA turns this principle upside down.

An accused will be denied bail by the entire hierarchy of courts because the bail provision contained in section 45 of the PMLA says that a judge can give bail only when he is satisfied that the accused is innocent. Which judge will take such a risk? So the person will rot in jail for years together without trial. The judicial perspective on bail was laid out by Justice V.R. Krishna Iyer back in 1978 under the following words in Gudikanti Narasimhulu And

Ors vs Public Prosecutor, High Court of Andhra: "Personal liberty, deprived when bail is refused, is too precious a value of our constitutional system recognized under Article 21 that the curial power to negate it is a great trust exercisable, not casually but judicially, with a lively concern for the cost to the individual and the community".

AI APPLICATION IN ELECTION

AI can play a far wider role in elections than just disseminating disinformation. It can be used in the entire spectrum of campaign strategies, from the preliminary steps of voter identification to the intricate details of content development and delivery. With real-time analytics on campaign performances, AI is raising the bar for political campaigns with its data-driven and effective micro-targeting strategy.

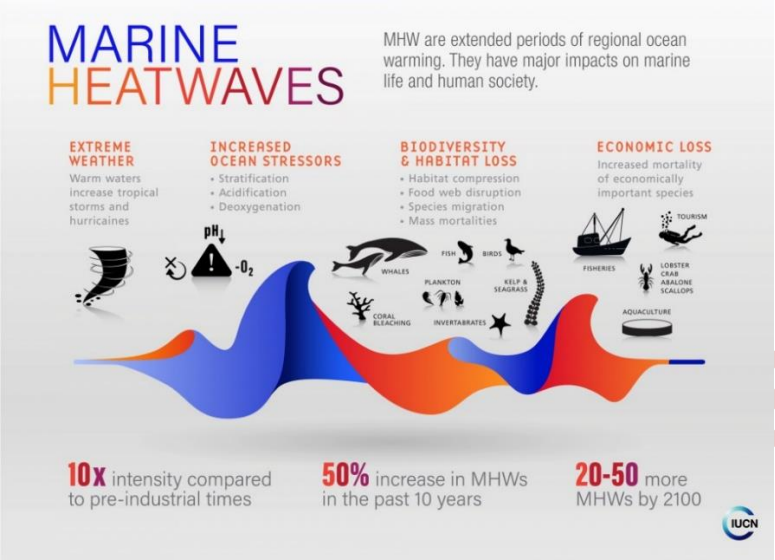
The political landscape is changing quickly due to GenAI technology, which presents both the potential and challenges for the 2024 elections. The United States government has outlawed rob calls using AI-generated voices in its response to the Biden robocall incident. Technology behemoths including Microsoft, Google, OpenAI, and Meta have vowed to combat AI content that aims to deceive voters

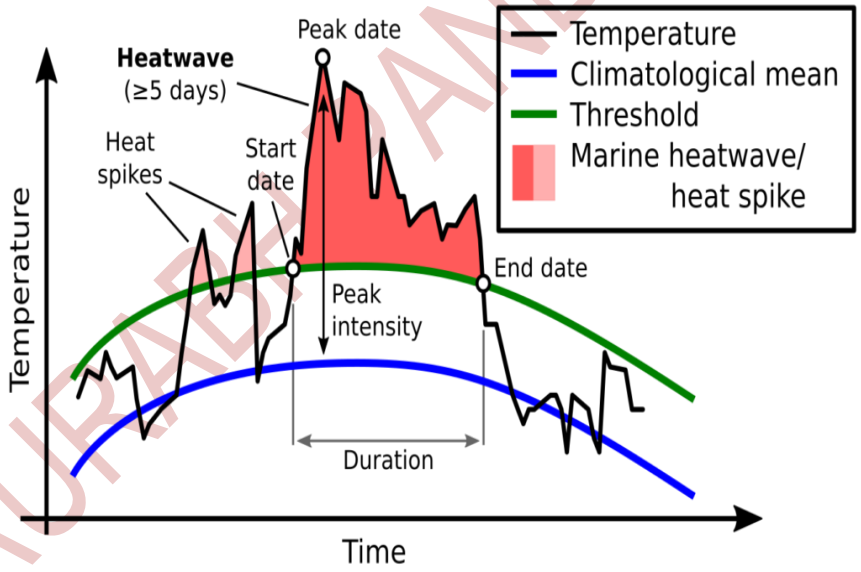
Election-related generated content may shape last-minute attempts to deter voters from exercising their right to vote or create an event with a manufactured portrayal of a candidate that is challenging to swiftly debunk.

Marine heatwave

- From 1950 to 2020, the Indian Ocean became warmer by 1.2 degrees Celsius, and climate models expect it to heat up a further 1.7 degrees Celsius to 3.8 degrees Celsius from 2020 to 2100.
- While we are familiar with heatwaves on land, “marine heatwaves”, their counterparts in the sea and linked to the rapid formation of cyclones, are expected to increase tenfold from the current average of 20 days per year to 220-250 days per year.
- Mostly attributable to global warming, the tropical Indian Ocean will likely be in a “near-permanent heatwave state” and accelerate coral bleaching, seagrass destruction, and loss of kelp forests, affecting the fisheries sector adversely
- The heat content of the Indian Ocean, when measured from surface to a depth of 2,000 meters, is currently increasing at the rate of 4.5 zetta-joules per decade, and is predicted to increase at a rate of 16–22 zetta-joules per decade in the future. Joule is a unit of energy and one zetta-joule is equal to one billion trillion joules (10^21). Rising heat content contributes to sea-level rise also. Heat causes the volume of water to increase, called the thermal expansion of water,

and this is responsible for more than half of the sea-level rise in the Indian Ocean larger than the changes arising from glacier and sea-ice melting.





Moon far side, tidal locking, and Lunar liberation

- Chang'e-6 is set to blast off on May 3 aboard a Long March 5 rocket from the Wenchang Satellite Launch Center on Hainan Island. The spacecraft will embark on a 53-day journey to the far side of the Moon and back, returning lunar soil and rocks to Earth that will help us understand the Moon's history.

- The mission will target the Moon's South Pole-Aitken (SPA) basin, where an ancient impact may have blasted part of the Moon's mantle up to the surface. The region has long been thought of as a keystone to understanding how and when massive objects pelted the Moon and Earth billions of years ago, and why the far side of the Moon is so different from the near side.

- Many missions have returned samples of the Moon to Earth over the years, most recently Chang'e-5 in 2020. But all have been from the near side, where line-of-sight communications with Earth simplify operations. Landing on the far side requires a communications relay satellite, of which China now has two.

- The country made the first successful lunar far-side landing in 2019 with Chang'e-4, and will follow that achievement with a sample return.

Far side of the moon and Tidal Locking

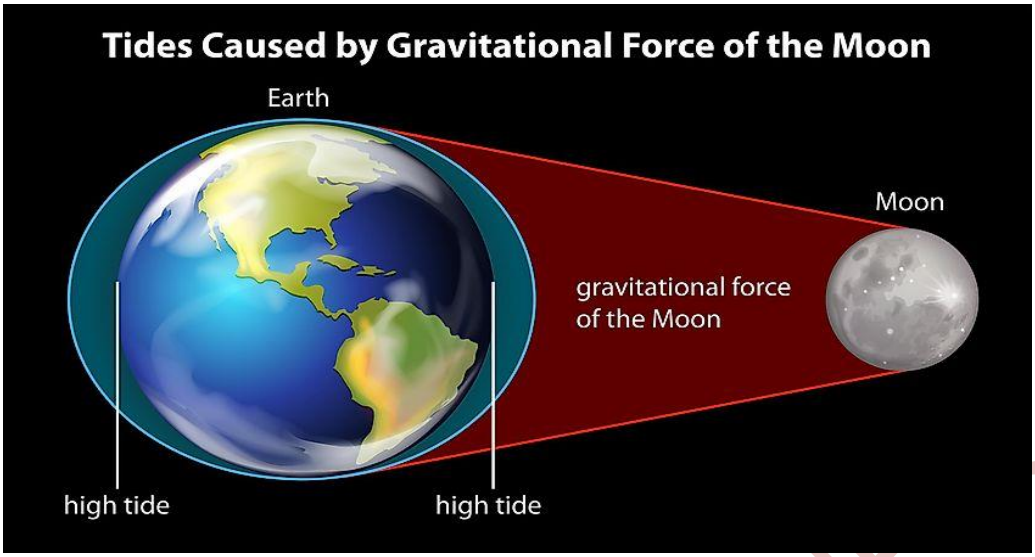
- From Earth, we always see the same side of the Moon. This side is known as the near side. We can never see the other side of the Moon the far side from Earth.

Why Do We Never See the Far Side?

- The reason the same side of the Moon always faces Earth is that the Moon rotates around its axis at the same speed as it revolves around Earth. This effect is known as tidal locking, and it is caused by the tidal forces of our planet.

- In the same way as the Moon exerts a tidal force on our planet, causing tides on Earth, our planet exerts a tidal force on the Moon.

- Earth is larger than the Moon, so its tidal force is much more powerful. Over time, this force has slowed down the Moon's rotation until it reached a speed matching the speed of its orbit around Earth. All of the major moons in the solar system including the Galilean moons of Jupiter, and Saturn's Titan are tidally locked to their parent planet.



Lunar Liberation

- However, there is a small variation to this rule. Since the Moon revolves around Earth on an elliptical path, the Moon's distance from Earth varies from day to day. The point of the orbit closest to Earth is called perigee, while the point farthest away is known as apogee.

- Like all celestial objects with elliptical orbits, the Moon's speed varies a little on its path around Earth. It speeds up when it is closest and slows down when it is farthest away from us. At perigee, the Moon's orbital speed is a little faster than its rotational speed. This variation in speed, along with other factors, causes an effect called lunar liberation.

- From Earth, the Moon seems to rock slightly from north to south and wobble a little from east to west. Over time, it is possible to see up to 59% of the Moon's surface, but only 50% at a time. In other words, over time, we can see up to 9% of the outskirts of the Moon's far side from Earth.

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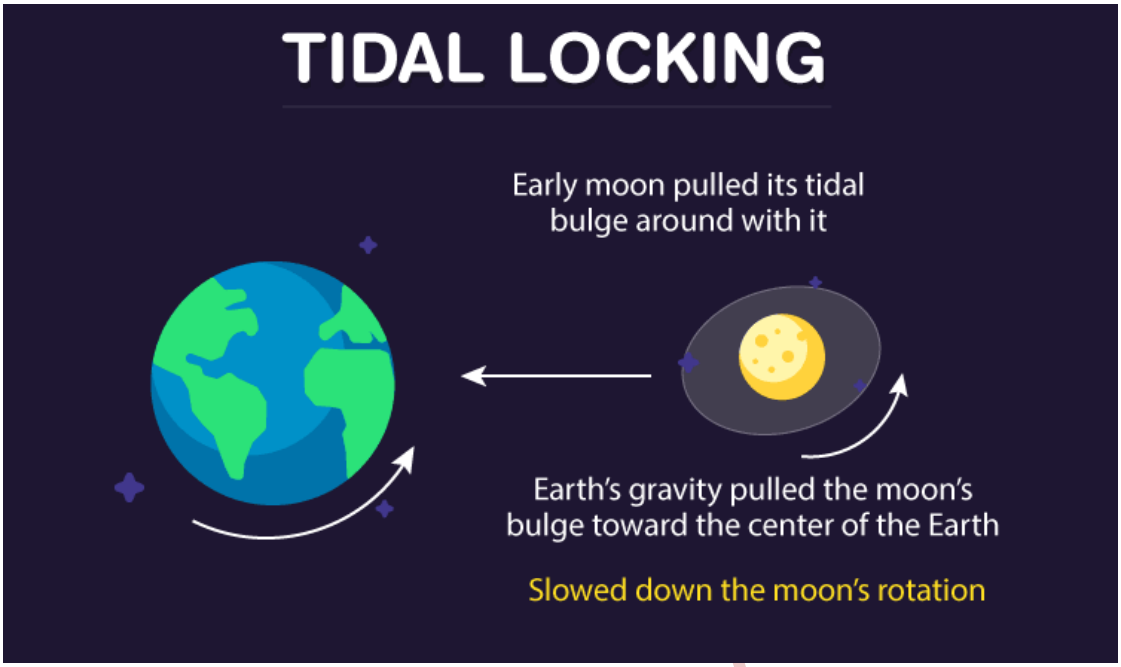

Unclassed forest

- In compliance with a February 19, 2024, Supreme Court order, the Ministry of Environment, Forests and Climate Change (MoEFCC) uploaded the various State Expert Committee (SEC) reports on its website earlier in April.

- This interim order was in response to a public interest litigation challenging the constitutionality of the Forest (Conservation) Act Amendment (FCAA) 2023. A key concern in the petition was that the status of unclassed forests, which were to be identified by the SEC reports, wasn't known, or if they had been identified at all.

What does the FCAA stipulate?

- With the enactment of FCAA, unclassed forests that have legal protection under the landmark T.N. Godavarman Thirumalpad (1996) case would lose this protection, leading to their inevitable diversion.

- The SEC reports were to be prepared in pursuance of the order, which specified that 'forests' as per their dictionary meaning and all categories of forests irrespective of ownership and notification status would be included under the ambit of the Forest (Conservation) Act, 1980.

- As a result, unclassed forests, also known as deemed forests, would require the Central government's approval in case a project proponent sought to divert that land for non-forest use.

Unclassed or deemed forests may belong to forests, revenue, railways and other government entities, community forests, or those under private ownership, but are not notified.

- No State has provided verifiable data on the identification, status, and location of unclassed forests. Seven States and Union Territories appear not to have constituted the SEC at all.

- Twenty-three States have shared their reports but only 17 are in line with the Court's directives.? It is clear that the reports were hastily put together, using incomplete and unverified data collected from readily available records.

Anticyclonic conditions and Heat waves

- An anticyclone has winds moving in a clockwise direction, with air sinking down in the middle of it. As this air hits the ground, it is compressed and warmed and can create a high-pressure heat dome. An anticyclonic circulation could also explain the historic Dubai flood. And these anticyclones exist over the North Indian Ocean and the Indian subcontinent even now

What links anticyclones to heat?

- The persistence of the anticyclones is not unusual in and of itself. During the pre-monsoon season, the upper-level Indian Easterly Jet (IEJ) begins to take shape in the upper atmosphere, at around the 10 degrees N latitude, across the Arabian Sea, peninsular India, and the Bay of Bengal. A strong westerly jet exists to the north around 30 degrees N, and the two together can generate an anticyclonic pattern over the Indian Ocean and the Indian subcontinent.

- An easterly jet refers to strong winds coming from the east while westerly jets come from the west. These are natural seasonal features. The westerly jet is pushed north during the monsoon season and the IEJ dominates the Indian subcontinent.

- During the pre-monsoon season, a strong anticyclone can bring dry and hot weather over many parts of India while a weak anticyclone produces milder weather. These are natural seasonal features. The westerly jet is pushed north during the monsoon season and the IEJ dominates the Indian subcontinent.

- During the pre-monsoon season, a strong anticyclone can bring dry and hot weather over many parts of India while a weak anticyclone produces milder weather. The record warming of 2023 has so far not been fully explained since it was much warmer than what we expected just from

the superposition of El Niño on global warming.

- But the impact of El Niño during its pre-monsoon demise on the IEJ tends to produce a stronger and more persistent anticyclone and thus longer lasting and more intense heat waves. So, the heat wave season this year is consistent with the warmer temperatures due to the El Niño itself as well as the 'steroids' being added by the unexplained warming of 2023.

Stages of early warnings

- Returning to the local manifestation of global warming: accurate early-warning systems take a three-step approach called the 'ready-set-go' system, under the so-called 'Sub-seasonal-to-Seasonal Predictions' project of the World Climate Research Program under the World Meteorological Organisation.

- India is part of this project, has invested heavily in S2S predictions, and has made impressive progress in improving the accuracy of predictions. Preparing the system and guiding the National Disaster Management Agency (NDMA) requires this three-step approach to function efficiently and effectively.

- Considering there are more than 1.2 million polling stations for the general elections this year, the optimal use of resources to prepare for, mitigate, and recover from extreme events requires location-specific information at each step.

- The 'ready' step provides a seasonal outlook where the background state, or the external factors (such as global warming and El Niño), are used to maximize the accuracy of longer-lead forecasts. The 'ready' step allows the NDMA, its local agencies, and all local governments to ready their disaster response systems. The sub-seasonal predictions refer to the extended range of weeks two to four, which contribute to the 'set' step.

- Resource allocations and identifying potential hotspots to move resources including personnel ensure disaster-preparedness is set to go. The 'go' step is based on short- (days 1-3) and medium- (days 3-10) range forecasts. At this step, everything hits the road to manage a disaster, including rescue efforts, hydration centers, and heat.

Internal combustion engine

- Internal combustion engines are everywhere, yet they are not a common sight. The power most cars and motorcycles by combusting a fossil fuel like petroleum (although these vehicles are slowly being replaced by electric vehicles). Combustion is a type of chemical reaction called a redox reaction, short for 'reduction-oxidation'.

- Here, one substance loses electrons and the other gains them. The losing substance is called the oxidant. The gaining substance is called the reductant. During combustion, the fuel is the reductant. All combustion reactions release energy. Sometimes, the heat energy in this release will vaporize the fuel, producing a flame. The combustion reaction also releases a gaseous mix of highly oxidized matter called smoke.

Pantabangan

- The old sunken town of Pantabangan in Nueva Ecija province, Philippines. Due to a severe drought in the Philippines, a settlement submerged since the 1970s has reemerged. This is the sixth appearance of the 300-year-old ruins, including parts of a church and tombstones, since the construction of a dam.

- The reservoir's water level has dropped nearly 50 meters below normal as the country faces extreme heat exacerbated by El Niño conditions, leading to official drought declarations in about half of the country's provinces.

INS VIKRANT

- The 45,000 metric tons' vessel, 262 meters (~860 ft.) long and almost 60 meters (~197 ft) wide, is built at an estimated cost of INR 20,000 Cr. (~$ 2.5 Bn) almost one-fifth the cost of a regular aircraft carrier.

- Built by Cochin Shipyard Ltd., it is also the biggest ship ever built in India. The aircraft carrier is capable of handling 30 aircraft & helicopters and has a maximum design speed of ~28 knots (52 km/hr). The ship has a 16-bed hospital with two operation theatres and two ICUs. Its flight deck size is nearly 12,500 sq. m almost as big as two-and-a-half hockey fields – and can operate 12 fighter planes and 6 helicopters at once

- This development has brought India into an elite league of powerful nations that can build an indigenous aircraft carrier by themselves. While around 24 countries have past or ongoing aircraft carrier operations, only 5 nations – USA, UK, France, Russia, and China can build their own carriers. These nations are also the five permanent UNSC members! With the induction of INS Vikrant, the Indian Navy now has two aircraft carriers in its array INS Vikramaditya being the other one.

- The Indian defense forces have certainly got a boost with the latest development. This development has brought India into an elite league of powerful nations that can build an indigenous aircraft carrier by themselves.

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The second INS Vikrant (IAC-1) is India's first indigenously built aircraft carrier, marking a significant milestone in the country's naval and shipbuilding capabilities. The name "Vikrant" means "courageous" or "victorious" in Sanskrit.

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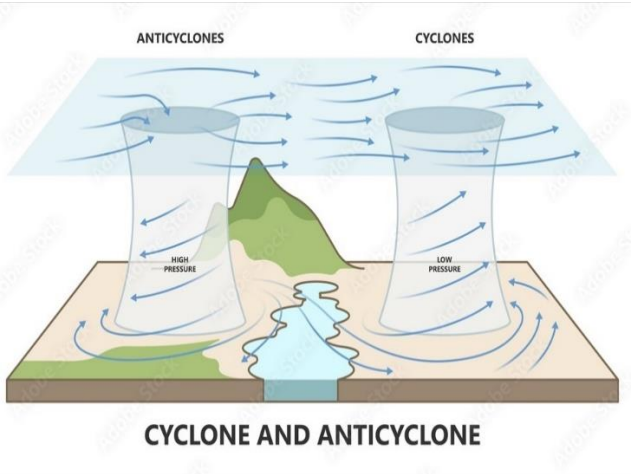
- The heat content of the Indian Ocean, when measured from surface to a depth of 2,000 meters, is currently increasing at the rate of 4.5 zetta-joules per decade, and is predicted to increase at

a rate of 16–22 zetta-joules per decade in the future. Joule is a unit of energy and one zetta-joule is equal to one billion trillion joules (10^21). “Rising heat content contributes to sea-level rise also.

- Heat causes the volume of water to increase, called the thermal expansion of water, and this is responsible for more than half of the sea-level rise in the Indian Ocean larger than the changes arising from glacier and sea-ice melting.



CYCLONE AND ANTICYCLONE

Cyclones	Anti cyclones
It is a low pressure system with surroundings of high pressure.	It is a high pressure system with surroundings of low pressure.
It blows anti clockwise in the Northern Hemisphere.	It blows clockwise in the Northern Hemisphere.
It blows clockwise in the Southern Hemisphere.	It blows anti clockwise in the Southern Hemisphere.
It is associated with cloudy skies, heavy rainfall with stormy winds.	It is associated with clear skies, mild winds and dry conditions.
It can cause great damage to lives and property if precautions are not taken.	The weather is settled and pleasant.

Unclassed forests

- In compliance with a February 19, 2024, Supreme Court order, the Ministry of Environment, Forests and Climate Change (MoEFCC) uploaded the various State Expert Committee (SEC) reports on its website earlier in April.
- This interim order was in response to a public interest litigation challenging the constitutionality of the Forest (Conservation) Act Amendment (FCAA) 2023.
- A key concern in the petition was that the status of unclassed forests, which were to be identified by the SEC reports, wasn’t known or if they had been identified at all.

What does the FCAA stipulate?

- With the enactment of FCAA, unclassed forests that have legal protection under the landmark T.N. Godavarman Thirumulpad (1996) case would lose this protection, leading to their inevitable diversion.

- The SEC reports were to be prepared in pursuance of the order, which specified that 'forests' as per their dictionary meaning and all categories of forests irrespective of ownership and notification status would be included under the ambit of the Forest (Conservation) Act, 1980.
- As a result, unclassed forests, also known as deemed forests, would require the Central government's approval in case a project proponent sought to divert that land for non-forest use.
- Unclassed or deemed forests may belong to forests, revenue, railways and other government entities, community forests, or those under private ownership, but are not notified State has provided verifiable data on the identification, status, and location of unclassed forests.
- In fact, seven States and Union Territories appear not to have constituted the SEC at all. Twenty-three States have shared their reports but only 17 are in line with the Court's directives.? It is clear that the reports were hastily put together, using incomplete and unverified data collected from readily available records.

China and Pakistan's climate

- Extreme heatwaves in China follow floods in Pakistan because of an upper tropospheric pathway tied to the Asian summer monsoon system, according to an analysis of more than 40 years of atmospheric data. This pathway emerges due to the system's internal variability and occurs independently of sea surface temperature forcing patterns.
- In the summer of 2022, Pakistan experienced catastrophic flooding. Right afterward, China was struck by long-running heatwaves followed by severe drought.

Functional diversity

- A new study demonstrates how a diversity of functional plant traits can bolster dryland forest ecosystem productivity in Canada as the climate warms.
- Based on 57 years of data, the research suggests that dryland biomes with more of this functional plant diversity are far more productive than their monoculture counterparts even during drought intensification.

- Functional diversity can thus boost ecosystem resiliency over the long term and is unique as Canadian drylands offer a well-preserved forest ecosystem for research.

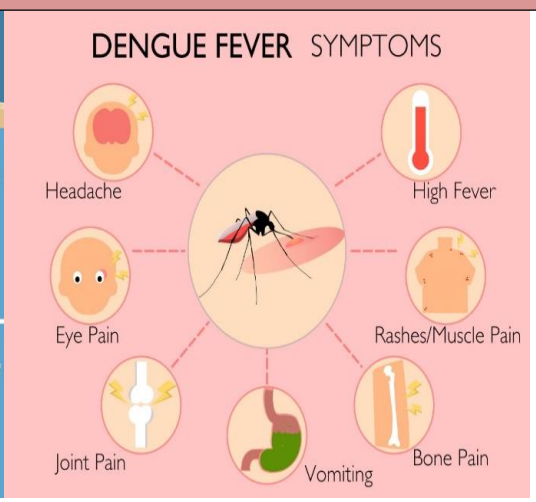
What is Functional diversity??

- Functional diversity refers to those components of biodiversity that influence how an ecosystem operates or functions.
- The biological diversity, or biodiversity, of habitat is much broader and includes all the species living in a site, all of the genotypic and phenotypic variation within each species, and all the spatial and temporal variability in the communities and ecosystems that these species form.
- Functional diversity, which is a subset of this, is measured by the values and range in the values, for the species present in an ecosystem, of those organismal traits that influence one or more aspects of the functioning of an ecosystem.
- Functional diversity is of ecological importance because it, by definition, is the component of diversity that influences ecosystem dynamics, stability, productivity, nutrient balance, and other aspects of ecosystem functioning.
-

Dengue

Vaccination Efforts: Dengvaxia

- **First Licensed Vaccine**: Dengvaxia (CYD-TDV) is the first dengue vaccine licensed and approved for use in several countries. It is recommended for individuals aged 9-45 who have had at least one previous dengue infection.



- Coconut palm is considered a native of Malesia, a bio-geographical region that includes Southeast Asia (notably India), Indonesia, Australia, New Guinea, and several Pacific Island groups.

- In India, coconut is mainly grown in the southern States of Kerala, Karnataka, Tamil Nadu, Telangana, and Andhra Pradesh. These states produce over 90% of coconuts. This is because these trees need warm and sandy soil which is well-drained and nutrient-rich, a warm and humid climate, and abundant rainfall.

- North India, on the other hand, has a predominantly temperate climate, with cold winters and hot summers. The region also experiences distinct seasons with uneven rainfall, which are not conducive to the growth of coconut trees. However, some Northeastern States, with their appropriate temperatures and rainfall, also produce coconuts, but they have a clayey soil, not ideal for the trees to grow.

Appearance: The coconut palm typically grows to a height of 20-30 meters (65-100 feet). It has a slender, ringed trunk and a crown of large, feathery leaves.
Fruit: The coconut fruit is a drupe, not a true nut. It has a hard outer shell (exocarp), a fibrous husk (mesocarp), and a hard inner shell (endocarp) that encases the seed and coconut meat (endosperm).

Bathymetry

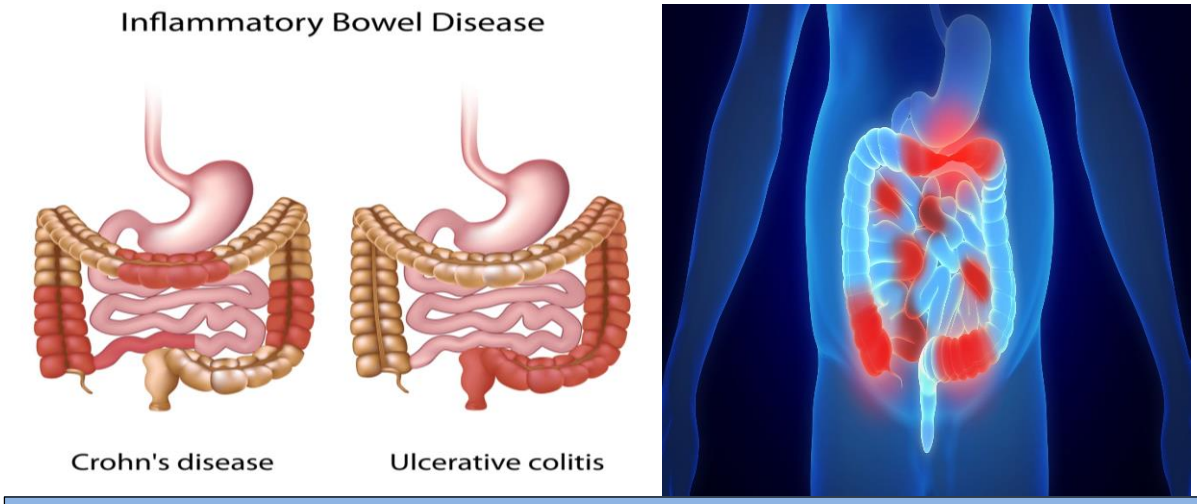
- A recent study of the Indian Ocean poor or the bathymetry. There is a significant improvement in the upper ocean salinity, temperature, and currents, particularly near the coast.“Oceans play a critical role in both weather and climate prediction and the maritime industry.

- Due to the vast economic benefits, it is essential to accurately forecast specific oceanographic parameters such as currents, temperature, and salinity of surface and subsurface on different time scales, the study has highlighted the importance of bathymetry in advancing the

Data Collection Methods

Echo Sounding: This traditional method uses sound waves (sonar) to measure water depth. A sound pulse is emitted from a ship, and the time it takes for the echo to return from the seabed is used to calculate depth.
Multibeam Sonar: This advanced technique uses multiple beams of sound to map large swathes of the seafloor in high resolution, providing detailed topographic maps.
Side-Scan Sonar: This method produces images of the seafloor by emitting sound waves at an angle, useful for identifying objects and features on the seabed.
Satellite Altimetry: Satellites measure the sea surface height, which can be used to infer underwater features by analyzing variations in gravitational pull caused by underwater mountains and valleys.
LIDAR (Light Detection and Ranging): In shallow waters, airborne LIDAR systems use laser pulses to measure the seafloor topography.

Inflammatory Bowel Disease



Snakebite as disease

- The World Health Organization (WHO) stepped in to alert the world about one of its biggest hidden health crises. It officially classified snakebite envenoming as a highest priority neglected tropical disease.
- A major issue is that the current process of producing anti-venom is outdated: it involves injecting large animals like horses with snake venom and collecting the animals' blood for the antibodies it produces against the venom. But the horses' blood could contain antibodies against other microorganisms as well, even against other components of the venom that are not harmful to humans
- Three-finger toxins (3FTxs) are one of the most abundant and lethal ingredients in elapid venoms. Crystal structures of their antibody 95Mat5 and 3FTx-L variants revealed that the antibody bound the toxin exactly where the toxin would have bound its target receptor in human nerve and muscle cells.
- By mimicking the receptor-toxin interaction, the antibody could whisk the toxins away from the receptors and prevent them from exerting their deadly effects.

Defense against virus

- A virus must be at the correct location to infect new target cells. Viruses are selective. This is because viruses have special proteins on their outer surface that make contact with a receptor on the host cell. Any cell type that makes the receptor can be infected? The HIV receptor is CD4. Only cells that make CD4, such as T-cells and macrophages, can be infected by HIV.

- SARS-CoV-2 uses a receptor called ACE2. Cells of the respiratory tract express ACE2 and are targets. HIV can't infect respiratory cells, and SARS-CoV-2 can't infect T-cells. Viral transmission is an outcome of a chase inside the host: between the virus making copies of itself and the immune system.

- The virus must transmit before the immune system beats it or the host dies. One such receptor is for a protein called phosphatidyl serine (PS). The PS protein is usually expressed by dying cells in the body, as a signal to the immune cells to destroy them.

- The immune cells express the PS receptor and fuse themselves with these cells, quietly destroying them. Viruses hijack this pathway with a process called apoptotic mimicry: by expressing the PS protein on their surfaces, allowing them to infect the very cells that will destroy them.

- The mere presence of a virus in a given compartment wouldn't guarantee transmission from that route. For example, the Zika virus can be detected in semen, saliva, and breast milk but rarely spreads through these means despite the presence of target cells in the oral and genital cavities. Zika transmits mainly via mosquitoes

How does the body defend itself?

- The body uses extracellular vesicles in these bodily fluids to inhibit viral infection. Vesicles are small structures enclosed by fat that a cell uses to transport substances from one part of the cell to another.

- When they are secreted outside the cell, they're called extracellular vesicles. The researchers discovered that these extracellular vesicles are abundant in saliva and semen and contain the same PS proteins on their surface that viruses like Zika use for infection.

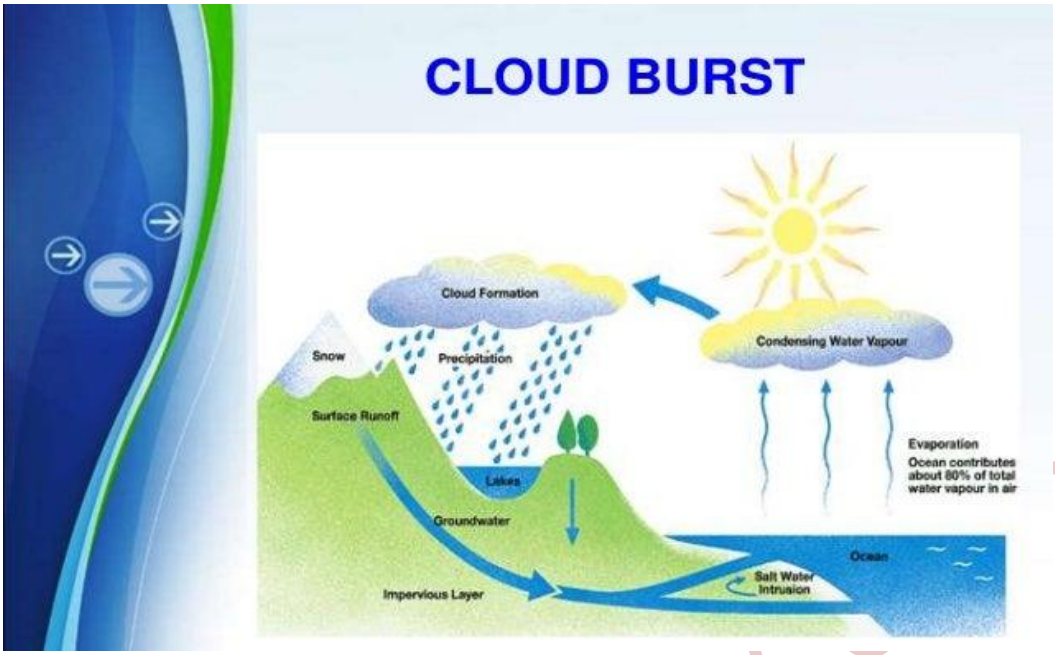
- The team also discovered that the concentration of these extracellular vesicles that contain PS is low in the blood and high in saliva and semen. PS-containing vesicles compete for the same receptors the viruses use for entry, thus crowding the latter out and preventing infection.

Glacial lakes expanding

- The Indian Space Research Organisation's (ISRO) long-term satellite imagery covering the catchments of Indian Himalayan river basins from 1984 to 2023 has shown significant changes in glacial lakes. According to the ISRO, of the 2,431 lakes larger than 10 hectares identified during 2016-17, 676 glacial lakes have notably expanded since 1984.

- The glacial lakes are categorized based on their formation process into four broad categories, namely Moraine-dammed (water dammed by moraine), Ice-dammed (water dammed by ice), Erosion (water dammed in depressions formed by erosion), and other glacial lakes.

- "Among the 676 expanding lakes, the majority of them are Moraine dammed [307] followed by Erosion [265], other [96], and Ice-dammed [8] glacial lakes, respectively,"



AI IN DRUG DISCOVERY

- Where existing libraries also fall short, some AI-driven computer programs can also predict the structures of potential drug molecules. Chemists can synthesize them de novo (from scratch) or one can pick existing molecules with similar structures and modify them.
- AI-based companies to help with computational drug discovery, and plan to work with the pharmaceutical industry to synthesize them.

Europe is 'warming faster

- Europe is the fastest-warming continent and its temperatures are rising at roughly twice the global average, two top climate monitoring organizations reported on April 22, warning of the consequences for human health, glacier melt, and economic activity.
- Another year of increasing temperatures and intensifying climate extremes including heat stress with record temperatures, wildfires, heatwaves, glacier ice loss, and lack of snowfall. The average sea-surface temperature for the ocean across Europe hit its highest annual level in 2023, the Europe report said.

Approach towards climate change

- The first such point of departure could be the adoption of an overarching regulation on climate change which takes forward the policy-driven approach of climate action in India couched in the National and State Action Plans on Climate Change.
- An overarching regulation has the intended benefit of enhancing state capacities by driving the allocation of funds, functions, and functionaries.
- The second pathway can build inter-ministerial and inter-sectoral approaches. The One Health initiative is one such example which has brought together 13 Ministries and departments in the domains of health, environment, science, and technology for disease control, research, and pandemic preparedness. We need to expand this approach to the private sector by integrating a rights-based approach to climate action in their core operations.
- For instance, the circular economy approaches need to engage with human rights-compliant supply chains, including reverse logistics, to have a truly transformative impact.
- The third pathway can leverage the court's observation to empower citizen groups and civil society organizations in fostering a rights-based dialogue on environment, biodiversity, and climate action. Within the ambit of environmental policy, it can build consensus on overcoming potential tensions between climate mitigation and action.

Earthquake in Taiwan

- In the Taiwan region, the Philippine Sea plate is moving northwest towards the Eurasian plate at a velocity of about 7.8 cm per year, which is faster than the motion of the Indian plate.
- Lying 160 km off the coast of China, Taiwan was formed at a convergent boundary of the Philippine and Eurasian plates in the western Pacific Ocean

Earthquake preparedness

- The island nation has the most advanced earthquake-monitoring network and early warning systems. Widespread awareness campaigns and drills on earthquake safety have improved the public's understanding of earthquake risks.

- The government constantly updates the earthquake safety requirements of the new and existing building stock and incentivizes residents by offering subsidies to improve the quake resistance of buildings.
- Taiwan has been able to reach sound scientific judgments based on how severe the shaking would be in each location. With the knowledge of the frequency of earthquakes in each source and how severely the ground shakes in a particular area, specific seismic codes can be designed, and specific construction norms can be followed.
- Taiwan could also use new technologies such as seismic dampers and base isolation systems.

What India can do??

- As India is going through a major phase of infrastructural expansion in many tectonically unstable regions including the Himalayas, sometimes flagrantly violating the norms that should be followed in ecologically sensitive areas, earthquake safety should be of particular concern.
- All infrastructural projects must comply with seismic safety regulations.
- The Taiwan earthquake provides important lessons for India. These include following seismic codes, constructing safer engineered structures, and overcoming inadequacies in the enforcement and non-compliance of seismic codes.
- These codes, unique to a particular region, are prepared based on local earthquake activity, building types, and construction materials. Indian code IS 1893 species seismic designs based on seismic zonation maps so that buildings do not collapse.
- In some parts of India, traditional architectural styles possessing earthquake resistivity can be rediscovered and encouraged.

Post-stroke depression (PSD)

- The current World Health Organization definition of stroke is to rapidly develop clinical signs of global disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than one of vascular origin.

- Stroke is associated with substantial neuropsychiatric morbidity including cognitive impairment, dementia, personality change, and mood disorders.
- Disability stemming from stroke is a mixture of physical, mental, and emotional manifestations. The neuropsychiatric features may be a result of the damage sustained by the brain or may be a function of the individual's reaction to the handicaps imposed on them. Depression is more common among stroke survivors, manifesting as post-stroke depression (PSD).

Poxvirus

- One particularly infamous poxvirus, smallpox, alone may have killed more than 500 million people in the last century. Smallpox didn't discriminate between rich, poor, young, old, and killed a third of the individuals whom it infected.
- Expanding, contracting as required Mpox, like all poxviruses, are DNA viruses. The mpox genome has about 197 kilobases (kb).
- The core genes are those closely conserved (i.e. preserved during evolution) by various poxviruses plus two sections about 6.4 kb long, one at each end of the genome.
- These sections of the virus genome were found to strongly influence human-to-human transmissibility. These were eventually found to be the virus's genomic accordions.

Brazil's biggest floating solar plant

- Brazil's biggest floating solar plant, with 10,500 plates on the water's surface, at the Billings dam developed by Empresa Metropolitana de Aguase Energeia in São Paulo.
- While the Latin American country has been working to increase the share of solar power in its national grid, heat waves such as one that passed through in early March – have lowered panel efficiencies by up to 15%

- The Billings Reservoir (locally known as Represa Billings) is the largest in São Paulo, Brazil, covering a total of 127 km2. It is named after Asa White Kenney Billings, the American hydroelectric engineer who was instrumental in building it.

Antihistamines

- Antihistamines are common drugs that can be purchased without a prescription and are used to treat short-lived allergic reactions, like a sneezing fit or an itch.
- As the name suggests, an antihistamine drug acts against the activity of the histamine receptor proteins that bind to a compound in the body called histamine.
- This compound consists of two attached: ethylamine (CH3CH2NH2) and imidazole (C2N2H4), the latter being a ring.
- Depending on its location, histamine performs broadly four types of functions, each involving different histamine receptors called H1, H2, H3, and H4.
- The H1 receptor is found mostly in the inner surface of blood and lymphatic vessels, neurons, and smooth muscle cells. H1 antihistamines are used to block the effects of minor allergies.

Water stress in India

- India houses 18% of the world's population on 2.4% of the earth's surface area and has just 4% of global freshwater resources. Nearly half its rivers are polluted, and 150 of its primary reservoirs are currently at just 38% of their total live storage capacity.
- Further, it is the largest user of groundwater in the world. And three-quarters of India's districts are hotspots for extreme climate events.
- Against this backdrop, India has invested heavily in disaster preparedness, but the nature of climatic shocks will continue to change.

- There will be sudden shocks (heavy rainfall, rapid declines in water availability) as well as slow onset but periodic stresses (reduced water retention in soils, changes in trend lines for rainfall).

Importance of water

- Water connects our hydrological, food, and energy systems, impacting millions of people.
- Precipitation is the primary source of soil moisture and water stored in vegetation (green water) and the water available in rivers and aquifers (blue water).
- Both blue and green water impact the food we grow irrigating crops, influencing harvests, and being critical to the economy.
- But this sector that employs the most is increasingly climate vulnerable.
- The India Employment Report 2024 shows that agriculture still employs around 45% of the population and absorbs most of the country's labor force.
- Water is also a key component of the world's clean energy transition.
- Green hydrogen, seen as a crucial pillar for decarbonizing industry and long-distance transport sectors, is produced using water and electricity sourced from renewables.
- Pumped storage hydropower which acts as a natural battery and is essential to balance the power grid load is an important component of a clean but reliable power system
- What India does to ensure water for domestic supply, food security, and the clean energy transition will matter to its economy.
- First, effective water governance needs policies that recognize its interactions with food and energy systems.
- Second, India needs to focus on the judicious use of blue and green water through water accounting and efficient reuse. The National Water Mission targets increasing water use efficiency by 20% by 2025.
- Similarly, the Atal Mission on Rejuvenation and Urban Transformation (AMRUT) 2.0 calls for reducing non-revenue water, which is lost before it reaches the end user, to less than 20% in urban local bodies. What India does to ensure water for domestic supply, food security, and the clean energy transition will matter to its economy.

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- Third, leverage financial tools to raise money for climate adaptation in the water sector.
- Following global trends, India's climate action has been largely focused on mitigation in the industrial, energy, and transport sectors. Financial commitments for climate change adaptation in the water and agriculture sectors are still relatively small.
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Andaman and Nicobar

- The Andaman and Nicobar (A&N) administration issued three public notices, announcing its intention to create three wildlife sanctuaries: a coral sanctuary at Meroë Island, a megapode sanctuary at Menchal Island, and a leatherback turtle sanctuary on Little Nicobar Island.
- The selection of Meroë and Menchal Islands as conservation reserves for coral reefs and Megapode birds is arbitrary.
- Menchal does not have more than a pair or two of the endemic Megapode birds. The Nicobar megapode or Nicobar scrub fowl (Megapodius nicobariensis) is a megapode found in some of the Nicobar Islands (India)

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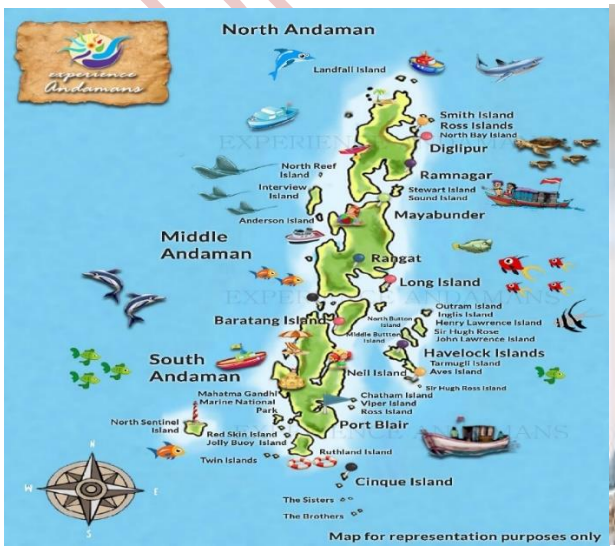
Galatea National Park

- Galathea National Park is a national park located in the Union Territory of Andaman and Nicobar Islands, India. It is located on the island of Great Nicobar in the Nicobar Islands, which lie in the eastern Indian Ocean (Bay of Bengal).The total area of this park is some 110 square kilometers, and it was gazette as a National Park of India in 1992.

- Galathea forms part of what has been designated as the Great Nicobar Biosphere Reserve, which also includes the larger Campbell Bay National Park, separated from Galathea by a 12-km forest buffer zone.



Leatherback turtle

- It is the largest turtle in the world. It is the only species of sea turtle that lack scales and a hard shell. They are named for their tough rubbery skin and have existed in their current form since the age of the dinosaurs. These turtles are highly migratory which can swim over 10,000 miles a year between nesting and foraging grounds.
- They are also accomplished divers with the deepest recorded dive reaching nearly 4,000 feet deeper than most marine mammals. It has a unique thermoregulatory adaptation allows them to maintain core body temperatures at extremely cold depths.
- Distribution: It is found in every ocean except the Arctic and Antarctic.
- They have the widest global distribution of any reptile, with nesting mainly on tropical or subtropical beaches.
- Conservation status, IUCN: Endangered, CITES: Appendix.

Soloman Islands

The Solomon Islands, also known simply as the Solomons, is a country consisting of six major islands and over 900 smaller islands in Melanesia, part of Oceania, to the northeast of Australia. It is directly adjacent to Papua New Guinea to the west, Australia to the southwest, New Caledonia and Vanuatu to the southeast, Fiji, Wallis and Futuna, and Tuvalu to the east, and Nauru and the Federated States of Micronesia to the north. It has a total area of 28,896 square kilometers (11,157 sq mi) and a population of 734,887 according to the official estimates for mid-2023. Its capital and largest city, Honiara, is located on the largest island, Guadalcanal. The country takes its name from the wider area of the Solomon Islands archipelago, which is a collection of Melanesian islands that also includes the Autonomous Region of Bougainville (currently a part of Papua New Guinea), but excludes the Santa Cruz Islands. The Solomon Islands is an archipelagic state situated in the southwest Pacific Ocean, approximately 2,000 km to the northeast of Australia. Its land mass of 28,400 km² extends over

nearly 1000 islands comprising nine main island groups. The capital, Honiara, is located on Guadalcanal, the largest island.

The population of the Solomon Islands, estimated to be about 720,956 (2019), is predominantly Melanesian, although there are small Polynesian, Micronesian, Chinese, and European communities. There are 63 distinct languages in the country, with numerous local dialects. Ruang is the southernmost stratovolcano in the Sangihe Islands arc, North Sulawesi, Indonesia. It comprises an island 4 by 5 kilometres wide. The summit contains a partial lava dome and reaches some 725 meters in altitude.

Understanding liver function

The liver, often hailed as the body's powerhouse, boasts a repertoire of functions crucial to our overall well-being. Primarily, it detoxifies harmful substances, be it environmental toxins or metabolic byproducts, ensuring our bloodstream remains clean. Additionally, the liver synthesizes essential proteins, stores glycogen for energy, and metabolizes fats, carbohydrates, and proteins, thereby regulating blood sugar levels and cholesterol.

The Gut: gateway to health mere passageway for food, the gut hosts trillions of microorganisms collectively known as the gut microbiota. This bustling community aids in breaking down food, synthesizing vitamins, and, crucially, bolstering our immune system. Maintaining a diverse and balanced gut microbiome is pivotal for overall health.

However, modern lifestyles, marked by processed foods, antibiotics, and chronic stress, often disrupt this delicate equilibrium, paving the way for gastrointestinal disorders like irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), and leaky gut syndrome. The intricate interplay between the liver and the gut, is often referred to as the liver-gut axis.

This bidirectional communication system involves various molecules, hormones, and immune cells shuttling between the two organs, influencing each other's function. One crucial link is the bile produced by the liver, which aids in fat digestion. Interestingly, bile acids also act as signaling molecules in the gut, modulating the composition of the gut microbiota.

Conversely, metabolites produced by gut bacteria can influence liver metabolism and inflammation. Moreover, a healthy gut microbiome contributes to the integrity of the gut

barrier, preventing harmful substances from leaking into the bloodstream and burdening the liver.

Conversely, a compromised gut barrier, as seen in conditions like leaky gut syndrome, can trigger systemic inflammation and liver dysfunction. English is the official language, but Solomons' Pijin is most commonly spoken

Solomon Islands was first settled sometime between 30,000 and 28,000 BC by people coming from the Bismarck Islands and New Guinea when sea levels were lower and Buka and Bougainville were physically joined to southern Solomon Islands in one landmass (Greater Bougainville).

In 1893, the UK Government established a protectorate over the eastern group of islands, with Germany controlling most of the west. The UK protectorate was extended to all nine main island groups now part of Solomon Islands, while Buka and Bougainville became part of German New Guinea (later incorporated into Papua New Guinea).

Agroforestry related issues

The Gaja cyclone nearly razed all coconut trees and made the soils saline; we did not know what to plant after.

The five-year 'Trees Outside of Forests India' (TOFI) initiative is one such attempt to assess comprehensive ways to stimulate a change in the status quo. It's a joint initiative of the U.S. Agency for International Development (USAID) and India's Ministry of Environment, Forest and Climate Change.

In particular, we discovered that water availability and transition finance have been recurrent concerns for smallholders across these states. The problem remains relevant and is especially acute for smallholders who need additional funding to secure water and/or who incur ~~additional~~ debt in doing so.

Moreover, water availability is critical during the sapling stage but remains a constant concern if the trees compete with crops for water in water-constrained environments (e.g. hard rock aquifers and low-rainfall regions).

One way to overcome this constraint is to grow trees that don't compete with the crops for water. Choosing the right species for the right place and the right reason is elemental for agroforestry to enhance the sustainability of livelihoods.

Finding native species that FIt multiple criteria is admittedly challenging but necessary to arrest or reverse land degradation while diversifying livelihood opportunities. the Indian Forest and Wood Certification Scheme 2023, which certifies agroforestry and wood-based products as sustainable, has an exhaustive list of eligibility criteria for farmers and industries.

The emerging concept of ecosystem credits or existing approaches such as 'payment for ecosystem services' (PES) are potential incentive mechanisms. (In PES, an ecosystem service user, e.g. a food processing company, volunteers to pay a service provider, such as a small farmer, for trees promoting a service like pollination). These instruments strengthen the ideology of nature-centered economics.

Frogs

Frogs use a myriad of ways to defend themselves against predators. Some are poisonous Some are brightly colored. Some even ate their bodies with air to appear bigger. Another way frogs have been known to defend themselves or alert others nearby, about a predator is to make loud sounds. Recently, scientists have found that one tiny species of frog endemic to the Brazilian Atlantic rainforest emits ultrasonic sounds that are inaudible to humans but can scare off predators. Leaf litter frogs emit these ultrasonic calls to stave off predators or, possibly, attract other animals that might attack the predator and protect the frogs.

Heat Waves

According to the IMD, the definition of a heatwave depends on the p~~hysiography of~~ regions. The IMD will declare a heatwave if the maximum temperature recorded at a station is 40 degrees Celsius or more in the plains, 37 degrees Celsius or more in the coast, and 30 degrees Celsius or more in the hills. A heatwave's severity is determined by its departure from normal temperature. There is a 'normal heatwave' when the departure is by 4.5-6.4 degrees Celsius and a 'severe heatwave' if the departure is greater.

Heatwave declaration could also be based on actual maximum temperature: a 'heatwave' is when this figure is greater than 45 degrees Celsius and a 'severe heatwave' when greater than 47 degrees Celsius

Heat action plans (HAPs)

Heat action plans (HAPs). -HAPs aim to increase preparedness and lower the a~~dverse impacts~~ of extreme heat by outlining strategies and measures to prepare for, address, and recover from heat waves. HAPs in India follow a general pattern.

They provide a snapshot of regions' heat profiles, including information on the number of past heatwave events, yearly trends in the summer maximum temperature, land surface temperature,

and so on, followed by a vulnerability assessment which maps out regions that require immediate attention and a response plan.

This plan presents recommendations for mitigating and addressing heatwave impacts before, during, and after a heatwave and outlines the roles and responsibilities of various line departments, such as the disaster management authority, labor department, and police.

What do the HAPs recommend?

HAPs typically suggest a combination of measures such as using forecasts and early warning systems to alert the public and relevant authorities about heatwaves, educating the public through campaigns that provide information on risks associated with heatwaves, building heat shelters and cooling centers, and providing clean drinking water to avoid dehydration.

HAPs provide directives for hospitals to be well equipped with supplies and an adequate number of trained healthcare workers to recognize and treat a large influx of patients with heat-related illnesses.

HAPs also suggest long-term measures such as adopting urban planning strategies that promote tree planting, using heat-resistant building materials to reduce the urban heat island effect, and using cool roofing technologies to reduce solar absorption, thereby decreasing indoor temperatures

What debilitates HAPs from addressing the problem effectively?

The Local context

Inconsistent methods

Vulnerable populations:

Resource allocation:

Breaking down silos:

They breed mostly during the monsoon season when females lay a single egg on open ground. Males have a gular pouch, which helps produce a resonant booming mating call to attract females and can be heard up to a distance of 500 meters. Males play no role in the incubation and care of the young, which remain with the mother till the next breeding season. These birds

are opportunist eaters. Their diet ranges widely depending on the seasonal availability of food. The biggest threat to this species is hunting, which is still prevalent in Pakistan. ~~This is follow~~ed by occasional poaching outside Protected Areas, collisions with high-tension electric wires, fast-moving vehicles, and free-ranging dogs in villages.

Three Fish species that live in the Laccadive Sea, of the southwest corner of the Indian coast, are capable of using tools. All three species used live or dead coral structures as anvils to break the hard shells of sea urchins so they could get to the edible bits inside.

The Jansen's wrasse (Thalassoma jansenii) and the checkerboard wrasse (Halichoeres hortulanus) have never been reported using tools before, and this is the first documented instance of the moon wrasse (Thalassoma lunare) using tools in the wild Unlike primates, birds, otters, octopuses, and many other animals that s~~cientists know~~ are capable of wielding tools, fish have no hands, claws, or tentacles.

This presents an obvious challenge for tool use since being able to grasp and manipulate objects are key requirements for using tools. Some fish have found innovative ways of using water itself as a tool. The archer fish, for example, spouts jets of water through its specialized mouth to shoot down prey above the surface urchin, a wrasse would skillfully approach it from the side and use it~~s snout to gin~~gerly turn the urchin over with a series of pushes and jabs.

The underside of the urchin has fewer and softer spines, allowing the wrasse to safely pick it up in its jaws. With the prize in its mouth, the wrasse would swim to a nearby hard coral and strike the urchin against it, dusting off the prickly spines. Even more strikes would break open the test as well.

Sea urchins

Sea urchins are spiny, globular echinoderms in the class Echinoidea. About 950 species of sea urchins are distributed on the seabed's of every ocean and inhabit every depth zone from the intertidal seashore down to 5,000 meters. The spherical, hard shells of sea urchins are round and covered in spines.

Hard corals vs soft corals

Appearance: Hard corals have tentacles in multiples of 6, while soft coral tentacles form in multiples of 8. Hard corals closely represent rocks, while soft corals look like underwater plants.

Growth characteristics: Hard corals deposit calcium carbonate skeletons that remain behind after they die, forming the base of coral reefs. Soft corals have internal structural support known as spiracles.

Defense Mechanisms: Polyps of hard coral can retreat into their skeletons for protection, while soft corals rely more on chemical defense

Coral bleaching

Bleached and dead coral around Lizard Island on the Great Barrier Reef, located 270 km north of the city of Cairns. Australia's famed Great Barrier Reef is teetering on the brink, suffering one of the most severe coral bleaching events on record and the fifth in eight years leaving scientists unsure of its survival.

Hard vs soft corals

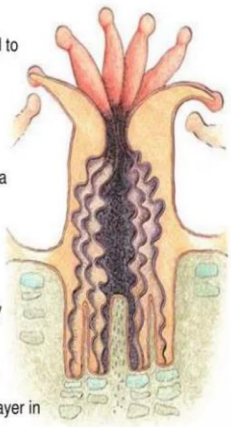
Coral Reefs

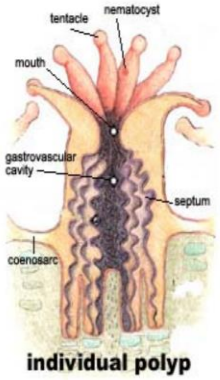
-Are produced by the organisms that live on them
-Are produced by a soft bodied polyp similar to and related to an anemone
-Very diverse ecosystem

Coral Anatomy & Growth

-Reef forming corals secrete CaCO3
-Are members of the Phylum Coelenterata, Class Anthozoa
-Are radially symmetrical
-Subclasses:
-Soft Corals- sea fans, sea pens, sea whips
-Hard Corals- stony corals (make the reefs)
-Are carnivores, tentacles have nematocysts to capture prey and bring it into the digestive cavity

-Most corals live in colonies
-Each polyp sits in a hard limestone cup called a corallite
-Which is made by their epidermis
-The polyp grows by drawing itself up a secreting a new layer in the bottom of the cup
-All the polyps are connected over the top of the calcium cup by a thin tissue layer called a cenosarc, so touching and tearing this tissue can injure the coral and let infections in.



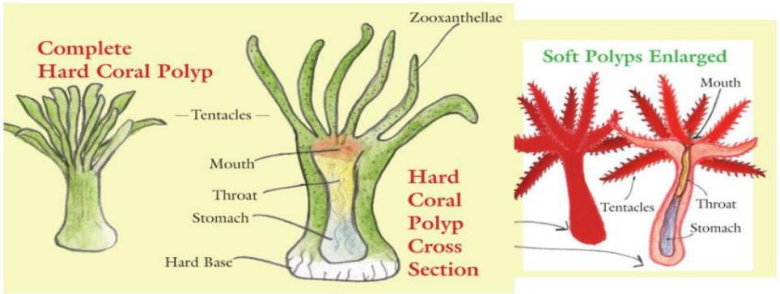


Hard corals

- Reef builders.
- Rigid skeleton made of calcium carbonate ($CaCO_3$)
- Secrete calcium cabonate

Soft corals

- No skeleton
- No calcium carbonate secretions



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Parkinson's disease

Parkinson's disease is a neurodegenerative movement disorder that progresses relentlessly. It gradually impairs a person's ability to function until they ultimately become immobile and often develop dementia. Many factors may contribute to the development of Parkinson's, both environmental and genetic. Until recently, the underlying genetic causes of the disease were unknown. A new genetic mutation for Parkinson's disease called RAB32 Ser71Arg.

RAB32 Ser71Arg interacts with several proteins previously linked to early- and late-onset

Parkinsonism as well as non-familial Parkinson's disease, the proteins encoded by these linked genes optimize levels of the neurotransmitter dopamine. Dopamine is lost in Parkinson's as the cells that produce it progressively die. Together, these linked genes and the proteins they encode and regulate specialized autophagy processes.

Linked genes are genes located close together on the same chromosome. They are usually (but not always) inherited together. Autophagy is the natural, conserved degradation of the cell that removes unnecessary or dysfunctional components through a lysosome-dependent regulated mechanism. It allows the orderly degradation and recycling of cellular components.

Coal Cages

Scientists around the world have been working for years to address the decline of coral reef populations. Besides working to keep existing coral alive, researchers have also been growing new coral in labs and then placing them in the ocean. one problem is predators like parrots • sh attempt to bite and destroy the newly transplanted coral in areas like South Florida, leaving them with less than a 40% survival rate.

developed 'Coral Fort, claiming the small biodegradable cage made in part with drinking straws boosts the survival rate of transplanted coral to over 90%. The fish eventually lose interest in the coral as it matures, but scientists need to protect the coral in the meantime. Stainless steel and PVC pipe barriers have been set up around transplanted coral in the past,

but those barriers needed to be cleaned of algae growth and eventually removed.

India in Arctic

What changed Indian policy, ostensibly, was scientific data showing that the Arctic was warming faster than previously thought. When facts tying catastrophic climatic occurrences in India to the melting of Arctic Sea ice emerged, decision-makers felt compelled to act. Second, New Delhi is seized of the opening up of Arctic Sea routes, primarily the Northern Sea Route, and would like to route Indian trade through the region. This might help India reduce costs for shipping companies along with time, fuel, and security costs for transmitting goods.

The third reason is geopolitics. China's growing investments in the Arctic have raised concern in India. Russia's decision to grant China expanded access to the Northern Sea Route has deepened this anxiety. India's increasing focus on the Arctic comes at a time of heightened tensions in the region, fueled by the Russia-Ukraine conflict and exacerbated by the suspension of various regional cooperative forums

There are concerns about the potential repercussions of these tensions, especially given Russia's growing reliance on its nuclear deterrent on the Kola Peninsula. For India, which aims to maintain constructive relations with both Western nations and Russia, these developments carry significant strategic implications. To be sure, India is no newcomer to the Arctic. Its involvement in the region goes back to 1920, with the signing of the Svalbard Treaty in Paris. In 2007, India undertook its first research mission to investigate Arctic microbiology, atmospheric sciences, and geology. A year later, India became the only developing country, aside from China, to establish an Arctic research base.

After being granted 'observer' status by the Arctic Council in 2013, India commissioned a multi-sensor moored observatory in Svalbard in 2014 and an atmospheric laboratory in 2016. The work at these stations focuses on examining Arctic ice systems and glaciers and the consequences of Arctic melt on the Himalayas and the Indian monsoon

the issue of Indian engagement in the Arctic divides the country's academic and policy communities. Opinions are split over the potential impacts of the changing climate in the Arctic on India's economy. The concern primarily stems from mining in the region for fossil fuels, an area where India has yet to articulate a clear economic strategy. The proponents of economic

Indian Arctic policy

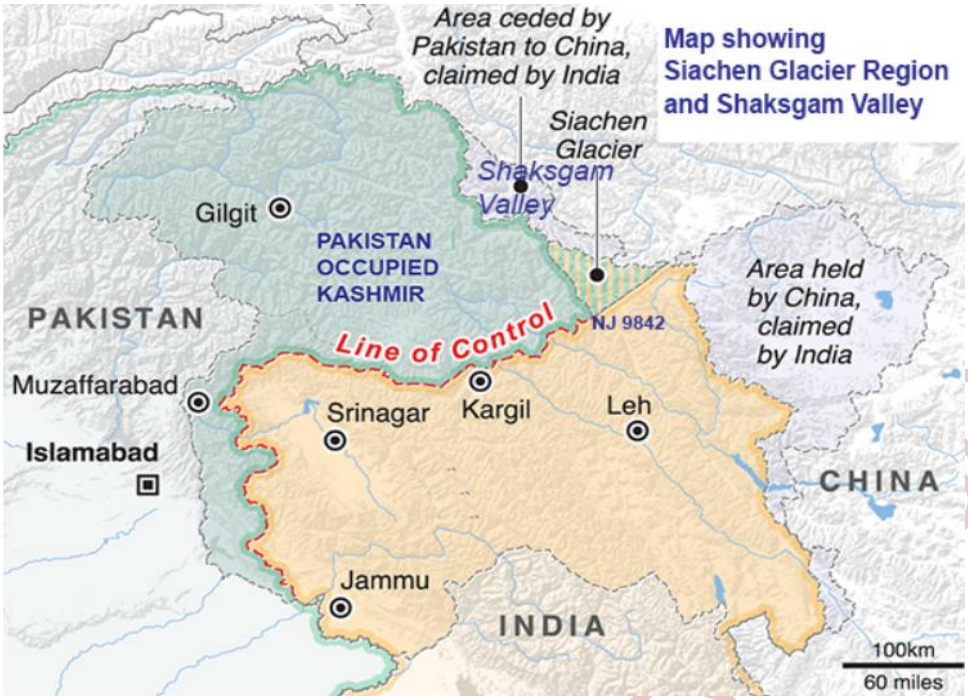
exploitation in the Arctic advocate a pragmatic approach in the region, especially around oil and gas exploration, and mining.

India's present policy is to cooperate with Arctic countries in green energy, and green and clean industries, as a way of bolstering its 'responsible stakeholder' credentials. With Denmark and Finland, for instance, Indian collaboration has come in areas such as waste management, pollution control, renewable energy, and green technology. Many believe a partnership with Norway could be transformational for India as it would enable greater Indian participation in the Arctic Council's working groups, tackling issues such as the blue economy, connectivity, maritime transportation, investment and infrastructure, and responsible resource development. While the Indian government seems keen to benefit from seabed mining and resource exploitation in the Arctic, it ought to unequivocally back a sustainable mode of extraction.

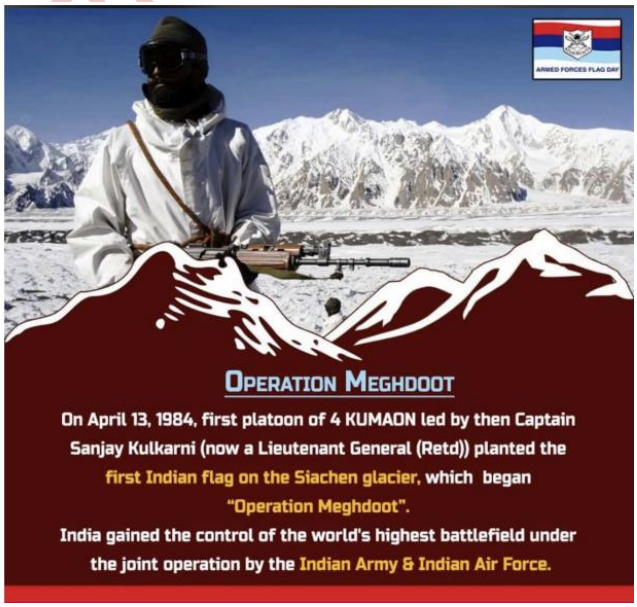
India's Arctic Policy (the other four being economic and human development; transportation and connectivity; governance and international cooperation; and national capacity building.

Siachen Glacier

Conflicting claims Siachen, in Balti language means "land of roses 'Sia' is a kind of rose species that grows in the region, and 'Chen' means "in abundance". However, it is known for being the world's highest and coldest battlefield. It sits at a very strategic location with Pakistan on the left and China on the right. Siachen is a legacy of the Partition between India and Pakistan. While the Line of Control (LoC) was delineated and accepted by both sides up to NJ-9842 as part of the 1972 Shimla agreement, the glacier itself was left unmarked

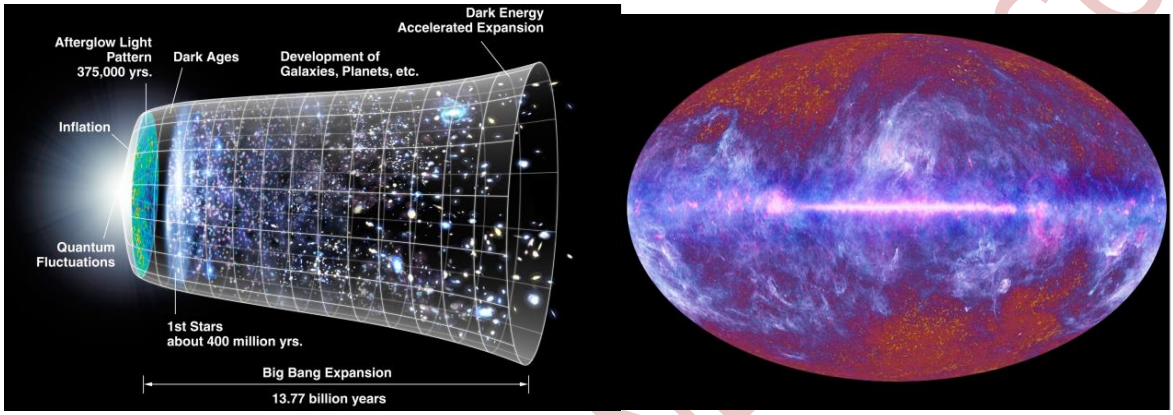


India claims the area based on the Jammu and Kashmir Accession Agreement of 1947 and the Karachi Agreement of 1949, which define the ceasefire line beyond NJ-9842 as running "Northwards to the glaciers". On the other hand, Pakistan interprets it as 'North-Eastwards' to claim the area beyond the Saltoro Ridge and beyond Siachen as its own. This would give Pakistan direct connectivity to China as well as strategic oversight over the Ladakh region and the crucial Leh-Srinagar highway, posing a serious threat to India.



How fast is the universe expanding?

A closed universe is said to have a positive curvature of space like a sphere. Such a universe will be finite even if it has no bounds. That is, in this universe, we can travel forever without falling off an ‘edge’ Another possibility is that the universe will continue to expand forever, but the rate will decrease. The rate will take an infinite amount of time to drop to zero, so the universe will keep expanding, just slower. This leads to a flat universe. According to many, this is the state of our universe at this time



Based on studying the cosmic microwave background, cosmologists have estimated space to be expanding at around 68 kilometers per second per mega parsec. Using the cosmic distance ladder method, they arrived at a figure of 73 (km/s)/Mpc Cosmologists deduced this based on studying the cosmic microwave background (CMB). This is a sea of photons, the particles of light, present throughout the universe. They are leftover from the Big Bang, it's afterglow. Scientists have measured temperature changes in the CMB and studied its large-scale properties using complicated trigonometry.

Cryogenics

Cryogenics is the science of materials at temperatures below negative 153 degrees C. The technologies by which materials are cooled up to this temperature are collected under the term refrigeration. Instead, cryogenics deals with thermal conditions in which even the substances that we encounter in our daily lives as gases such as hydrogen, nitrogen and, of course, the air in our atmosphere are liquid. This field typically uses helium and nitrogen as the cryogenic fluid, the thing that cools a substance.

Nitrogen has a boiling point of negative 196 degrees C, and helium, negative 269 degrees C. So below these temperatures, they are liquid. Such fluids need to be stored in vacuum flasks or they could leak and damage their surroundings. Many cryogenic materials have desirable properties. For example, hydrogen is one of the best rocket fuels but it can only be used as a liquid, so it needs to be cryogenically cooled. (Cryogenic hydrogen and cryogenic oxygen power the third stage of ISRO's LVM-3 rocket.) In the process of cryogenic hardening, a material steel in particular can be made harder and stronger.

The Ashaninka

The Ashaninka are one of South America's largest tribes. Their homeland covers a vast region, from the Upper Juruá River in Brazil to the watersheds of the Peruvian Andes. For over a century, colonists, rubber tappers, loggers, oil companies, and Maoist guerillas have invaded their lands.

SC ON ECOTOURISM

National and State forest authorities have leaned on ecotourism to simultaneously attain conservation goals, enhance revenue, and improve the livelihoods of local people. In its recent judgment, instead of treating eco-tourism as a panacea for conservation and revenue generation, the Supreme Court said that the approach must be of egocentrism and not anthropocentrism. The court directed the banning of tiger safaris in core areas and the constitution of a committee to explore the feasibility of permitting tiger safaris in peripheral areas in not just in Jim Corbett, but across India.

In the context of the growing degradation of biodiversity hotspots and the support to revenue-generating eco-tourism, a valuation method that is based on ecosystem services (food, water, and services regulating the climate and Foods, etc.) is a must. The system refers to the benefits people obtain from natural ecosystems in contrast with man-made structures. The Court could have set a precedent by saying that ecosystem services are more important and generate more revenue than eco-tourism or raised the need to put in place a precise law and policy relating to ecosystem services.

It also disagreed with the 2019 guidelines of the National Tiger Conservation Authority permitting a tiger safari on the lines of a zoo in a national park. The court stressed that tigers should be sourced from the same landscape as where the safari is being conducted and not outside the tiger reserve.

Doxing

The act of digitally publicizing a person's private details is called doxing or doxing. Doxxers generally publicise highly personal data such as other people's home addresses, phone numbers, private email IDs, medical conditions, government documents, social security numbers, live locations, insurance information, private employment details, etc. Such information is usually obtained through illegal methods such as hacking or theft. Doxing (sometimes written as Doxing) is the act of revealing identifying information about someone online, such as their real name, home address, workplace, phone, financial, and other personal

information. That information is then circulated to the public — without the victim's permission.

What is hepatitis?

"Hepatitis is an inflammation of the liver that is caused by a variety of infectious viruses and non-infectious agents leading to a range of health problems, some of which can be fatal,". There are five main strains of the hepatitis virus, referred to as types A, B, C, D, and E. While they all cause liver disease, they differ in important ways including modes of transmission, the severity of the illness, and geographical distribution.

In particular, types B and C lead to chronic disease and together are the most common cause of liver cirrhosis, liver cancer, and viral hepatitis-related deaths. An estimated 354 million people worldwide live with hepatitis B or C, and for most, treatment remains beyond reach, according to the WHO.

Disease	Pathogen	Symptoms	Incubation period	Method of transmission	Diagnostic test
Hepatitis A	HAV, Picornaviridae	Fever, headache, malaise, jaundice	2-6 weeks	Ingestion	IgM antibodies
Hepatitis B	HBV, Hepadnaviridae	Severe liver damage, chronic disease occurs	3-26 weeks	Parenteral, sexual contact	IgM antibodies
Hepatitis C	HCV, Flaviviridae	Same as HBV, more chronic	2-33 weeks	Parenteral	PCR of viral RNA
Hepatitis D	HDV, Deltaviridae	Severe liver damage, high mortality rate	6-26 weeks	Parenteral, when co-infected with HBV	IgM antibodies
Hepatitis E	HEV, Caliciviridae	Pregnant women may be at high risk and show high mortality, not chronic disease	2-6 weeks	Ingestion	IgM antibodies, PCR of viral RNA

Sea Level Rise

Concurrent occurrences of heatwaves and extreme short-term sea level rise at the same coastal locations significantly increased between 1998 and 2017 when compared to the preceding twenty years. A so-called 'concurrent heatwave and extreme sea level' (CHWESL) event is when a heatwave and an extreme short-term sea level rise occur at the same coastal location over the same period. This can pose a serious threat to coastal communities.

China said on it is offering security assistance to Tonga for a Pacific islands summit. found a significant association between heatwave intensity and the probability of a CHWESL event occurring, with a 1% increase in heatwave intensity associated with an approximately 2% increase in the probability of a CHWESL event occurring. global coastal areas could experience on average 38 days of CHWESL conditions each year between 2025 and 2049, an increase of 31 days compared to the historical period of 1989-2013.

The authors conclude that CHWESL events could pose a significant threat to coastal communities, particularly from the risks of excess heat to human health. They note that countries in tropical areas are likely to be the most severely affected, and that many of these countries are low or middle-income countries which may struggle to cope with the effects.

Gerozyme'

Dr. Daniel Belsky, an epidemiologist at Columbia University, New York (my Alma Mater), has coined the term 'geroscience', meaning geriatric, or related to age. Here, he has devised a novel blood test that determines the pace at which a person is aging. His group has devised a method that studies the formation of methyl groups through an enzyme in the DNA of senior citizens and ends that this methylation is sensitive to aging. This is often referred to as 'gerozyme'.

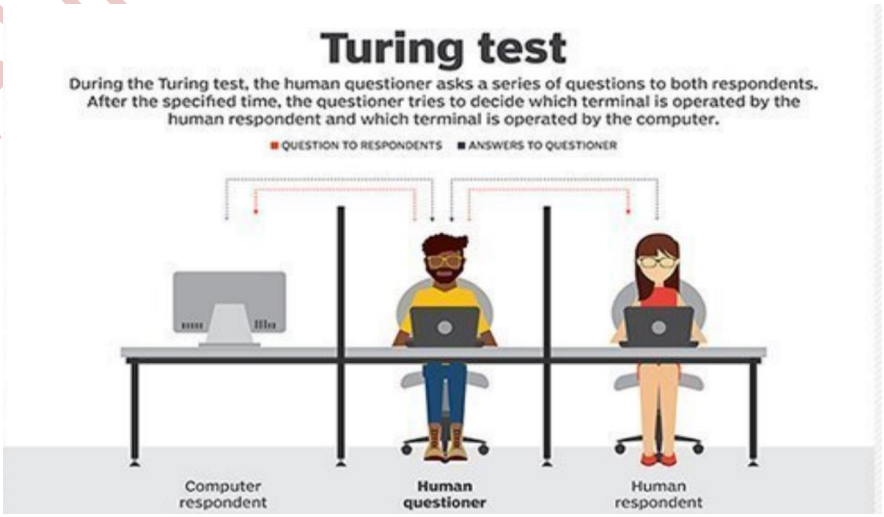
AI and singularity

The popular understanding seems to be that the day is not far off when artificial intelligence (AI) will be able to think like humans and interact, at least through languages, in a way that is indistinguishable from real humans. Such a day has been called "the singularity," a pivotal moment for the human race.

With the recent success of large language models (LLMs) like ChatGPT, which are capable of interpreting language use and composing sentences, many think this day is imminent.

TURING TEST

The Turing Test measures the intelligence of a test subject to determine whether a machine can demonstrate intelligence. According to the test, a computer program can think if its responses can fool a human into believing it, too, is human. Not everyone accepts the validity of the Turing Test, but passing it remains a major challenge to developers of artificial intelligence.



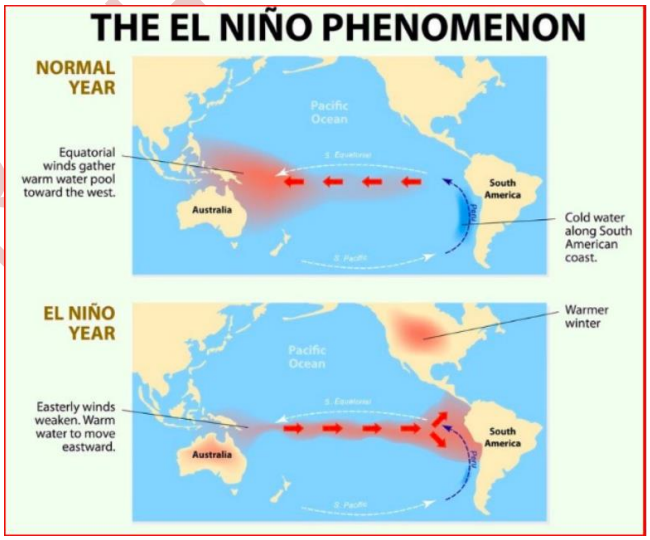
There are variations to the Turing test as well as modifications to the approach of asking questions in different AI tests. The Turing test has several limitations including requiring a controlled environment, not having a dedicated definition of intelligence, and needing to adapt to evolving technological advancements.

The hottest March in history was in 2024

The world experienced the warmest March ever due to a combined effect of El Niño and human-caused climate change, making it the 10th consecutive month since June last year to set a new temperature record, the European Union's climate agency.

The earth's global surface temperature has already increased by around 1.15 degrees C compared to the average in 1850–1900, a level that hasn't been witnessed since 1.25 lakh years ago, before the most recent ice age. The rise in global average temperature is attributed to the rapidly increasing concentration of greenhouse gases, primarily carbon dioxide and methane, in the atmosphere.

The continuing, albeit weaker, El Niño and predicted above-normal sea-surface temperatures over much of the global oceans are expected to lead to above-normal temperatures over almost all land areas until May,



One health

The recent decision on the 'National One Health Mission' by the cabinet marks a milestone. In July 2022, the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-

STIAC) endorsed the setting up of the 'National One Health Mission'. Since then, 13 Ministries and Departments as well as science funding agencies this includes the Department Of Science and Technology, the Department of Biotechnology (DBT), the Council of Scientific and Industrial Research (CSIR), the Department of Pharmaceuticals, AYUSH, or Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy the Ministries of Health, Animal Husbandry and Environment, as well as Defence, came together to shape the mission, taking one of the most holistic approaches to one health and pandemic preparedness in the world.

There was consensus among the leadership of these Ministries to have a National Institute for One Health. Based in Nagpur, it is to be the anchor in coordinating activities nationally, and the nodal agency to coordinate international activities across the space of one health. The goals of the 'National One Health Mission' are to develop strategies for integrated disease surveillance, joint outbreak response, coordinated research and development (R&D), and ensure seamless information sharing for better control of routine diseases as well as those of a pandemic nature

under the mission, a national network of high-risk pathogen (Biosafety level or BSL 3 and BSL 4) laboratories has been created. Bringing such laboratories that are managed by different departments together will serve to address the disease outbreak response better regardless of human, animal, and environmental sectors. Under the mission, efforts are being made to apply artificial intelligence (AI) machine learning, and disease modeling to address these issues and coordinate capacity building in epidemiology across sectors.

National Mission for Sustaining the Himalayan Ecosystem

The National Action Plan on Climate Change (NAPCC) has enunciated the launch of a National Mission for Sustaining the Himalayan Ecosystem. The mission attempts to address some important issues concerning

a) Himalayan Glaciers and the associated hydrological consequences,

b) Biodiversity conservation and protection,

c) Wildlife conservation and protection,

d) Traditional knowledge societies and their livelihood

e) Planning for sustaining the Himalayan Ecosystem

Sustaining the Himalayan ecosystem as a national mission will focus on the rapid generation of four types of national capacities, they deal with

a) Human and knowledge capacities,

b) Institutional capacities,

c) Capacities for evidence-based policy building and governance, and

d) Continuous self-learning for balancing between the forces of Nature and the actions of mankind

Tonga

The Pacific Islands Forum: The Pacific Islands Forum brings the region together to address pressing issues and challenges and foster collaboration and cooperation in the pursuit of shared goals. Founded in 1971, it comprises 18 members: Australia, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Kiribati, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. Our vision is for a resilient Pacific region of peace, harmony, security, social inclusion, and prosperity, that ensures all Pacific peoples can lead free, healthy, and productive lives.

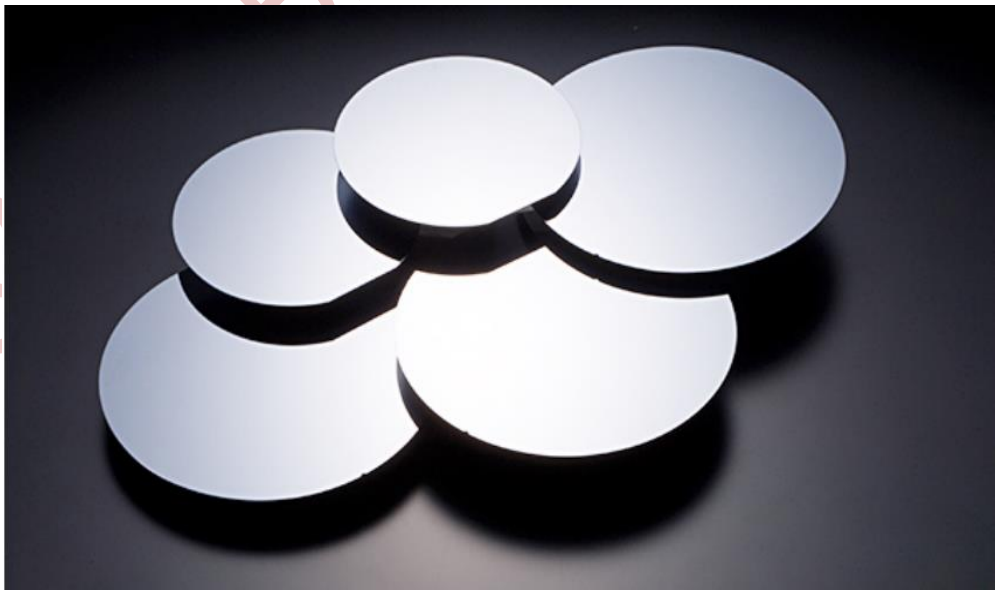
Songkran

In Thailand, Songkran refers to the sun's annual passing into the Aries constellation, the first sign of the Zodiac, which marks the traditional start of the new year. Occurring in mid-April after the rice harvest, it is a time when people reunite with their families and pay their respects to older adults, ancestors, and sacred Buddha images. Pouring water is a significant act during Songkran, symbolizing cleansing, reverence, and good fortune. Other activities include bathing important Buddha images, splashing water on family and friends, folk plays, games, music, and feasting


U.S. becomes Taiwan's largest export market

Self-ruled Taiwan is a microchip-manufacturing powerhouse, churning out the world's most advanced silicon wafers necessary to power everything from e-vehicles and satellites to fighter jets and increasingly to power AI technology. For two decades, its top export market has been China which claims Taiwan as part of its territory but December data from the Finance Ministry shows the United States topping the list for the first time since August 2003.

Silicon WAFER



Silicon wafer is a material used for producing semiconductors, which can be found in all types of electronic devices that improve the lives of people. Silicon comes second as the most common element in the universe; it is mostly used as a semiconductor in the technology and electronic sector. There are various methods used in silicon fabrication including the horizontal Bridgeman method, horizontal gradient freeze method, vertical gradient freeze, vertical Bridgeman method, and the Czochralski pulling method.

All through the growth process dopants can be included to modify the purity of the silicon wafer depending on its manufacturing purpose. Some of the silicon dopants that can be added throughout the growth process include aluminum, boron, nitrogen, indium, and gallium.

National Investigation Agency

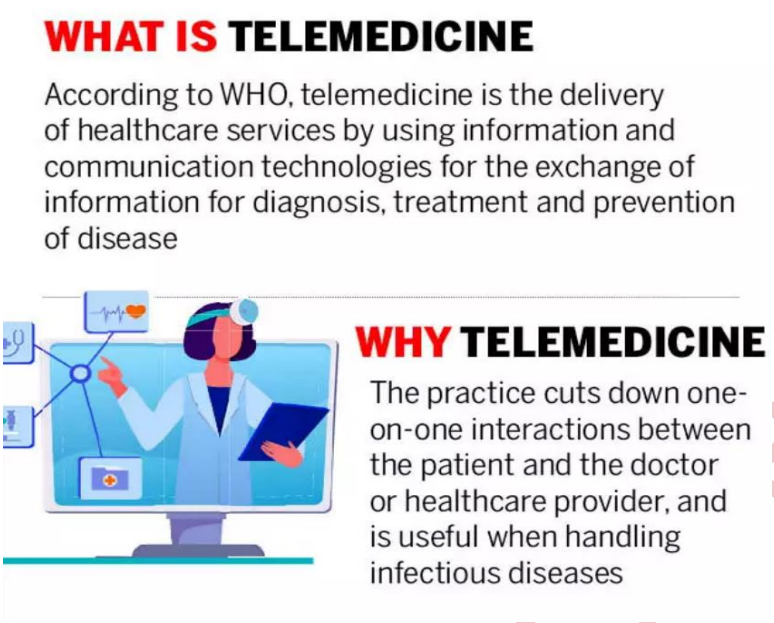
The Government after due consideration and examination of the issues involved, proposed to enact legislation to make provisions for the establishment of a National Investigation Agency in a concurrent jurisdiction framework, with provisions for taking up specific cases under specific Acts for investigation. Accordingly, the NIA Act was enacted on 31-12-08 and the National Investigation Agency (NIA) was born. At present NIA is functioning as the Central Counter Terrorism Law Enforcement Agency in India.

The National Investigation Agency aims to be a thoroughly professional investigative agency matching the best international standards. The NIA aims to set the standards of excellence in counter-terrorism and other national security-related investigations at the national level by developing into a highly trained, partnership-oriented workforce. NIA aims at creating deterrence for existing and potential terrorist groups/individuals. It aims to develop as a storehouse of all terrorist-related information.

Telemedicine

Telemedicine is a patient-friendly means of healthcare service delivery. It is relevant to India, where 70% of the population lives in villages. A hospital visit requires expensive travel to urban centres, which creates its own carbon footprint India's healthcare sector emitted 74 million tonnes of carbon dioxide in 2014. And since emissions would have increased with the

demand for health services since then, the impact on health will also have grown.



Using tele ophthalmology every rural patient saved ₹370 and each urban patient ₹8,339 on travel. When costs like food and lost wages were factored in, total savings among rural patients ballooned to ₹29,100 and ₹3.45 lakh among their urban counterparts. Tele ophthalmology may potentially provide health services to underserved and remote rural populations who otherwise may not have access to specialized eye care.

Volga, Orenburg region

Residents being evacuated from the flooded city of Orsk, in Orenburg at the southern tip of the

Ural Mountains, Russia said more than 10,000 residential buildings were flooded across the Urals, the Volga area, and western Siberia as emergency services evacuated cities threatened by rising rivers. The previous day, the country had declared a federal emergency in the Orenburg region.

IMPACT OF CLIMATE CHANGE ON

According to the United Nations Development Programme (UNDP), women and children are 14 times more likely than men to die in a disaster. The Supreme Court of India has just ruled that people have a right to be free from the adverse effects of climate change, and the right to a clean environment is already recognized as a fundamental right within the ambit of the right to life. Agriculture is the most important livelihood source for women in India, particularly in rural India. Climate-driven crop yield reductions increase food insecurity, adversely impacting poor households that already super higher nutritional deficiencies.

Within small and marginal landholding households, while men face social stigma due to unpaid loans (leading to migration, emotional distress, and sometimes even suicide), women experience higher domestic work burdens, worse health, and greater intimate partner violence. When compared to districts without droughts in the past 10 years, National Family Health Survey (NFHS) 4 and 5 data showed that women living in drought-prone districts were more underweight, experienced more intimate partner violence, and had a higher prevalence of girl marriages.

For women, the increasing food and nutritional insecurity, work burdens, and income uncertainties lead not only to poor physical health but also impact their mental health and

emotional well-being. Studies are increasingly showing a direct correlation between these natural disasters and gender-based violence against women. Also, extreme weather events and subsequent changes in water cycle patterns severely impact access to safe drinking water, which increases the drudgery and reduces the time for productive work and health care of women and girls.

Prolonged heat is particularly dangerous for pregnant women (increasing the risk of preterm birth and eclampsia), young children, and the elderly. Similarly, exposure to pollutants in the air (household and outdoor) affects women's health, causing respiratory and cardiovascular disease, and also the unborn child, impairing its physical and cognitive growth. One of the most worrying aspects of air pollution is its impact on the growing brain.

STEPS

First, we should reduce the impact of prolonged heat on priority groups (outdoor workers, pregnant women, infants and young children, and the elderly). Urban local bodies, municipal corporations, and district authorities in all vulnerable districts need to have a plan and provide training and resources to key implementers. The Mahila Housing Trust in Udaipur showed that painting the roofs of low-income houses with reflective white paint reduced indoor temperatures by 3° C to 4° C and improved quality of life.

Water shortage is probably the biggest threat to our very existence and needs concerted societal action Convergence of sectors and services and prioritization of actions can happen most effectively at the village or panchayat levels. Finally, a gender lens needs to be applied to all State-action plans on climate change. The National Action Plan on Climate Change (NAPCC) and State Action Plan on Climate Change (SAPCC) highlight the impacts on women, yet often default to portraying them as victims, missing deeper gender dynamics.

Urbanization

Urbanisation in India is shaped by three important factors. First, colonialism played a catalytic role in creating urban spaces, which continued even after Independence until the 1960s. Second and third, the Green Revolution and neoliberalisation in the 1970s and 1990s have consolidated these urban spaces into concrete enclaves. Metropolitan cities such as Chennai, Mumbai, and Kolkata, which are products of colonial urbanism, metamorphosed radically in later years.

These cities have expanded quite substantially and witnessed rapid urbanization to accommodate more people and their demands.

The wealth generated due to the Green Revolution and neoliberal policies has further accelerated urban expansion, albeit in an unequal manner. Newer forms of consumer culture have seeped effortlessly into these urban spaces, thus bringing revolutionary changes in the housing, health, and education sectors. The newer dimensions, such as the construction of a single new town, a city within the city, a real estate project, or an ensemble of various independent but related projects, all of them either adjacent to or parallel to the road or bypass, not in a systematic manner but in a sporadically or sparsely manner, can be called 'bypass urbanism', manifestly a slow but strongly emerging concept in urban studies.

Urban infrastructural developments, instead of creating assimilation or integration between different sections, have invariably created estrangements based on their social and class identities. The bypass is not just a road that connects one point to another by avoiding bottlenecks. It also, unintendedly, does socio-economic bypassing in everyday life.

Climate change and fundamental right

On recognizing the right to be free of the adverse effects of climate change as a distinct fundamental right, the Supreme Court of India has advanced the case for a healthy environment and sustainable development. The apex court had long ago recognized the right to live in a clean environment as part of the right to life under Article 21 of the Constitution. However, the Court has now reasoned that the right to be protected from climate change and the right to a wholesome environment are two sides of the same coin; and given the increasing threat from climate change year after year, the time has come to treat the former as a distinct right.

It has explained how the vagaries of climate change hurt life through factors ranging from rising temperatures, storms, and droughts to food shortages due to crop failure and shifts in vector-borne diseases. If environmental degradation and climate change lead to an acute shortage of food and water, the right to equality will also be violated, as the poorer, under-served communities will not be able to cope with the adversity.

The Court's emphasis on climate change came in a case that pitted the concern over multiple deaths of the Great Indian Bustard due to solar power transmission lines against India's international obligation to meet its emission reduction and increase its energy capacity through non-fossil fuel sources.

Approved List of Models and Manufacturers of Solar Photovoltaic Modules

Recent government orders on attempts to increase local sourcing of solar modules to support India's renewables manufacturing ecosystem have been widely reported in the media as 'import restrictions'. This follows the Ministry of New and Renewable Energy's (MNRE), March 29 order to re-implement its 2021 notification of an 'Approved List of Models and Manufacturers of Solar Photovoltaic [PV] Modules', also called the ALMM list.

This list consists of manufacturers who "are eligible for use in Government Projects/Government assisted projects/ projects under Government schemes & programs. including projects set up for sale of electricity to the Central and State Governments. The government's re-introduction of this rule has been premised on the estimation that following measures, such as the Production Linked Incentive (PLI) scheme, India's domestic sector has boosted its production capacities and bettered price competitiveness to meet local demand. This is an import substitution effort, and not an attempt to restrict imports.

The government's ambitious target of 500 GW of installed capacity from non-fossil fuels by 2030 is the main driver to scale solar power in India. India also accounts for the fastest rate of growth in demand for electricity through 2026 among major economies, according to the IEA.

GOD PARTICLE

Researchers at the Large Hadron Collider at CERN discovered the particle in 2012. Noble prize-winning physicist Peter Higgs, responsible for one the greatest scientific discoveries in the last century, died at the age of 94. In 1964, he theorized the existence of the Higgs boson, a fundamental force-carrying particle, which gives other particles their mass. His ground-breaking work helped explain how everything in the universe has mass.

What is Higgs Boson?

Particles make up everything in the universe but they did not have any mass when the universe began. They all sped around at the speed of light, according to the European Council for Nuclear Research (CERN). Everything we see planets, stars, and life -emerged after particles gained their mass from a fundamental field associated with the particle known as the Higgs boson.

Why is it called the God Particle?

The Higgs boson is popularly known as the " God Particle". The name originated from Nobel Prize-winning physicist Leon Lederman's book on the particle which he titled the "Goddamn Particle" -owing to frustration over how difficult it was to detect.

Why do humans lack a tail?

One of the most striking anatomical features of apes, which ~~sets th~~em apart from monkeys, is the absence of a tail. All mammals have a tail at some point during their development, but apes, including humans, chimpanzees, bonobos, gorillas, orangutans, and gibbons, lose them in utero, leaving behind three to five vestigial vertebrae called the coccyx, or tailbone.

Apes started to lose their tails in this way around 25 million years ago when the ape and monkey lineages split from a common ancestor in complex organisms, genes are spaced far apart. In humans, for example, only 1.5% of the genome codes for protein. At the time, scientists didn't know what the rest did and called it 'junk' DNA.

Today we know this 'junk' DNA is responsible for various functions, including controlling when to make a protein and when not to. A significant fraction of the 'junk' also contains transposable elements.

These are pieces of DNA that can shift their positions within the genome.-One such element, called Alu, is unique to primates (both apes and monkeys).

It is tiny, being made up of around 300 base pairs. Twenty-five million years ago, after the ape and monkey lineages separated, a chance insertion of an Alu element occurred in an important gene in the zygote of an ancient creature. The probability of the insertion occurring in that exact region was around one in a million.

Yet it still occurred, and it caused that ancient creature to not develop a tail.

And because the insertion had happened in the zygote, it was imprinted in the DNA of every cell of that creature, and its subsequent offspring of them. That creature was the ancestor of all modern apes. Total solar eclipse: A total solar eclipse happens when the Moon ~~passes betwee~~n the Sun and Earth, completely blocking the face of the Sun. The sky will darken as if it were dawn or dusk.

Disruptive Technology in Defence

Imagine a weapon that can take down a country's entire communication satellite system, completely cutting them off the global grid, or picture hackers manipulating an enemy's radar defenses from miles away, paving the way for a smooth, unobstructed air strike.

Unfortunately, it's not just a fragment of imagination anymore; it has become an increasingly alarming reality: Emerging and Disruptive Technologies

The term ‘Disruptive Technology' was coined in 1997 by Harvard Business School's professor Clayton M. Christensen in his book “The Innovator's Dilemma” to refer to completely new or enhanced technologies that bring about a radical, not incremental, shift, have the potential to change how the world operates, and disrupt the pre-existing notions of affairs.

ARTIFICIAL INTELLIGENCE

By enhancing the capabilities of militaries in areas of autonomous systems, decision-making, data analysis, surveillance, mitigating risks, and reducing the scope for human error, AI is rapidly transforming the defense sector.

Lethal Autonomous Weapon Systems (LAWS), aka "Killer Robots," which will employ sensor data to select and engage targets without human instructions, are currently being developed.

Unmanned vehicles have already started impacting warfighting in the past decade. Unmanned Aerial Vehicles, Unmanned Surface Vehicles, Unmanned Underwater Vehicles, and Unmanned Ground Vehicles have revolutionized surveillance and reconnaissance.

QUANTUM TECHNOLOGY

Quantum Cryptography can encode data in a way that is almost impossible to intercept, quantum communication can create secure lines of communication that will be unhackable, and quantum sensors can detect very weak signals and minuscule changes in magnetic and electric fields, making them very useful for monitoring radio conversations and detecting submarines and mines.

DIRECTED ENERGY WEAPONS

DEWs operate by using highly concentrated and coherent beams of light to neutralize their targets.

AI REGULATION

The United Nations' Resolution on Artificial Intelligence, the AI Act by the European Parliament, laws introduced on AI in the U.K. and China, and the launch of the AI mission in India. These efforts to formalize AI regulations at the global level will be critical to various sectors of governance in all other countries. A global acknowledgment of the risks associated with AI systems and the urgent need to promote responsible use was at the center of the adopted resolution.

It recognized that unethical and improper use of AI systems would impede the achievement of the 2030 Sustainable Development Goals (SDGs), weakening the ongoing efforts across all three dimensions social, environmental, and economic. Another controversial aspect mentioned in the UN resolution has been the plausible adverse impact of AI on the workforce. It would be imperative, especially for developing and least developed countries, to devise a response as the labor market in such countries is increasingly vulnerable to the use of such systems.

The EU's approach

The EU recently passed the AI Act, the foremost law establishing rules and regulations governing AI systems. With its risk-based approach, the Act categorizes systems into four categories, namely unacceptable, high, limited, and minimal risks, prescribing guidelines for each. The Act prescribes an absolute ban on applications that risk citizens' rights, including manipulation of human behavior, emotion recognition, mass surveillance, etc. While the Act allows exemptions to banned applications when it is pertinent to law enforcement, it limits the deployment by asking for prior judicial/administrative authorization in such cases.

The U.K.'s framework

The U.K., on the other hand, has adopted a principled and context-based approach in its ongoing efforts to regulate AI systems. The approach requires mandatory consultations with regulatory bodies, expanding its technical know-how and expertise in better regulating complex technologies while bridging regulatory gaps, if any.

The U.K. has thus, resorted to a decentralized and more soft law approach rather than opting to regulate AI systems through stringent legal rules. This is in striking contrast to the EU approach.

India's position

India will be home to over 10,000 deep tech start-ups by 2030. In this direction, a ₹10,300 crore allocation was approved for the India AI mission to further its AI ecosystem through enhanced public-private partnerships and promote the start-up ecosystem.

Amongst other initiatives, the allocation would be used to deploy 10,000 Graphic Processing Units, Large Multi-Models (LMMs), and other AI-based research collaboration and efficient and innovative projects. With its economy expanding, India's response must align with its commitment to the SDGs while also ensuring that economic growth is maintained.

This would require the judicious use of AI systems to offer solutions that could further the innovation while mitigating its risks.

Mass death of Penguin (h5N1)

En masse deaths of a penguin species were reported on the remote southern continent of Antarctica.H5N1 influenza cases were first reported in South America in 2022, and have spread aggressively among wildlife species.

The disease subsequently made its way to Antarctica. En masse deaths of a penguin species were reported on the remote southern continent of Antarctica.H5N1 influenza cases were first reported in South America in 2022, and have spread aggressively among wildlife species. The disease subsequently made its way to Antarctica.

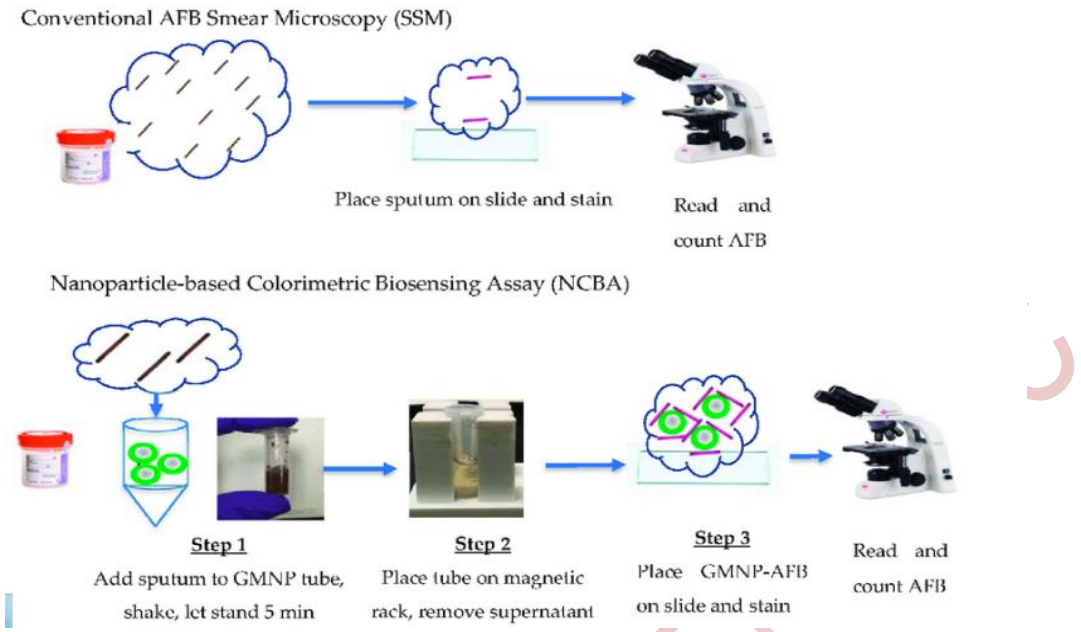
Electronic Fibre

A Flexible Electronic Fiber that utilizes the human body as part of the circuit enables textile-based electronics without the need for batteries or chips, a study report. According to the researchers, the approach is well suited for scalable manufacture of comfortable Fiber-based electronics for a wide range of applications, including “smart” clothing. The soft, thin Fiber that enables wireless visual digital interactions utilizes the human body as part of the circuit. The approach harvests electromagnetic energy.

SMEAR MICROSCOPY

Smear Microscopy: Microscopic. examination of specially stained smears to. detect acid-fast

organisms such as. Mycobacterium tuberculosis and non-tuberculous mycobacteria (NTM)



New solar power rule

To incentivize India's solar module manufacturing industry, the Ministry of New and Renewable Energy (MNRE) has brought into effect from April 1 an executive order, The Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019.

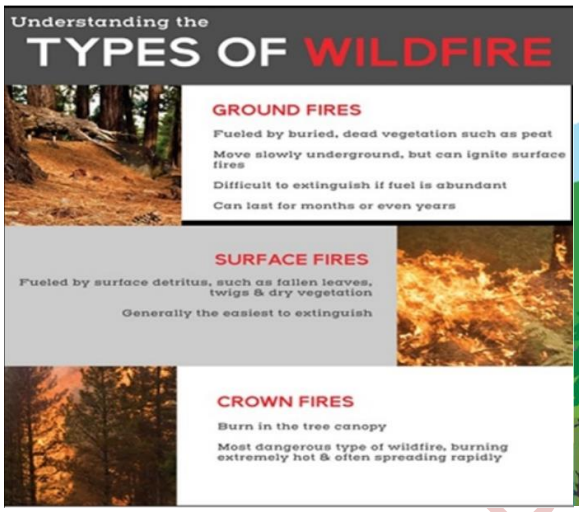
Being on the list as an 'approved' manufacturing facility certifies a company as a legitimate manufacturer of solar panels and not a mere importer or assembler. This became necessary because India's solar industry, its claim of indigenousness notwithstanding, is heavily reliant on imports of cheaper and comparable-quality solar modules from China. Modules are multiple solar panels joined together. Solar panels are an assembly of solar cells. Despite being among the top manufacturers in the world and a commitment to scale solar installation four-fold by 2030, local production of these cells and modules is much below demand. India also has limited capacity to make the raw material of cell ingots, and wafers and is dependent on imported cells.

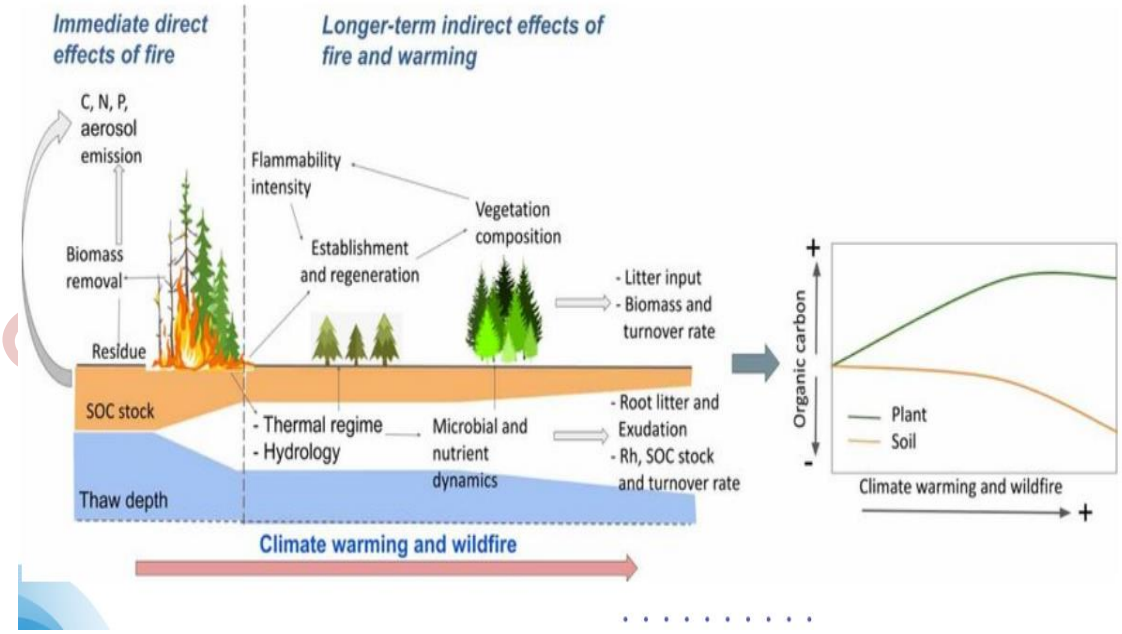
What is the context of the executive order?

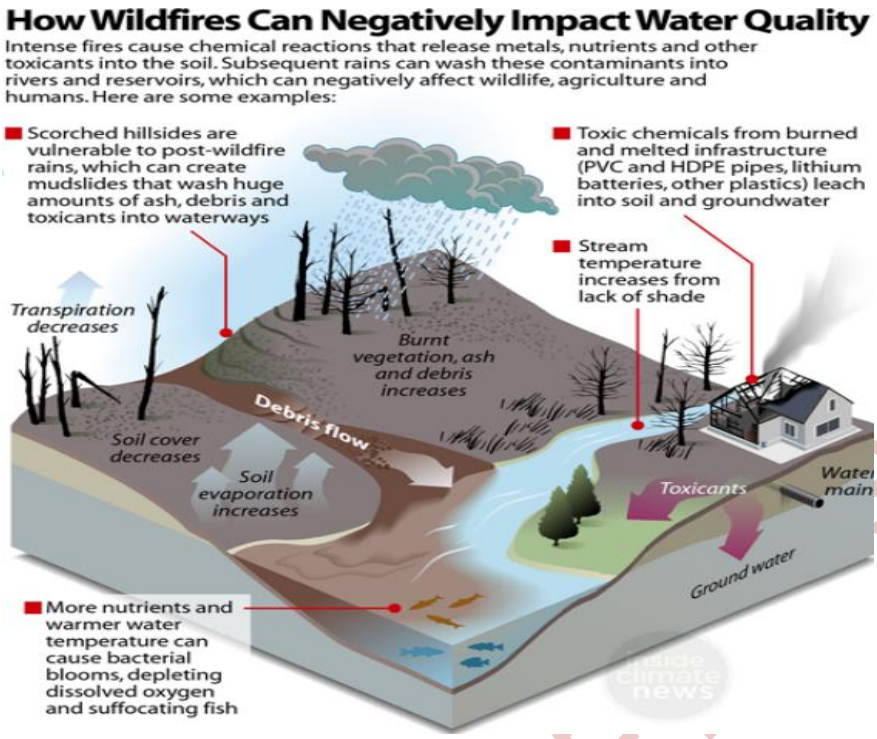
Why is India reliant on imports? The creation of such a list was also aimed at restricting imports from China, which controls nearly 80% of the global supply, with the downturn in diplomatic

relations between the countries also being a factor. India has ambitious plans of sourcing about 500 GW, nearly half its requirement of electricity, from non-fossil fuel sources by 2030. This would mean at least 280 GW of solar power by that year or at least 40 GW of solar capacity being annually added until 2030. In the last five years, this has barely crossed 13 GW though the government has claimed that COVID-19 affected this trajectory.

Forest Fire







Dam Burst in Russia

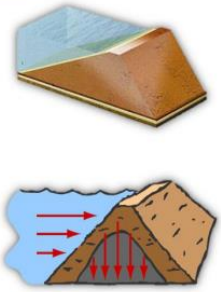
An emergency was declared across the entire Orenburg region after levels in the Ural River rose dangerously because of melting ice. The region - which includes Orsk, other Urals provinces, and parts of neighboring Kazakhstan - has been hit by widespread flooding in recent days. The region which includes Orsk, other Urals provinces, and parts of neighboring Kazakhstan - has been hit by widespread flooding in recent days.

Last year Dam Burst in pic shown

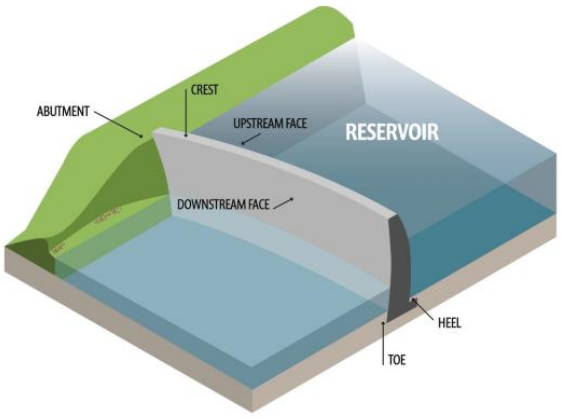
Types of DAM

EMBANKMENT DAM

- It is a non-rigid dam which resists the forces acting on it by its shear strength and upto some extent by its own weight
- Earth dams are constructed where the foundation or the underlying material are weak to support the masonry dam.
- They are trapezoidal in shape and mainly built with clay, sand and gravel, hence they are also known as Earth fill dam or Rock fill dam.

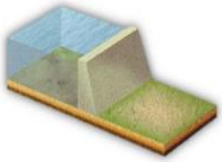


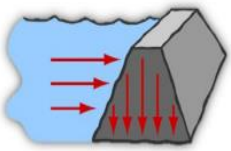
ARCH DAM



GRAVITY DAM

- It is a masonry or concrete dam which resists the forces acting on it by its own weight.
- These dams are heavy and massive wall-like structures of concrete in which the whole weight acts vertically downwards. Its c/s is approximately triangular in shape.
- As the entire load is transmitted on the small area of foundation, such dams are constructed where rocks are competent and stable.





BUTTRESS DAM

- It is a masonry or concrete dam which resists the forces acting on it by series of structural supports called buttresses.
- Buttresses transmit force from wall of dam to wider area of ground. These buttresses are in the form of triangular or multiple arch masonry or reinforced concrete walls.
- This type of structure can be considered even if the foundation rocks are little weaker.

About UNHRC

The Human Rights Council is the main intergovernmental body within the United Nations responsible for human rights. Established in 2006 by the General Assembly, it is responsible for strengthening the promotion and protection of human rights around the globe. The Council, composed of 47 Member States, provides a multilateral forum to address human rights violations and country situations. It responds to human rights emergencies and makes recommendations on how to better implement human rights on the ground. The Council benefits from substantive, technical, and secretariat support from the Office of the High Commissioner for Human Rights (OHCHR). The Human Rights Council replaced the former United Nations Commission on Human Rights.

Functions

Serves as an international forum for dialogue on human rights issues with UN officials and mandated experts, states, civil society, and other participants; Adopts resolutions or decisions during regular sessions that express the will of the international community on given human rights issues or situations. Adopting a resolution sends a strong political signal that can prompt governments to take action to remedy those situations; Holds crisis meetings known as special sessions to respond to urgent human rights situations, 36 of which have been held to date; Reviews the human rights records of all United Nations Member States via the Universal Periodic Review;

Membership and Election

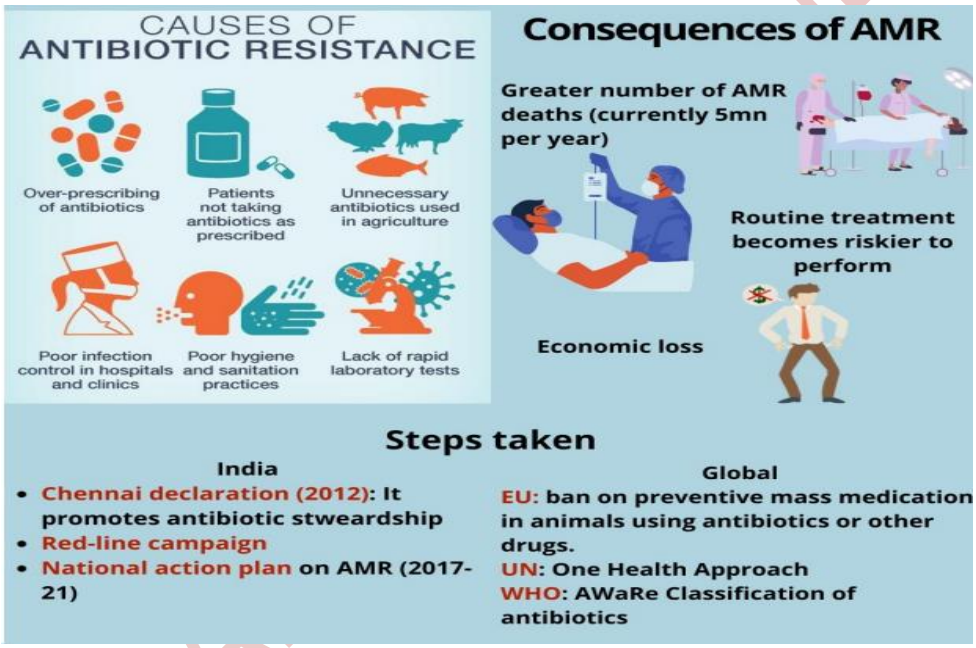
he Human Rights Council consists of 47 Member States elected directly and individually by a majority of the 193 states of the UN General Assembly. Elections take place every year. Seats are equitably distributed among the five UN regional groups, with one third of the members being renewed each year. Each member serves a three-year term. Membership is limited to two consecutive terms. As of December 2022, 123 of the 193 Member States of the United Nations have served as Council members.

Antimicrobial resistance

Resistance to antimicrobials (AMR) antibiotics, antifungals, and antiparasitics is already wreaking havoc and is the result of the massive use of these products to treat humans, animals, and food. Evidence is mounting that "changes occurring in the natural environment due to the

climate crisis are increasing the spread of infectious disease, potentially including drug-resistant infections"

Microbes that are not completely eradicated by a given substance can develop resistance to that product, gradually reducing the arsenal of drugs available to treat infections. AMR is already one of the world's leading causes of death, directly responsible for 1.27 million deaths a year, if left unchecked, AMR is expected to reduce life expectancy by an average of 1.8 years by 2035, leading to unprecedented healthcare costs and economic losses. Within a decade, AMR is estimated to cost the world $412 billion a year in additional health costs and $443 billion a year in lost labor productivity

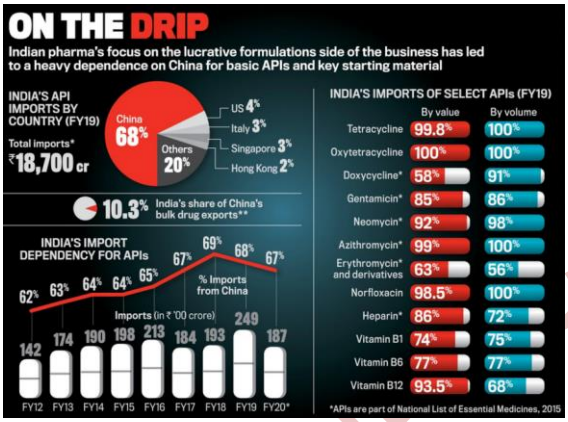


Pharmaceutical industries

India has one of the most advanced pharmaceutical industries among developing countries, being the third largest in the world in volume terms and the 13th largest in value, it is critically dependent on China for supplies of bulk drugs and drug intermediates, with China accounting for about two-thirds of the total imports. The paper further notes that the largest export destination of bulk drugs from India is the US, which has the strictest regulatory standards, followed by Brazil, Bangladesh, Turkey, China, the Netherlands, Nigeria, Vietnam, and Egypt. India is among the top five suppliers of bulk drugs to many developing countries, like,

Bangladesh, Nigeria, Vietnam, Egypt, Iran, and Pakistan. China is a larger supplier, but India is also a substantial exporter,

- **"Active pharmaceutical ingredients or Bulk drug"-** means any pharmaceutical, chemical, biological or plant product including its salts, esters, isomers, analogues and derivatives, conforming to pharmacopoeial standards specified in the Drugs and Cosmetics Act, 1940 and which is used as such or as an ingredient in any formulation.



DPCO

- **National Pharmaceutical Pricing Policy (NPPP)** is the policy ***governing price control*** and **DPCO** is the order by which ***price control is enforced.***
- The Drug Price Control Orders are issued by Ministry of Chemicals and Fertilizers, which is the main nodal administrative ministry for pharmaceutical companies.
- They are issued under the "Essential Commodities Act 1955 whereby certain medicines could be declared to be essential commodities.