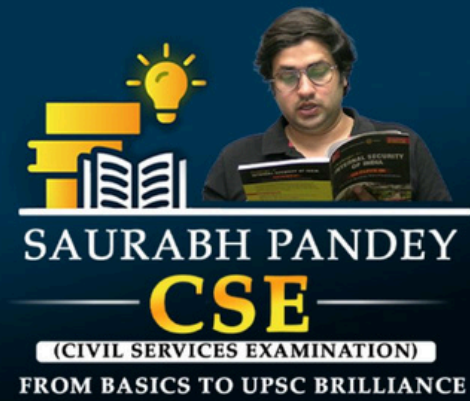
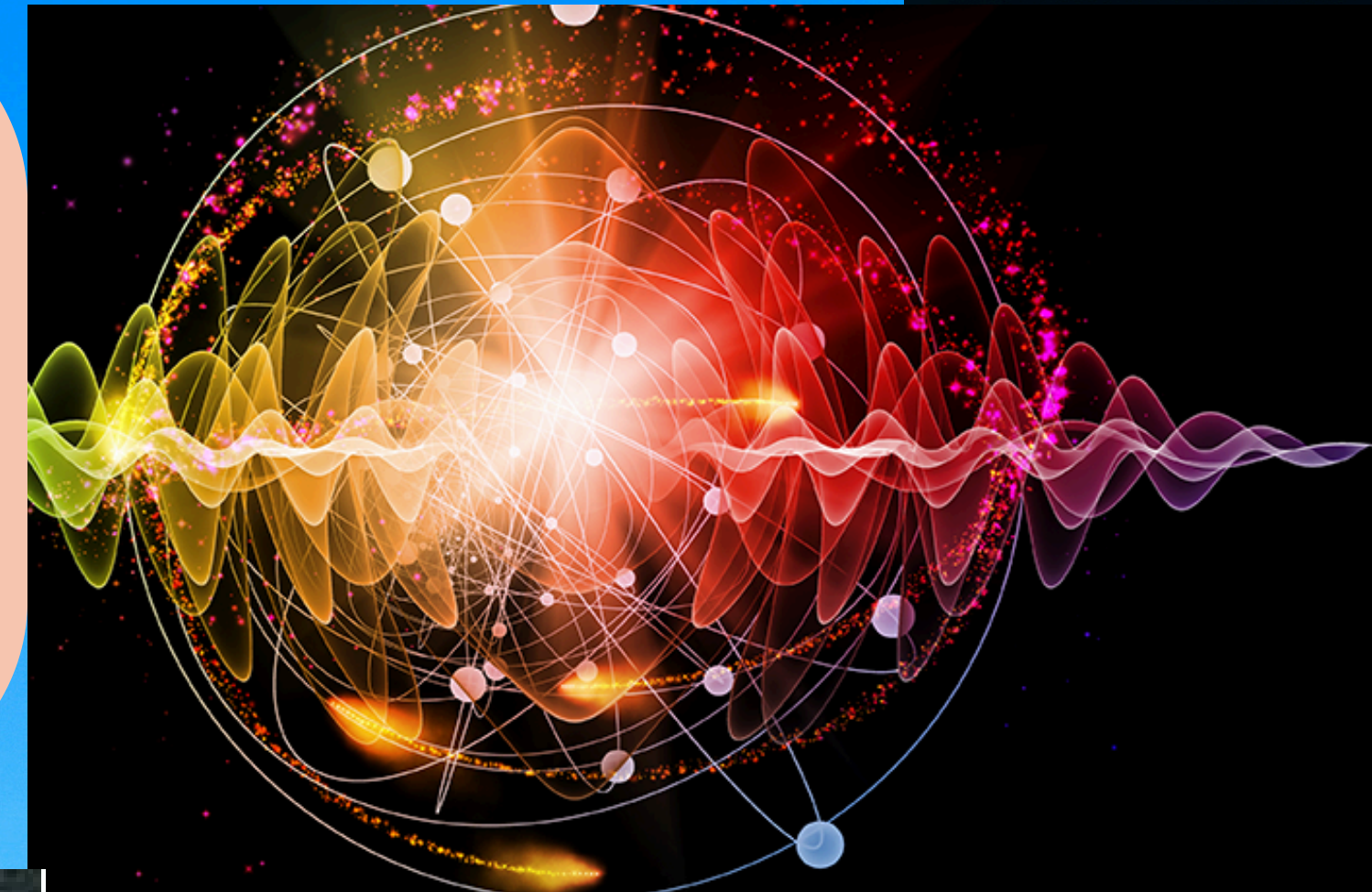


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**By Saurabh  
Pandey  
Sir**



- Meningoencephalitis
- Prosopagnosia
- Rhisotope
- Multiomics
- Ichthyophis spp





# Topics

- MOND (for MOfified Newtonian Dynamics),
- Dark Matter
- Particulate Matter
- World wealth report
- Person in news
- Gene Therapy
- Mains



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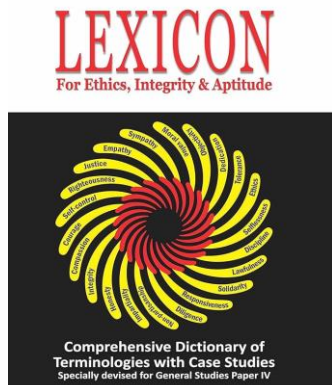
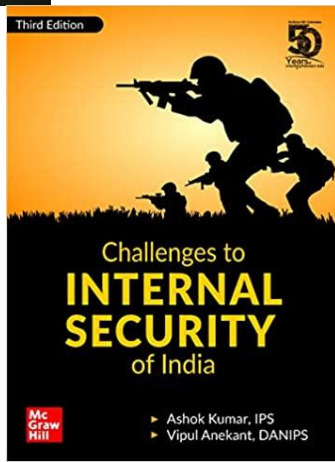
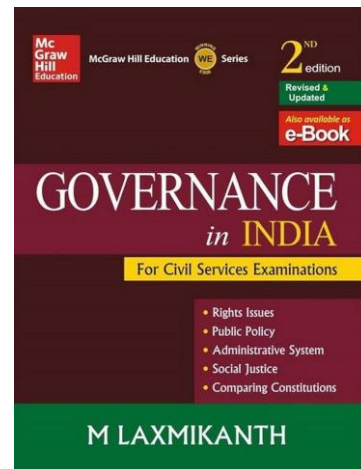
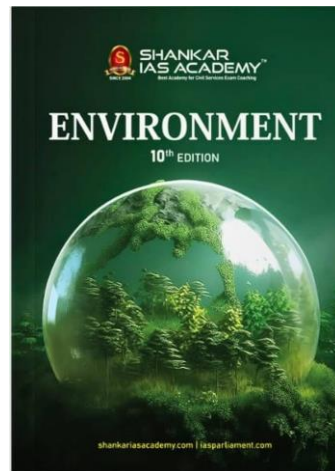
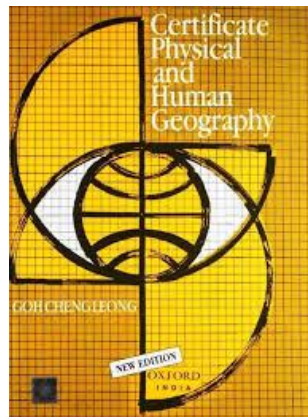
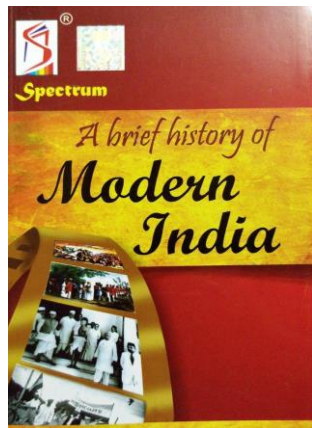
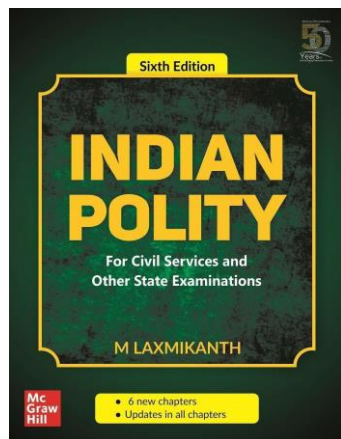
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# Dark matter's main rival theory dead?

To prevent galaxies from flying apart, additional gravity is needed. So the idea of an invisible substance called dark matter was proposed. But nobody has ever seen the stuff, leading to a rival idea, called MOND, that the galactic discrepancies are caused instead by a breakdown of Newton's laws

Indranil Banik  
Harry Desmond

One of the biggest mysteries in astrophysics today is that the forces in galaxies do not seem to add up. Galaxies rotate much faster than predicted by applying Newton's law of gravity to their visible matter, despite those laws working well everywhere in the Solar System.

To prevent galaxies from flying apart, some additional gravity is needed. This is why the idea of an invisible substance called dark matter was first proposed. But nobody has ever seen the stuff. And there are no particles in the hugely successful Standard Model of particle physics that could be the dark matter – it must be something quite exotic.

This has led to the rival idea that the galactic discrepancies are caused instead by a breakdown of Newton's laws. The most successful such idea is known as Milgromian dynamics or MOND, proposed by Israeli physicist Mordehai Milgrom in 1982. But our recent research shows this theory is in trouble.

The main postulate of MOND is that gravity starts behaving differently to what Newton expected when it becomes very weak, as at the edges of galaxies. MOND is quite successful at predicting galaxy rotation without any dark matter, and it has a few other successes. But many of these can also be explained with dark matter, preserving Newton's laws.

So how do we put MOND to a definitive test? We have been pursuing this for many years. The key is that MOND only changes the behaviour of gravity at low accelerations, not at a specific distance from an object. You'll feel lower acceleration on the outskirts of any celestial object – a planet, star or galaxy – than when you are close to it. But it is the amount of acceleration, rather than the distance, that predicts where gravity should be stronger.

This means that, although MOND effects would typically kick in several thousand light years away from a galaxy, if we look at an individual star, the effects would become highly significant at a tenth of a light year. That is only a few thousand times larger than an astronomical unit (AU) – the distance between the Earth and the Sun. But weaker MOND effects should also be detectable at even smaller scales, such as in the outer Solar System.

This brings us to the Cassini mission, which orbited Saturn between 2004 and its final fiery crash into the planet in 2017. Saturn orbits the Sun at 10 AU. Due to a quirk of MOND, the gravity from the rest of our galaxy should cause Saturn's orbit to deviate from the Newtonian expectation in a subtle way.

This can be tested by timing radio pulses between Earth and Cassini. Since Cassini was orbiting Saturn, this helped to measure the Earth-Saturn distance and allowed us to precisely track Saturn's orbit. But Cassini did not find any anomaly of the kind expected in MOND. Newton still works well for Saturn.

One of us, Harry Desmond, recently published a study investigating the results in greater depth. Perhaps MOND would fit the Cassini data if we tweaked how we calculate galaxy masses from their brightness? That would affect how much



A multi-spectral view of Messier 74, a.k.a. the Phantom Galaxy, captured by the Hubble and the James Webb Space Telescopes. Galaxy rotation has long perplexed scientists. ESA/WEBB, NASA & CSA, J. LEE

of a boost to gravity MOND has to provide to fit models of galaxy rotation, and that's what we should expect for Saturn's orbit.

Another uncertainty is the gravity from surrounding galaxies, which has a minor effect. But the study showed that, given how MOND would have to work to fit with models for galaxy rotation, it cannot also fit the Cassini radio tracking results – no matter how we tweak the calculations.

With the standard assumptions considered most likely by astronomers and allowing for a wide range of uncertainties, the chance of MOND matching the Cassini results is the same as a flipped coin landing heads up 59 times in a row. This is more than twice the "5 sigma" gold standard for a discovery in science, which corresponds to about 21 coin flips in a row.

## More bad news for MOND

That's not the only bad news for MOND. Another test is provided by wide binary stars – two stars that orbit a shared centre several thousand AU apart. MOND predicted that such stars should orbit around each other 20% faster than expected with Newton's laws. But one of us, Indranil Banik, recently led a very detailed study that rules out this prediction. The chance of MOND being



The main postulate of MOND is that gravity starts behaving differently to what Newton expected when it becomes very weak, as at the edges of galaxies

right given these results is the same as a fair coin landing heads up 190 times in a row.

Results from yet another team show that MOND also fails to explain small bodies in the distant outer Solar System. Comets coming in from out there have a much narrower distribution in energy than MOND predicts. These bodies also have orbits that are usually only slightly inclined to the plane that all the planets orbit close to. MOND would cause the inclinations to be much larger.

Newtonian gravity is strongly preferred over MOND on length scales below about a light year. But MOND also fails on scales larger than galaxies: it cannot explain the motions within galaxy clusters. Dark matter was first proposed by Fritz Zwicky in the 1930s to account for the random motions of galaxies within the Coma Cluster, which requires more gravity to

hold it together than the visible mass can provide.

MOND cannot provide enough gravity either, at least in the central regions of galaxy clusters. But in their outskirts, MOND provides too much gravity. Assuming instead Newtonian gravity, with five times as much dark matter as normal matter, seems to provide a good fit to the data.

The standard dark matter model of cosmology isn't perfect, however. There are things it struggles to explain, from the universe's expansion rate to giant cosmic structures. So we may not yet have the perfect model. It seems dark matter is here to stay, but its nature may be different to what the Standard Model suggests. Or gravity may indeed be stronger than we think – but on very large scales only.

Ultimately though, MOND, as presently formulated, cannot be considered a viable alternative to dark matter any more. We may not like it, but the dark side still holds sway.

(Indranil Banik is a postdoctoral research fellow in astrophysics, University of St. Andrews. Harry Desmond is senior research fellow of cosmology, University of Portsmouth. This article is republished from The Conversation.)





## MOND (for MOfified Newtonian Dynamics),



- In 1983, the physicist Mordehai Milgrom initiated a new research program in cosmology, called MOND (for MOfified Newtonian Dynamics), or Milgromian dynamics.
- In three papers, Milgrom proposed a set of postulates describing how Newton's laws of gravity and motion should be changed in regimes of very low acceleration.
- Milgrom's postulates were designed to explain the asymptotic flatness of galaxy rotation curves, without the necessity of postulating the existence of "dark matter".
- Milgrom showed that a number of other, novel predictions follow from his three postulates, and proposed these predictions as tests of the theory.



# What is **Dark Matter**?



**Dark matter** is a mysterious, invisible substance that makes up about 27% of the universe's mass and energy. Unlike ordinary matter, it neither emits, absorbs, nor reflects light, making it undetectable through electromagnetic observations.

Its presence is inferred from gravitational effects on visible matter and cosmic structures. The exact nature of **dark matter** remains unknown, but it is believed to consist of non-baryonic particles.

While it does not interact with electromagnetic forces, its gravitational influence plays a crucial role in shaping the large-scale structure of the cosmos. Research continues to unravel the enigma of **dark matter** and its impact on the universe.

# Goodbye, Cassini

On September 15, the only spacecraft ever to orbit Saturn will dive into the gas giant, ending its 20-year-long mission.

**SATURN**



**CASSINI**

Distance: 1.2 billion km

**EARTH**

## QUICK FACTS

**Launched:**

Oct 15, 1997

**Time in space:**

7,276 days

**Launch mass:**

5,712 kg

**Cost:**

\$3.9bn

**Distance travelled:**

7.9 billion km

**Fuel source:**

33kg of plutonium



Sources: NASA, ESA







Particulate matter, or PM, is the air pollutant most responsible for human morbidity and mortality. FILE PHOTO

## Global project 'paints' evidence of air pollution in India

Press Trust of India

Researchers and artists have joined forces for an international project to make invisible air pollution in India visible, demonstrating the health risks posed to the population.

Combining digital light painting and low-cost air pollution sensors, the scientific team produced photographic evidence of pollution levels in cities across three countries — India, Ethiopia, and the U.K. — to spark debate among local communities.

Their findings, published in *Nature Communications Earth & Environment* on Wednesday, record how photographs taken as part of the 'Air of the Anthropocene' initiative stimulated discussion around the impact of air pollution.

The illustrations covered two children's playgrounds in India, 500 km apart — one in urban Delhi, the other in rural Palampur — with PM2.5 values at the Palampur playground at least 12.5 times less than those measured in Delhi.

"Air pollution is the leading global environmental risk factor. By painting with light to create impactful images, we provide people with an easy-to-understand way of comparing air pollution in different contexts — making something that was largely invisible visible," said Francis Pope, an environmental scientist from Birmingham University and co-creator of the project with artist Robin Price.

"Air of the Anthropocene creates spaces and places for discussions about air pollution, using art as a proxy to

**Combining digital light painting and low-cost air pollution sensors, the scientific team produced photographic evidence of pollution levels in cities across three countries**

communicate and create dialogues about the issues associated with air pollution," he said.

Air pollution also varied dramatically between locations in Ethiopia — a kitchen using biomass stoves for food preparation had PM2.5 concentrations up to 20 times greater than an outdoor site nearby.

In Wales, large variations in air pollution around the Tata Steel Port Talbot steelworks were noted. Air quality monitoring and light painting at dusk in summer measured PM2.5 concentrations higher than the hourly average value.

Particulate matter, or PM, is the air pollutant most responsible for human morbidity and mortality. It has multiple impacts on physical health and is responsible for diseases, including heart disease, stroke, and cancers.

The "painting with light" team used low-cost air pollution sensors to measure PM mass concentrations. The sensors' real-time signal was used to control a moving LED array programmed to flash more rapidly as PM concentration increased.

"By providing a visual understanding of air pollution that is accessible to people who don't necessarily have a scientific background, the light painting approach can demonstrate that managing air pollution levels can have a significant impact on people's day-to-day lives," said Mr. Price.

Co-author Carlo Luliu, from the University of Birmingham, commented: "Thanks to the power of images, we can provoke people's emotions — fostering awareness and prompting people to share their perspectives and take action to

# Particulate Matter



**PM stands for particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.**

- **PM10 : inhalable particles, with diameters that are generally 10 micrometers and smaller; and**
- **PM2.5 : fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.**



## **Sources of PM**

**These particles come in many sizes and shapes and can be made up of hundreds of different chemicals.**

**Some are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks or fires.**

**Most particles form in the atmosphere as a result of complex reactions of chemicals such as sulfur dioxide and nitrogen oxides, which are pollutants emitted from power plants, industries and automobiles.**

## **What are the Harmful Effects of PM?**

- **Particulate matter contains microscopic solids or liquid droplets that are so small that they can be inhaled and cause serious health problems.**
- **Some particles less than 10 micrometers in diameter can get deep into your lungs and some may even get into your bloodstream.**
- **Of these, particles less than 2.5 micrometers in diameter, also known as fine particles or PM<sub>2.5</sub>, pose the greatest risk to health.**
- **Fine particles are also the main cause of reduced visibility (haze) in parts of the United States, including many of our treasured national parks and wilderness areas**

# World's richest have never been so wealthy, says Capgemini in study



**Agence France-Presse**  
PARIS

The world has never had so many rich people and their investments in soaring stock markets have made them wealthier than ever recorded, according to a study published on Wednesday.

The number of “high net worth individuals” (HNWI) – defined as people with liquid assets of at least \$1 million – rose by 5.1% last year to 22.8 million, according to consulting firm Capgemini.

Their total wealth reached \$86.8 trillion in 2023, a 4.7% increase from the previous year, according to the annual World Wealth Report.



**For equality:** Rising global wealth and inequality fuelled debates on making rich pay their fair share of taxes. GETTY IMAGES VIA AFP

The number of HNWIs and their total wealth are the highest since Capgemini began the annual study in 1997.

Their fortunes have risen as stock markets have surged: New York's tech-

heavy Nasdaq surged 43% in 2023 while S&P 500 gained 24%. The Paris CAC 40 grew 16% while the Frankfurt DAX advanced by 20 percent.

The number of HNWI and their wealth had each

fallen by more than 3% in 2022, a year of macroeconomic uncertainty and geopolitical tensions, the report said. The decline in the wealth was the steepest in a decade as equities fell. “However, 2023 brought economic growth and improved fortunes for major investment sectors to reverse the falloff,” the report said.

“Despite ongoing interest rate uncertainty and rising bond yields, equities surged along with the tech market, fueled by enthusiasm for generative AI and its potential impact on the economy.” Rising wealth and inequality in the world have fuelled debates on making the rich pay their fair share of taxes.



# **World wealth report (Capgemini)**

**The number of “high net worth individuals” (HNWI) — defined as people with liquid assets of at least \$1 million — rose by 5.1% last year to 22.8 million, according to consulting firm Capgemini.**

**Their total wealth reached \$86.8 trillion in 2023, a 4.7% increase from the previous year, according to the annual World Wealth Report.**

**The number of HNWIs and their total wealth are the highest since Capgemini began the annual study in 1997.**

**MOSCOW**

## Russian cosmonaut becomes the first to spend 1,000 days in space



AP

▲ A 59-year-old Russian cosmonaut has become the first person to spend 1,000 days in space, Russian space agency Roscosmos said on Wednesday. Oleg Kononenko achieved the milestone on Tuesday, having made five journeys to the International Space Station dating back to 2008. AP

- **Russian cosmonaut has become the first person to spend 1,000 days in space, Russian space agency Roscosmos**
- **Oleg Kononenko achieved the milestone on Tuesday, having made five journeys to the International Space Station dating back to 2008.**



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The treatment involves injecting a modified virus into the ear that smuggles in a working version of OTOF gene. AFP

## Gene therapy offers hope for children with hearing disability

**Agence France-Presse**  
WASHINGTON

Zhu Yangyang babbles away like a typical happy three-year-old, calling out for “mama” and “papa” and accurately naming colours – a remarkable achievement considering he was completely without hearing just months ago.

He is one of five children whose hearing was restored through a revolutionary new gene therapy in a clinical trial led by Chinese and American researchers, offering hope for those born with a rare genetic mutation of the OTOF gene. This means they are unable to produce the protein otoferlin, which is needed for hair cells in the inner ear vital for hearing.

The treatment involves injecting a modified virus into the inner ear that smuggles in a working version of the OTOF gene.

Yangyang’s mother Chang Yiyi says she was moved to tears when she realised, around three weeks after the treatment last September, that he could hear her.

The results of the study was published in *Nature Medicine* on Wednesday. “This is absolutely a turning point,” Zheng-Yi Chen, the study’s senior author at the Eaton-Peabody Laboratories at Mass Eye and Ear, said, adding that companies were now conducting clinical trials with the goal of moving towards regulatory approval.

“If the results hold, without any complications, I think in three to five years, it may be a medically approved product,” he added.

# Gene Therapy



**Gene therapy is a technique that modifies a person's genes to treat or cure disease. Gene therapies can work by several mechanisms:**

- **Replacing a disease-causing gene with a healthy copy of the gene**
- **Inactivating a disease-causing gene that is not functioning properly**
- **Introducing a new or modified gene into the body to help treat a disease**

**Gene therapy products are being studied to treat diseases including cancer, genetic diseases, and infectious diseases.**

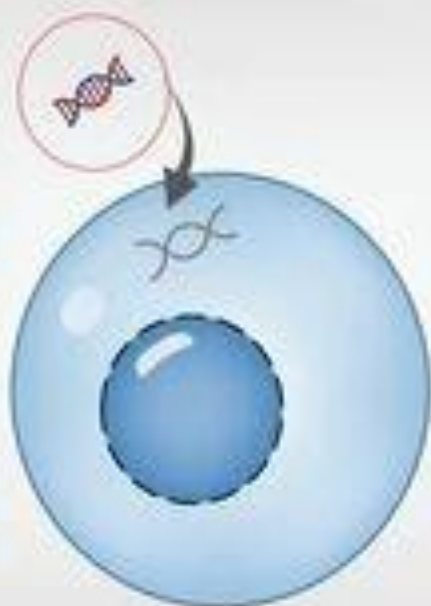


# Gene Therapy



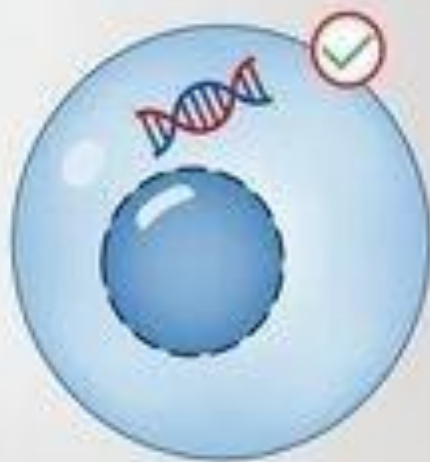
1

Cell with  
non-functioning Gene



2

Adding DNA containing a  
functional version of the  
lost gene



3

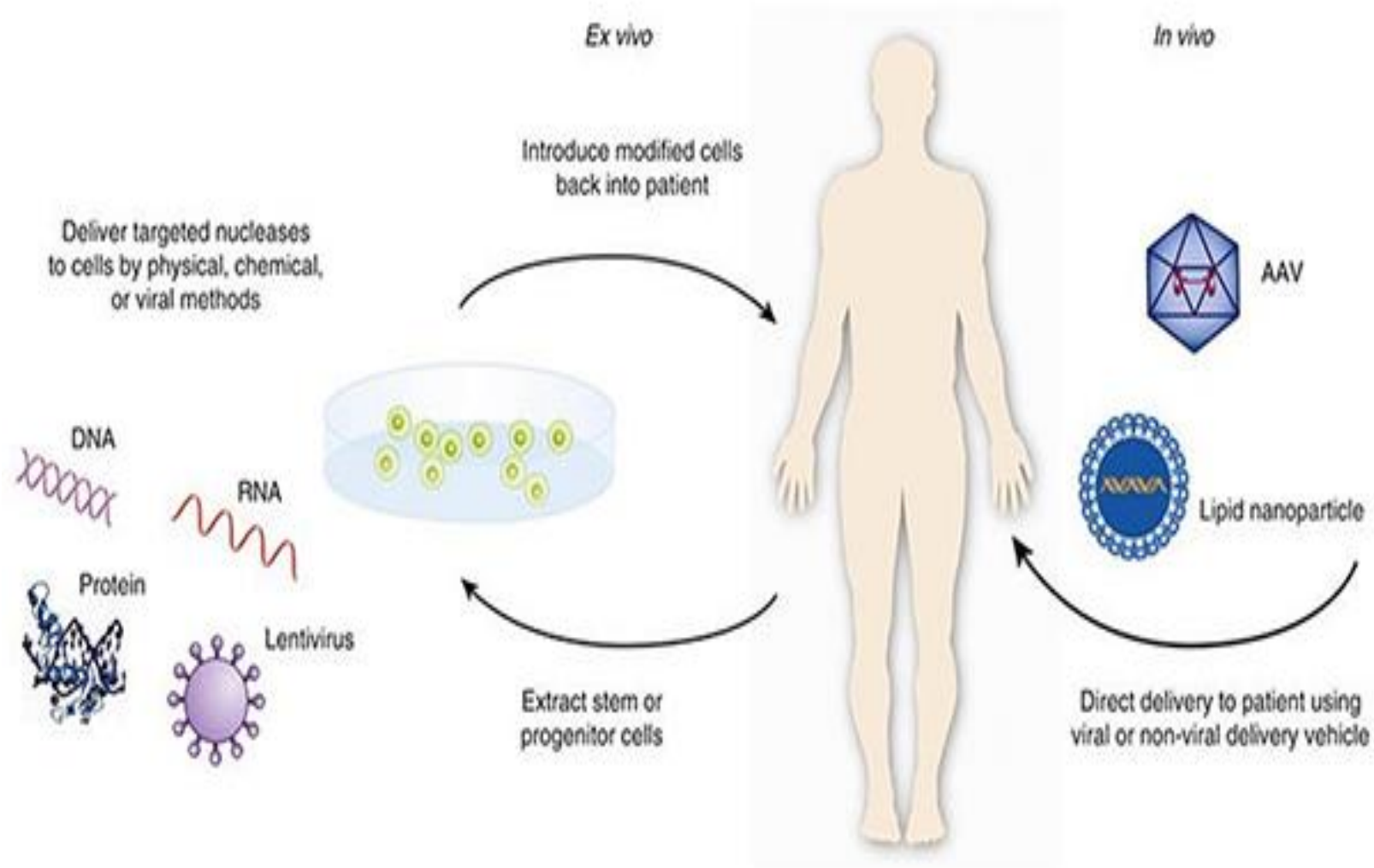
Cell functioning  
Normally

**There are a variety of types of gene therapy products, including:**

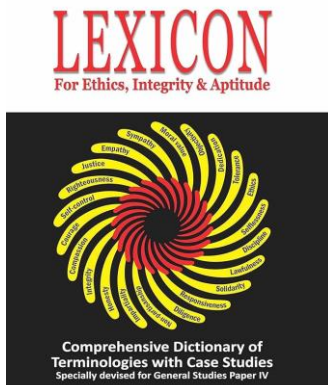
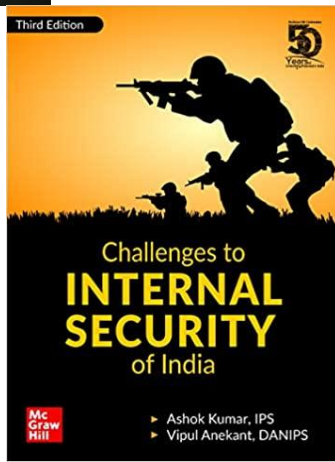
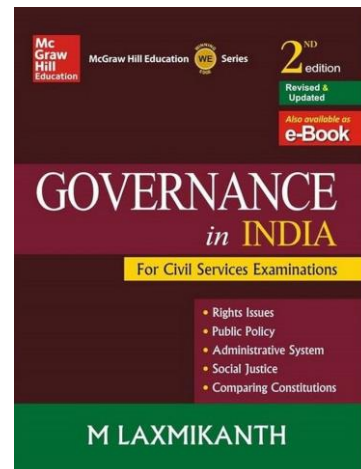
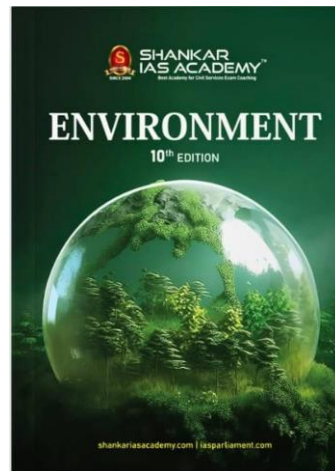
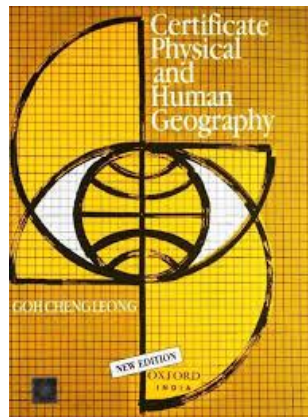
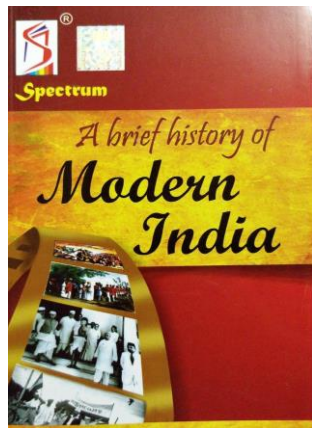
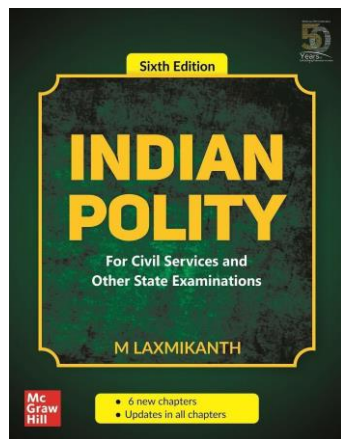
- **Plasmid DNA:** Circular DNA molecules can be genetically engineered to carry therapeutic genes into human cells.
- **Viral vectors:** Viruses have a natural ability to deliver genetic material into cells, and therefore some gene therapy products are derived from viruses. Once viruses have been modified to remove their ability to cause infectious disease, these modified viruses can be used as vectors (vehicles) to carry therapeutic genes into human cells.

- **Bacterial vectors:** Bacteria can be modified to prevent them from causing infectious disease and then used as vectors (vehicles) to carry therapeutic genes into human tissues.
- **Human gene editing technology:** The goals of gene editing are to disrupt harmful genes or to repair mutated genes.
- **Patient-derived cellular gene therapy products:** Cells are removed from the patient, genetically modified (often using a viral vector) and then returned to the patient.





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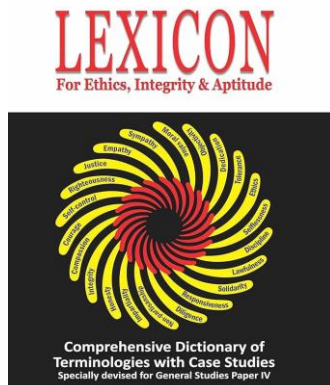
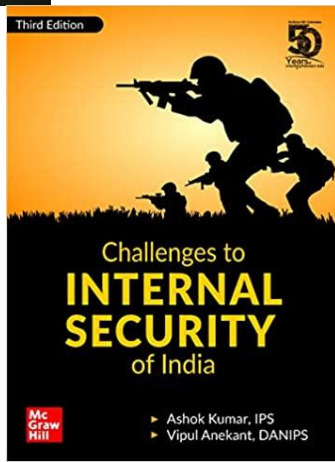
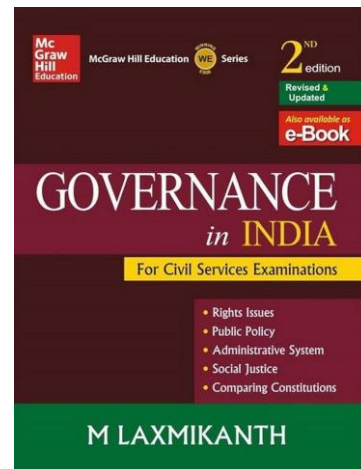
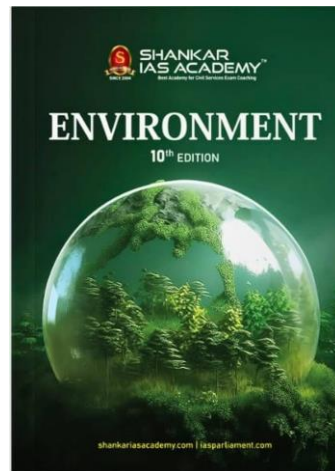
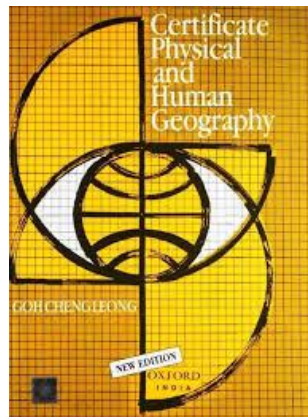
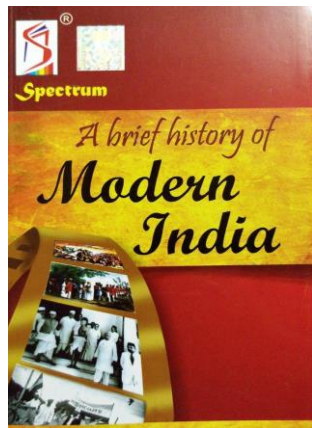
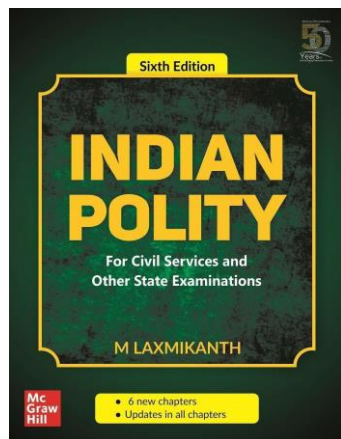


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# Short on troops, Australia opens military to non-citizen residents from Five Eyes

**Agence France-Presse**

SYDNEY

Australia will allow non-citizens to join its armed forces, the government said on Tuesday, as the sparsely populated nation struggles to meet recruitment targets.

Defence Minister Richard Marles said that from July, looser eligibility criteria would allow “permanent residents who have been living in Australia for 12 months” to serve.

Citizens from Britain, Canada, New Zealand and



**Thinly stretched:** The Australian Defence Forces can today count on about 90,000 personnel, including reservists. AP

the United States are being favoured, he added.

Australia has a coastline that would stretch one-and-a-bit times around the

Earth, but a population of just 26 million.

Canberra has surged defence spending in recent years, buying fleets of sub-

marines, jets and scores of fighting vehicles to meet mounting regional tensions. But it has struggled to find enough pilots, mariners and troops to operate and maintain them.

Experts warn too few Australians don a uniform to meet even current requirements, much less a beefier military of tomorrow.

The Australian Defence Forces can today count on about 90,000 personnel, including reservists, according to the Australian Strategic Policy Institute.

# **‘Five Eyes’**

- **The ‘Five Eyes’ is a multilateral intelligence-sharing network shared by over 20 different agencies of five English-speaking countries — Australia, Canada, New Zealand, the United Kingdom and the United States.**
- **It is both surveillance-based and signals intelligence (SIGINT). Intelligence documents shared between the member countries are classified ‘Secret—AUS/CAN/NZ/UK/US Eyes Only,’ which gave the group its title ‘Five Eyes.’**

## How did the alliance come into being?

- The alliance between the U.S. and the U.K. evolved around the Second World War to counter the Cold War Soviet threat.
- The two countries, which had successfully deciphered German and Japanese codes during the World War, forged a collaboration to share intelligence related to signals such as radio, satellite and internet communications.
- In the aftermath of the war in 1946, the alliance was formalised through an agreement for cooperation in signals intelligence.

- **The treaty called the British-U.S. Communication Intelligence Agreement, or BRUSA (now known as the UKUSA Agreement), was signed between the State-Army-Navy Communication Intelligence Board (STANCIB) of the U.S. and the London Signal Intelligence Board (SIGINT) of Britain.**
- **Its scope was limited to “communication intelligence matters only” related to “unrestricted” exchange of intelligence products in six areas: collection of traffic; acquisition of communication documents and equipment; traffic analysis; cryptanalysis; decryption and translation; and acquisition of information regarding communication organisations, practices, procedures, and equipment.**



- The arrangement was later extended to ‘second party’ countries —Canada joined in 1948, while Australia and New Zealand became part of the alliance in 1956.

## How does the ‘Five Eyes’ network work?

- The five partner countries share a broad range of information and access to their respective intelligence agencies. Initially, the partners are assigned respective SIGINT mandates.

•



**A Canadian intelligence officer writes in a military journal (2020) that the US is responsible for Russia, northern China, most of Asia and Latin America; Australia covers southern China, Indo-China and its close neighbours, such as Indonesia; the UK is in charge in Africa and west of the Urals within the former Soviet Union; and New Zealand is responsible for the Western Pacific, while Canada handles the polar regions of Russia**

# The bacteria that write new genes to cope with infections

Columbia University researchers suggest that when *Klebsiella pneumoniae* bacteria are infected by bacteriophages, they take the help of reverse transcriptase to create a specific protein they called *Neo*. This protein could place the bacterial cell in suspended animation, thus stopping the infection in its tracks

Sridhar Sivasubbu  
Vinod Scaria

**A**mid the unprecedented challenges presented by the COVID-19 pandemic, a once obscure enzyme found itself in the spotlight: reverse transcriptase. As laboratories worldwide rushed to develop reliable diagnostic tests, techniques using the enzyme became the gold standard to detect the SARS-2 virus, and a cornerstone of molecular diagnostics. This remarkable enzyme not only facilitated rapid and accurate testing; along with another powerful approach – genome-sequencing – it also helped track the virus's spread, paving the way for surveillance, better public healthcare, and vaccine development.

The discovery of reverse transcriptase is a story unto itself. Researchers in the labs of Howard Temin and David Baltimore independently discovered it and published their findings in back-to-back articles in the journal *Nature* in 1970. In his paper, Dr. Baltimore suggested that in the vesicular stomatitis virus, a protein called RNA polymerase was involved in reverse-translating RNA to DNA.

## A molecular biology revolution

The discovery was transformative. The prevailing belief at the time was that in all living beings, hereditary information flowed only from DNA to RNA and from RNA to protein (a.k.a. the 'Central Dogma'). The discoveries of Drs. Temin and Baltimore et al. showed information could flow the other way, too, with RNA giving 'rise' to DNA. The name 'reverse transcriptase' was, however, coined by the editor of *Nature*, in an article discussing the significant advance in an accompanying column.

The discovery's impact was also immediate. The ability of cells to create DNA copies from RNA revolutionised research methods in molecular biology, where researchers could reverse-transcribe messenger RNAs to pieces of DNA, clone that DNA into bacterial vectors, and study the function of the corresponding genes. In diagnostics, clinicians used reverse transcriptase to convert RNA to DNA and thus estimate the amount of viral material in a given sample. This technique quickly found wide application and use in the study of RNA viruses, including hepatitis B and the human immunodeficiency virus (HIV).

Indeed, the discovery of reverse transcriptase had a significant effect on the management and treatment of HIV



A growth of *Klebsiella pneumoniae* bacteria developed from a positive blood culture. CHABA MARRACCINI

infections, including Acquired Immunodeficiency Syndrome (AIDS), in the 1980s. A generation of antiviral agents that specifically targeted the reverse transcriptase enzyme helped convert an otherwise deadly disease to one that could be managed, translating to improving the long-term outcomes and survival of people living with AIDS. Subsequent studies of the reverse transcriptase enzyme since the 1970s led to mechanistic insights into how viruses use this enzyme to replicate, as well.

## Retroelements in the human genome

Reverse transcriptases also had a significant role in shaping the human genome. The human genome is interspersed in many places with sequences, called elements, that appear to have originated from retroviruses. Thus, researchers call them retroelements. Evolutionary biologists believe these retroelements to have been transferred horizontally during the course of millions of years of evolution. (Horizontal gene transfer refers to genes 'jumping' between organisms rather than from parent to offspring.) And until recently, researchers also considered them to be 'junk' elements; they were repeated through the genome and they seemingly did not confer any function to the human organism.

However, recent evidence has suggested that these retroelements could really have had a profound impact on human biology and evolution, and that they play important roles in a variety of physiological processes. In a recent paper in the journal *Nature Communications*, researchers extensively studied the expression of genes in different parts of the human brain from post-mortem brain



Techniques using the reverse transcriptase enzyme became the gold standard to detect SARS-2 virus, and a cornerstone of molecular diagnostics

samples. They reported that the expression of more than a thousand human endogenous retroviruses – a major class of retroelements in the human genome – could be associated with a risk of neuropsychiatric diseases in humans.

Retroelements in the human genome and bacterial reverse transcriptases have a common evolutionary history as well as share functional mechanisms. Bacterial reverse transcriptases – believed to be the precursors of their eukaryotic counterparts – exhibit analogous mechanisms. The discovery of reverse transcriptase activity across the different domains of life underscores the enzyme's fundamental role in both prokaryotic and eukaryotic systems as well as a remarkable evolutionary continuity and functional versatility.

## How do *Klebsiella* create genes?

Researchers widely believe that bacterial reverse transcriptases were the precursors of their eukaryotic counterparts. They discovered the first reverse transcriptase in bacteria in 1989, with papers published back to back in the journals *Science* and *Cell*. In bacteria, as in the case of humans, retroelements are categorised as belonging to three broad

groups: the Group II introns, the retrons, and the diversity generating retroelements.

In a preprint paper uploaded to the bioRxiv preprint server on May 8, researchers at Columbia University in New York, led by Stephen Tang and Samuel Sternberg, suggested that when the bacteria *Klebsiella pneumoniae* is infected by bacteriophages – viruses that infect bacteria – they use a non-coding RNA with specific motifs (or structures) that could bind to reverse transcriptase and instruct cells to create DNA. This DNA copy has multiple copies of a gene that can create a specific protein.

The researchers dubbed this protein 'Neo' for "never-ending open-reading frame". It could place the bacterial cell in a state of suspended animation, blocking its replication, and thus stalling the replication of the invading bacteriophage as well. Thus, the infection is stopped in its tracks.

Recent discoveries – including the role of reverse transcriptase in bacterial defence against bacteriophages – hint at the potential of innovative applications in biotechnology and medicine, especially in the context of emerging antimicrobial resistance, the ability of disease-causing microbes to resist the effects of substances designed to incapacitate or kill them. Further exploring reverse transcriptases could also reveal novel mechanisms of genetic evolution and viral resistance, potentially leading to new therapeutic strategies and biotechnological tools.

(The authors are senior consultants at Vishwanath Cancer Care Foundation and adjunct professors at IIT Kanpur and Dr. D.Y. Patil Medical College, Hospital & Research Centre, Pune.)

## THE GIST

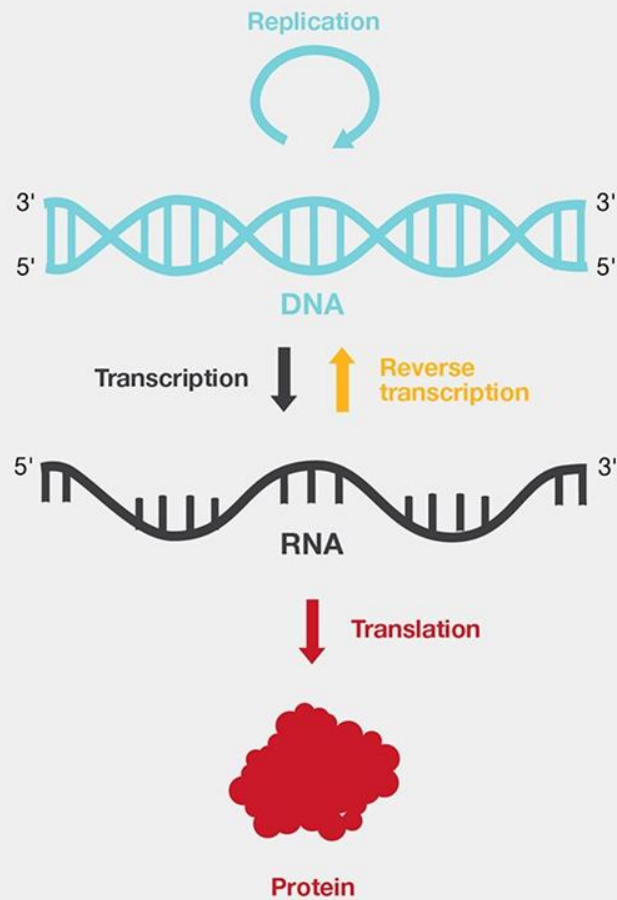
The ability of cells to create DNA copies from RNA revolutionised research in molecular biology. Researchers could reverse-transcribe messenger RNAs to pieces of DNA, clone that DNA into bacterial vectors, and study the function of the corresponding genes

Reverse transcriptase had a significant effect on management of HIV infections in the 1980s. A generation of antiviral agents targeting the reverse transcriptase enzyme helped convert an otherwise deadly disease to one that could be managed

Reverse transcriptase has the potential to reveal novel mechanisms of genetic evolution and viral resistance, leading to new therapeutic strategies and biotechnological tools

# Reverse transcriptase

- The ability of cells to create DNA copies from RNA revolutionised research in molecular biology.
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- **A generation of antiviral agents targeting the reverse transcriptase enzyme helped convert an otherwise deadly disease to one that could be managed**
- **Reverse transcriptase has the potential to reveal novel mechanisms of genetic evolution and viral resistance, leading to new therapeutic strategies and biotechnological tools**

# The Sun never stops shining



**Q: How can the sky glow even after sunset?**

- Jaivanthika Karthikeyan

The sun may have set from

our perspective — but hasn't yet from the perspective of the upper atmosphere.

The Sun still shines at the atmosphere, but at a sharp angle beneath the horizon. In this hour, we see the sky glow because molecules in the air scatter these sunlight in different directions, including ours. This is also why the evening sky appears red at the horizon.

Both this effect and the sky being blue-hued in daytime is the result of Rayleigh scattering — the scattering of sunlight by particles in the air that are much smaller than the light's wavelength.

As the Sun continues to set, a smaller amount of sunlight strikes the upper atmosphere. Nightfall truly kicks in only when the Sun is at least around 18 degrees beneath the horizon. The arrival of daylight happens in a similar process, in reverse. When the Sun is at least 18 degrees below the horizon in the east, the sky starts to turn reddish again near the horizon.



A city skyline against the twilight glow. DANIEL MOTA/UNSPLASH

When the star's position crosses the horizon (as seen by the observer), daylight breaks out and the day begins.

The sky can appear to glow even after the Sun has dipped 18 degrees below the horizon, due to other sources of light. These include the scattering of starlight by the atmosphere and — increasingly — light pollution.

- Karthik Vinod, intern with The Hindu



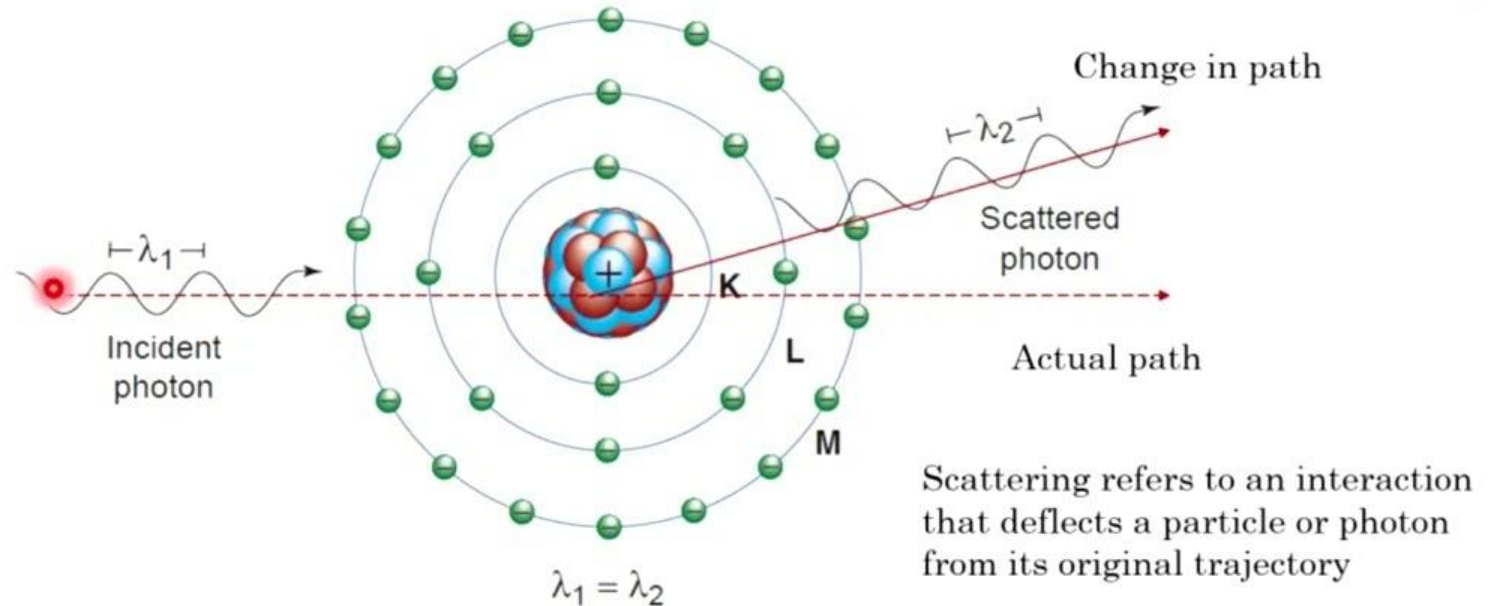
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# Rayleigh scattering

**the sky being blue-hued in daytime is the result of Rayleigh scattering — the scattering of sunlight by particles in the air that are much smaller than the light's wavelength.**

# Rayleigh Scattering



■ **FIGURE 3-6** Rayleigh scattering. The diagram shows that the incident photon  $\lambda_1$  interacts with an atom and the scattered photon  $\lambda_2$  is being emitted with the same wavelength and energy. Rayleigh scattered photons are typically emitted in the forward direction fairly close to the trajectory of the incident photon. K, L, and M are electron shells.



# > RAYLEIGH SCATTERING

**WEATHER  
AUTHORITY**



The sun emits 'white' light composed of all the colors of the rainbow

At about 18 miles up, light begins to encounter air molecules

All other colors continue down to the surface relatively unimpeded

Air molecules are just the right size to help scatter blue and violet light wavelengths.

The blue light, however, is scattered from molecule to molecule until it's reflected at you from all parts of the sky



## BIG SHOT



This photo released on Tuesday by the China National Space Administration (CNSA) shows the ascender and lander captured by China's Chang'e-6 lunar probe after it landed on the moon. A module of the Chinese lunar probe successfully took off from the far side of the Moon on Tuesday carrying samples back to Earth, state media reported. AFP

# Chang'e -6



- The Chang'e-6 probe was launched last month and its lander touched down on the far side of the Moon on Sunday. It used a drill and robotic arm to dig up soil on and below the Moon's surface,
- After successfully gathering its samples, the Chang'e-6 unfurled China's national flag for the first time on the far side of the Moon.
- probe's landing site was the South Pole-Aitken Basin, an impact crater created more than 4 billion years ago, which is 13km (8 miles) deep and has a diameter of 2,500km (1,500 miles).

- **China's Moon programme is part of a growing rivalry with the United States – still the leader in space exploration – and others, including Japan and India.**
- **China has put its own space station – the Tiangong – into orbit and regularly sends crews there.**
- **The emerging global power aims to put a person on the Moon before 2030, which would make it the second nation after the US to do so.**



## Far side of the moon ??

- The far or "dark" side of the moon - which faces away from Earth - is technically challenging to reach due to its distance, and its difficult terrain of giant, deep craters and few flat surfaces.
- Space officials have had to use a satellite to direct and maintain communications with the Chang'e-6 craft.

# China makes first landing on the far side of the moon



*Near side,  
always faces Earth*



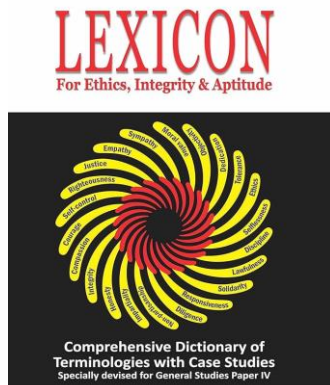
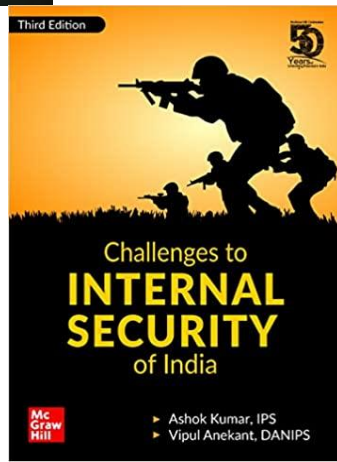
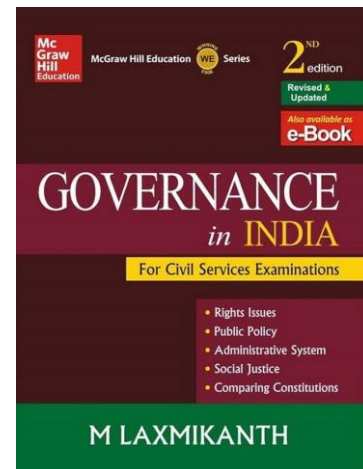
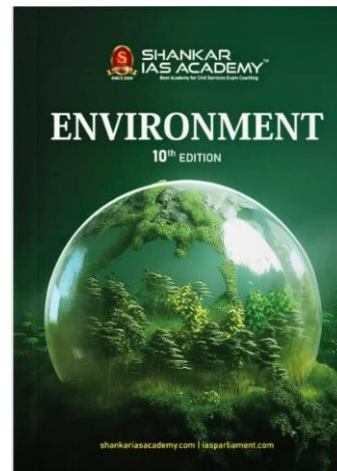
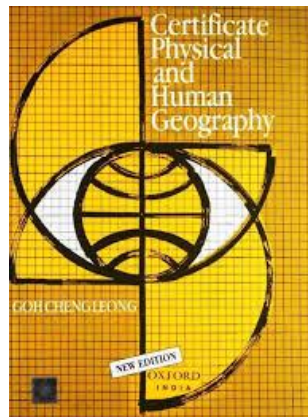
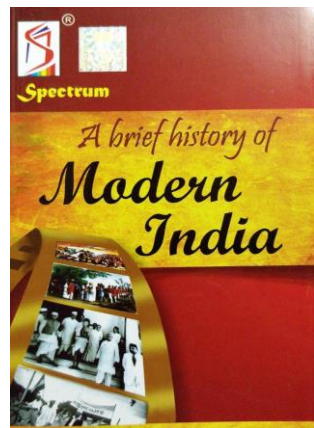
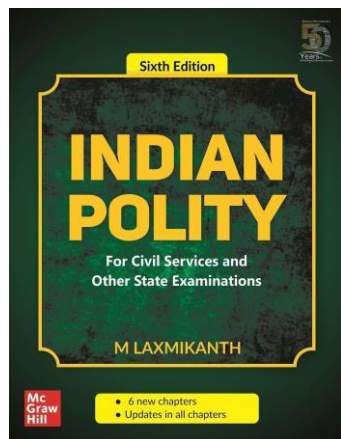
*Far side,  
always away from Earth*



***Landing in the  
South Pole-Aitken Basin***

SOURCE NASA  
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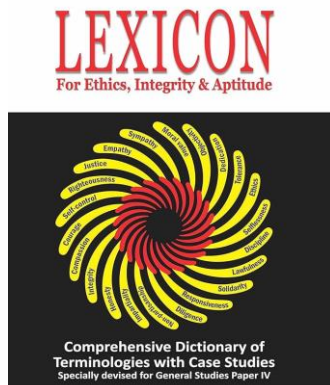
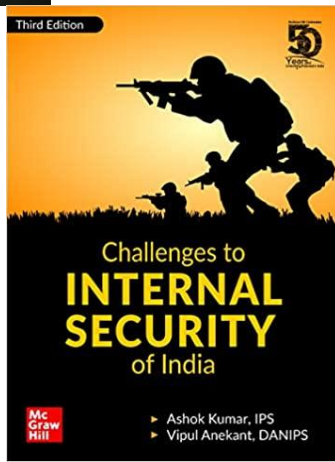
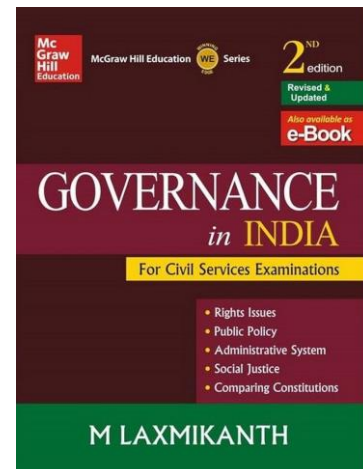
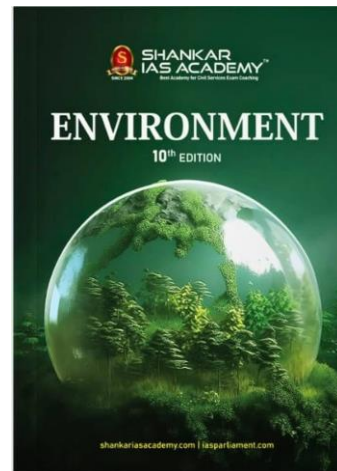
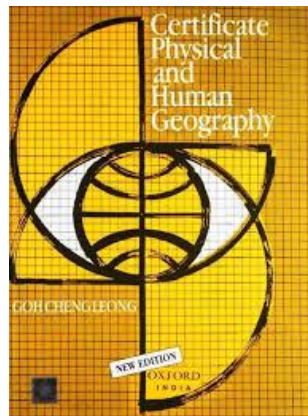
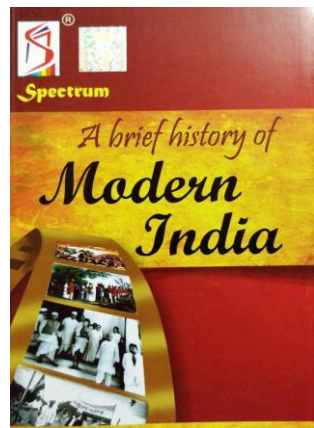
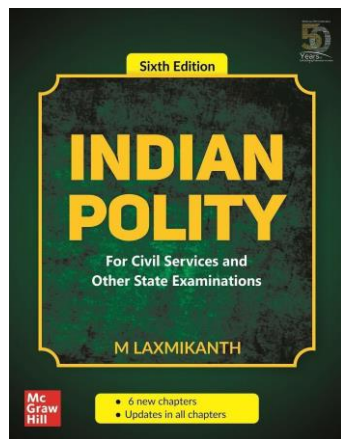
- (PraVaHa)
- Hydroxyurea
- Green beard genes
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- The Preston curve
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ISRO's Launch Vehicle Mark-III M4 carrying 'Chandrayaan-3' lifts off on July 14, 2023. ISRO says initial aerodynamic design studies for launch vehicles demand evaluation of many configurations.

## ISRO develops new PraVaHa software for aerodynamic design

**The Hindu Bureau**

BENGALURU

The Indian Space Research Organisation (ISRO) has developed Computational Fluid Dynamics (CFD) software named Parallel RANS Solver for Aerospace Vehicle Aero-thermo-dynamic Analysis (PraVaHa).

This software was developed in ISRO's Vikram Sarabhai Space Centre (VSSC). It can simulate external and internal flows on launch vehicles, winged and non winged re-entry vehicles. According to ISRO, initial aerodynamic design studies for launch vehicles demand evaluation of a large number of configurations.

Any aerospace vehicle while moving through the Earth's atmosphere during launch or re-entry is subjected to severe aerodynamic and aerothermal loads in terms of external pressure and heat flux.

Understanding the airflow around aircraft, rocket bodies, or Crew Module (CM) during earth re-entry is essential to design the

shape, structure, and Thermal Protection System (TPS) required for these bodies.

The unsteady part of aerodynamics contributes to serious flow issues around such rocket bodies and creates significant acoustic noise during the mission. Computational Fluid Dynamics (CFD) is one such tool to predict the aerodynamic and aerothermal loads which solve numerically the equations of conservation of mass, momentum, and energy along with the equation of state.

PraVaHa has been used extensively in the Gaganyaan program for aerodynamic analysis of human-rated launch vehicles, viz, HLV M3, Crew Escape System (CES), and CM.

Currently, the PraVaHa code is operational to simulate airflow for Perfect Gas & Real Gas conditions. Validations of the code are under way for simulating the effect of chemical reactions that occur during air dissociation upon 'earth re-entry' and 'combustion' as in scramjet vehicles.

# (PraVaHa)



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# ICMR seeks to provide oral formulation of hydroxyurea to treat sickle cell disease

**Bindu Shajan Perappadan**  
NEW DELHI

The Indian Council of Medical Research (ICMR) has invited Expressions of Interest (EoI) from eligible organisations for the “joint development and commercialisation” of a low dose or paediatric oral formulation of hydroxyurea to treat sickle cell disease in India.

India has the highest prevalence of sickle cell disease in South Asia. Over 20 million people with the disease live in the country. While most pharmaceutical companies in India market 500-mg capsules or 200-mg tablets of hydroxyurea, the biggest challenge in treatment is that it is not available in the suspension form for effective use in the case of paediatric patients, the ICMR said.

Sickle cell disease is one



Over 20 million people with sickle cell disease are residing in India. AP

of the most common monogenic disorders of haemoglobin, and hydroxyurea, a myelosuppressive agent, is an effective drug for treating patients of sickle cell disease, and thalassemia.

## **Risk of low dose**

The ICMR said that since only high-dosage hydroxyurea tablets are available, initiating a low-dose treatment becomes a tedious

task for service providers, as the capsule or tablet has to be broken down appropriately to be administered in accordance with body weight, risking the efficacy available with measured doses.

“Thus, there is a need for paediatric formulation of HU (hydroxyurea), considering the number of SCD cases in India and in view of the launch of the National Mission to eliminate Sickle Cell Anaemia/SCD (by 2047),” it said.

The ICMR, which is the apex biomedical research body in the country, also said that in India, according to the National Health Mission’s guidelines, healthcare providers initiate hydroxyurea therapy to only symptomatic sickle cell disease patients among children both because of the lack of availability of paediatric doses as well as the fear of toxicity.

In children, the prescribed dose is 10 mg to 15 mg per kilogram of body weight after two years of age. This titration of dose is difficult, and currently, it is carried out by using a fraction of the broken capsules, which is not an appropriate method because it can lead to less accurate administration of the drug, which has five dose-related side-effects.

## **Titration of drug**

With the availability of a formulation, the titration of the drug can be better, and its dose-related side effects can be reduced.

The council said that it could enter into any form of exclusive or non-exclusive agreement with eligible manufacturing companies for joint development and commercialisation of paediatric oral formulations of hydroxyurea for sickle cell disease.

# Hydroxyurea

- **Hydroxyurea helps the body make a type of hemoglobin that helps keep red blood cells round. Hemoglobin is the protein inside red blood cells that carries oxygen to the body.**
- **Round and flexible red blood cells work better and last longer.**



## What are Sickle Cell Disorders?

- A group of disorders that cause red blood cells to become misshapen and break down.
- The cells die early, leaving a short age of healthy red blood cells and can block blood flow causing pain.



### Types:

#### Sickle Cell Anaemia

Dysfunctional red cells due to abnormal haemoglobin

#### Sickle Cell Crisis

Blockage of blood vessels causing severe pain or organ damage



Healthy

Sickle cell anaemia



Normal red blood cell



Sickle red blood cell



unrestricted blood flow



sickle cells blocking  
blood flow

# SICKLE CELL TRAIT



NORMAL HbA



SICKLE HbS



**parent 1**

HAS THE SICKLE CELL TRAIT



**parent 2**

HAS THE SICKLE CELL TRAIT

**child**



**25%**

CHANCE TO NOT HAVE  
SICKLE CELL DISEASE OR TRAIT



**50%**

CHANCE TO HAVE SICKLE CELL TRAIT  
BUT NOT SICKLE CELL DISEASE



**25%**

CHANCE TO HAVE  
SICKLE CELL DISEASE



# 'Green-beard' genes could explain how altruism arose in nature

Amoebae don't use rational numbers. Instead, they use genes to estimate kinship with other amoebae. If the genes have not diverged at all, or have diverged very little, there is kinship and it is good to cooperate. If they have diverged significantly, there is less kinship and hence cooperation is risky

D.P. Kashekar

**A**ltruism is widespread in nature. Worker honey bees devote their entire life to foraging and caring for their sister, the queen, and her offspring, but do not themselves reproduce. In widow spiders, a male allows a female fertilised by him to eat him, and thus nourish herself and her offspring. A meerkat, a mongoose found in Africa, assumes the role of a sentinel, perching itself on a mound or rock, keeping a lookout for predators, instead of foraging for food, while the rest of the clan is feeding. If a predator is sighted, it alerts the others.

Many humans themselves have agreed that "greater love has no man than he who lays down his life for his friends".

How can the emergence of altruism in all these diverse forms be explained?

## A genetic switch

Most of the progress in answering this question has come from studies of a simpler organism that has been easier for researchers to study: the social amoeba *Dictyostelium discoideum*. The take-home message of these studies is that if a gene makes a worker bee altruistic, it also helps the copy of the gene in the queen and her offspring to be passed on to the next generation, even if the worker herself does not reproduce.

Such so-called 'green-beard' genes allow the individuals bearing them to recognise and preferentially cooperate with each other.

Alternatively, a green-beard gene could provide individuals to behave harmfully towards those carrying a different version of the gene.

Thus, scientists have postulated, green-beard genes encode some kind of tag that helps the genome to know their identity (i.e. self-recognition).

## Altruistic amoebae

*Dictyostelium discoideum* is a free-living, fast-growing, unicellular amoeba. In the wild, it feeds on bacteria that grow on decaying vegetation. In the laboratory, researchers have been known to feed them a bacterial 'lawn' grown in a Petri dish. When the bacteria run out, the amoebae stop multiplying and gather in the hundreds of thousands to form multicellular aggregates visible to the naked eye.

The aggregates then transform into fruiting bodies, each a few millimetres tall. A fruiting body is composed of a slender stalk made of dead cells, and it holds aloft a droplet of spores. About 20% of the amoebae in an aggregate altruistically sacrifice themselves to form the stalk. The remaining 80% become the spores.

Small fauna, such as ants and earthworms, disperse the spores to new food sources where they germinate to release amoebae. The newly released amoebae then go on to repeat the cycle of growth, division, and dispersal.

## Beware of cheaters

Not all the amoebae in an aggregate necessarily share kinship. Some could be only distantly related, so the aggregates can potentially be genetic chimeras – structures in which not all amoebae have the exact same genome. And when the



A view of *Dictyostelium discoideum* bacteria aggregating under a microscope. PUBLIC DOMAIN

genome differs, there is a risk that some strains may have found a way to 'cheat' and avoid becoming stalk cells, and as a result become represented in more than their fair share among the spores.

How does *D. discoideum* ensure that cheaters do not prosper? In 2017, researchers from the University of Manchester, in the U.K., reported that two genes in the *D. discoideum* genome – called *tgtrB* and *grcC* – displayed all the properties one would expect in a green-beard gene. On May 11 this year, researchers at the Baylor College of Medicine in the U.S. reported evidence that *D. discoideum* amoebae use these genes to navigate the risk of chimerism.

Their findings demonstrate how sophisticated genetic machinery can confer these deceptively simple life-forms the ability to express a universal virtue.

Both these studies were published in the journal *Nature Communications*.

## Separating kith from kin

The *tgtrB* and *grcC* genes are located next to each other in the *D. discoideum* genome, and are expressed together (so if one isn't expressed, the other isn't either). They contain information for cells to make two cell surface proteins called TgtrB and TgtrC. The TgtrB protein on one cell binds to the TgtrC protein on another. If the binding is strong, the TgtrB protein is activated, and confers altruistic behaviour – manifesting as the amoeba's willingness to form the stalk.

The binding between the TgtrB and the TgtrC proteins of cells of the same strain



The study demonstrated the logic that green-beard genes use to produce altruism plus the corresponding ability to keep altruistic amoebae from being exploited by greedy ones

is strong, and leads to self-recognition and cell-cell cooperation. Pure cultures of cells that lack the *tgtrB* and *grcC* genes fail to develop because they are unable to recognise each other as being alike.

The *tgtrB* and *grcC* genes are also very polymorphic within the same population of *D. discoideum* amoebae; they have multiple variants. In fact, they are among the most variable genes in the *Dictyostelium* genome. When the researchers in the 2017 study examined 20 strains of the amoeba isolated from a common location, they found 18 different variants of each gene.

The researchers were able to correlate differences in the *grc* gene sequences between two strains to the efficiency with which their cells segregated from each other in mixed aggregates and formed separate fruiting bodies. Specifically, when the binding of TgtrB and TgtrC proteins across the cells of diverged strains was weak, TgtrB failed to be activated, and the cells split away from each other instead of cooperating.

When the researchers deleted the *tgtrB* gene but left the *grcC* gene intact, the

amoeba did not cheat on 'non-self' amoebae that carried a different *grcC*. Instead, it cheated those with the same *grcC* variant as itself – i.e. its kin. Every family has its black sheep!

## From Haldane to Voltaire

On the other hand, amoebae in which the researchers activated the *tgtrB* gene alone (by introducing a mutation) were relegated to the stalk when mixed with their kin.

These findings demonstrate the logic that green-beard genes use to produce altruism plus the corresponding ability to keep altruistic amoebae from being exploited by greedy ones.

The British-Indian geneticist J.B.S. Haldane (1892-1964) is reputed to have said that he would jump into a river to save eight cousins but not seven – but also that he would jump in to save two brothers, yet not one. His quip highlights the fact that we share one-half of our genes with a sibling and one-eighth with a first cousin.

As far as we know, amoebae do not use rational numbers. Instead, they use their rapidly evolving genes to estimate kinship with other amoebae. If the genes have not diverged at all, or have diverged very little, there is kinship and it is good to cooperate. If they have diverged significantly, there is less kinship and hence cooperation is risky.

To paraphrase the philosopher Voltaire (1694-1778), if *grc* genes did not exist, it would be necessary for the amoeba to invent them.

(D.P. Kashekar is a retired scientist.)

# Green beard genes

- if a gene makes a worker bee altruistic, it also helps the copy of the gene in the queen and her offspring to be passed on to the next generation, even if the worker herself does not reproduce.
- Such so-called 'green-beard' genes allow the individuals bearing them to recognise and preferentially cooperate with each other.
- Alternatively, a green-beard gene could provoke individuals to behave harmfully towards those carrying a different version of the gene.
- Thus, scientists have postulated, green-beard genes encode some kind of tag that helps the genome to know their identity (i.e. self-recognition)



JADES-GS-z14-0, shown in the pullout, is the new record-holder for the earliest known galaxy.  
NASA/ESA/STScI

## JWST spots oldest galaxy yet, from cosmic dawn

Reuters

NASA's James Webb Space Telescope (JWST) has spotted the earliest known galaxy, one that is surprisingly bright and big considering it formed during the universe's infancy - at only 2% its current age.

By peering across vast cosmic distances, JWST is looking way back in time, observed the galaxy as it existed about 280 million years after the big bang event that initiated the universe roughly 13.8 billion years ago, the researchers said. This period spanning the universe's first few hundred million years is called cosmic dawn.

The telescope has revolutionised the understanding of the early universe since becoming operational in 2022. The new discovery was made by the JWST Advanced Deep Extragalactic Survey (JADES) research team.

This galaxy, called JADES-GS-z14-0, measures about 1.7 million light-years across. It has a mass equivalent to 500 million stars the size of our sun and was rapidly forming new stars, about 20 every year.

Before JWST's observations, scientists didn't know galaxies could exist so early and certainly not luminous ones like this.

"The early universe has surprise after surprise for us," said astrophysicist Kevin Huutane of Steward Observatory at the University of Arizona, one of the leaders of the study published online this week ahead of formal peer review.

"I think everyone's jaws dropped," added astrophysicist and study co-author Francesco D'Elia of the Kavli Institute

**JWST observed the galaxy as it existed about 280 million years after the Big Bang event that initiated the universe roughly 13.8 billion years ago**

for Cosmology at the University of Cambridge. "JWST is showing that galaxies in the early universe were much more luminous than we had anticipated."

Until now, the earliest known galaxy dated to about 220 million years after the Big Bang, as announced by the JADES team last year.

"It makes sense to call the galaxy big, because it's significantly larger than other galaxies that the JADES team has measured at these distances, and it's going to be challenging to understand just how something this large could form in only a few hundred million years," Huutane said.

While it is quite big for such an early galaxy, it is dwarfed by some present-day galaxies. Our Milky Way is about 100,000 light years across, with the mass equivalent to about 10 billion sun-sized stars.

Star formation in the early universe was more violent than today, with massive hot stars forming and dying quickly, and releasing tremendous amount of energy through ultraviolet light, stellar winds and supernova explosions, Mr D'Elia said.

Three main hypotheses have been advanced to explain the luminosity of early galaxies. The first attributed it to supermassive black holes in these galaxies gobbling up material. That appears to have been ruled out by the new findings because the light observed is spread over an area wider than would be expected from black hole gluttony.

# JAMES WEB TELESCOPE

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## ENGLISH

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So big it has to fold origami-style to fit in the rocket and will unfold like a "Transformer" in space.

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With unprecedented infrared sensitivity, it will peer back in time over 13.5 billion years to see the first galaxies born after the Big Bang.

Will orbit the Sun 1.5 million kilometers or 1 million miles from the Earth. (Hubble orbits 560 kilometers above the Earth.)



**Proposed  
Launch Date:**

Webb will be  
launched in 2021

**Launch  
Vehicle:**

Ariane 5 ECA

**Mission  
Duration:**

5 - 10 years

**Diameter  
of primary  
Mirror:**

6.5 m (21.3 ft)  
approximately

**Primary  
mirror material:**

beryllium coated  
with gold

# JAMES WEBB TELESCOPE

A window into cosmos

**Focal  
length:**

131.4 meters

**Optical  
resolution:**

~0.1  
arc-seconds

**Orbit:**

1.5 million  
km from Earth



JADES-GS-z14-0, shown in the pullout, is the new record-holder for the earliest known galaxy.  
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# The Preston curve

- The Preston curve refers to a certain empirical relationship that is witnessed between life expectancy and per capita income in a country.
- It was first proposed by American sociologist Samuel H. Preston in his 1975 paper “The changing relation between mortality and level of economic development”.
- Preston found that people living in richer countries generally had longer life spans when compared with people living in poorer countries.

- **This is likely because people in wealthier countries have better access to healthcare, are better educated, live in cleaner surroundings, enjoy better nutrition etc.**
- **When a poor country begins to grow, its per capita income rises and causes a significant increase in life expectancy initially as people are able to consume more than just subsistence calories, enjoy better healthcare etc.**

# More road projects, higher toll revenue boost the introduction of InvITs

**Janaki Krishnan**  
MUMBAI

The faster pace of development of highways in FY25 alongside increased revenue from tolls and toll hikes are attracting road developers, private equity and pension funds to float road infrastructure investment trusts, assets under which are expected to more than double in the next three years creating a ₹1 lakh crore incremental lending opportunity.

In FY24 road InvITs controlled more than 10,000 km of road length and this is expected to cross 22,500 km by FY28, according to SBI Caps.

## Major buyers

"InvITs have emerged as one of the major buyers of operational road assets in India in recent years, and it has also facilitated the unlocking of capital for road developers once their road projects become operational," said Vinay Kumar G., Vice President and Sector Head - Corporate Ratings at ICRA.

There are more than half a dozen road InvITs already in operation while more are in the pipeline. At the moment, PE firm Actis-backed NXT Infra Trust and Roadstar Infra Pvt. Ltd.'s (a subsidiary of IL&FS Transportation Networks) InvIT is awaiting regulatory approval.

In the current fiscal year, the awarding of road projects by the Ministry of Road Transport and Highways is expected to be better than the 8,551 km seen last year, while execution is expected to be 5-8% higher at 12,500-13,000 km, ac-



**Patient capital:** Key investors in InvITs were pension funds and sovereign funds who invested for the long term. THE HINDU

## ICRA projects NHAI's asset monetisation in FY25 could fetch it up to ₹60,000 cr. via sale of 33 road assets

According to Mr. Kumar.

Fastag revenue spiked in FY24 to ₹65,000 crore and it is expected to reach ₹77,000 crore in the current fiscal year and to surpass ₹1 lakh crore annually by FY28, SBI Caps estimated. On Sunday, National Highways Authority of India announced a 5% raise in toll rates, giving further boost to revenue visibility.

## Patient capital

The road sector, due to the long-term concession periods and elongated payback periods requires patient capital with a long-term investment horizon, pointed out Mr. Kumar. He added that key investors in InvITs were pension funds and sovereign funds who invested

for the long term.

Canada's CDPQ and CPPIB are pension funds that have taken stakes in road InvITs in India.

Anything which generates revenue is InvIT-able, said Prateek Jhavar, Head, Infrastructure & Real Assets at Avendus.

He added that more InvITs were in the pipeline, especially with a new monetisation programme of NHAI's assets expected.

ICRA had recently estimated that NHAI's asset monetisation in FY25 could fetch it up to ₹60,000 crore from the sale of 33 road assets through toll-operate-transfer and InvIT mode; this could translate into ₹38,000-43,000 crore funding opportunity.

"We expect InvITs will continue to acquire operational road assets and grow their asset base further in the coming years," said Mr. Kumar.

*(The writer is with The Hindu businessline)*



# InvITs

- InvITs are a type of investment vehicle that allows investors to invest in infrastructure projects.
- The main objective of InvITs is to provide retail investors with access to investment opportunities in infrastructure projects that were previously only available to large institutional investors.
- InvITs offer investors the opportunity to invest in a diversified portfolio of infrastructure projects, which can provide stable income streams and potential capital appreciation over the long term. At the same time, it helps infrastructure projects tap into household savings

- **InvITs are similar to mutual funds or REITs, but they invest in infrastructure assets like toll roads, power transmission lines, and pipelines.**

## Structure

- **InvITs are created by sponsors, who are typically infrastructure companies or private equity firms.**
- **The sponsor sets up the InvIT and transfers ownership of the underlying infrastructure assets to the trust.**
- **The trust then issues units to investors, which represent an ownership stake in the trust and thus the underlying assets**

# What are Infrastructure Investment Trusts ?

It is a trust which raises money from individuals, companies & institutions to invest in infra. projects.



The money raised is used to construct highways, dams, power & energy farms, towers etc.



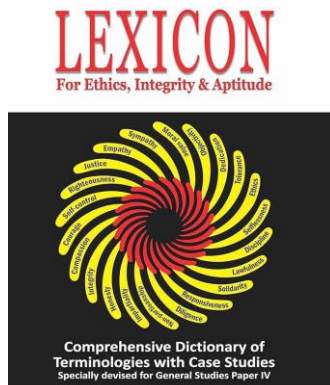
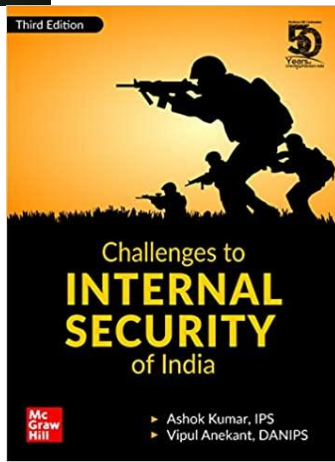
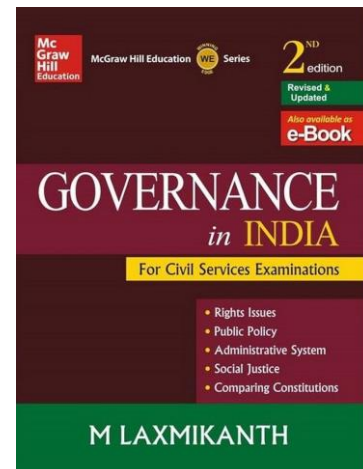
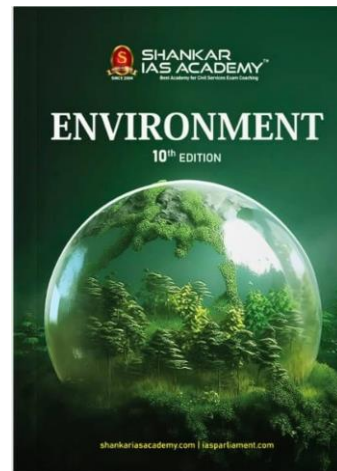
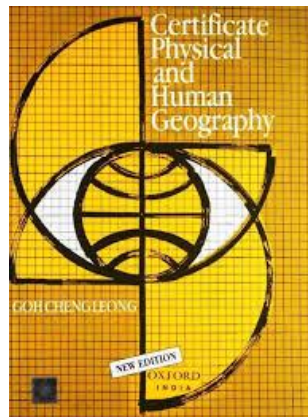
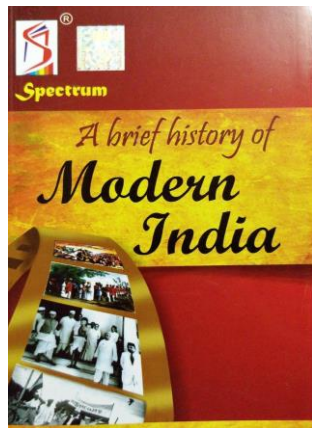
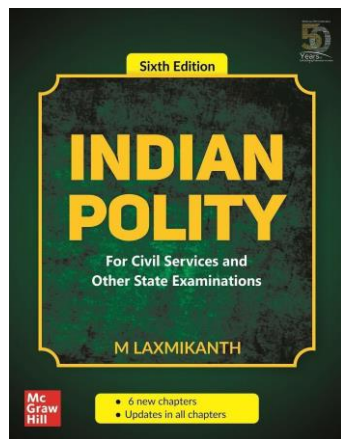
Revenue generated from these projects are distributed to shareholders as dividends.



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By saurabh Pandey



THE HINDU



# Tonga volcano could cause unusual weather for rest of decade: study

Usually, the sulphur dioxide in the smoke of a volcano cools the earth's surface for a short period. Hunga Tonga was an underwater volcano, so it produced little smoke and a lot of water vapour, which shot into the stratosphere. And in the stratosphere, water vapour is a potent greenhouse gas.

Martin Jucker

**H**unga Tonga-Hunga Ha'apai (Hunga Tonga for short) erupted on January 15, 2022, in the Pacific Kingdom of Tonga. It created a tsunami, which triggered warnings across the entire Pacific basin, and sent sound waves around the globe multiple times.

A new study published in the journal of *Climate* explores the climate impacts of this eruption.

Our findings show the volcano can explain last year's extraordinarily large ozone hole as well as the much wetter than expected summer of 2024.

The eruption could have lingering effects on our winter weather for years to come.

## A cooling smoke cloud

Usually, the smoke of a volcano – and in particular the sulphur dioxide contained inside the smoke cloud – ultimately leads to a cooling of the earth's surface for a short period. This is because the sulphur dioxide transforms into sulphate aerosols, which send sunlight back into space before it reaches the surface. This shading effect means the surface cools down for a while, until the sulphate falls back down to the surface or gets rained out.

This is not what happened to Hunga Tonga.

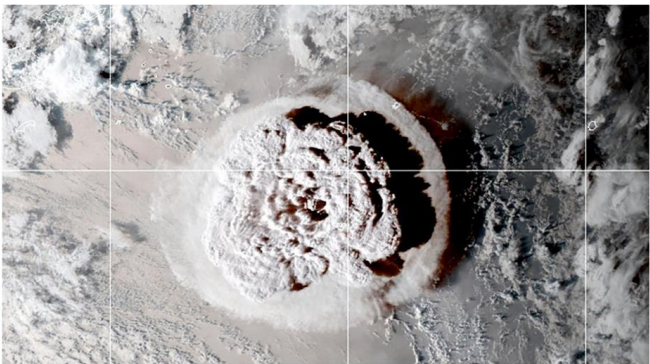
Because it was an underwater volcano, Hunga Tonga produced little smoke, but a lot of water vapour: 100-150 million tonnes, or the equivalent of 60,000 Olympic swimming pools. The enormous heat of the eruption transformed huge amounts of sea water into steam, which then shot high into the atmosphere with the force of the eruption. All that water ended up in the stratosphere: a layer of the atmosphere between about 15 and 40 kilometres above the surface, which produces neither clouds nor rain because it is too dry.

Water vapour in the stratosphere has two main effects. One, it helps in the chemical reactions that destroy the ozone layer, and two, it is a very potent greenhouse gas.

There is no precedent in our observations of volcanic eruptions to know what all that water would do to our climate, and for how long. This is because the only way to measure water vapour in the entire stratosphere is via satellites. These have only existed since 1979, and there hasn't been an eruption similar to Hunga Tonga in that time.

## Follow the vapour

Experts in stratospheric science around



The eruption of the underwater volcano Hunga Ha'apa off Tonga in 2022. The volcano has had weather altering impact across the globe. REUTERS

the world started examining satellite observations on the first day of the eruption. Some studies focused on the more traditional effects of volcanic eruptions, such as the amount of sulphate aerosols and their evolution after the eruption, some concentrated on the possible effects of the water vapour, and some included both.

But nobody really knew how the water vapour in the stratosphere would behave. How long will it remain in the stratosphere? Where will it go? And, most importantly, what does this mean for the climate while the water vapour is still there?

Those were exactly the questions we set out to answer.

We wanted to find out about the future, and unfortunately, it is impossible to measure that. This is why we turned to climate models, which are specifically made to look into the future.

We did two simulations with the same climate model. In one, we assumed no volcano erupted, while in the other one we manually added the 60,000 Olympic swimming pools worth of water vapour to the stratosphere. Then, we compared the two simulations, knowing that any differences must be due to the added water vapour.

## What did we find out?

The large ozone hole from August to December 2023 was at least in part due to Hunga Tonga. Our simulations predicted



The eruption created a tsunami which triggered warnings across the entire Pacific basin, and sent sound waves around the globe multiple times

that ozone hole almost two years in advance.

Notably, this was the only year we would expect any influence from the volcanic eruption on the ozone hole. By then, the water vapour had just enough time to reach the polar stratosphere over Antarctica, and during any later years, there would not be enough water vapour left to enlarge the ozone hole.

As the ozone hole lasted until late December, with it came a positive phase of the Southern Annular Mode during the summer of 2024. For Australia, this meant a higher chance of a wet summer, which was exactly opposite what most people expected with the declared El Niño.

Again, our model predicted these two years ahead.

In terms of global mean temperatures, which are a measure of how much climate change we are experiencing, the impact of Hunga Tonga is very small, only about 0.005 degrees Celsius. (This was independently confirmed by another study.) This means that the incredibly

high temperatures we have measured for about a year now cannot be attributed to the Hunga Tonga eruption.

## Disruption for the rest of the decade

But there are some surprising, lasting impacts in some regions of the planet.

For the northern half of Australia, our model predicts colder and wetter than usual winters up to about 2029. For North America, it predicts warmer than usual winters, while for Scandinavia, it again predicts colder than usual winters.

The volcano seems to change the way some waves travel through the atmosphere. And atmospheric waves are responsible for highs and lows, which directly influence our weather.

It is important here to clarify that this is only one study, and one particular way of investigating what impact the Hunga Tonga eruption might have on our weather and climate. Like any other climate model, ours is not perfect.

We also didn't include any other effects, such as the El Niño-La Niña cycle. But we hope that our study will stir scientific interest to try and understand what such a large amount of water vapour in the stratosphere might mean for our climate.

Whether it is to confirm or contradict our findings, that remains to be seen – we welcome either outcome.

(Martin Jucker is lecturer in atmospheric dynamics, UNSW Sydney. This article is republished from The Conversation.)

## THE GIST

A large ozone hole that developed from August to December 2023 was caused by Hunga Tonga. Simulations by researchers predicted that ozone hole almost two years in advance.

Hunga Tonga's impact on climate change was very small. It was calculated at only about 0.015 degrees Celsius. Consequently the high temperatures that have been measured for about a year now cannot be attributed to the eruption.

Researchers' climate simulation predicts that the northern half of Australia will be colder and wetter than usual winters up to 2029. For North America, it predicts warmer than usual winters, while for Scandinavia, it again predicts colder than usual winters.

# Hunga Tonga-Hunga Ha'apa

- **Hunga Tonga-Hunga Ha'apai (Hunga Tonga for short) erupted on January 15, 2022, in the Pacific Kingdom of Tonga.**
- **It created a tsunami, which triggered warnings across the entire Pacific basin, and sent sound waves around the globe multiple times.**

## A cooling smoke cloud

- Usually, the smoke of a volcano — and in particular the sulphur dioxide contained inside the smoke cloud — ultimately leads to a cooling of the earth's surface for a short period.
- This is because the sulphur dioxide transforms into sulphate aerosols, which send sunlight back into space before it reaches the surface.
- This shading effect means the surface cools down for a while, until the sulphate falls back down to the surface or gets rained out.
- This is not what happened to Hunga Tonga.

- Because it **was an underwater volcano**, Hunga Tonga produced little smoke, but a lot of water vapour: 100–150 million tonnes, or the equivalent of 60,000 Olympic swimming pools.
- **The enormous heat of the eruption transformed huge amounts of sea water into steam**, which then shot high into the atmosphere with the force of the eruption.
- All that water ended up in the stratosphere: a layer of the atmosphere between about 15 and 40 kilometres above the surface, which produces neither clouds nor rain because it is too dry.
- **Water vapour in the stratosphere has two main effects.**
- **One, it helps in the chemical reactions that destroy the ozone layer, and two, it is a very potent greenhouse gas.**

- **For the northern half of Australia, our model predicts colder and wetter than usual winters up to about 2029.**
- **For North America, it predicts warmer than usual winters, while for Scandinavia, it again predicts colder than usual winters.**
- **The volcano seems to change the way some waves travel through the atmosphere.**
- **And atmospheric waves are responsible for highs and lows, which directly influence our weather.**



# Carnian pluvial episode: bounty in rain

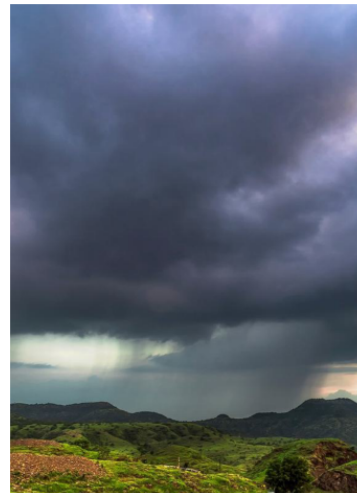
### Arkatapa Basu

The earth's climate has always been in flux. There have been ice ages, periods of scorching deserts, even seemingly endless rain.

Some 230 million years ago, during the late Triassic Period, it rained for more than a million years straight. Researchers call this slice of time the carnian pluvial episode. And right after this episode, the age of the dinosaurs began. While it wasn't as major an event as, say, any one of the planet's five mass extinctions, the carnian pluvial episode certainly altered the path of evolution of both terrestrial and marine flora and fauna.

The world's landmasses in the late Triassic consisted of the supercontinent Pangaea. Scientists have suggested that the heavy downpour was the result of volcanic activity in the Wrangellia Province, which is in the present day on the western coast of North America. This volcanic activity is expected to have wiped out approximately a third of marine life and a substantial amount of terrestrial life — but which, according to evidence scientists have found, the carnian pluvial episode may have turned around for the better.

During and after the episode, the



At one point during the late Triassic Period, it rained for more than a million years straight.

GETTY IMAGES/ISTOCKPHOTO

number and diversity of species increased. Many of them played and continue to play an important role in the way the earth looks today.



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## **carnian pluvial**

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- During and after the episode, the number and diversity of species increased.

## BIG SHOT



▲ This picture from the Institut Botanic de Barcelona shows a fern in New Caledonia. A small, seemingly unremarkable fern that only grows on a remote Pacific island was on May 31 crowned the record-holder for having the largest genome of any organism on the earth. The New Caledonian fern (*Tmesipteris oblongeolata*) has more than 50-times more DNA packed into the nucleus of its cells than humans. AFP

# New Caledonian fork fern

- In a new **study published today in the journal iScience**, researchers from the Royal Botanic Gardens, Kew and the Institut Botànic de Barcelona (IBB-CSIC) in Spain present a **new record-holder for the largest amount of DNA stored in the nucleus of any living organism on the planet.**
- Coming in at more than 100 metres of unravelled DNA, the New Caledonian fork fern species *Tmesipteris oblanceolata* was found to contain over 50 times more DNA than humans and has dethroned the Japanese flowering plant species *Paris japonica*, which has held this record since 2010.

- addition, the plant has achieved three Guinness World Records titles for Largest plant genome, Largest Genome, and Largest fern genome for the amount of DNA in the nucleus.
- *T. oblanceolata* is a rare species of fern found on the island nation of New Caledonia, an overseas French territory situated in the Southwest Pacific, about 750 miles east of Australia, and some of the neighbouring islands such as Vanuatu.



# Does inequality lead to growth?

Several argue that inequality harms democratic processes. Some inequality, others argue, is actually beneficial, since it acts as an incentive to entrepreneurs to start businesses. This view is mistaken, for inequality can have deleterious economic effects

## ECONOMIC NOTES

Rahul Menon

**R**ahul Gandhi's statements regarding redistribution — and the polarising rebuttal of Prime Minister Narendra Modi — have brought the topic of inequality to the forefront. Researchers from the Paris School of Economics have shown inequality in modern India to be greater than colonial times.

Several argue that inequality harms democratic processes. Some inequality, others argue, is actually beneficial, since it acts as an incentive to entrepreneurs to start businesses, thereby increasing employment and welfare for others.

This view is mistaken, for inequality can have deleterious economic effects as well. Consider one form of inequality, that of concentration of monopoly power amongst capital relative to labour. This can have negative effects on consumption, welfare, and growth. If done properly, wealth taxes and distribution can have positive effects.

### Monopoly power and consumption

Billionaires draw their wealth from monopoly. Their business groups are dominant players in their specific market. This allows them to set prices instead of being determined by the market. The extent of mark-ups above the cost of production is determined by their monopoly power. Thus, for any given level of money wages, real wages — which determine purchasing power — are lower in economies with strong monopolies.

These monopoly effects are currently being experienced as the cost-of-living crises affecting the developed economies. The phenomenon of “greedflation”, or companies raising prices to increase profit margins in the wake of multiple demand-and-supply shocks due to the pandemic, has been pointed to as contributing to high rates of inflation in the West. Textbook economics shows us



ISTOCKPHOTO

that the profit-maximising level of output under a monopoly is less than under a competitive economy, implying a welfare loss. Thus, the presence of monopolies can lead to lower real wages and lower levels of output and investment.

### Inequality and growth

Assume that a company decides to set up a new factory. Before the new capital stock is created, wages are paid out to workers to build it. The income of the workers is spent on purchasing goods, which increases the income of goods-sellers, whose increased income results in purchases of other goods, and so on. The total increase in the income of workers and goods-sellers is greater than the initial investment. This process is called the ‘multiplier’ effect, wherein investment raises incomes by a greater proportion than the initial investment.

When companies exercise market power, mark-ups and prices will be higher. Real wages of workers are lower, and they can only purchase lesser items. However companies, because of higher margins, will enjoy the same amount of profits from the sale of a lesser amount of goods. The increase in income from a given amount of investment will be lesser under monopoly because of reduced consumption power. Thus, investment will have a weaker effect on growth under monopoly while not affecting profits.

One can argue that consumption of the rich can help boost growth. While the absolute amount of consumption of the rich is more, they consume a smaller proportion of their incomes. The multiplier process depends on the proportion of consumption from incomes. An unequal economy will put lesser incomes in the hands of those with

a greater propensity to consume, leading to weaker expansion in the economy.

### Redistribution and growth

Some argue that the ‘cure’ of redistribution can prove more harmful than the disease of inequality by affecting job creation. Entrepreneurs would see reduced incentives for amassing wealth under a high-tax regime, resulting in a scale-back of investment and jobs.

One must make a distinction between wealth and profits. Investment occurs under the influence of future profit expectations, while wealth is accumulated past profits. As the Polish economist Michal Kalecki argued, taxes on wealth would not affect investment since it leaves expectations of future profits unchanged. For example, taxing Gautam Adani’s wealth will not affect investment since expected profits from airports depends on the demand for air-travel which is independent of the value of his wealth.

No doubt, the difficulty in converting profits into wealth may deter some business-owners from undertaking investment. But an economy with high expectations of profit would ensure businesses invest even if wealth is taxed. Redistribution can generate forces to spur growth even if some billionaires pull back on investment. For one, if wealth is redistributed and increases income, the multiplier process would become stronger. Businesses would be more willing to invest where purchasing power is strong. If monopolies are curtailed, then prices would be lower and real wages higher, leading to greater demand.

Consider Thomas Piketty’s proposal of taxing billionaire wealth and providing basic income. This might cause some to exit the economy, but can create a new class of entrepreneurs who can create start-ups, freed from the necessity of working for wages. Redistribution is not a silver bullet, and too high a rate of taxation can become a net drain on an economy. Used in conjunction with other policy measures, curtailing inequality can lead to a healthier economy.

## THE GIST

▼  
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# Wealth and inequality

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- These monopoly effects are currently being experienced as the **cost-of-living crises affecting the developed economies.**
- **The phenomenon of “greedflation”**, or companies raising prices to increase profit margins in the wake of multiple demand-and-supply shocks due to the pandemic, has been pointed to as contributing to high rates of inflation in the West.
- Textbook economics shows us that the **profit-maximising level of output under a monopoly is less than under a competitive economy**, implying a welfare loss.

- **Inequality and growth**
- Assume that a company decides to set up a new factory.
- Before the **new capital stock is created, wages are paid out to workers to build it.**
- The income of the workers is spent on purchasing goods, which increases the income of goods-sellers, whose increased income results in purchases of other goods, and so on.
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- Thus, **investment will have a weaker effect on growth under monopoly while not affecting profits.**

# Redistribution and growth

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# Can domestic MFs invest in their overseas counterparts?

What does a proposed framework by SEBI put forward? What are some of the concerns?

**Saptaparno Ghosh**

## The story so far:

**T**he Securities and Exchange Board of India (SEBI) on May 17 floated a consultation paper proposing a framework for facilitating investments by domestic Mutual Funds (MFs) in their overseas counterparts, or Unit Trusts (UTs) that invest a certain portion of their assets in Indian securities. Comments about the framework are solicited until June 7.

## What is the framework's purpose?

Noting India's strong economic growth prospects, SEBI observes that Indian securities offer an attractive investment opportunity for foreign funds. SEBI says this has led to several international indices, exchange traded funds (ETFs), MFs, and UTs allocating a part of their assets towards Indian securities. In the consultation paper, MSCI Emerging Markets Index was noted to hold 18.08% exposure to Indian securities.

Indian mutual funds, somewhat conversely, diversify their portfolios by launching 'feeder funds' which invest in overseas instruments such as (units of) MF, UTs, ETFs and/or index funds. Other than diversification, it eases the path to make global investments. However, ambiguity remains about investments which have Indian exposures, which deters domestic MFs from investing in these instruments. SEBI's cumulative assessment sees merit in potentially allowing investments of this kind with "limited exposure to Indian securities." Within the proposed framework, the markets regulator also intends to place essential safeguards which would keep the Indian instruments "true to their label" and enable investors to take desired exposure in overseas securities. If the fund has significant exposure to Indian securities, the purpose of making an overseas investment is defeated.

## What proposals has SEBI tabled?

Significantly, the upper limit for

investments made by overseas instruments (in India) has been capped at 20% of their net assets. That is, overseas instruments being considered must not have an exposure of more than 20% in Indian securities. Deeming the cap "appropriate," SEBI explains that this would help "strike a balance between facilitating investments in overseas funds with exposure to India and preventing excessive exposure." The markets regulator has also sought that Indian mutual funds ensure contributions of all investors of the overseas MF/UT is pooled into a single investment vehicle. Other than this, Indian mutual funds must also ensure that all investors of the overseas instrument are receiving gains proportionate to their contribution – and in no order of preference. SEBI stresses that these investments are to be made autonomously by the manager (of the overseas instrument) without any influence from the investors or undisclosed parties. SEBI is also seeking public disclosures of the portfolios of

such overseas MF/UTs periodically for the sake of transparency. Finally, it warns against the existence of any advisory agreement between the Indian mutual fund and the overseas MF/UT. This is to prevent conflict of interest and avoid any undue advantage.

## What happens when overseas instruments breach the limit?

If the overseas instrument breaches the 20% limit, the Indian mutual fund scheme which is investing in the overseas fund would slip into a six-month observance period. This period is to be utilised by the overseas instrument/fund to rebalance its portfolio adhering to the cap. Further investment in the overseas instrument would be allowed only when the exposure drops below the limit. If the portfolio is not rebalanced within this period, the MF must liquidate its investment in the overseas instrument within six months.

## Are there other considerations?

The first consideration is RBI's upper limit for overseas investment by mutual funds. RBI Governor Shaktikanta Das stated that there was no proposal to increase the investment limit. In light of this, Suresh Soni, CEO at Baroda BNP Paribas Mutual Fund told *The Hindu*, "The changes to regulations would not have any practical impact immediately, as the overall industry limit for overseas investments is effectively exhausted." Mr. Soni says such investments provide diversification opportunities to Indian investors.

## THE GIST

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- **Indian mutual funds, somewhat conversely, diversify their portfolios by launching ‘feeder funds’ which invest in overseas instruments such as (units of) MF, UTs, ETFs and/or index funds.**
- **Other than diversification, it eases the path to make global investments.**
- **A feeder fund (“Feeder”) is an investment vehicle, often a limited partnership, that pools capital commitments of investors and invests or “feeds” such capital into an umbrella fund, often called a master fund (“Master”),**

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**BEIJING**

## China probe successfully lands on far side of moon to collect samples



REUTERS

China's Chang'e-6 lunar probe successfully landed on Sunday on the far side of the moon to collect samples, state media reported — the latest leap for Beijing's decades-old space programme. The Chang'e-6 set down in the immense South Pole-Aitken Basin, one of the largest known impact craters in the solar system. AFP

# Chang'e 6

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# Chang'e 6



Chang'e 6 is a robotic lunar exploration mission by the China National Space Administration.

As China's second sample return mission, it will attempt to obtain a sample of soil and rock from the far side of the Moon, while it conducts scientific experiments on the lunar surface.

The **Chinese Lunar Exploration Program** is designed to be conducted in four phases of incremental technological advancement:

- The goal of the first phase was to reach **lunar orbit**. This was completed by **Chang'e 1** in 2007 and by **Chang'e 2** in 2010.
- The second phase sought to land and rove on the Moon, a feat that was accomplished by **Chang'e 3** in 2013 and by **Chang'e 4** in 2019.

- The third phase involves the collection of lunar samples and sending them to Earth, first completed by **Chang'e 5** in 2020 and planned for Chang'e 6.
- The fourth phase consists of the development of a robotic research station near the Moon's south pole.
- The program aims to facilitate crewed lunar landings in the 2030s and possibly build a crewed outpost near the **lunar south pole**.

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# Roman Baths may harbour novel antimicrobial natural products

## The Hindu Bureau

The world-famous Roman Baths are home to a diverse range of microorganisms which could be critical in the global fight against antimicrobial resistance, a new study suggests. The investigation of extreme ecological niches, such as hot springs, has gained recent interest due to their unique ecosystems, increasing the chance for novel antimicrobial natural product

discovery. The study, published in the journal *The Microbe*, is the first to provide a detailed examination of the bacterial and archaeal communities found within the waters of the popular tourist attraction in the city of Bath (U.K.).

Scientists collected samples of water, sediment and biofilm from locations within the Roman Baths complex including the King's Spring (where the waters reach around 45 degree C) and the Great Bath,

where the temperatures are closer to 30 degree C. The samples were then analysed using cutting edge sequencing technology and traditional culturing techniques were employed to isolate bacteria with antibiotic activity.

Around 300 distinct types of bacteria were isolated across the Roman Baths site with different examples being more prominent within the varying water temperatures. Further tests showed 15 of

these isolates – including examples of Proteobacteria and Firmicutes – showed varying levels of inhibition against human pathogens including *E.coli*, *Staphylococcus Aureus* and *Shigella flexneri*.

“From initial isolation experiments, 297 isolates were purified, of which 15 showed broad spectrum activity against human pathogens, though interestingly these were not from target genera in

the *Actinobacteria*. From these data, there is clear potential for novel antimicrobial natural products discovery from the Roman Baths, as has been demonstrated from other thermal hot springs globally,” the authors write.

The research comes at a time when the need for new sources of antibiotics is at unprecedented levels, with resistance of bacteria to currently used medication estimated to be responsible for more than 1.25

million deaths globally each year. The researchers say a significant amount of additional investigation is required before the microorganisms found in the Roman Baths can be applied in the fight against disease and infection globally. However, they add that this initial study has shown there is clear potential for novel antimicrobial natural products contained within its hot springs to be explored further for that purpose.

# Roman Baths

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- The investigation of extreme ecological niches, such as hot springs, has gained recent interest due to their unique ecosystems, increasing the chance for novel antimicrobial natural product discovery

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# Cities warming due to effect of urbanisation, climate change

The rate of warming in cities is nearly twice that of the rest of the country, with local-scale urbanisation alone causing additional warming of about 60%

V. Vinoj  
S.S. Sethi

**R**ecently, for two consecutive days, Delhi reported daytime temperatures above 50 degrees C, the highest ever recorded in the city. There is a reason why cities are experiencing higher temperatures than non-urban and rural areas. The ongoing climate change and rapid urbanisation are now defining the Anthropocene, with the cities experiencing both thereby making the urban population vulnerable to the compounding impact. India's urban landscape (especially population) is projected to double by 2050, adding more than 450 million residents. This rise outnumbers the present total population of the United States and the European Union, signaling a huge historical shift. Given the breakneck urbanisation, our cities must be prepared for future challenges.

The altered thermodynamic, and aerodynamic properties of the cities tend to trap more heat, making cities warmer than their rural and suburban counterparts, a phenomenon well-known as the urban heat island (UHI) effect. In addition, climate change is causing a significant increase in record-breaking temperatures and frequent prolonged heat waves. Therefore, the overall warming in any city tends to be complex with both urbanisation and global warming playing a pivotal role. This alters the resultant micro-climate of the cities with an influence on heat, rainfall distribution and even air pollution



dispersion with implications for public health.

In a study published recently, we seek to separate the warming caused by local scale urbanisation and regional scale climate change in the context of 141 major cities in India and quantify their relative contributions. This kind of segregation is scientifically quite complex. One strategy is to determine the contributions of various factors to warming over time. These factors include information on concrete structures, roads, industries, parks, water bodies, residential activities, air conditioning, vehicular activities, and so on. Such detailed analysis requires enormous time, effort and

investment, even for just one city and has to be incorporated into models or combined with extremely high-resolution satellite images for further analysis. A much simpler approach was followed using high-resolution night-time land surface temperature from MODIS, a sensor aboard Aqua satellite in NASA's A-train constellation. Under the assumption that the observed changes in warming (2003 to 2020) over the rural areas are driven primarily by regional climate change, the warming over the urban built-up areas for each city was compared to its rural counterpart at every one sq. km area. Thus, after the removal of regional warming sig-

natures from the urban areas, the signal related to urbanisation was estimated for 141 major and minor cities providing first-time information on global warming-free urbanisation signatures.

Overall, the rate of warming in cities is near twice that of the rest of the country, with local-scale urbanisation alone causing additional warming of about 60%. While all cities showed an increase in night-time land surface temperature, with an average increase of 0.53 degree C per decade, a large divide among cities was seen. The tier-II cities in the eastern part of the country have stronger urbanisation-driven warm-

ing, surprisingly not seen even for the larger metros and mega cities. This may be indicating a window of opportunity.

India is aggressively acting to reduce emissions and shift to non-fossil fuel based energy sources as clearly stated in the updated nationally determined contribution (NDC) working towards climate justice. State level heat action plans and implementation of early warning and forecasting systems for heat-waves show India's commitment to saving lives by reducing heat related mortality.

Based on the predominant contribution to warming, the study emphasises that urban heat management must follow a differential approach for each city. Cities with a large urbanisation contribution may benefit from local scale interventions – use of sustainable materials like cool roofs and cool/permeable pavements, green infrastructures, creation of maintenance of lakes and parks, urban forests, and comprehensive emission reduction strategies. While other cities may require more regional scale efforts – national or regional level emission reduction, large-scale afforestation/ plantation, rejuvenation of surrounding water bodies – for effective warming mitigation with both having implications for extreme urban rainfall, floods, air pollution, etc.

(V. Vinoj is Associate Professor, School of Earth, Ocean and Climate Sciences, IIT Bhubaneswar, and S.S. Sethi is PhD scholar at the School of Earth, Ocean and Climate Sciences, IIT Bhubaneswar)



# Cities experience higher temperatures

For two consecutive days, Delhi reported daytime temperature above 50°C, the highest ever recorded in the city

- Altered thermodynamic, aerodynamic properties of the cities tend to trap more heat, making cities warmer than their rural and suburban counterparts

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- Climate change too is causing a significant increase in temperature

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- Urbanisation and global warming together play a pivotal role in the overall warming in any city

- All 141 cities show an increase in night-time land surface temperature, with an average increase of 0.53°C per decade

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- Urbanisation alone is causing additional warming of about 60%, while the climate change

is responsible for the remaining smaller share

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- Tier-II cities in the eastern part of the country have stronger urbanisation-driven warming than even large metros and mega cities

---

- Tailored city specific action plans are needed for sustainable urban growth for cities with a large heat exposure





## Why some cuckoo birds have higher rates of speciation

Cuckoos, which lay their eggs in nests of other birds, have higher speciation rates when they lay their eggs in a broader range of host bird species' nests. This higher speciation rate is driven by host rejection and cuckoo selection for mimetic nestling traits. In some species, cuckoo chicks kick the host young from the nest, whereas in others, cuckoo birds are reared alongside the host young. This variation places a high selective pressure on hosts to develop defenses and the emergence of counter adaptations in cuckoos.



# Why some cuckoo birds have higher rates of speciation



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- In some species, cuckoo chicks kick the host young from the nest, whereas in others, cuckoo birds are reared alongside the host young.
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# What is speciation ??

- **Speciation occurs when a group within a species separates from other members of its species and develops its own unique characteristics.**
- **The demands of a different environment or the characteristics of the members of the new group will differentiate the new species from their ancestors**



## A history of Zika virus raises risk of symptomatic dengue

People who have already been exposed to the Zika virus are more vulnerable to symptomatic infections with some types of dengue virus later on, according to a comprehensive study in Nicaragua during an unusual dengue outbreak in 2022. The results, which involved more than 3,400 participants, support the idea that the interplay between Zika and dengue can influence the risk of severe dengue infections in vulnerable populations – a finding with implications for the safe rollout of vaccination campaigns.

# Zika Virus

- **People who have already been exposed to the Zika virus are more vulnerable to symptomatic infections with some types of dengue virus later on, according to a comprehensive study in Nicaragua during an unusual dengue outbreak in 2022.**

# ALL ABOUT ZIKA VIRUS DISEASE

Zika virus disease is an emerging viral disease transmitted through the bite of an infected *Aedes* mosquito

## Symptoms

➤ Most of those infected with Zika virus disease either remain asymptomatic or show mild symptoms of fever, rash, conjunctivitis, body ache, joint pain

➤ Severe forms of disease requiring hos-

pitalization is uncommon and fatalities are rare

➤ There is no vaccine or drug available to prevent/treat Zika virus disease at present



➤ Zika virus infection during pregnancy can cause infants to be born with microcephaly and other congenital malformation



# NO VAX YET, BUT FATALITIES RARE

## What Is Zika Disease

➤ Zika, a mosquito-borne virus, first identified in monkeys in Uganda in 1947

➤ In 2007, first outbreak in the Pacific region. Subsequent outbreaks reported from Africa, America, Asia, French Polynesia, Western Pacific and Brazil

➤ Transmitted by *Aedes aegypti* mosquitoes, also the vector for dengue and chikungunya

➤ Infection in a pregnant woman can cause birth defects in the newborn

**Symptoms** ➤ Most remain asymptomatic or show mild fever, rashes, conjunctivitis, body ache, joint pain



➤ **Only 1 in 4** may develop the symptoms

➤ Hospitalisation uncommon, fatalities rare

➤ **No vaccine or drug available**

## The State Scenario

➤ Maharashtra has reported fewer than 5 cases, including in Pune, Palghar. The Palghar patient was a 7-year-old girl from Jhai ashramshala

➤ This is the first case in Mumbai





## Question Corner

# Blood proteins

**Besides the red pigment, what material was used in the red paint by people of Peru's Sicán culture?**

Thirty years ago, archeologists excavated the tomb of an elite 40-50-year-old man from the Sicán culture of Peru, a society that predated the Incas. The man's seated, upside-down skeleton was painted bright red. Researchers analysed the paint and found that it contains human blood and bird egg proteins in addition to a red pigment. The study began when researchers wondered what the Sicán people had used in the paint mix as a binding material. As per a

release, the researchers analysed a small sample of the mask's red paint. Using sophisticated equipment they found that the sample contained proteins, so proteomic analysis was done, which revealed six proteins from human blood in the red paint, including serum albumin and immunoglobulin G. Other proteins, such as ovalbumin, came from egg whites. Because the proteins were degraded, the researchers could not identify the exact species of bird's egg used to make the paint, but likely is the Muscovy duck.

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Readers may send their questions / answers to [questioncorner@thehindu.co.in](mailto:questioncorner@thehindu.co.in)

# The Sicán culture

- The Sicán culture inhabited what is now the north coast of Peru between about 750 CE and 1375 CE.
- They succeeded the Moche culture, but there is still controversy among archeologists and anthropologists over whether the two are separate cultures.
- The Sican culture is the name that archaeologist Izumi Shimada gave to the culture that inhabited what is now the north coast of Peru between about 750 and 1375 CE.
- According to Shimada, Sican means "temple of the Moon". The Sican culture is also referred to as Lambayeque culture, after the name of the region in Peru

# What grade of coal does India produce?

Why does it need imported coal? What is the status of the country's transition away from the fossil fuel?

Jacob Kenley

**The story so far**  
A recent report by the Organized Crime and Corruption Reporting Project, a venture backed by billionaire hedge fund manager and philanthropist, George Soros, furnished new documents to allege that in 2004, the Adani Group claimed 'low grade' coal, imported from Indonesia, to be 'high quality' coal, inflated its value and sold it to Tamil Nadu's power generation company, TANGEDCO (Tamil Nadu Generation and Distribution Company).

**What is 'high grade' and 'low grade' coal?**

High and low quality are relative terms and only meaningful in the context of where the coal is used and how they are processed. The Gross Calorific Value (GCV), or the amount of heat or energy that can be generated from burning the coal, determines the gradation of coal. Coal being a fossil fuel is a mixture of carbon, ash, moisture and a host of other impurities. The higher the available carbon in a unit of coal, the greater is its quality or 'grade'. There are 17 grades of coal by this metric from grade I, or top quality coal, with a kilo of it yielding higher than 7,000 kcal, and the lowest producing anywhere between

There are two ways to get clean coal. Coal plants can have 'washing plants' on site to process the coal and reduce its ash and moisture content. The other method is coal gasification

2,000-2,500 kcal, as per a classification by the Coal Ministry. However, the calorific value is not a useful metric on its own. The most important uses of coal are in running thermal power plants or powering a blast furnace to produce steel and both require different kinds of coal. 'Coking' coal is the kind needed to produce coke – an essential component of steel making – and thus requires minimal ash content.

Non-coking coal, despite its ash content, can be used to generate enough useful heat to run a boiler and turbine.

**What are the characteristics of Indian coal?**

Indian coal has historically been evaluated as being high in ash content and low in calorific value compared to imported coal. The average GCV of domestic thermal coal ranges from 3,500-4,000 kcal/kg compared to imported thermal coals of 45,000 kcal/kg of GCV. Also the average ash content of Indian coals is more than 40% compared to imported coal which has less than 10% ash content. The consequence of this is that high ash coal when burnt results in higher particulate matter, nitrogen and sulphur dioxide. Given this, the government, since 1954, has controlled the price of coal in a way that power companies were disincentivised to use high grade coking coal for power generation. Thus in the pursuit of balancing India's needs for coal production, power plants and pollution, the government has recommended the use of imported coal with lower ash and moisture content. The Central Electricity Authority (CEA) in 2012 recommended, and which still stands, that about 10-15% blending of imported coal can usually be safely used in Indian power boilers, which are designed for low quality Indian coal.

**What is clean coal?**

Basically, we get clean coal when the carbon content has been increased by reducing its ash content. Coal plants have 'washing plants' on site which can process the coal in ways that reduce ash and moisture content. They employ huge blowers or a 'bath' to remove fine, coarse ash. However, deploying such equipment is expensive and adds to the cost of power. The other method to clean coal – again requiring significant investment – is coal gasification. Here, the need to directly burn coal is bypassed by converting it into gas. By relying on an integrated gasification combined cycle (IGCC) system, steam and hot pressurised air or oxygen combine with coal in a reaction that forces carbon molecules apart. The resulting gases, a mixture of carbon monoxide, hydrogen, CO2 and water vapour, is then dried and burned in a gas turbine to make electricity. Since IGCC power plants create two forms of energy (steam from the gasification process apart from syngas as fuel), they increase efficiency of the coal used.

**What is the future of coal in India?**

Official data says that India in 2023-24 produced 997 million tonnes of coal, an 1% growth over the previous year. Most of this was produced by the state-owned Coal India Ltd and its subsidiaries.

As of March 2024, India produced 261 tonnes of coal, of which 58 million tonnes was coking coal. Despite stated commitments to transition India's electricity sector away from fossil fuel, coal is the mainstay of India's energy economy. Change, however, is in the air as for the first time this year, renewable energy accounted for 71.1% of the record 11.6 GW power generation capacity added by India in the first quarter of this year, while coal's share (including lignite) of total power capacity dropped below 50% for the first time since the 1960s.

# Coal in india



## What is 'high grade' and 'low grade' coal?

- High and low quality are relative terms and only meaningful in the context of where the coal is used and how they are processed.
- The Gross Calorific Value (GCV), or the amount of heat or energy that can be generated from burning the coal, determines the gradation of coal.
- Coal being a fossil fuel is a mixture of carbon, ash, moisture and a host of other impurities.
- The higher the available carbon in a unit of coal, the greater is its quality or 'grade.'
- There are 17 grades of coal by this metric from grade 1, or top quality coal, with a kilo of it yielding higher than 7,000 kcal, and the lowest producing anywhere between 2,200-2,500 kcal, as per a classification by the Coal Ministry.

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- **Non-coking coal, despite its ash content, can be used to generate enough useful heat to run a boiler and turbine.**

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- **Indian coal has historically been evaluated as being high in ash content and low in calorific value compared to imported coal.**
- **The average GCV of domestic thermal coal ranges from 3,500-4,000 kcal/kg compared to imported thermal coals of +6,000 kcal/kg of GCV.**



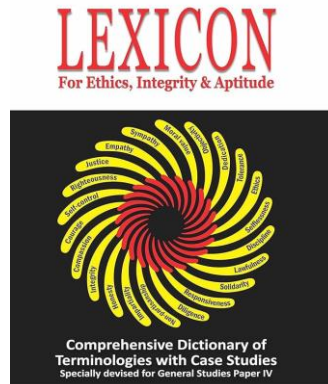
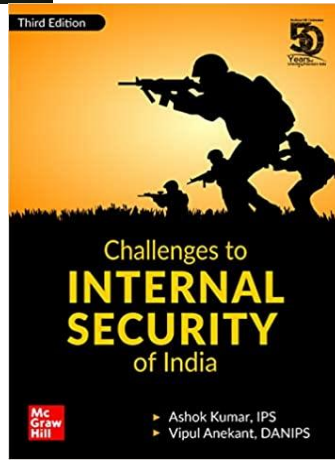
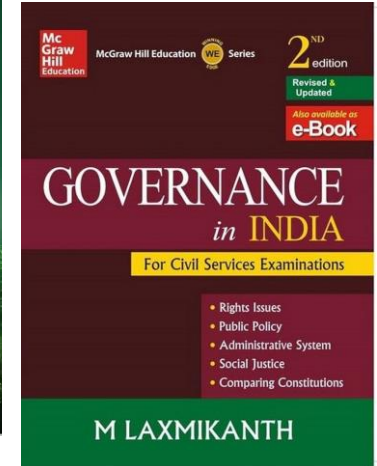
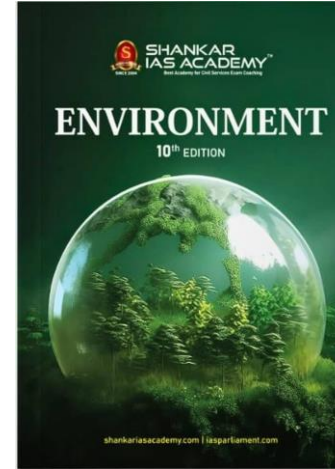
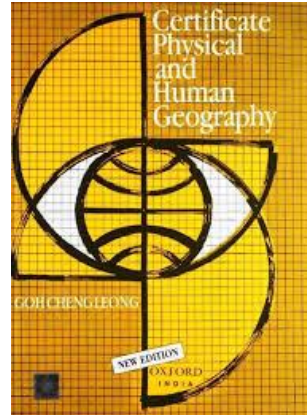
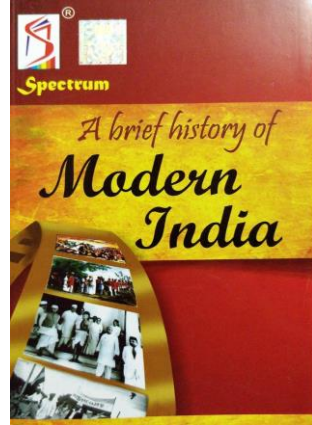
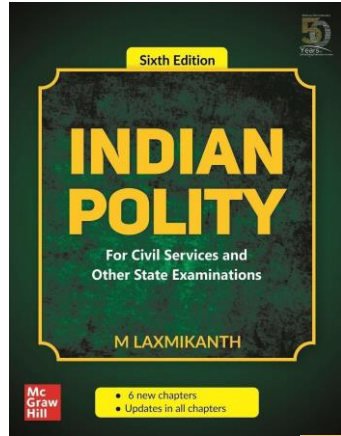
- **Also the average ash content of Indian coals is more than 40% compared to imported coal which has less than 10% ash content.**
- **The consequence of this is that high-ash coal when burnt results in higher particulate matter, nitrogen and sulphur dioxide.**
- **Given this, the government, since 1954, has controlled the price of coal in a way that power companies were disincentivised to use high-grade coking coal for power generation.**

## **What is clean coal?**

- **Broadly, we get clean coal when the carbon content has been increased by reducing its ash content.**
- **Coal plants have ‘washing plants’ on site which can process the coal in ways that reduce ash and moisture content.**
- **They employ huge blowers or a ‘bath’ to remove fine, coarse ash. However, deploying such equipment is expensive and adds to the cost of power.**

- **The other method to clean coal — again requiring significant investment — is coal gasification.**
- **Here, the need to directly burn coal is bypassed by converting it into gas.**
- **By relying on an integrated gasification combined cycle (IGCC) system, steam and hot pressurised air or oxygen combine with coal in a reaction that forces carbon molecules apart.**
- **The resulting syngas, a mixture of carbon monoxide, hydrogen, CO<sub>2</sub> and water vapour, is then cleaned and burned in a gas turbine to make electricity**

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# Topics

- Canopy Bridge for Gibbon
- About Gibbon
- Heat waves
- Goldfinch
- Lodz
- Mains



By saurabh Pandey



# Railways to construct canopy bridges across track in Assam gibbon habitat

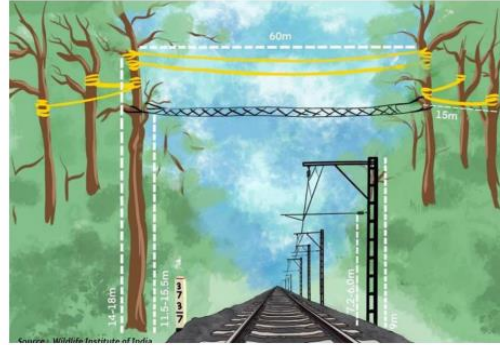
**The Hindu Bureau**  
GUWAHATI

The Northeast Frontier Railway (NFR) has earmarked funds to construct canopy bridges for India's only ape to move across a railway track bifurcating its prime habitat in eastern Assam.

A 1.65-km-long track – set to be doubled and electrified – divides the 2,098.62-hectare Hollongapar Gibbon Sanctuary in Jorhat district. The sanctuary has the largest concentration of the Hoolock gibbon, one of 20 species of apes on earth.

The gibbon, known for its vocalisation, spends much of its time on the upper canopy of tall trees, mostly the hollong (*Dipterocarpus macrocarpus*). The fragmentation of the forest along the track has disturbed the arboreal nature of the ape, putting it at risk while crossing the track.

"We decided to install canopy bridges inside the sanctuary to facilitate the



The canopy bridge designed by the Wildlife Institute of India for installation in a gibbon sanctuary in Assam, and, right, a Hoolock gibbon. SPECIAL ARRANGEMENT



movement of the gibbons across the track. The decision was made in consultation with the Assam State Forest Department, Wildlife Institute of India (WII) and other stakeholders," NFR spokesperson Sabyasachi De said.

These canopy bridges, designed by the WII in consultation with the NFR, will be constructed at identified points to facilitate easy movement of the arboreal species between the two halves of the sanctuary partitioned by the Mariani-

Dibrugarh railway track.

"The ends of the canopy bridges, as well as the knots, will be secured and clamped or tightened using appropriate and high-grade fastening materials and techniques. As a fail-safe mechanism, safety nets will be installed below the main twin-rope bridge to save the species accidentally falling off the bridges," Mr. De said.

The canopy rope bridges will be installed in such a way that lianas and creepers can be guided

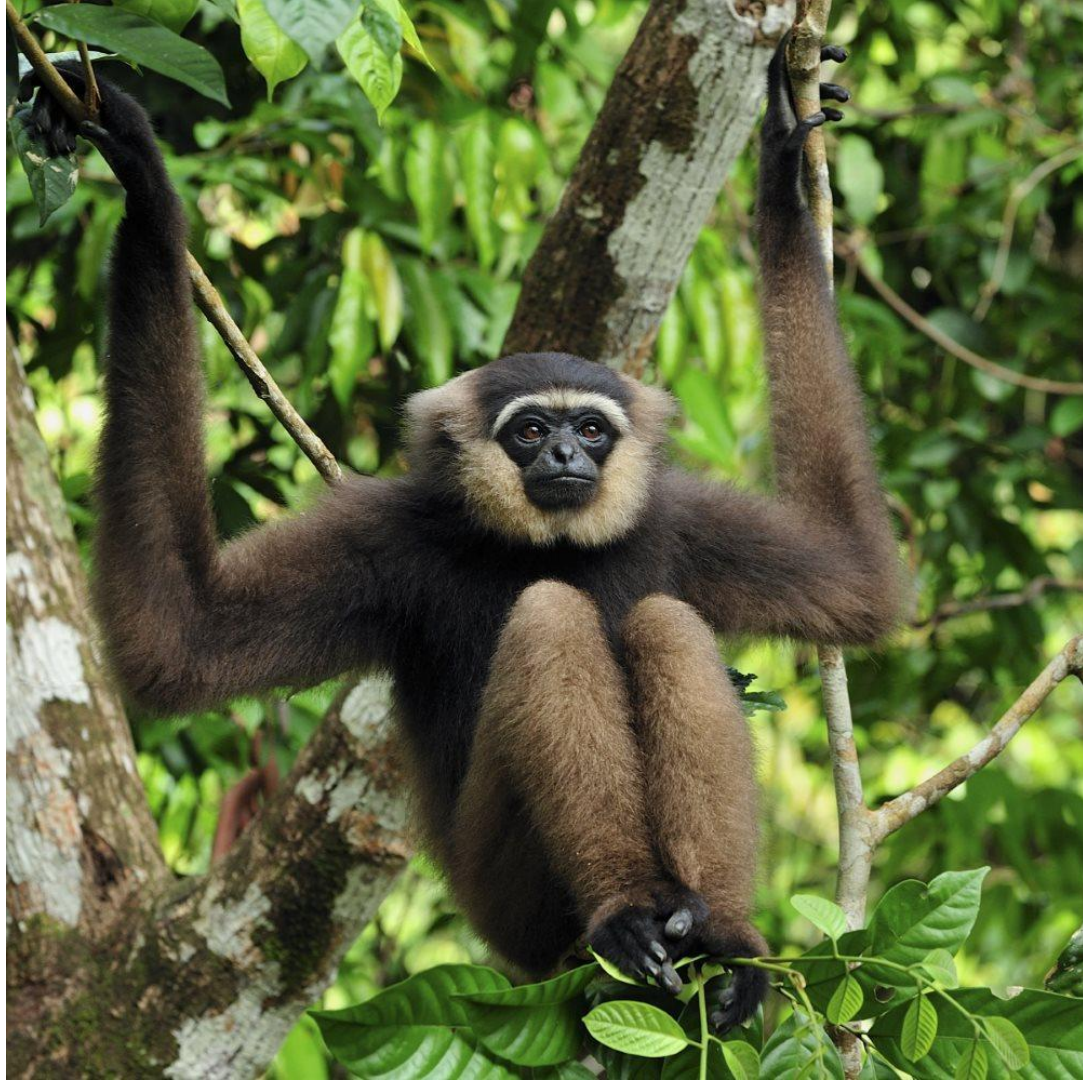
along them to make the bridges look as natural as possible, railway officials said.

The NFR had undertaken efforts in the past to build an artificial canopy bridge while the State Forest Department and Assam-based biodiversity conservation organisation Aaranyak had erected a natural canopy bridge in a part of the sanctuary frequented by the gibbons. The gibbons did not use the artificial bridge but used the natural canopy.



# Canopy Bridge for Gibbon

- **The Northeast Frontier Railway (NFR) has earmarked funds to construct canopy bridges for India's only ape to move across a railway track bifurcating its prime habitat in eastern Assam.**
- **The gibbon, known for its vocalisation, spends much of its time on the upper canopy of tall trees, mostly the hollong (*Dipterocarpus macrocarpus*).**
- **The fragmentation of the forest along the track has disturbed the arboreal nature of the ape, putting it at risk while crossing the track**





# About Gibbon

- Gibbon, (family Hylobatidae), any of approximately 20 species of small apes found in the tropical forests of Southeast Asia.
- Gibbons, like the great apes (gorillas, orangutans, chimpanzees, and bonobos), have a humanlike build and no tail, but gibbons seem to lack higher cognitive abilities and self-awareness.
- They also differ from great apes in having longer arms, dense hair, and a throat sac used for amplifying sound. Gibbon voices are loud, are musical in tone, and carry over long distances.

- The most characteristic vocalization is the “great call,” usually a duet in which the female leads and the male joins in with less complex notes, used as a territorial marker by both sexes.
- The various species of gibbons can be divided into four genera: *Hoolock*, *Hylobates*, *Nomascus*, and *Symphalangus*.
- Molecular data indicate that the four groups are as different from one another as chimpanzees are from humans.

- Gibbons are arboreal and move from branch to branch with speed and great agility by swinging from their arms (brachiating).
- On the ground, gibbons walk erect with the arms held aloft or behind.
- They are active during the day and live in small monogamous groups that defend territories in the treetops. They feed mainly on fruit, with varying proportions of leaves and with some insects and bird eggs as well as young birds.

- The dark-handed gibbon (*Hylobates agilis*), which lives on Sumatra south of Lake Toba and on the Malay Peninsula between the Perak and Mudah rivers, may be either tan or black and has white facial markings.
- The **white-handed gibbon** (*H. lar*), of northern Sumatra and most of the Malay Peninsula northward through Thailand into Yunnan, China, is similar but has white extremities.

- The pileated gibbon (*H. pileatus*), of southeastern Thailand and western Cambodia, has white hands and feet; the male is black and the female buff with a black cap and chest patch.
- The difference in colour comes about with age; the juveniles are buff and both sexes darken with age, but the male does so much more rapidly.
- Kloss's gibbon (*H. klossii*), from the Mentawai Islands west of Sumatra, is completely black throughout its life.

# Heat-baked Chennai can set an example for India



**T**he year 2023 was by far the hottest ever according to a recent World Meteorological Organization (WMO) report. Global average temperatures reached 1.45° C higher than pre-industrial levels, almost touching the 1.5° C limit set in the Paris Agreement. Scientists predict that 2024 could be similar. With global emissions still growing, climate impacts are worsening. Heatwaves are sweeping through the Indian sub-continent. And, more hotter and longer-lasting heat waves are being predicted in the years to come.

## The reality of the urban heat island

In cities, this problem is exacerbated by a phenomenon termed the Urban Heat Island (UHI) effect. Temperatures in large, crowded urban settings can be several degrees higher than in surrounding rural areas, and even hotter at night. Concrete structures and tarmac roads retain heat which stays trapped inside this “urban bubble” along with air pollutants. A lack of green spaces and waste heat from air conditioners and other machinery add to the UHI.

Chennai, a coastal city, is affected by yet another feature which is cause for worry. Humidity reduces the cooling effect of perspiration, leading to a person experiencing an elevated body temperature, debilitating heat stress, exhaustion, and even a potentially fatal heat stroke.

As shown by available heat maps, the UHI in Chennai adds between 2° to 4° C to temperatures in nearby rural areas. So, when the maximum temperature is 40° C elsewhere, parts of Chennai could register between 42° to 44° C. Under high humidity conditions, wet-bulb temperature (indicating the extent to which evaporation can take place and facilitate cooling) of around 38.5° C is considered by the World Health Organization to be “near the limits of human survivability”.

In India, a heatwave is officially declared in coastal areas when the maximum temperatures are over 37° C and 4.5° C above normal. Clearly, with an UHI, heatwave conditions are quite easily breached in Chennai. The effects could be much worse, even dangerous, when compared to inland, rural areas.

India has national, State and even some district-level Heat Action Plans (HAP) to reduce morbidity and mortality, especially among the vulnerable poor, infants and the elderly. The National Disaster Management Authority (NDMA) Guidelines, which are being upgraded, and those of several States, outline measures to deal with heatwaves including early warning bulletins, and staggered work hours at outdoor construction sites, with shaded areas and temporary shelters, and strategic provisioning of drinking water and oral rehydration salts. Besides such post facto responses to heatwaves, longer term measures are needed to deal with UHI and reduce urban heat. The Chennai Metropolitan Development



**D. Raghunandan**

is Climate Change Lead, Inhaf ClimACT-Chennai



**Bindhu Bhuma**

was formerly Project Associate, Inhaf ClimACT-Chennai

The city is one of the few to have adopted a Climate Action Plan but there is scope for much improvement towards better liveability

Authority (CMDA) has recently commissioned the preparation of presumably more detailed heat maps than what are available now. While awaiting more localised planning and actions, several broad brush measures may be readily thought of and implemented. The Chennai Climate Action Plan (CCAP) offers several meaningful suggestions including those discussed here, albeit scattered under different sections. In our view, they underestimate causative factors and, therefore, remedial measures and targets.

## A study and findings

Our study on Chennai and climate change (see Proposed Action Plan under [www.inhaf.org/climact](http://www.inhaf.org/climact)) looks at UHI as one among several inter-linked multi-dimensional issues. Our major findings and recommendations are discussed here.

Increasing green cover, obviously, tops the list. Green areas such as urban forests, large greens and parks, avenue and other trees, even lawns, release moisture which evaporates and cools the environs. Well-distributed green areas also influence local micro-climate, reduce air pollution, and promote health and well being. Tree-lined and shaded walkways and tracks provide pedestrians, cyclists and itinerant workers shelter from the blazing sun, and also encourage non-motorised transportation. With such multiple benefits, green areas are considered essential for sustainable urban development by UN Habitat, which recommends that green spaces be available for all citizens within 400 metres from their residence.

Regrettably, Chennai has among the lowest percentage of green cover of all the metros in India. The area under the Corporation is greener, with promising initiatives such as “*miyawaki* forests”, although questions remain about the species planted. However, the expansion of the city has heavily depleted green areas and waterbodies.

Varied figures are cited for green cover in the larger Chennai Metropolitan Area (CMA) depending on the assessment methodology. But an estimated 12% appears reasonable (subject to correction), compared to an estimated over 20% in Bengaluru, Kolkata, Mumbai and Delhi. The densely populated city-state of Singapore has an astounding 47% under green cover. Many European cities have green cover that is well over the EU norm of 30%.

Congested, poorly ventilated localities and informal settlements of the urban poor suffer the most from UHI and would benefit from green areas, parks and waterbodies that are nearby. The Master Plan III should provide for inviolable green areas and local parks with equitable access.

Rough estimates indicate that increasing green cover in the CMA to a well-distributed 25% could significantly reduce UHI by about 1.5° C or more. This could also absorb around 10% of its carbon

dioxide emissions and assist moving towards a “net zero” future.

## On the use of air-conditioners, energy saving

A less understood factor behind UHI is waste heat from air-conditioning. In Chennai, as in other Indian metros, roughly 50% of electricity consumption during summer is for air-conditioning alone, which vent heat out. The more the UHI, the greater the use of air-conditioning, generating even more heat in a nasty feedback loop. It is estimated that moving towards more energy-efficient (EE) air-conditioning, through a combination of mandates for the purchase of five-star or split EE air-conditioners and incentives for the exchange of older air-conditioners for new EE units (as offered by the electricity distributor in Delhi, to reduce peak load, a win-win for distributor and consumer), could reduce UHI by as much as 1.5° C.

Cities such as Shanghai and Seoul have reported a significant reduction in UHI through such strategies. Several east Asian cities have in addition mandated other energy-saving measures for air-conditioning such as having a thermostat setting of 25° C in offices and commercial buildings. Energy savings can also accrue from switching off air-conditioners (and other appliances) from the mains rather than by remote control (this leaves appliances on low power-consuming stand-by mode). Greater consciousness about climate change would undoubtedly help but savings of roughly 25% on electricity charges, would also act as a powerful driver of change.

Further, if buildings are better insulated and ventilated, and constructed using appropriate designs and materials according to “green” building codes, they would require less air-conditioning and generate less waste heat.

Total energy savings could then rise to roughly 40%-50% and reduce UHI by, say, around 3° C. There would also be a significant co-benefit – of emissions reduction from thermal power plants in Chennai.

Having permeable pavings and walkways using alternative materials, increased shrubbery along sidewalks, berms and dividers, and reflective paint on roofs, walls and streets, are other measures to reduce UHI. A sharp reduction in personal vehicles (most four-wheelers have powerful engines and airconditioners), through a rapid scaling-up of effective public transport with electric buses, would be another major contribution.

Chennai is one of a very few cities in India to have adopted a Climate Action Plan, but there is considerable scope for improvement. The city and its residents should utilise this opportunity to ensure long-term policies and measures to cool the city, improve liveability, and set an example for the rest of India.



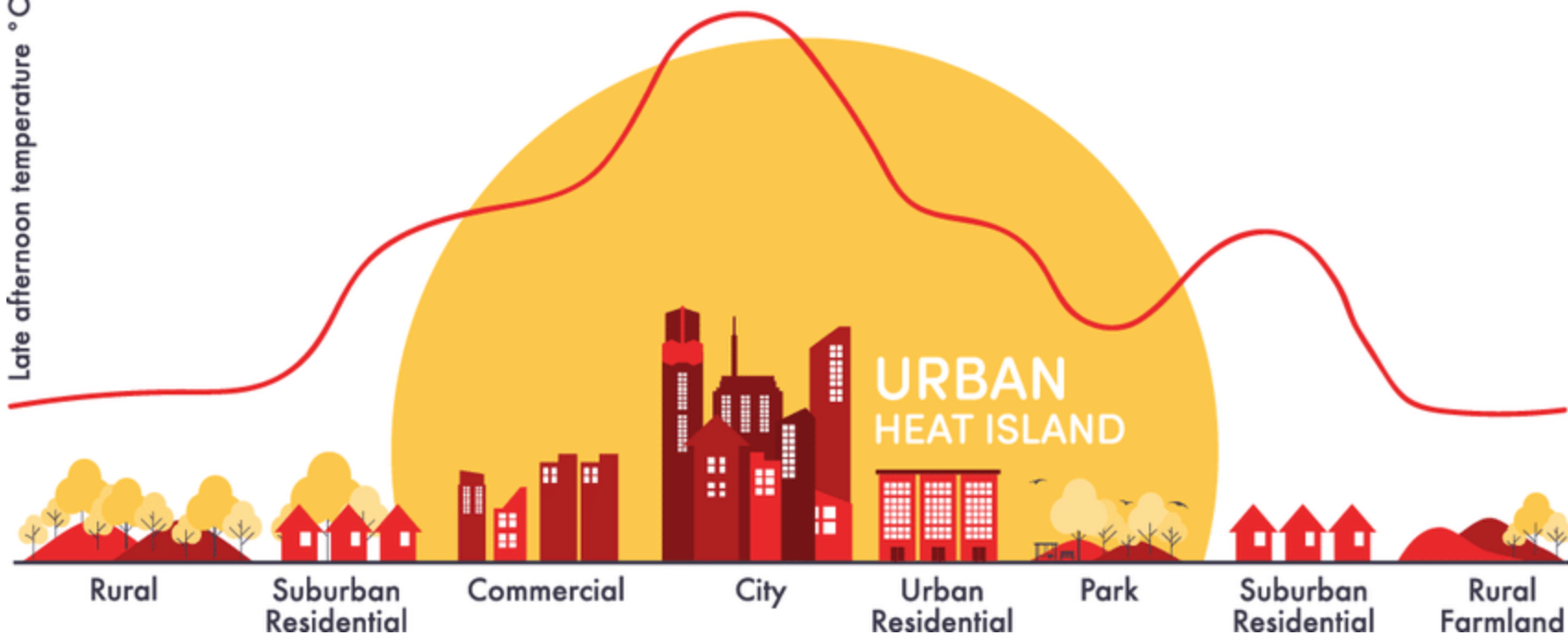
# **HEAT WAVES**

**In cities, this problem is exacerbated by a phenomenon termed the Urban Heat Island (UHI) effect.**

**Temperatures in large, crowded urban settings can be several degrees higher than in surrounding rural areas, and even hotter at night.**

**Concrete structures and tarmac roads retain heat which stays trapped inside this “urban bubble” along with air pollutants.**

Late afternoon temperature °C



- **A lack of green spaces and waste heat from air conditioners and other machinery add to the UHI.**
- **Chennai, a coastal city, is affected by yet another feature which is cause for worry.**
- **Humidity reduces the cooling effect of perspiration, leading to a person experiencing an elevated body temperature, debilitating heat stress, exhaustion, and even a potentially fatal heat stroke.**

- **. Under high humidity conditions, wet-bulb temperature (indicating the extent to which evaporation can take place and facilitate cooling) of around  $38.5^{\circ}\text{C}$  is considered by the World Health Organization to be “near the limits of human survivability”.**
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- **The effects could be much worse, even dangerous, when compared to inland, rural areas.**
- **India has national, State and even some district-level Heat Action Plans (HAP) to reduce morbidity and mortality, especially among the vulnerable poor, infants and the elderly.**

- **The National Disaster Management Authority (NDMA) Guidelines, which are being upgraded, and those of several States, outline measures to deal with heat waves including early warning bulletins, and staggered work hours at outdoor construction sites, with shaded areas and temporary shelters, and strategic provisioning of drinking water and oral rehydration salts.**
- **The Chennai Climate Action Plan (CCAP) offers several meaningful suggestions including those discussed here, albeit scattered under different sections.**
- **In our view, they underestimate causative factors and, therefore, remedial measures and targets.**



- **Increasing green cover, obviously, tops the list. Green areas such as urban forests, large greens and parks, avenue and other trees, even lawns, release moisture which evaporates and cools the environs.**
- **Well-distributed green areas also influence local micro-climate, reduce air pollution, and promote health and well being.**

- **Tree-lined and shaded walkways and tracks provide pedestrians, cyclists and itinerant workers shelter from the blazing sun, and also encourage non-motorised transportation.**
- **With such multiple benefits, green areas are considered essential for sustainable urban development by UN Habitat, which recommends that green spaces be available for all citizens within 400 metres from their residence**

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- **It is estimated that moving towards more energy-efficient (EE) air-conditioning, through a combination of mandates for the purchase of 5-star or split EE air-conditioners .**
- **Energy savings can also accrue from switching off air-conditioners (and other appliances) from the mains rather than by remote control (this leaves appliances on low power-consuming stand-by mode)**

- **if buildings are better insulated and ventilated, and constructed using appropriate designs and materials according to “green” building codes, they would require less air-conditioning and generate less waste heat.**
- **Having permeable pavings and walkways using alternative materials, increased shrubbery along sidewalks, berms and dividers, and reective paint on roofs, walls and streets,**

## *Little room for leisure*



An Afghan man watches goldfinches compete in a birdsong duel at a basketball court in Kabul. Under the Taliban regime, entertainment options have drastically shrunk in line with their austere interpretation of Islam — but the birdsong duels remain immensely popular. AFP

# Goldfinch

- Goldfinch, any of several species of the genus *Carduelis* (some formerly in *Spinus*) of the songbird family Fringillidae; they have short, notched tails and much yellow in the plumage.
- All have rather delicate sharp-pointed bills for finches. Flocks of goldfinches feed on weeds in fields and gardens.
- They have high lisping calls, often given in flight





- **American goldfinches are granivores, which means they mainly eat seeds. Some of their favorites include sunflower, thistle, and elm seeds.**
- **The goldfinch is a diurnal bird, meaning it's most active during the day.**
- **It has excellent flying skills, dipping and rising in a wavelike pattern as it soars.**
- **When it's not airborne, or perched on plants, the bird hops along the ground searching for seeds to eat.**
- **These animals have six different vocalizations, including their “po-ta-to-chip” call.**

## *Saying it with flowers*



**Colours of tradition:** People walking past a flower carpet prior to the Corpus Christi procession in Spycimierz, Lodz region in Poland. For over 200 years, local residents here create colourful flower carpets, almost 1-km long, along the Corpus Christi procession route. AFP

# Lodz

Lódź is a city in central **Poland** and a former industrial centre. It is the capital of **Lódź Voivodeship**, and is located 120 km (75 mi) south-west of **Warsaw**.



# Topics

- Nata Pratha
- NHRC
- One china Policy
- Next-generation sequencing (NGS)
- Gene deserts
- Promoter
- OPEC PLUS
- H5N2
- Mains



By saurabh Pandey



# NHRC seeks report on *Nata Pratha* practice

**The Hindu Bureau**

NEW DELHI

The National Human Rights Commission (NHRC) issued notice on Thursday to the Union Ministry of Women and Child Development and the States of Rajasthan, Madhya Pradesh, Uttar Pradesh, and Gujarat over a practice known as *Nata Pratha*. The girls in some communities of these States are sold either on stamp paper or otherwise in the name of illegal or child marriage, mostly by their own families.

Given the immoral consequences, the Commission has called for its eradication and abolition.

The States have been directed to submit a report on measures taken or proposed to be taken in this regard within eight weeks.

It suggested that individuals involved in forcing women into *Nata Pratha* must be prosecuted under laws relating to human trafficking.

# Nata Pratha

- A centuries-old custom “Nata Pratha” is still alive in several Indian states like Rajasthan, Gujarat and Madhya Pradesh. The custom allows men to live with as many women resulting in children being abandoned by their parents.
- Nata Pratha is practiced by the Bhil tribe, the one of the largest tribes in South Asia.
- Traditionally, both the man and the woman are supposed to be married or widowed, but the custom has evolved to include single people as well.



- **The National Human Rights Commission (NHRC) called for eradication of 'nata pratha' and issued notice to the Centre and the governments of Rajasthan, Madhya Pradesh, Uttar Pradesh and Gujarat over the evil tradition.**
- **Under 'nata pratha', girls in some communities are allegedly 'sold', either on a stamp paper or otherwise in the name of marriage having no legal sanctity in parts of Rajasthan and the adjoining areas in Madhya Pradesh, Uttar Pradesh and Gujarat.**

## About the Organisation

- **The National Human Rights Commission (NHRC) of India was established on 12 October, 1993. The statute under which it is established is the Protection of Human Rights Act (PHRA), 1993 as amended by the Protection of Human Rights (Amendment) Act, 2006.**
- **It is in conformity with the Paris Principles, adopted at the first international workshop on national institutions for the promotion and protection of human rights held in Paris in October 1991, and endorsed by the General Assembly of the United Nations by its Regulations 48/134 of 20 December, 1993.**

- **The NHRC is an embodiment of India's concern for the promotion and protection of human rights.**
- **Section 2(1)(d) of the PHRA defines Human Rights as the rights relating to life, liberty, equality and dignity of the individual guaranteed by the Constitution or embodied in the International Covenants and enforceable by courts in India.**

## 2.3 Composition of NHRC

NHRC is an autonomous institution consisting of:

1.
  - (a) A Chairperson who has been a Chief Justice of the Supreme Court;
  - (b) One Member who is or has been a Judge of the Supreme Court;
  - (c) One Member who is or has been the Chief Justice of a High Court;
  - (d) Two Members to be appointed from amongst persons having knowledge of, or practical experience in matters relating to Human Rights;
2. The Chairperson of the National Commission for Minorities, National Commission for the Scheduled Castes, National Commission for the Scheduled Tribes and National Commission for Women are deemed Members of the Commission.



## China protests PM's comment on closer ties with Taiwan

China on Thursday protested over Prime Minister Narendra Modi's comment that he looked forward to having closer ties with Taiwan and insisted that New Delhi should resist the Taiwan authorities' "political calculations". China views Taiwan as a rebel province that must be reunified with the mainland. "First of all, there is no such thing as 'president' of the Taiwan region," Chinese Foreign Ministry spokesperson Mao Ning told a media briefing in Beijing. "On the one-China principle, India has made serious political commitments and is supposed to recognise, be alarmed about and resist the Taiwan authorities' political calculations, and refrain from doing things that violate the one-China principle," Ms. Mao said. PTI

# One china policy



- It is the diplomatic acknowledgement of China's position that there is only one Chinese government.
- The policy can be traced back to 1949 and the end of the Chinese civil war.
- The defeated Nationalists, also known as the Kuomintang, retreated to Taiwan and made it their seat of government while the victorious Communists began ruling the mainland as the People's Republic of China. Both sides said they represented all of China.
- Since then China's ruling Communist Party has threatened to use force if Taiwan ever formally declares independence, but it has also pursued a softer diplomatic track with the island in recent years



U.S. One China Policy	PRC One-China Principle
<ul style="list-style-type: none"> <li>Guided by the Taiwan Relations Act, three US-PRC Joint Communiques, and Six Assurances to Taiwan</li> </ul>	<ul style="list-style-type: none"> <li>Based on the PRC's misrepresentation of various nations' one China policies and UNGAR 2758</li> </ul>
<ul style="list-style-type: none"> <li>Acknowledges, but does not endorse PRC's position that Taiwan is part of China</li> </ul>	<ul style="list-style-type: none"> <li>Asserts that "Taiwan is part of China" and that this is an "indisputable fact"</li> </ul>
<ul style="list-style-type: none"> <li>Rests upon the expectation that Taiwan's future will be determined by peaceful means</li> </ul>	<ul style="list-style-type: none"> <li>Provides that "non-peaceful means shall be used" if possibilities of peaceful unification exhausted</li> </ul>
<ul style="list-style-type: none"> <li>Does not recognize PRC sovereignty over Taiwan</li> </ul>	<ul style="list-style-type: none"> <li>Asserts that Taiwan is part of the sovereign territory of China</li> </ul>



## **India's stance on 'One China' policy**

**India has also stuck by the 'One China' policy. However, for India the 'One China' Policy doesn't just govern Taiwan but also Tibet; India doesn't recognise Taiwan or any Tibetan authority as independent of China.**

**The meetings between leaders of India and China routinely reaffirmed the 'One China' policy.**

**However, India stopped doing so in 2010 after then Chinese premier Wen Jiabao's visit. India was miffed after China issued 'stapled visas' instead of normal visas for residents of Jammu and Kashmir travelling to China.**

- **Though India doesn't have formal diplomatic ties with Taiwan, New Delhi has an office in Taipei for diplomatic functions called the India Taipei Association (ITA) headed by a senior diplomat and Taiwan has the Taipei Economic and Cultural Centre (TECC) in New Delhi. Both were established in 1995.**
- **One has seen slight changes to India's position on the policy since Narendra Modi's ascent to power.**
- **In 2014, when he was sworn in as prime minister, he had invited Taiwan's Ambassador Chung-Kwang Tien for the ceremony.**
- **After the Galwan clashes of 2020, India has been taking a tougher stance against China vis-à-vis Taiwan.**

# Understanding cancer become a data problem?

Can the use of data analytical tools render the process of diagnosis at least, easier? Will that eventually result in lowering risks, discomfort and pain for patients, and kin? At the cusp of health care and technology, lie innovations and solutions that will aid patients and those who treat them.

Vikas Pawar

Looking back 10 years to before my father passed away after his diagnosis of brain cancer, what I remember the most is the intricate web of challenges we confronted during his illness. The World Health Organization (WHO) reports that approximately 33,000 new incidences of brain cancer happen each year in India alone, while Global Cancer Observatory 2020 estimates brain cancer as the 19th most common type of cancer. Behind these alarming numbers, lie many stories of pain and unrest. Every family deals with the pain and uncertainty of taking care of loved ones, who may never get better.

Move forward by 10 years, inadvertently drawn to cancer research by the profound personal experience, I now find myself associated with it - and what I have learned fills me with hope. There have been amazing breakthroughs made in oncology research worldwide, the kind that will mitigate some of the challenges I experienced first hand. Based on my experience in working in this field, I will try to explain how this critical field has evolved over the last decade. The current standard of care for diagnosing cancer often requires invasive and risky procedures such as surgeries to extract tissue samples for analysis. Believe it or not, the risks for patients from these procedures range from short-term paralysis to death. Can we make it easier for the patients and their families, at least as far as diagnosis goes? The answer is a resounding yes. And, the answer lies in our genes.

We have all read about genes, DNA, and RNA as part of our basic high-school science. Technically, they are the fundamental building blocks of life, shaping our traits and our health. In the context of this discussion, science today links people's genes to their susceptibility to diseases like cancer. Let me give you a simple example. Imagine that you have a recipe for a sweet dish written down, and you want to make a bowl of it. However, when you're writing out the recipe, you accidentally change one of the ingredients. Instead of listing "sugar," you write "salt." This small change alters the taste and texture of the dish, making it turn out very differently than you intended. Similarly, in our bodies, our DNA is like the recipe for making and maintaining us. If there's a mistake in the DNA code, called a mutation, it can change how our cells grow and function, sometimes leading to cancer.

Therefore, what we must primarily understand is what are the mutations in the genes causing cancer. Research suggests that there are close to 3,000 such cancer-causing genes. With each gene containing thousands of DNA codes, and each code potentially holding vital information about cancer development, the sheer volume of data analysis for a human can become quite overwhelming. And seemingly impossible.

But, enter Next-Generation Sequencing (NGS). Cutting-edge technology that is potentially transforming our ability to



Scientists with test tubes containing stem cells at the GlaxoSmithKline research centre in Stevenage, U.K. REUTERS

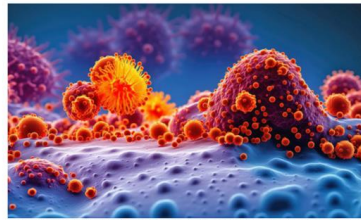
decipher the genetic code with speed and precision. To provide context, the Human Genome Project officially began in 1990 and was completed in 2003, taking about 13 years to finish, at a cost of about \$3 billion. Today's technology lets us accomplish the same process in possibly less than a week, and costs a little under \$1,000!

Getting back to cancer diagnostics, thanks to advancements in NGS, we have the concept of a liquid biopsy, a revolutionary technique that offers a less invasive alternative to surgery. To explain the concept, think of a detective investigating a case. To piece together the crime scene, the detective collects different types of evidence: fingerprints on a doorknob, footprints, and fibre left



If there's a mistake in the DNA code, or a mutation, it can change how cells behave. A DNA mutation can change how cells grow and function, sometimes leading to cancer

behind on the carpet. Similarly, in a liquid biopsy, clinicians act as detectives. Instead of invasive procedures like surgery, they collect a small sample of patient's blood, which is like the evidence at a crime scene. Within this blood sample, they look for genetic patterns that indicate the presence of cancer cells.



The current standard of care for diagnosing cancer often requires invasive and risky procedures such as surgeries to extract tissue samples for analysis. GETTY IMAGES

These genetic biomarkers are like the fingerprints and footprints found at a crime scene, providing crucial clues about the patient's health. It provides answers to questions: Is there a malignancy? And if so, what precisely is the type of malignancy?

Of course, this process is easier said than done. Producing such real-time results with precision requires the support of rigorous data analysis. The genetic data from several tumour and blood samples needs to be assimilated by artificial intelligence systems based on machine learning algorithms, combined with big data analytics platforms. No wonder chip makers and sequencing technology firms are making significant investments to expand their presence in the NGS domain. These technology tools enable researchers not only to process large amounts of information faster, but also to detect patterns that previously would have gone unnoticed by the human eye or mind alone.

As we navigate the ever-evolving landscape of oncology, it is clear that the future holds immense promise. By combining the power of data at our disposal, with innovative technologies like NGS, we may well be inching closer to unravelling the complexities of this disease. A popular saying suggests that data has become the new oil. As we stand at the forefront of a new era in cancer research, perhaps solving for its cure is also a data problem.

(The author is part of Hyderabad-based Exogen Genomics, a company focused on pioneering a liquid biopsy diagnostic specifically tailored for brain cancers. vilasapawar@hotmail.com)

# What is NGS?

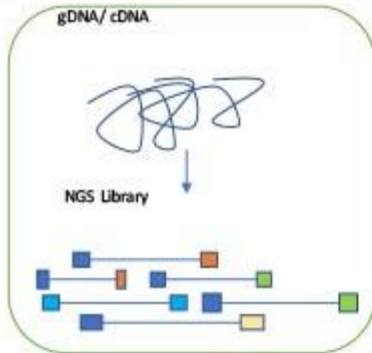


- **Next-generation sequencing (NGS) is a massively parallel sequencing technology that offers ultra-high throughput, scalability, and speed.**
- **The technology is used to determine the order of nucleotides in entire genomes or targeted regions of DNA or RNA.**
- **NGS has revolutionized the biological sciences, allowing labs to perform a wide variety of applications and study biological systems at a level never before possible.**
- **Today's complex genomics questions demand a depth of information beyond the capacity of traditional DNA sequencing technologies.**

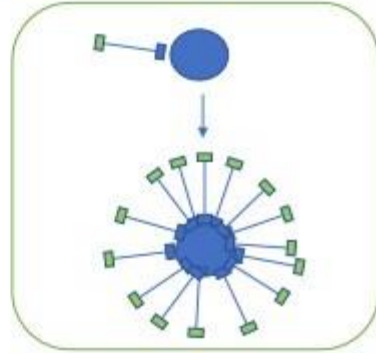
- **NGS has filled that gap and become an everyday tool to address these questions.**
- **Next-generation sequencing (NGS) is a technology for determining the sequence of DNA or RNA to study genetic variation associated with diseases or other biological phenomena.**
- **Introduced for commercial use in 2005, this method was initially called “massively-parallel sequencing”, because it enabled the sequencing of many DNA strands at the same time, instead of one at a time as with traditional Sanger sequencing by capillary electrophoresis (CE)**



## 1. Construct Library



## 2. Clonal Amplification



## 3. Sequence Library



## 4. Analyze Data





IBD presently affects approximately 1% of the world's population and one in every 10 people in the United Kingdom, or 1% of the population.

## Major cause of inflammatory bowel disease discovered

Asian News International

Researchers have identified a new biochemical pathway that is a major cause of inflammatory bowel disease (IBD) and related disorders that can be addressed with existing medications.

An autoimmune disease, such as IBD, which encompasses Crohn's disease and ulcerative colitis, presently affects approximately 5% of the world's population and one in every 10 people in the United Kingdom. These diseases are also becoming increasingly widespread, with over half a million individuals in the U.K. living with IBD by 2022, nearly double the previous prediction of 300,000.

Despite increasing prevalence, current treatments do not work in every patient and attempts to develop new drugs often fail due to our incomplete understanding of what causes IBD.

Researchers at Francis Crick Institute, in collaboration with UCL and Imperial College London published their findings in Nature. Scientists at the Crick journeyed into a 'gene desert' – an area of DNA that doesn't code for proteins – which has previously been linked to IBD and several other autoimmune diseases.

They found that this gene-desert contains an 'enhancer', a section of DNA that is like a volume dial for nearby genes, able to crank up the amount of proteins they make. The team discovered that this particular enhancer was only active in macrophages, a type of immune cell known to be important in IBD, and boosted a gene called ETS2, with higher levels correlating with a higher risk of

**Researchers found that MEK inhibitors, drugs already prescribed for other non-inflammatory conditions, were predicted to switch off the inflammatory effects of ETS2**

disease.

Using genetic editing, the scientists showed that ETS2 was essential for almost all inflammatory functions in macrophages, including several that directly contribute to tissue damage in IBD. Strikingly, simply increasing the amount of ETS2 in resting macrophages turned them into inflammatory cells that closely resembled those from IBD patients.

The team also discovered that many other genes previously linked to IBD are part of the ETS2 pathway, providing further evidence that it is a major cause of IBD.

Specific drugs that block ETS2 don't exist, so the team searched for drugs that might indirectly reduce its activity. They found that MEK inhibitors, drugs already prescribed for other non-inflammatory conditions, were predicted to switch off the inflammatory effects of ETS2.

The researchers then put this to the test, and discovered that these drugs not only reduced inflammation in macrophages, but also in gut samples from patients with IBD.

As MEK inhibitors can have side effects in other organs, the researchers are now working with LifeArc to find ways to deliver MEK inhibitors directly to macrophages.

James Lee, Group Leader of the Genetic Mechanisms of Disease Laboratory at the Crick, and Consultant Gastroenterologist at the Royal Free Hospital and UCL, who led the research, said: "IBD usually develops in young people and can cause severe symptoms that disrupt education, relationships, family life and employment. Better



SAURABH PANDEY  
CSE

Researcher at the Crick Institute

# What is Gene deserts ??

- Gene deserts are regions of the genome that are devoid of protein-coding genes. Gene deserts constitute an estimated 25% of the entire genome, leading to the recent interest in their true functions.
- Originally believed to contain inessential and "**Junk DNA**" due to their inability to create proteins, gene deserts have since been linked to several vital regulatory functions, including distal enhancing and conservatory inheritance.
- Thus, an increasing number of risks that lead to several major diseases, including a handful of cancers, have been attributed to irregularities found in gene deserts.
- One of the most notable examples is the 8q24 gene region, which, when affected by certain **single nucleotide polymorphisms**, lead to a myriad of diseases

# Regulator SEBI expands promoter definition for IPO-bound companies

**Ashley Coutinho**  
MUMBAI

The exchanges have expanded the promoter definition for companies tapping the market for an initial public offering, said two people in the know.

According to current SEBI regulations, a promoter is someone who controls the affairs of the company or can appoint the majority of directors or is named as such in an offer document. Earlier, founders holding 25% were deemed as promoters by virtue of having negative control and the power to block special resolution.

For the past year or so, SEBI has been insisting that founders of IPO-bound companies holding 10% or more classify themselves as promoters. SEBI has yet to introduce a consultation paper or any amending regulations to put this view into practice, according to experts.

## What norms say

The new guidelines now go a step further, and say founders collectively holding 10% will all be promoters if they are key managerial personnel (KMP) or a director in the company.

Even the immediate relative of the promoter will have to be classified as a promoter if she/he is on the company board or a KMP. Immediate relatives who hold 10% or more in the company, directly or indirectly, will also be deemed promoters.

It is not unusual for immediate relatives to hold 10% or more in Indian companies despite not being on the board or in-



**Definition issues:** The new norms say founders collectively holding 10% will all be promoters if they are KMP. REUTERS

involved in its management, said experts. "A brother or father of a promoter who is a non-executive director and does not hold any shares in the company will be deemed a promoter. This is going way beyond what is envisaged in law," said a lawyer. If a promoter's brother is classified as a promoter, for instance, then the latter's brother-in-law (his spouse's brother) will be classified as part of the promoter group, even though he may not be involved in the business of the listed company.

## Declassification

Once part of the promoter group, there is no easy way for declassification as a public shareholder given 31A of LODR Regulations.

"Since such a person was anyway classified as a part of the promoter group by virtue of him being an immediate relative of the promoter, any declassification would be impossible due to the restrictive rule. This is especially problematic in case of married daughters who may not any active role in the listed company," said Binoy Parikh, ED, Katalyst Advisors.

Last year, Khubilal Jugraj Rathod and Vimalchand Jugraj Rathod were identified as promoters while filing the draft prospectus for Flair Writing Industries.

Later, relatives Rajesh Rathod, Mohit Rathod and Sumit Rathod, each holding 10%, were included as promoters.

Consequently, several relatives of these three new promoters, including in-laws, were made part of the promoter group.

## Subjective definition

The subjective definition of promoter has been a subject matter of several court rulings in the past, according to Vinod Kothari, Director, Vinod Kothari Consultants. "There is no perfect way to ascertain control. Accounting standards have very complicated criteria for determination of control. So, moving to a more objective test is appreciable."

Immediate relatives include spouse of that person, or any parent, brother, sister or child of the person or of the spouse.

*(The writer is with The Hindu businessline)*

# Promoter



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- Earlier, founders holding 25% were deemed as promoters by virtue of having negative control and the power to block special resolution.
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# 'India must spend up to \$385 bn for RE goal'



**Reuters**

BENGALURU

India will have to invest as much as \$385 billion to meet its target of 500 gigawatts (GW) of renewable energy (RE) by 2030, but coal will remain a key source of electricity generation for the next decade, Moody's Ratings said.

India, a major greenhouse gas emitter, said it aims to ramp up non-fossil fuel capacity set by 50 GW each year to help meet 500 GW target. It missed its target of 175 GW by 2022.

Moody's, however, estimates an annual capacity addition of about 44 GW will help achieve the goal.

For that, India will have to spend \$190 billion to



\$215 billion on capacity over the next six to seven years and another \$150 billion to \$170 billion for transmission and distribution, the credit ratings agency estimates.

India's strong policy support boosted the RE share to about 43% in its power capacity mix in fiscal 2023-24, attracting private investments.



# Renewable energy fact

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# Russia defends OPEC+ oil pact, says may tweak if needed



**Reuters**

ST PETERSBURG

The current OPEC+ agreement is helping to balance oil supply and demand and provides certainty for energy markets, Russian Deputy Prime Minister Alexander Novak said, adding that the group might adjust it if necessary to support the market.

Brent crude oil prices slid below \$80 per barrel a day after the group agreed on Sunday to extend most of their oil output cuts into 2025, but left room for voluntary cuts from eight members to be unwound gradually, beginning in October.

That is the price level at which many OPEC+ mem-



**Output in focus:** OPEC+ members are now cutting production by a total of 5.86 million barrels per day. REUTERS

bers need to balance their budgets.

The Organization of the Petroleum Exporting Countries and allies led by Russia, together known as OPEC+, have made a series of deep output cuts since late 2022.

OPEC+ members are now cutting production by a total of 5.86 million barrels per day (bpd), or about 5.7% of global demand.

Some OPEC+ members, including Russia, agreed to gradually phase out the additional voluntary cuts of

2.2 million bpd over the course of a year from October to September 2025.

“However, we are ready to react quickly to market uncertainties,” Mr. Novak told an economic forum at St Petersburg, sitting alongside Saudi Energy Minister Prince Abdulaziz bin Salman among other high-profile guests.

Speaking to reporters, Mr. Novak also said Russia is working on establishing its oil production capacity by autumn 2025. OPEC+ is working to agree oil production capacity for its member countries by the end of 2024, an issue that has created tensions in the past because each nation’s output target is calculated from its notional capacity.

## **What is OPEC?**

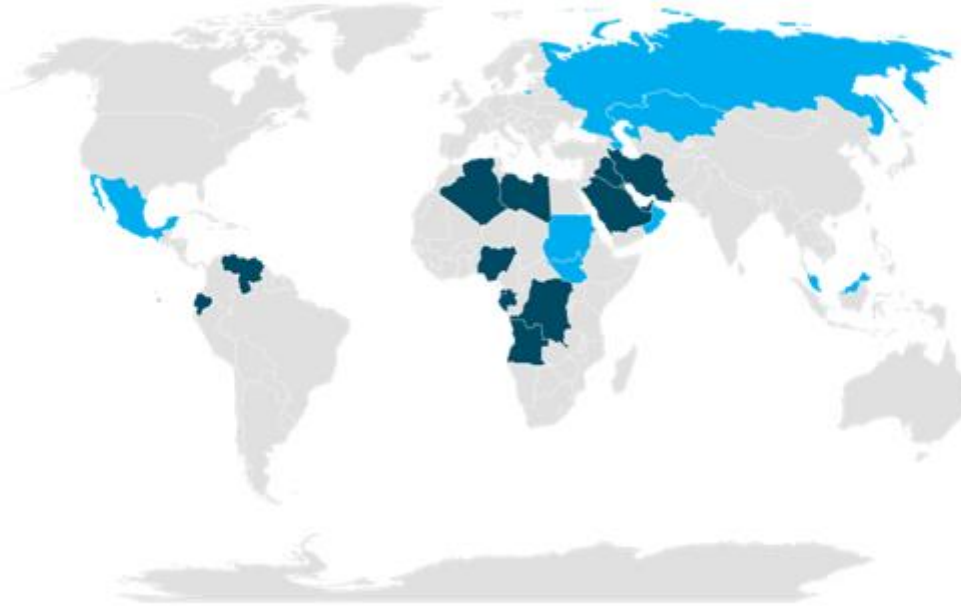
- **The Organization of the Petroleum Exporting Countries (OPEC) was founded in Baghdad, Iraq, with the signing of an agreement in September 1960 by five countries namely Islamic Republic of Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. They were to become the Founder Members of the Organization.**
- **It is a permanent, intergovernmental organization.**
- **Currently, the Organization has a total of 14 Member Countries.**

- **Opec+ refers to the alliance of crude producers, who have been undertaking corrections in supply in the oil markets since 2017.**
- **OPEC plus countries include Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan and Sudan.**
- **The aim was to undertake production restrictions to help resuscitate a flailing market.**



# OPEC and OPEC+ Member Nations, 2019

- OPEC Member
- OPEC+ Member





# First fatal human case of H5N2 bird flu identified

**Agence France-Presse**

GENEVA

The World Health Organization said on Wednesday a person in Mexico had died in the first confirmed human case globally of infection with the H5N2 variant of bird flu.

The patient, who died on April 24 after developing fever, shortness of breath, diarrhoea, and nausea, had "no history of exposure to poultry or other animals", and "multiple underlying medical conditions", the WHO said.

Mexican health authorities reported the confirmed case of human infection with the virus to the UN health body on May 23, after a 59-year-old was taken to hospital in Mexico City. The WHO said the case was the "first laboratory-confirmed human case of infection with an influenza A(H5N2) virus reported globally".

The source of exposure to the virus was unknown, although cases of H5N2 have been reported in poultry in the country.

According to the UN health body, H5N2 cases affected poultry in the state of Michoacan in March, with other outbreaks identified in the State of Mexico. But it said establishing a link between the human case and the poultry infections was so far impossible, estimating the risk to people as "low".

A different variant of bird flu, H5N1, has been spreading for weeks among dairy cow herds in the United States, with a small number of cases reported among humans.

# (H5N2)



## Situation at a glance

- On 23 May 2024, the Mexico International Health Regulations (IHR) National Focal Point (NFP) reported to PAHO/WHO a confirmed fatal case of human infection with avian influenza A(H5N2) virus detected in a resident of the State of Mexico who was hospitalized in Mexico City.
- This is the first laboratory-confirmed human case of infection with an influenza A(H5N2) virus reported globally and the first avian H5 virus infection in a person reported in Mexico.
- Although the source of exposure to the virus in this case is currently unknown, A(H5N2) viruses have been reported in poultry in Mexico.



## **What is H<sub>5</sub>N<sub>2</sub>?**

- **H<sub>5</sub>N<sub>2</sub> is just one of several kinds of avian influenza viruses.**
- **H<sub>5</sub> viruses have been circulating among poultry and wild birds in Mexico since the mid-1990s.**
- **However, unlike other avian influenza strains that have caused outbreaks in humans — such H<sub>1</sub> and H<sub>3</sub> viruses — H<sub>5</sub> viruses rarely infect humans.**

- **The viruses are classified based on two types of protein on their surfaces: hemagglutinin, or H, which plays a crucial role in allowing the virus to infect cells, and neuraminidase, or N, which helps the virus spread. Many different combinations of H and N proteins are possible.**
- **H5N2 belongs to a family of bird flu viruses called H5, which primarily infects wild birds. There are a total of nine known subtypes of H5 viruses**

- **H5N1, which was detected in dairy cows in the U.S. in March, also belongs to this family.**
- **It is commonly associated with highly contagious strains of H5 viruses called the “Goose Guangdong lineage” that have caused numerous outbreaks in poultry over the last 20 years and sporadic infections in humans**

# Topics



- Longitude Prize
- About PA-100AST
- The Truenat platform
- **Artificial intelligence act**
- Grey Zone Warfare
- Mains



By saurabh Pandey



# Rapid, diagnostic test for UTIs may help stem super bug crisis

The Longitude Prize-winning device offers an affordable, quick, point-of-care test for urinary tract infections, which promises to revolutionise infection management and global efforts to tackle antimicrobial resistance

Abdul Ghafur

**T**his week, a prize was announced that is likely to have far-reaching implications in the world of health care. Despite its importance, most of the community is unaware of the event. The winner of the Longitude Prize is poised to spearhead a revolution in the field of infection management and global efforts to tackle antimicrobial resistance. The £8 million (£ 85 crore) Longitude Prize on Antimicrobial Resistance (AMR), first announced in 2014, revealed its winner at an event in London's Science Museum. The PA-100 AST System from Sysmex Astrego is a high-tech, transformative, rapid, point-of-care test for UTIs (Urinary Tract Infection).

Rational use of antibiotics – choosing the appropriate antibiotic for the correct patient at the optimal time – is fundamental to saving lives and combating the superbug crisis. Rapid diagnostics are poised to be crucial in this effort. The winner of the Longitude Prize is set to spearhead the list of emerging rapid diagnostic technologies in a transformative manner. The applications for the Longitude Prize bring hope, suggesting that through collective action, we can look forward to a future protected from the threats of antimicrobial resistance.

The crisis is imminent: Antibiotic-resistant infections killed nearly 1.3 million people globally in 2019 and are on course to cause 10 million deaths a year by 2050, outstripping cancer. The global economy may lose \$ 4 trillion by 2050 and up to \$ 100 trillion by 2050 due to the AMR crisis.

**What does the prize mean?**

Most advanced tests in medical practice today are PCR-based, but the PA-100 AST System from Sysmex Astrego has developed a transformative technology based on a phenotypic test. This test identifies the bacteria causing the urinary tract infection and performs antibiotic susceptibility testing (AST) to determine the effective antibiotic for the specific patient in under 45 minutes.

The test uses a single-use cartridge, the size of a smart phone. Less than half a millilitre of the urine is added to this cartridge. Bacteria in the urine are trapped in over 10,000 microfluidic traps in parallel arrays and exposed to five different antibiotics at five different concentrations. The cartridge is inserted into a reader instrument the size of a shoe box, where bacterial growth is monitored by phase-contrast imaging. The reader provides a report, "sensitive" or "resistant" for each antibiotic in 30-45 minutes. This supports doctors and health workers in their clinical decision making at the point of care, and opens up the significant possibility of previously "retired" first-line antibiotics coming back



The dipstick test has an accuracy of 50-60%. Even if the doctor carries out a dipstick test, it doesn't help the doctor choose the right antibiotic. GETTY IMAGES

into use for the majority of patients. Accurate, rapid diagnosis of bacterial infections that helps doctors and health workers manage and target antibiotics, will slow the development and spread of antibiotic resistant infections, improve healthcare and potentially save millions of lives.

The test represents a huge advance over the current turnaround time of 2-3 days. The test will help doctors prescribe the right antibiotic at the right time, rather than waiting for 3 days and resorting to an empirical antibiotic prescription. The test can be performed in a doctor's clinic rather than sending the urine sample to a laboratory. When a patient with symptoms of a urinary infection visits a doctor, if the new technology is used, the doctor will know within 45 minutes whether the patient has urinary infection or not and if there is an infection for which antibiotics will work. The test is transformative, accurate, and affordable for patients worldwide.

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educated guesswork, before the culture results are ready. By this time, the patient has already completed a full or half course of antibiotics. Such blind antibiotic prescriptions are a major cause of the antibiotic resistance crisis, especially in countries like India. A transformative, rapid point-of-care diagnostic test that is accurate and affordable has the potential to revolutionise urinary tract infection treatment in India and worldwide.

Currently urinary tract infection management in most cases is based on a 50/50 rationale. Only 50% of patients with symptoms of urinary infection have an actual infection, and the accuracy of a urine dipstick is 50-60%.

In India, every year, millions of patients with urinary tract infections visit doctors or pharmacies seeking treatment. These infections result in significant loss of life, burden the healthcare system, and have a socio-economic impact.

In 20-30% of sepsis patients, the infection originates from the urinary tract. Up to two in five people who develop severe sepsis will lose their lives. Hence, rapid and accurate point-of-care test for urinary tract infection can save millions of lives worldwide, especially in India. The solution is a rapid, accurate, and affordable test that can help the doctor diagnose urinary infections accurately and provide information on the correct antibiotic that can cure the infection.

**What is the Longitude Prize?**

In 1714, the British government

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In the 18th century, thousands of ships were lost at sea because sailors couldn't determine the position of the ship at sea. If a ship doesn't know where it is, it risks being shipwrecked.

To determine the position of a ship, both latitude and longitude are needed. Latitude was easy to measure by observing the sun, moon, and stars, but longitude was a mystery.

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300 years after the first Longitude Prize, Britain launched a second Longitude Prize. The public was asked to vote for a major challenge that needed an immediate solution, such as global warming, food shortages, and water shortages. The public voted for Anti Microbial Resistance.

A £ 10 million Longitude Prize was announced in 2014. Of this, £ 2 million was awarded to various innovators to refine their technology. The final winner receives £ 8 million.

The Longitude Prize on AMR intends to incentivise the creation of new diagnostic tests that in a matter of minutes, can identify whether an infection is bacterial and, if so, the right antibiotic to prescribe to slow the spread of antibiotic resistant infections.

The goal is to replace the 2-3 day lab test process that doctors and patients must currently endure, and end "just in case" prescribing that is prevalent as a result, which promotes the development of antibiotic resistance.

(Dr. Abdul Ghafur, Consultant in Infectious Diseases, Apollo Hospitals, Chennai, and a member of the Longitude Prize jury from its inception. drghafur@hotmail.com)

# Longitude Prize

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## About PA-100AST

- **PA-100 AST** System from Sysmex Astrego has developed a transformative technology based on a phenotypic test.
- This test identifies the bacteria causing the urinary tract infection and performs antibiotic susceptibility testing (AST) to determine the effective antibiotic for the specific patient in under 45 minutes.



## CONCEPT: LIGHT MICROSCOPES THAT INCREASE CONTRAST

### Phase-Contrast Microscopy

- Phase -Contrast Microscopes: makes cells & their dense structures appear darker than the gray background.
  - Special optic devices increase the differences in how different substances/surroundings refract light differently.
  - Excellent for enhancing contrast of \_\_\_\_\_ details in unstained, living cells.

**EXAMPLE:** Images from a Phase-Contrast Microscope.



**Phase - \_\_\_\_\_ Microscopy**



# Rapid, diagnostic test for UTIs may help stem super bug crisis

The Longitude Prize-winning device offers an affordable, quick, point-of-care test for urinary tract infections, which promises to revolutionise infection management and global efforts to tackle antimicrobial resistance

Abdul Ghafur

**T**his week, a prize was announced that is likely to have far-reaching implications in the world of health care. Despite its importance, most of the community is unaware of the event. The winner of the Longitude Prize is poised to spearhead a revolution in the field of infection management and global efforts to tackle antimicrobial resistance. The £8 million (£ 85 crore) Longitude Prize on Antimicrobial Resistance (AMR), first announced in 2014, revealed its winner at an event in London's Science Museum. The PA-100 AST System from Sysmex Astrego is a high-tech, transformative, rapid, point-of-care test for UTIs (Urinary Tract Infection).

Rational use of antibiotics – choosing the appropriate antibiotic for the correct patient at the optimal time – is fundamental to saving lives and combating the superbug crisis. Rapid diagnostics are poised to be crucial in this effort. The winner of the Longitude Prize is set to spearhead the list of emerging rapid diagnostic technologies in a transformative manner. The applications for the Longitude Prize bring hope, suggesting that through collective action, we can look forward to a future protected from the threats of antimicrobial resistance.

The crisis is imminent: Antibiotic-resistant infections killed nearly 1.3 million people globally in 2019 and are on course to cause 10 million deaths a year by 2050, outstripping cancer. The global economy may lose \$ 4 trillion by 2050 and up to \$ 100 trillion by 2050 due to the AMR crisis.

**What does the prize mean?**

Most advanced tests in medical practice today are PCR-based, but the PA-100 AST System from Sysmex Astrego has developed a transformative technology based on a phenotypic test. This test identifies the bacteria causing the urinary tract infection and performs antibiotic susceptibility testing (AST) to determine the effective antibiotic for the specific patient in under 45 minutes.

The test uses a single-use cartridge, the size of a smart phone. Less than half a millilitre of the urine is added to this cartridge. Bacteria in the urine are trapped in over 10,000 microfluidic traps in parallel arrays and exposed to five different antibiotics at five different concentrations. The cartridge is inserted into a reader instrument the size of a shoe box, where bacterial growth is monitored by phase-contrast imaging. The reader provides a report, "sensitive" or "resistant" for each antibiotic in 30-45 minutes. This supports doctors and health workers in their clinical decision making at the point of care, and opens up the significant possibility of previously "retired" first-line antibiotics coming back



The dipstick test has an accuracy of 50-60%. Even if the doctor carries out a dipstick test, it doesn't help the doctor choose the right antibiotic. GETTY IMAGES

into use for the majority of patients. Accurate, rapid diagnosis of bacterial infections that helps doctors and health workers manage and target antibiotics, will slow the development and spread of antibiotic resistant infections, improve healthcare and potentially save millions of lives.

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(Dr. Abdul Ghafur, Consultant in Infectious Diseases, Apollo Hospitals, Chennai, and a member of the Longitude Prize jury from its inception. drghafur@hotmail.com)

# The Truenat platform

- The Truenat platform, a rapid molecular test for the diagnosis of pulmonary, extrapulmonary, and rifampicin-resistant tuberculosis, that was developed in India, has been hailed for its role in combating TB and as a possible component of global healthcare solutions at the recently held 77th World Health Assembly in Geneva.
- Developed by Goa-based Molbio, a point-of-care molecular diagnostics company, Truenat was first launched in 2017 and is a real-time quantitative micro-PCR system.

- **It is a portable, battery-operated machine that can be deployed at labs, health centres, and in the field.**
- **Truenat delivers results from samples in less than an hour and can test for over 40 diseases.**

## DNA



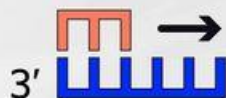
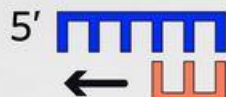
DNA template

## Denaturation



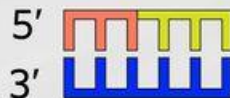
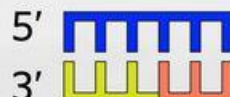
Primers

## Annealing

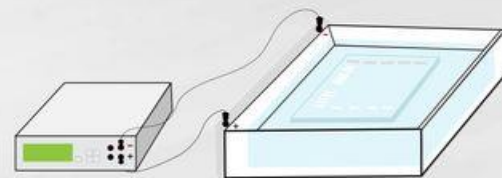


dNTPs

## Extension



## End-point Analysis





# China's 'grey-zone' warfare tactics against Taiwan

What are the coercive measures China has imposed on Taiwan?

**Anushka Saxena**

**The story so far:**

Since the new Taiwanese president Lai Ching-te has assumed office, all eyes have been on the rocky start to his tenure. While China's belligerent response to Mr. Lai's "pro-independence" and "secessionist" statements was striking, it has now resorted to a sophisticated ploy to respond to Mr. Lai's Democratic Progressive Party (DPP). This is often referred to as 'grey-zone' warfare, which comprises elements that frustrate Taiwan in a sustained manner.

**What has China done?**

China's preparedness to invade Taiwan and fight a high-intensity war over the island is a much debated subject. Training drills in the People's Liberation Army Eastern Theater Command (PLA ETC) are targeted precisely at demonstrating China's ability to fight and win. However, a more cognitive tool that Beijing is

deploying to demonstrate this ability is simulated audiovisuals. On May 24, for example, the PLA ETC Weibo account released a 3D animation video depicting how in an invasion scenario, land-and-warship-based ballistic missile launchers would fire tens of missiles at one go, striking areas in Taipei and Kaohsiung.

Moreover, since 2020, the X account of the Taiwanese Ministry of National Defence has turned into a repository of reportage on daily sorties conducted by PLA fighter jets, unmanned aerial vehicles (UAVs), strategic fighters and early warning aircraft. While such sorties do not engage the island's defence forces directly, they exert sustained pressure on them. Further, these UAVs also conduct intelligence work in the areas surrounding the island. The long term presence of such mobilisation induces wear-out within Taiwanese forces, even before there is kinetic combat.

**What about ideology?**

To build a favourable image for itself,

Beijing often deploys narratives within Taiwanese territory that thrust ideological choices upon its citizens. For example, sometime on May 25, just under a week after Mr. Lai assumed office, internet users in Taiwan observed a Youtube video of a Chinese citizen operating a drone to drop cardboard boxes on Kinmen island. When investigated by the Kinmen Defence Command on May 26, the boxes unveiled fliers written in simplified Chinese, stating "Both sides of the Taiwan Strait belong to one China, one Chinese nation. Taiwan independence is a dead end. Lai's Taiwan independence is a dead end." Some other fliers warned, "Don't sacrifice your life for Taiwan independence, do you understand?"

The Kinmen Command stated that this was "a typical cognitive warfare tactic" deployed by China, because it initiates public discussions on social media, and garners attention for the Chinese cause.

**What are political tactics China uses?**

In its 'carrots and sticks' approach

towards Taiwan, Beijing deploys sticks for the DPP and carrots for its primary opposition party, the Kuomintang (KMT). Well known for its relatively pro-mainland views, the KMT continues to engage with Communist Party (CPC) officials, even as any meaningful communication between the DPP and the CPC has stalled since Ms. Tsai became President of Taiwan in 2016. DPP legislators have often described these engagements as KMT's "collusion" with the CPC. In fact, KMT officials have, in the past, been investigated by the Tsai administration under the 'anti-infiltration law' after their visits to China.

China's 'sticks' against the DPP entail coercive economic measures, which leverage the cross-strait trade and business interdependence to seek concessions. One such example is China's unilateral suspension of preferential tax rates for chemical imports from Taiwan, granted under the only trade agreement to exist between the two sides – the Economic Cooperation Framework Agreement (ECFA). Beijing announced that such a suspension, applicable to 134 items imported from Taiwan, is retaliation against Mr. Lai's propagation of "separatist" sentiments in his inaugural speech, as well as Taipei's own restrictions against imports of over 2,000 goods made in China.

As 'grey-zone' warfare tactics become a subject of deliberation, Mr. Lai will have much to grapple with during his tenure.

*Anushka Saxena is a Research Analyst at Takshashila Institution, Bengaluru.*

**THE GIST**

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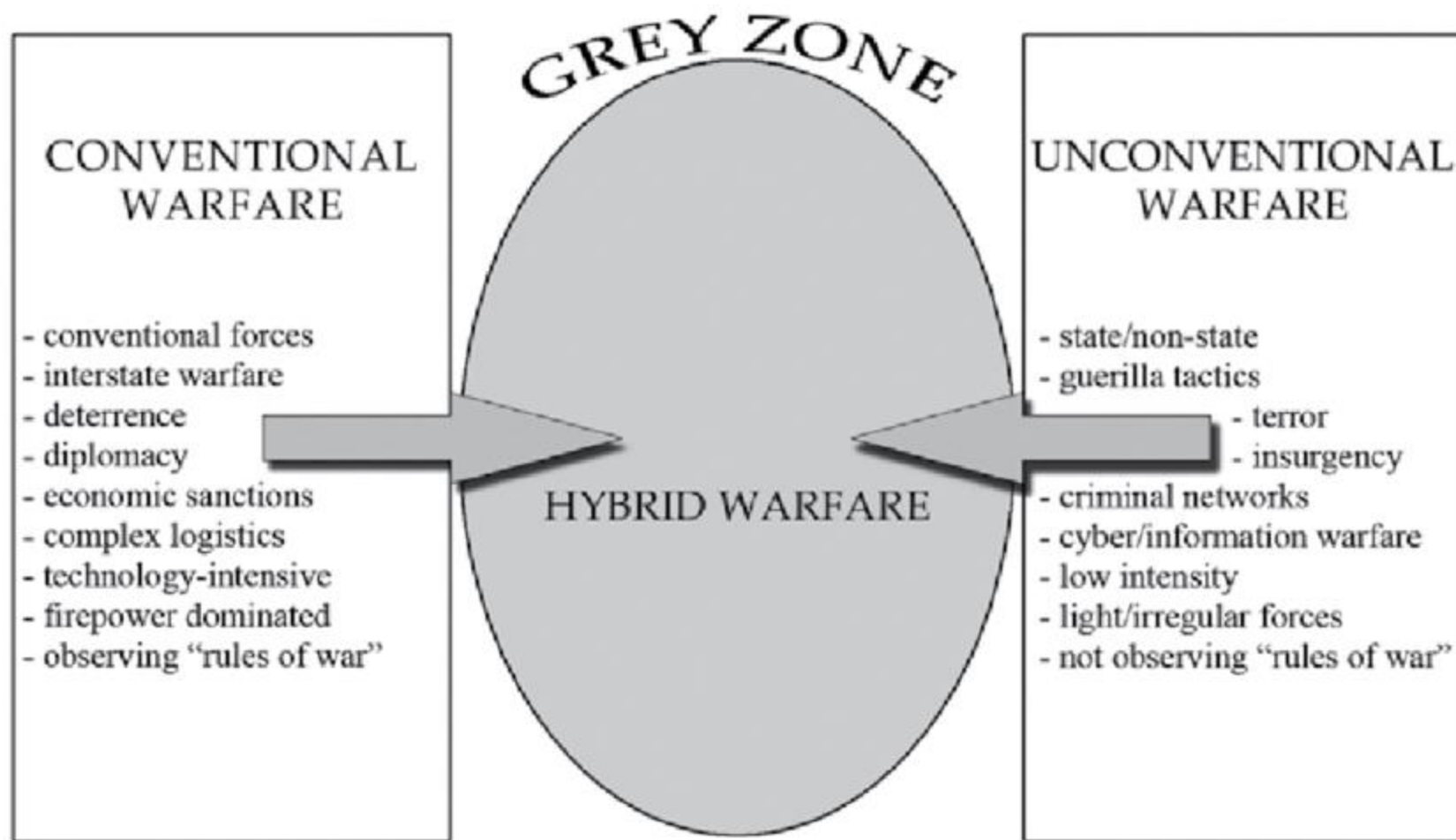
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Additionally, to build a favourable image for itself, Beijing often deploys narratives within Taiwanese territory that thrust ideological choices upon its citizens.

# What is Grey Zone Warfare ?

- Grey zone tactics, confrontation, and conflict relates to the use of non-military means – below the threshold of armed conflict – to achieve political objectives.
- Grey zone confrontation is the dangerous ‘grey’ area between peace and war.
- Activities can include political and election meddling, cyber threats and attacks, economic coercion, use of proxies, and many other measures – including military action.
- According to [Andrew Dowse and Sascha-Dominik Bachmann](#), it uses the ambiguity of international law, the ambiguity of actions and attribution, or because the impact of the activities does not justify a response by governments.
- Left unchecked, grey zone activities can undermine governments. Grey zone activities are generally unseen and insidious.
- There are no rules and the front line is everywhere. Miscalculations in the grey zone can also inadvertently lead to armed conflict.

Characteristic	Grey-Zone Conflict	Hybrid Warfare
Level	Tactical, operational, strategic	Tactical and operational
Use of conventional military operations	Used alongside non-conventional operations.	Used alongside non-conventional operations. Usually the dominant element.
Use of non-conventional military operations	May be used standalone or alongside conventional operations.	Used alongside conventional operations as auxiliary tactics.
Protracted engagement	One of the dominant characteristics.	May be protracted or short



Special  
forces

Irregular  
forces

Support  
of local  
unrest

Information  
warfare  
propaganda

Diplomacy

Cyber  
attacks

Economic  
warfare

Regular  
military  
forces



# Hybrid Warfare =

Combination of multiple conventional  
and unconventional tools of warfare



# European Union's new AI rules ignite battle over data transparency

Questions have been raised over how AI companies obtain the data used to train their models; AI companies are highly resistant to revealing what their models have been trained on, describing the information as a trade secret that would give competitors an unfair advantage were it made public

## NEWS ANALYSIS

**Reuters**  
LONDON

**A** new set of laws governing the use of artificial intelligence (AI) in the European Union will force companies to be more transparent about the data used to train their systems, prying open one of the industry's most closely guarded secrets.

In the 18 months since Microsoft-backed OpenAI unveiled ChatGPT to the public, there has been a surge of public engagement and investment in generative AI, a set of applications that can be used to rapidly produce text, images, and audio content.

But as the industry booms, questions have been raised over how AI companies obtain the data used to train their models, and whether feeding them bestselling books and Hollywood movies without their creators' permission amounts to a breach of copyright.

The EU's recently-passed AI Act is being rolled out in phases over the next two years, giving regulators time to implement the new laws while businesses grapple with a new set of obligations. But how exactly some of these rules will work in practice is still unknown.



**Looming concern:** Some fear the new rules may hinder European AI startups' competitiveness. REUTERS

One of the more contentious sections of the Act states that organisations deploying general-purpose AI models, such as ChatGPT, will have to provide "detailed summaries" of the content used to train them. The newly established AI Office said it plans to release a template for organizations to follow in early 2025.

While the details have yet to be hammered out, AI companies are highly resistant to revealing what their models have been trained on, describing the information as a trade secret that would give competitors an unfair advantage were it made public.

"It would be a dream come true to see my competitors' datasets, and like-



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**MATTHIEU RIOUF**  
CEO, Photorum

wise for them to see ours," said Matthieu Riouf, CEO of Photorum.

"It's like cooking," he added. "There's a secret part of the recipe that the best chefs wouldn't share, the 'je ne sais quoi' that makes it different."

How granular these transparency reports end up being will have big implications for smaller AI

startups and big tech companies like Google and Meta, which have put the technology at the centre of their future operations.

### Sharing trade secrets

Over the past year, a number of prominent tech companies, including Google, OpenAI, and Stability AI have faced lawsuits from creators claiming their content was improperly used to train their models.

While U.S. President Joe Biden has passed a number of executive orders focused on the security risks of AI, questions over copyright have not been fully tested. Calls for tech companies to pay rights holders for data have received bipartisan support in Congress.

Amid growing scrutiny, tech companies have signed a flurry of content-licensing deals with media outlets and websites. Among others, OpenAI signed deals with the Financial Times and The Atlantic, while Google struck deals with NewsCorp social media site Reddit.

Despite such moves, OpenAI drew criticism in March when CTO Mira Murati declined to answer a question from the Wall Street Journal on whether YouTube videos had been used to train its video-generating tool Sora, which the company said would breach its terms and conditions.

Last month, OpenAI faced further backlash for featuring an AI-generated voice described as "eerily similar" to her own by actress Scarlett Johansson in a public demonstration of the newest version of ChatGPT.

Thomas Wolf, co-founder of Hugging Face, said he supported greater transparency, but that sentiment was not shared across the industry. "It's hard to know how it will work out. There is still a lot to be decided," he said.

Senior lawmakers across the continent remain divided.

Dragos Tudorache, one of the lawmakers who oversaw the drafting of the AI Act in the European parliament, said that AI com-

panies should be compelled to make their datasets public.

"They have to be detailed enough for Scarlett Johansson, Beyonce, or for whoever to know if their work, their songs, their voice, their art, or their science were used in training the algorithm," he said.

A Commission official said: "The AI Act acknowledges the need to ensure an appropriate balance between the legitimate need to protect trade secrets and, on the other hand, the need to facilitate the ability of parties with legitimate interests, including copyright holders, to exercise their rights under Union law."

Under President Emmanuel Macron, the French government has privately opposed introducing rules that could hinder European AI startups' competitiveness.

French finance minister Bruno Le Maire said he wanted Europe to be a world leader in AI, and not only a consumer of American and Chinese products.

"For once, Europe, which has created controls and standards, needs to understand that you have to innovate before regulating," he said. "Otherwise, you run the risk of regulating technologies that you haven't mastered, or regulating them badly because you haven't mastered them."

# Artificial intelligence act

- **ground-breaking law aiming to harmonise rules on artificial intelligence, the so-called artificial intelligence act.**
- **The flagship legislation follows a 'risk-based' approach, which means the higher the risk to cause harm to society, the stricter the rules.**



- **The new law aims to foster the development and uptake of safe and trustworthy AI systems across the EU's single market by both private and public actors.**
- **At the same time, it aims to ensure respect of fundamental rights of EU citizens and stimulate investment and innovation on artificial intelligence in Europe.**

- **The AI act applies only to areas within EU law and provides exemptions such as for systems used exclusively for military and defence as well as for research purposes.**
- **GPAI models not posing systemic risks will be subject to some limited requirements, for example with regard to transparency, but those with systemic risks will have to comply with stricter rules.**

**To ensure proper enforcement, several governing bodies are set up:**

- **An AI Office within the Commission to enforce the common rules across the EU**
- **A scientific panel of independent experts to support the enforcement activities**
- **An AI Board with member states' representatives to advise and assist the Commission and member states on consistent and effective application of the AI Act**
- **An advisory forum for stakeholders to provide technical expertise to the AI Board and the Commission**

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  - Commission of Small Island States on Climate Change and International Law (COSIS)
  - INDIA -US
  - SPECIAL CATEGORY STATES
  - NEW CALEDONIA
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By saurabh Pandey



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# Can you understand the Indian Ocean and you'll understand much about earth

The Indian Ocean is among the fastest warming oceans, with dire consequences for heatwaves and rain over the subcontinent. Marine heatwaves are also a concern now for corals and fisheries. The Indian Ocean is also playing a role in how well the Pacific Ocean can control global warming

Raghu Murtugudde

**W**orld Oceans Day was on June 8. For the occasion, let's take in the wonders of the smallest of the three major oceans right in our front yard. The Indian Ocean has been getting a lot of attention recently for its rapid warming and the outsized influence it continues to have on its peers.

As it happens, the Indian Ocean is critical today to understand the earth's overall ocean response to increasing greenhouse gases and global warming.

## Home to the deadliest storms

The Indian Ocean is famous for its dramatic monsoon winds and the bountiful rain it brings to the Indian subcontinent. The winds and the rain have evoked prose and poetry for millennia. More than a billion people depend on the moisture it supplies to quench their thirst, to replenish fisheries, and to produce food and energy.

The warm summer months are characterised by the rapid warming of the Arabian Sea and the Bay of Bengal as well as the southern tropical Indian Ocean. The winds begin to turn around from a land-to-ocean direction during winter to an ocean-to-land direction as summer commences.

The scorching heat on the subcontinent also comes with the threat of pre-monsoon cyclones. The North Indian Ocean doesn't generate as many cyclones as the Pacific or the Atlantic Oceans, but the numbers and their rapid intensification have been growing ominously. The relatively small North Indian Ocean ensures cyclones don't grow into the sort of hot powerhouses hurricanes and typhoons can be, but also the developing countries along the rim of South Asia, East Africa, and West Asia are sitting ducks in their path. Thus, cyclones tend to be the deadliest storms by mortality.

The warm ocean supports fisheries, big and small, and fish such as anchovies, mackerel, sardines, and tuna. Dolphins are a tourist attraction; some whales have also been sighted in the Arabian Sea. Tourists also flock to popular beaches and the corals from Lakshadweep to the Andaman-Nicobar Islands, all the way down to Reunion Island off Madagascar.

## A unique configuration

The northern boundary of the Indian Ocean is closed off by the Asian landmass, minus tiny connections to the Persian Gulf and the Red Sea.

The southern Indian Ocean is also different from the other oceans thanks to two oceanic tunnels that connect it to the Pacific and the Southern Oceans.

Through the first tunnel – the Indonesian seas – the Pacific Ocean dumps up to 20 million cubic metres of water every second into the eastern Indian Ocean. These waters also transport a substantial amount of heat. They stay mostly in the top 500 m and move through the Indian Ocean towards Madagascar. The Pacific waters, called the Indonesian Throughflow, wander around the Indian Ocean and affect the circulation, temperature, and salinities.

The other tunnel connects the Indian Ocean to the Southern Ocean with two-way traffic. Colder, saltier and thus



The Indian Ocean is famous for its dramatic monsoon winds and the bountiful rain it brings to the Indian subcontinent. JOHN CAMERON/UNSPPLASH

heavier waters flow into the Indian Ocean from the Southern Ocean below a depth of about 1 km. Due to the closed northern boundary, the waters slowly mix upward, and with the waters coming from the Pacific. The waters in the top 1 km eventually exit to the south.

The mix of heat and water masses in the Indian Ocean confer some mighty abilities to affect the uptake of heat in the world's oceans.

## The little ocean that could

The Indian Ocean is a warm bathtub despite the underwater tunnels because it is heavily influenced by the Pacific Ocean through an atmospheric bridge as well. The atmospheric circulation, dominated by a massive centre of rainfall over the Maritime Continent, creates mostly sinking air over the Indian Ocean. The atmosphere also warms the Indian Ocean year after year.

The Indian Ocean thus gains heat that it must get rid of via the waters moving south. With global warming, the Pacific has been dumping some additional heat in the Indian Ocean. The cold water coming in from the Southern Ocean is also not as cold as before.

The net result: the Indian Ocean is among the fastest warming oceans, with dire consequences for heat waves and extreme rain over the Indian subcontinent. Marine heat waves are also a major concern now for corals and fisheries.

The warming Indian Ocean is affecting the wind circulation in a way that's also affecting the amount of heat the Pacific is able to take up. The Pacific Ocean takes



Despite being the smallest tropical ocean, the Indian Ocean's influence has become impossible to understate. Oceans take up over 90% of the additional heat more greenhouse gases in the atmosphere are trapping

up heat in its cold, eastern tropical region, and this is crucial to determine the rate of global warming. The Indian Ocean is thus playing a role in how well the Pacific can control global warming.

The other region where the ocean can draw down the heat and lock it away in deeper waters is in the North Atlantic. This is where surface waters become so dense that they sink like a rock into the depths. If the sinking of the water slows due to global warming – which seems to be the case – the heat doesn't sink away from the surface as quickly as it used to.

Indeed, researchers have found that the Indian Ocean's warming is actually helping accelerate the sinking of the heat, thus modulating global warming directly! This is why, despite being the smallest tropical ocean, the Indian Ocean's influence has become impossible to understate. Recall that the oceans take up over 90% of the additional heat more greenhouse gases in the atmosphere are trapping.

A hand in human evolution If this isn't wondrous enough, the reconfiguration of the Indian Ocean may

have played a role in the evolution of our ancestors as well.

Until about three million years ago, Australia and New Guinea were well south of the equator and the Indian Ocean was directly connected to the Pacific Ocean. And this Indo-Pacific Ocean was in a warm state known as a 'permanent El Niño' – a state that was associated with permanently plentiful rain and lush green forests over East Africa. Today, this part of Africa is arid.

The northward drift of Australia and New Guinea, which is still ongoing, separated the Indian and the Pacific Oceans around three million years ago. As a result, the eastern Pacific Ocean became cooler and the El Niño went from a permanent state to an episodic one, like the ones we've been seeing.

This transition aridified East Africa, turning its rainforests into grasslands and savannahs. Researchers have also hypothesised that these changes forced our ancestors, such as chimpanzees and gorillas, to move farther and run faster. In the rainforests, they had an abundance of food and hiding places and didn't have to.

If these hypotheses are borne out, it's possible the transformation also had a hand in the birth of bipedal movement – the ability to walk on two legs – which is much more efficient than moving on all four across larger distances.

The storied history of our neighbourhood ocean is thus a worthy thing to celebrate – and study – on World Oceans Day.

The author is a Professor, IIT Bombay, and Emeritus Professor, University of Maryland.



# Indian ocean

- **The Indian Ocean has been getting a lot of attention recently for its rapid warming and the outsized influence it continues to have on its peers.**
- **The warm summer months are characterised by the rapid warming of the Arabian Sea and the Bay of Bengal as well as the southern tropical Indian Ocean.**
- **The winds begin to turn around from a land-to-ocean direction during winter to an ocean-to-land direction as summer commences.**



- **The northern boundary of the Indian Ocean is closed of by the Asian landmass, minus tiny connections to the Persian Gulf and the Red Sea.**
- **The southern Indian Ocean is also different from the other oceans thanks to two oceanic tunnels that connect it to the Pacific and the Southern Oceans.**
- **Through the first tunnel — the Indonesian seas — the Pacific Ocean dumps up to 20 million cubic metres of water every second into the eastern Indian Ocean.**



- **These waters also transport a substantial amount of heat.**
- **They stay mostly in the top 500 m and move through the Indian Ocean towards Madagascar.**
- **The Pacific waters, called the Indonesian Throughflow, wander around the Indian Ocean and affect the circulation, temperature, and salinities.**
- **The other tunnel connects the Indian Ocean to the Southern Ocean with two-way traffic. Colder, saltier and thus heavier waters flow into the Indian Ocean from the Southern Ocean below a depth of about 1 km.**
- **Due to the closed northern boundary, the waters slowly mix upward, and with the waters coming from the Pacific**



- **The Indian Ocean is a warm bathtub despite the underwater tunnels because it is heavily influenced by the Pacific Ocean through an atmospheric bridge as well.**
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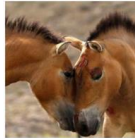
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- The net result: the Indian Ocean is among the fastest warming oceans, with dire consequences for heat waves and extreme rain over the Indian subcontinent.
- Marine heat waves are also a major concern now for corals and fisheries.
- The warming Indian Ocean is affecting the wind circulation in a way that's also affecting the amount of heat the Pacific is able to take up.
- The Pacific Ocean takes up heat in its cold, eastern tropical region, and this is crucial to determine the rate of global warming.
- The Indian Ocean is thus playing a role in how well the Pacific can control global warming.

## **Role in human evolution**

- **Until about three million years ago, Australia and New Guinea were well south of the equator and the Indian Ocean was directly connected to the Pacific Ocean. And this Indo-Pacific Ocean was in a warm state known as a ‘permanent El Niño’ — a state that was associated with permanently plentiful rain and lush green forests over East Africa.**
- **Today, this part of Africa is arid.**
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- **As a result, the eastern Pacific Ocean became cooler and the El Niño went from a permanent state to an episodic one, like the ones we've been seeing.**
- **This transition aridified East Africa, turning its rainforests into grasslands and savannahs.**
- **Researchers have also hypothesised that these changes forced our ancestors, such as chimpanzees and gorillas, to move farther and run faster**



A Przewalski mare (right) and a colt (left) after being released at the Khovrin Tal reservation in Western Mongolia. AP

## Wild horse species is returned to the Kazakh steppes

Agence France Presse

After a few hesitant steps following a long fight from Prague, three Przewalski horses galloped off for the first time into the Kazakh steppe – the native habitat of this endangered species.

The horses emerged after being locked in containers for 20 hours and are the first of 40 which are to be released into the wild in this vast Central Asian country over the next five years.

"We have been waiting for this moment for a very long time", Albert Sakengareyev from the Association for the Conservation of Biodiversity in Kazakhstan told AFP.

"A lot of work has been carried out in recent months in order for the Przewalski horses to come to Kazakhstan".

The project run by the Prague and Berlin zoos is aimed at preserving this species of stocky bulk horse with large heads which share a common ancestry with modern domestic horses but are genetically different.

Przewalski horses are commonly referred to as one of the world's last breeds of wild horse.

"We knew that the Przewalski horses are suited to this steppe", Mr. Sakengareyev said.

The horses are capable of resisting harsh winters like the ones in Kazakhstan.

**There are now 2,000 Przewalski horses around the world, mainly in China and Mongolia but also in France, Russia and living wild in the Chernobyl exclusion zone between Belarus and Ukraine**

where temperatures can drop below minus 30 degrees C and feed runs scarce.

The three first specimens – Zorro, Ypolska, and Zeta II – arrived earlier this month. Four more landed in Kazakhstan from Berlin on Thursday morning and were released in the afternoon.

They will initially be under observation in the Golden Steppe nature reserve before being left in the wild.

"This year we will follow their health and see how they acclimatise", Sakengareyev said.

The 5,000 km, first by plane to the town of Astanayk and then by truck along bumpy roads into the heart of the steppe, was not without risks.

Despite monitoring by experts, one of the horses sat down in his container even before taking off, raising the risk of stepping the blood flow in his legs.

"The journey could have been dangerous so we decided to leave him alone", said Miroslav Jelsky, the director of Prague Zoo.

There are now 2,000 Przewalski horses around the world, mainly in China and Mongolia but also in France, Russia and even living in the wild in the Chernobyl exclusion zone between Belarus and Ukraine.

Following the April 1986 Chernobyl disaster, 30 specimens were introduced there in 1998. The population has flourished and is now at 20.

In Kazakhstan, the Przewalski horse is not the only endangered species to have received special attention.

The round-eared Saiga antelope, once on the brink of extinction, has also seen its population grow to about two million thanks to conservation policies by



# Przewalski

- **Przewalski horses are commonly referred to as one of the world's last breeds of wild horse.**
- **The horses are capable of resisting harsh winters like the ones in Kazakhstan where temperatures can drop below minus 30 degrees C and food runs scarce.**
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- **Przewalski's horses are often described as small and stocky.**
- **They are heavily built, with a large head, thick neck and short legs.**
- **They are dun-colored with a dark zebra-like erect mane and no forelock. A dark stripe continues from the mane along the backbone to a dark, plumed tail.**
- **They have a yellowish-white belly and dark lower legs and zebra-like stripes behind their knees.**

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# A push for more climate action



**I**nternational climate change litigation reached a milestone on May 21, 2024 when the International Tribunal for the Law of the Sea (ITLOS) delivered an advisory opinion (the Opinion) sought by the Commission of Small Island States on Climate Change and International Law (COSIS) concerning the specific obligations of the Parties to the United Nations Convention on the Law of the Sea (UNCLOS) on climate change mitigation. The COSIS is an association of small island states set up in 2021. The ITLOS advisory opinion generates more attention in the context of the advisory proceedings to be decided by the International Court of Justice (ICJ) in the near future on the “Obligations of States in respect of Climate Change”.

## New elements

The ITLOS took a radical step by accepting the request of COSIS with the aim of identifying the obligations of states that are not parties to the COSIS Agreement. That is when the request touches principally upon the obligations of states that are not party to the agreement authorising the request. The Tribunal, in its Opinion, laid down very clearly that under Article 194(1) of the UNCLOS, “the Parties have specific obligations to take all necessary measures to prevent, reduce and control marine pollution from anthropogenic greenhouse gas emissions (GHG)”.

The Opinion has also removed doubts whether the release of carbon dioxide by man, directly or indirectly, into the marine environment qualifies to be in the category of substance or energy having potential deleterious effects on the marine environment within the meaning of Article 1(1)(4) of the UNCLOS.

The ITLOS clarification on carbon as pollutant bolsters the position taken by the scientific community that the surface ocean absorbs around a quarter of the CO<sub>2</sub> emitted into the atmosphere, at increasingly rapid rates, resulting



**Anwar Sadat**

teaches International Environmental Law at the Indian Society of International Law, New Delhi

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in the progressive acidification of sea water. Other greenhouse gases (GHGs) do not have this effect. In addition, the sea also absorbs over 90% of the excess heat (‘energy’) generated by global warming, resulting in higher ocean temperatures and, ultimately, in sea-level rise.

## Understanding its legal importance

The principle of prevention or no harm rule which governs state behaviour towards regulation of shared natural resources (between two or more states) so as to avoid transboundary harm of a significant nature in another state has its two main limitations when the rule is sought to be applied to regulate climate crisis: its anchoring in a bilateral frame, and, the principle is not helped due to obstacles relating to attribution and standing in establishing a breach of obligation to climate change.

The Opinion, by siding with the principle for climate change (which is a collective interest as compared to bilateral ones), adds a new chapter. The necessary measures are to be decided in the light of the best available science and the relevant international rules and standards contained in the United Nations Framework Convention on Climate Change, the Paris Climate Change Agreement 2015, and also 1.5° Celsius rather than 2° C as the global average temperature goal.

The Opinion describes the obligation relating to the taking of necessary measures as due diligence obligation but the standard of it in the eyes of the Opinion is stringent one given the high risks of serious and irreversible harm to the marine environment from such emissions. But the Parties’ obligations in terms of taking all necessary measures to reduce anthropogenic GHG emissions within Article 194 (1) are very general in nature. This can be interpreted to mean that neither the release of all pollution (GHGs) must be prevented nor that anthropogenic GHG emissions must cease

immediately or even eventually.

Measures that gradually reduce marine pollution by lowering GHG emissions over a period of time would be sufficient. Still, the identification of a general obligation by the ITLOS underlines one thing – that states do not have unfettered discretion in addressing climate change. Mere identification of general obligation will be of symbolic value and is inadequate.

Christina Voigt, an expert on environmental law, says as “most states are already implementing some action on climate change mitigation, the crux of the matter is not the existence of an obligation to mitigate climate change, but rather its content, in particular the standard of conduct applicable in relation to this obligation”. The example to substantiate this point is the decision of the Netherlands Supreme Court, in *Urgenda Foundation vs The Netherlands*, where the court held that to comply with a general mitigation obligation inferred from the European Convention on Human Rights (ECHR) in light of the standard of due care, the Netherlands had to reduce GHG emissions to 25% below 1990 levels by 2020 (as opposed to the government’s insufficient existing pledge of 17%).

The court identified this target largely by relying on scientific estimates and the least cost method of achieving the 2° C temperature goal in the Paris Agreement. The Opinion has not been able to identify the methodology concretely that can be used to assess a state’s requisite level of mitigation action – as in the *Urgenda* judgment. Moreover, the necessary measures to be taken, as per the Opinion, are to be subject to the means available to the states and their capabilities, which means that the principle of equity cannot be ignored in deciding the requisite level of mitigation action, if any.

Though advisory opinion lacks legal force, it does not necessarily affect its political pull as authoritative judicial pronouncements.





# **The International Tribunal for the Law of the Sea (ITLOS)**

- **The International Tribunal for the Law of the Sea (ITLOS) is an independent judicial body established by the 1982 United Nations Convention on the Law of the Sea.**
- **It has jurisdiction over any dispute concerning the interpretation or application of the Convention, and over all matters specifically provided for in any other agreement which confers jurisdiction on the Tribunal.**
- **Disputes relating to the Convention may concern the delimitation of maritime zones, navigation, conservation and management of the living resources of the sea, protection and preservation of the marine environment and marine scientific research.**



- The Tribunal is composed of 21 independent **members**, elected from among persons enjoying the highest reputation for fairness and integrity and of recognized competence in the field of the law of the sea.
- The Tribunal has jurisdiction over any dispute concerning the interpretation or application of the Convention, and over all matters specifically provided for in any other agreement which confers jurisdiction on the Tribunal (Statute, article 21).
- The Tribunal is open to **States Parties to the Convention** (i.e. States and international organisations which are parties to the Convention)

# UNCLOS



- The United Nations Convention on the Law of the Sea was opened for signature at Montego Bay, Jamaica, on 10 December 1982 and entered into force on 28 July 1996. A subsequent **Agreement relating to the implementation of Part XI of the Convention** was adopted on 28 July 1994 and entered into force on 28 July 1996. This Agreement and Part XI of the Convention are to be interpreted and applied together as a single instrument.
- The Convention establishes a comprehensive legal framework to regulate all ocean space, its uses and resources. It contains, among other things, provisions relating to the territorial sea, the contiguous zone, the continental shelf, the exclusive economic zone and the high seas.



- It also provides for the protection and preservation of the marine environment for marine scientific research and for the development and transfer of marine technology.
- One of the most important parts of the Convention concerns the exploration for and exploitation of the resources of the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction (the Area).
- The Convention declares the Area and its resources to be "the common heritage of mankind".
- The **International Seabed Authority**, established by the Convention, administers the resources of the Area.

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# Commission of Small Island States on Climate Change and International Law (COSIS)



- States who are least responsible for climate change, Small Island Developing States (SIDS), will be the most likely to bear the worst brunt of its effects in the short- as well as the long-term.
- Over the coming decades, SIDS will encounter "rising sea levels, extreme weather events, coral bleaching, loss of fisheries and marine biodiversity", as well as the risk of total submersion.
- Facing this existential threat, as well as inaction on the international stage, the Prime Ministers of Antigua and Barbuda and Tuvalu signed the Agreement for the Establishment of the Commission of Small Island States on Climate Change and International Law (COSIS) on the eve of COP26.



- **The Agreement was registered with the United Nations in accordance with Article 102 of the Charter of the United Nations.**
- **The Republic of Palau acceded to the Agreement in November 2021, Niue in September 2022, Vanuatu in December 2022, and St. Lucia in December 2022. Membership is open to any member of the Alliance of Small Island States (AOSIS).**





**"The mandate of the Commission shall be to promote and contribute to the definition, implementation, and progressive development of rules and principles of international law concerning climate change, including, but not limited to, the obligations of States relating to the protection and preservation of the marine environment and their responsibility for injuries arising from internationally wrongful acts in respect of the breach of such obligations."**

# From warp speed to reset, the state of India-U.S. ties

**T**his month marks a year since Prime Minister Narendra Modi's state visit to the United States, where U.S. President Joseph Biden rolled out the red carpet and the U.S. offered to restart the decade-old plan to transfer technology for jet engines to India. The visit was marked by many such announcements of strategic and high-tech cooperation, with the U.S.-India initiative on Critical and Emerging Technology (iCET) considered a major success for bilateral relations that would set the stage for a whole new phase in ties.

However, one year later, the pace of the relationship has not matched those ambitions for a number of external and internal reasons. As the newly sworn-in Indian Prime Minister will engage once again with the U.S. President this week at the G-7 outreach summit in Italy, and senior U.S. officials are set to arrive in Delhi, the "good, the not-so-good, and what could-become ugly" (to paraphrase the Hollywood western) in the relationship must be studied closely.

## The crests

It is clear where the 'good' and even 'great' in the India-U.S. relationship lies. Last September marked 25 years of the turnaround in ties post-Pokhran, that was heralded by Prime Minister Atal Bihari Vajpayee's famous Asia Society speech in New York, on September 28, 1998, where he called India and the U.S. "natural allies in the quest for a better future" for the world in the 21st century. Since then, Delhi and Washington have built up strategic ties year on year, with dialogues in a growing number of spheres – from climate change and green energy to critical and emerging technologies and outer space.

Over the past decade, the growth is seen in strategic trust in particular, with the conclusion of all foundational agreements, a plethora of military exercises, growing inter-operability and coordination on maritime operations, not to mention the considerable purchases in the pipeline of military hardware. A broader mutual understanding has been sparked by many of the old irritants going away from relations: the de-hyphenation of U.S.-India ties with Pakistan, silence over old concerns on Jammu-Kashmir that once roiled ties, India's increased engagement with the Quad (India, Australia, Japan and the U.S.) and the U.S.'s Indo-Pacific strategy, and shared concerns over China's aggression have brought Delhi and DC increasingly on the "same page", internationally.

While the bilateral engagement has been thriving, much of it due to dozens of official-level conversations that continue, some of the "not-so-good" or work-in-progress areas lie in the areas of multilateral cooperation on global conflicts. Russia's war in Ukraine has been one major area of difference, especially as the U.S. has framed the war purely in terms of the



Suhasini Haidar

international rule of law and humanitarian principles. India has chosen a more historical frame that also considers the disruption to other players like the Global South on issues such as food, fertilizer and energy security. There have been some compromises: the U.S. has withdrawn its objections to India's continued purchase of oil and other Russian exports and held off any talk of sanctions, while India has put over the annual India-Russia summit for two years now. It remains to be seen how the newly-elected Prime Minister manages engagements with Russian President Vladimir Putin in the next few months, with a possible meeting at the Shanghai Cooperation Organisation (SCO) Summit in Kazakhstan in July and the BRICS Summit in Russia's Kazan in October. Some of the edge of the U.S.'s moralistic posture has also been taken off by its support of Israel's bombardment of Gaza and the continued killing of civilians despite calls from the United Nations, the International Criminal Court and the International Court of Justice to stop.

## The China factor

On the other multilateral front and growing concerns over China's threats against Taiwan, with the latest conflagration over the Philippines in the South China Sea too, India-U.S. cooperation at the Quad has flagged somewhat. This has mainly been a factor of logistics. Mr. Biden's decision to decline the invitation for India's Republic Day in 2024 meant that the Quad Summit was foregone, and the U.S. has indicated that it will not be rescheduled until after the U.S. elections in November. Planned visits by U.S. National Security Adviser Jake Sullivan were cancelled twice this year, at the last moment, due to the Gaza crisis, in turn affecting the iCET review. As a result, so has the visit by the U.S. Deputy Secretary of State, Kurt Campbell (nicknamed 'Quadfather' or 'Asia Czar' for his role as Biden's Indo-Pacific Coordinator), who has instead focused on "Quad-Plus" meetings with the Republic of Korea and the Philippines over the past few months. All eyes are also on the Quad Foreign Minister's meeting to be scheduled in Japan this year, but much will depend on U.S. Secretary of State Antony J. Blinken being available for it.

There has been no Indian Ambassador in Washington for months, and South Block's ties with the U.S. Ambassador in India Eric Garcetti have been somewhat strained after his comments on Manipur and human rights. The State Department's comments on the state of democracy in India before the general election 2024 as well as consistent bad reviews for India in the State Department's Religious Freedom report enraged India's Ministry of External Affairs leading to the summoning of a senior US diplomat, and in turn widening the gap. Washington has been sounding excessively offensive and interfering and New Delhi prickly

and reactive. The decision by the U.S. to wait for the "final results" of the general election before congratulating Mr. Modi, and then issue a statement commending civil society and journalists for their "their commitment and vital contributions to India's democratic processes and institutions", will no doubt chafe the South Block-State Department equation.

## Tensions over 'plots'

Amid this discourse, the elephant in the room remains the attempted assassination of Khalistani separatist and U.S. citizen Gurpatwant Singh Pannun in New York, allegedly ordered by Indian security officials. June 2024 also marks a year since the plot in the U.S. was unearthed, along with transcripts linking the plot to the killing of Canadian citizen Hardeep Singh Nijjar outside Toronto, the same month (June 2023). Although details of the allegations became public only in November last year, it is clear that the discomfort over the perception that India is behind the killing of foreign citizens in friendly countries had begun to seep into the relationship even as Prime Minister Modi touched down in the U.S. last year. During a visit to Washington this summer, this writer saw signs that those concerns have broadened, particularly with U.S. intelligence agencies, the Department of Justice, and at the U.S. Congress, where lawmakers now routinely raise concerns from that section of the diaspora that feels most targeted by India, including those accused of terrorism by India. While the U.S.'s demand that India bring senior officials "to account" publicly for the alleged plot is a non-starter, the Government of India must realise that its theory of "rogue actors" being responsible for such a high profile plot will not wash either. It should proceed more quickly with its high-level investigation. Either way, one can expect the issue to come to a slow boil over the next few months as the trial in New York brings forth more details of what the U.S. believes, and passes on to the Canadian authorities too for the trial set to begin there.

Given the government's need to adjust to new coalition realities after the shock of the results of the general election as well as the fast-closing window of engagement with the U.S. government as Washington heads into "lame-duck" season, officials and leaders have their task cut out for them. While a possible Trump presidency in November might resolve many of the problems between them, it will most certainly introduce much more uncertainty to their ties as well. The opportunity for a Biden-Modi meeting this week then, followed by the visit by Mr. Sullivan to Delhi soon to complete the iCET review, as decided by the leaders during their phone call, is both desired and necessary for the restart they require, a year after it seemed that the relationship had reached "warp speed".





# India -US

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- **, with the conclusion of all foundational agreements, a plethora of military exercises, growing inter-operability and coordination on maritime operations, not to mention the considerable purchases in the pipeline of military hardware.**

- **A broader mutual understanding has been sparked by many of the old irritants going away from relations: the de-hyphenation of U.S.-India ties with Pakistan, silence over old concerns on Jammu-Kashmir that once roiled ties, India's increased engagement with the Quad (India, Australia, Japan and the U.S.) and the U.S.'s Indo-Pacific strategy, and shared concerns over China's aggression have brought Delhi and DC increasingly on the “same page”, internationally.**

- **. India has chosen a more historical frame that also considers the disruption to other players like the Global South on issues such as food, fertilizer and energy security.**
- **There have been some compromises: the U.S. has withdrawn its objections to India's continued purchase of oil and other Russian exports and held off any talk of sanctions, while India has put over the annual India-Russia summit for two years now**



## **China Factor**

**On the other multilateral front and growing concerns over China's threats against Taiwan, with the latest conflagration over the Philippines in the South China Sea too, India-U.S. cooperation at the Quad has Flagged somewhat.**

# On Special Category Status for Andhra

Why is the demand for special status for Andhra Pradesh back in the political limelight? Why did Chandrababu Naidu, back in 2018, settle for a special package? Is the State qualified to be granted special status? What did the 14th Finance Commission state?

## EXPLAINER

Sumit Bhattacharjee

### The story so far:

**T**he Andhra Pradesh Reorganisation Act, 2014, which bifurcated unified Andhra Pradesh into two States, was notified on March 1, 2014 and had come into force from June 2, 2014. While the Act had specified many things, there was no mention of giving a Special Category Status (SCS) to Andhra Pradesh. Now with the completion of the 2024 Lok Sabha elections, the demand for SCS to Andhra is again gaining attention.

### What is the history?

Shortly after the reorganisation, in a debate in the Rajya Sabha on February 20, 2014, the then Prime Minister Manmohan Singh had said that "SCS would be extended to the State of Andhra Pradesh for a period of five years". This was appreciated and seconded by Bharatiya Janata Party (BJP) leader M. Venkaiah Naidu.

But after Prime Minister Narendra Modi took over the reigns of the National Democratic Alliance (NDA)-led Union Government, the SCS was put on the back burner. When it was raised in both Houses by the Telugu Desam Party (TDP) and opposition MPs, it was said that Andhra Pradesh does not qualify for the SCS, firstly as per norms and secondly due to the dissolution of the Planning Commission in August 2014. The 14th Finance Commission had equated SCS with the general category status and had annulled SCS for new States.

### Why does AP not qualify for the SCS?

The concept of SCS was first brought into existence through the recommendations made by the Fifth Finance Commission in 1969. It was done to benefit a few States through special grants from the Centre. The focus was on States that had socio-economic issues and geographical



**In progress:** Ongoing construction of the bridge at Amaravathi, Andhra Pradesh on June 10. RAO G.N.

disadvantages, such as hilly States.

Five factors stood as the qualifying benchmark for the granting of SCS — States that comprise a majority tribal population, low density of population, hilly States and close to international borders, States that have socio-economic and industrial backwardness, and lack of adequate State finances. At present, the States that have the SCS include Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and Uttarakhand.

It was debated that Andhra Pradesh, based on the above strictures, does not

qualify for the SCS and that the Finance Commission had already annulled it. However, the Centre offered Andhra Pradesh a special package (SP).

### What did the special package entail?

Having been convinced that the SCS was ruled out by the Union Government, the first Chief Minister of residual Andhra Pradesh (2014-2019), Chandrababu Naidu of the TDP, who was then part of the NDA alliance, agreed for the SP. The SP included the recognition of the Polavaram irrigation project as a national project with full funding from the Union Government, tax concessions and special

assistance. Though Mr. Naidu accepted the SP, it was termed as a betrayal by the Opposition parties, including the Yuvajana Sramika Rythu Congress Party (YSRCP).

In 2018, Mr. Naidu walked out of the alliance and also moved a no-confidence motion which failed. Political analysts say that Mr. Naidu had succumbed to pressure from the opposition, who were building up a strong campaign against the TDP, based on the SCS issue. His volte-face from SCS to SP was being publicised as a 'betrayal of the State'.

### Does Andhra still qualify for SCS?

N.K. Singh, Chairman of the 15th Finance Commission, in his book *Portraits of Power*, stated that the 14th Finance Commission had never said that SCS cannot be given and that it was up to the Union Government to take a call.

The 14th Finance Commission instead of SCS had increased tax devolution to the State to 42% and also introduced revenue deficit grants for States facing a revenue gap, which Andhra had already received.

SCS, which has an arrangement of funding States in a ratio of 90:10 (90% the Centre and 10% the State), may not be a ruled out chapter for Andhra Pradesh. The Union Government can take a call and refer it to the 16th Finance Commission and the NITI Aayog, and can get back to the arrangement.

### Why is SCS in the limelight again?

Ever since the bifurcation of the State, it has been facing a revenue deficit. Additionally, the debts of the State have shot up enormously. Most of its projects and development have come to a standstill and on top of that the building for a new greenfield capital at Amaravati is pending and needs funding.

People are hopeful that since the TDP is again part of the NDA alliance which does not have a clear majority in the Centre, and is dependent on the MPs from Andhra Pradesh, it would be the right time to press for the SCS, for the overall development of the State.

## THE GIST

▼ The concept of SCS was first brought into existence through the recommendations made by the Fifth Finance Commission in 1969. It was done to benefit a few States through special grants from the Centre.

▼ Five factors stood as the qualifying benchmark for the granting of SCS — States that comprise a majority tribal population, low density of population, hilly States and close to international borders, States that have socio-economic and industrial backwardness, and lack of adequate State finances.

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# Special category states



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- It was done to benefit a few States through special grants from the Centre. Five factors stood as the qualifying benchmark for the granting of SCS — States that comprise a majority tribal population, low density of population, hilly States and close to international borders, States that have socio-economic and industrial backwardness, and lack of adequate State finances.
- Ever since the bifurcation of unified Andhra Pradesh, the residual State has been facing a revenue deficit. Additionally, the debts of the State have shot up enormously.



## **What is special category status?**

**Special category status is a classification of regions or states by the central government to provide special assistance in the form of tax benefits and financial support for development of the region.**

**It was first introduced in 1969 based on the recommendations of the Fifth Finance Commission.**



**What are the criteria to provide special status to a state?**

**The criteria listed by the government include: (1) hilly and difficult terrain (2) low population density (3) strategic location along the borders with neighbouring countries (4) economic and infrastructural backwardness and (5) non-viable nature of state finances.**



## Which states have special category status?

- In 1969, three states — Jammu & Kashmir (now a Union Territory after revocation of Article 370), Assam and Nagaland — were granted the special category status. Subsequently, 8 more states have been granted such a status.
- It includes Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, Tripura, Himachal Pradesh and Uttarakhand. Telangana was granted the special category status. Subsequently, 8 more states have been granted such a status.
- It includes Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, Tripura, Himachal Pradesh and Uttarakhand. Telangana was granted a special status tag after it was carved out of Andhra Pradesh in 2014

## What are the benefits of special category status?



- States that come under special category status get preferential treatment in getting central assistance and tax breaks.
- For the implementation of the centrally-sponsored scheme, the special category status states are required to contribute just 10% while the central government provides 90% of the fund.
- For other states the centre provides 60%-70% of the fund. Allotted money if not spent, lapse for the normal states, but in the case of special category states it is carried forward. Special category states are provided tax breaks to attract investments.
- Special category states are provided tax breaks to attract investments. They are also given preferential treatment in allocation of central funds assistance.

# What is happening in French territory of New Caledonia?

What does the new amendment bill on voters' list stipulate? Why are Kanaks against it?

**Padmashree Anandhan**  
**Neha Tresa George**

## The story so far:

**I**n June 3, the Socialist Kanak National Liberation Front (FLNKS) of the south pacific French territory of New Caledonia called for French President Emmanuel Macron to abandon the plan to modify the electoral reform.

## What happened?

Widespread protests and riots erupted in New Caledonia in response to the French parliament's decision to amend the voters' list. The new amendment bill will pave the way for incorporating citizens who were either born or lived in the territory for at least 10 years. Kanaks, the indigenous community of the territory, opposed this on claims that it diluted their electoral power thus marginalising them. The Kanaks comprise 43% of the 1,45,000 population, while the European (French loyalists), Wallisians and

Tutunians comprise 37%. The new voting amendment will give majority to the loyalists undermining the Kanaks' future towards decolonisation. This would also mean an alteration of the internal political environment towards French settlers.

## What is history of the archipelago?

New Caledonia had Kanaks as the original inhabitants. France gained control of the territory in 1853 and governed the Kanaks with reservations. After the Second World War, colonial laws were abolished and the Kanaks were granted French citizenship. In the 1960s, increased migration from France turned the Kanaks into a minority in New Caledonia. Angered by their deteriorating socio-economic status and lack of economic and political involvement, an independence movement grew along with the emergence of the FLNKS in 1984. Thus, tensions soared between the Kanaks and loyalists between from 1984 to 1988 which ended with the signing of the Matignon agreements in 1988 and the Nouméa

Accord in 1998 between the Kanaks and the French government. This allowed the transfer of powers from Paris to local authorities along with three referendums to decide the territory's independence.

The independence referendums held in 2018 and 2020 were in favour of France, and against an independent New Caledonia. Kanaks requested to postpone the third and final referendum due to COVID-19 in 2021, but the French disregarded the request. A lower turnout ensured a 96% result against an independent state. This infuriated the Kanaks who then opposed talks with the French government.

## Why do Kanaks want independence?

Post World War II, after the granting of French citizenship and transforming the French colonies into overseas territories, New Caledonia's migration pattern increasingly reflected that, of what the Kanaks call, "settler colonialism."

Under this new model, social inequalities widened leading to the

exploitation of the indigenous community. This was observed in the steel and nickel mining sectors, where indigenous people remained as labour while the non-indigenous people reaped economic and political benefits. And despite France's promise to reverse social inequalities and better Kanaks' political participation, the 2019 census showcased the poverty rate among Kanaks to be 32.5%, while only nine per cent of non-Kanaks experienced poverty. The scope of economic progress being stalled and the vote by the French Parliament to alter the electoral composition is seen as a move to end Kanak independence.

## What is the French endgame?

First, achieving tactical peace. More violence would mean an increased threat to overseas French citizens and a risk to Mr. Macron's party's reputation.

Second, integration is key to France's Indo-Pacific strategy. France considers itself an Indo-Pacific power through its overseas territories which combined makes it the second largest Exclusive Economic Zone (EEZ). Additionally, the large number of French citizens authenticates French governance. The Islands represent a strategic position for France in the Indo-Pacific, especially against China. Therefore, to seal its presence in these territories, integration becomes necessary which is difficult as Kanaks demand independence.

*The authors are researchers at NIAS, Bengaluru.*

## THE GIST

▼  
Widespread protests and riots erupted in New Caledonia in response to the French parliament's decision to amend the voters' list. The new amendment bill will pave the way for incorporating citizens who were either born or lived in the territory for at least 10 years.

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# New Caledonia

- **Widespread protests and riots erupted in New Caledonia in response to the French parliament's decision to amend the voters' list.**
- **The new amendment bill will pave the way for incorporating citizens who were either born or lived in the territory for at least 10 years.**
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- **Post World War II, New Caledonia's migration pattern increasingly reflected that, of what the Kanaks call, "settler colonialism."**





## ***'Slow-burn'***



A view of the eruption site of the volcano near Grindavik in Iceland on Monday. A volcano in southwestern Iceland has been erupting and spewing red lava close to the coastal town of Grindavik. AP





- Lava poured from a volcanic fissure near the town of Grindavík, Iceland, in spring 2024.
- The eruption, which began on March 16 and remained active over two weeks later, was the largest in a string of four **volcanic events** on the Reykjanes peninsula starting in December 2023.





- **Iceland** experiences frequent **volcanic** activity, due to its location both on the **Mid-Atlantic Ridge**, a divergent **tectonic plate boundary**, and being over a **hotspot**.
- Nearly thirty volcanoes are known to have erupted in the **Holocene epoch**; these include **Eldgjá**, source of the largest lava eruption in human history.

# India welcomes Egypt, Iran, UAE, Saudi Arabia and Ethiopia joining BRICS



## Press Trust of India

MOSCOW

India on Monday welcomed Egypt, Iran, UAE, Saudi Arabia and Ethiopia joining the BRICS as their representatives attended for the first time a key meeting of the grouping hosted by Russia.

Senior diplomat Dammu Ravi led the Indian delegation at the BRICS Foreign Ministers' Meeting in Nizhny Novgorod, in western Russia.

"A significant meeting in the format of expanded BRICS family. India wholeheartedly welcomes the new membership," the spokesperson of the Ministry of External Affairs Randhir Jaiswal said.



**United front:** India's BRICS Sherpa Dammu Ravi, left, and Foreign Ministers of member countries at the meeting in Russia. REUTERS

The meeting on Monday was the first ministerial meeting following BRICS expansion in 2023 when Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE joined Brazil, Russia, India, China, and South Africa as full-fledged BRICS

members.

Ravi, Secretary (Economic Relations) in MEA, led the Indian delegation at the BRICS Foreign Ministers' Meeting in Nizhny Novgorod, it said.

The ministers reiterated their commitment to mul-

tilateralism and upholding the international law, including the Purposes and Principles enshrined in the Charter of the United Nations (UN) as its indispensable cornerstone, and the central role of the UN in an international system in which sovereign states cooperate to maintain international peace and security, advance sustainable development, ensure the promotion and protection of democracy, human rights and fundamental freedoms for all. They voiced their support for a comprehensive reform of the UN, including its Security Council, with a view to making it more democratic, representative, effective and efficient.



# BRICS EXPANSION

- The idea of the BRICS was formulated by Chief Economist at Goldman Sachs, Jim O'Neill, in a 2001 study entitled "Building Better Global Economic BRICs". It became an analytical category in economic, financial, business, academic and media circles.
- In 2006, the concept, itself, gave rise to the grouping, incorporated into Brazil, Russia, India and China's foreign policy. In 2011, on the occasion of the Third Summit, South Africa became part of the group, who adopted the acronym BRICS.

- **India on welcomed Egypt, Iran, UAE, Saudi Arabia and Ethiopia joining the BRICS as their representatives attended for the first time a key meeting of the grouping hosted by Russia.**
- **following BRICS expansion in 2023 when Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE joined Brazil, Russia, India, China, and South Africa as full-fledged BRICS members.**



### WHAT?

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

### MEMBERS

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

### WHY IN NEWS?

The chair of BRICS 2021 is India. The theme of the 13th BRICS Summit is, 'BRICS @ 15: Intra-BRICS Cooperation for Continuity, Consolidation and Consensus.'

### OTHERS

There are two components that make up the financial architecture of BRICS:

- New Development Bank (NDB) (BRICS Development Bank)
- Contingent Reserve Arrangement (CRA).

# ALL YOU WANTED TO KNOW ABOUT THE BRICS BANK

## What is it?

It is a bank set up by the world's leading emerging economies aimed at funding infrastructure projects in developing nations

## What is the contingent reserve arrangement (CRA)?

The five countries will set up a \$100-bn pool of currency reserves to help countries forestall short-term liquidity pressures

## How will the CRA be funded?

China, the region's largest economy, will contribute \$41 bn to the CRA. Russia, India and Brazil will contribute \$18 bn each, while South Africa will contribute \$5 bn

## Where will the bank be based?

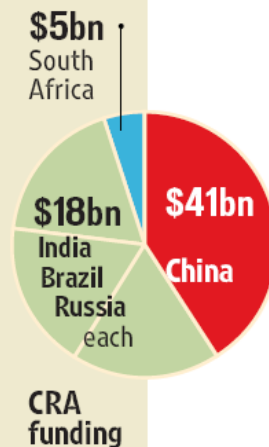
The New Development Bank will be based in Shanghai, China

## How will it be governed?

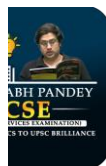
India will preside over its operations for the first five years, followed by Brazil and then Russia. It is scheduled to start lending in 2016

## How will it be funded?

The bank will begin with \$50 bn divided equally between its five founder members. Another \$50 bn will come from new members



# Particulate air pollution linked to 135 million premature deaths over 4 decades, finds study



**Agence France-Presse**  
SINGAPORE

Pollution from man-made emissions and other sources like wildfires have been linked to around 135 million premature deaths worldwide between 1980 and 2020, a Singapore university said on Monday.

Weather phenomena like *El Nino* and the Indian Ocean Dipole worsened the effects of these pollutants by intensifying their concentration in the air, Singapore's Nanyang Technological University (NTU) said, unveiling the results of a study led by its researchers.

The tiny particles called particulate matter 2.5 (PM 2.5), are harmful to human health when inhaled because they are small enough to enter the bloodstream. They come from vehicle and industrial



The harmful particulate matters come from vehicle and industrial emissions and natural sources such as fires and dust storms. AP

emissions as well as natural sources like fires and dust storms.

The fine particulate matter "was associated with approximately 135 million premature deaths globally" from 1980 to 2020, the university said in a statement on the study, published in *Environment International*.

It found that people were dying younger than the average life expectancy

from diseases or conditions that could have been treated or prevented, including stroke, heart and lung disease, and cancer.

Weather patterns increased the deaths by 14%, the study found.

Asia had the "highest number of premature deaths attributable to PM 2.5 pollution" at more than 98 million people, mostly in China and India, the university said. Pakistan, Ban-

gladesh, Indonesia and Japan also had significant numbers of premature deaths, ranging from 2 to 5 million people, it added.

## The big picture

The study is one of the most expansive to date on air quality and climate, using 40 years of data to give a big-picture view of the effects of particulate matter on health.

"Our findings show that changes in climate patterns can make air pollution worse," said Steve Yim, an associate professor at NTU's Asian School of the Environment, who led the study.

"When certain climate events happen, like *El Nino*, pollution levels can go up, which means more people might die prematurely because of PM 2.5 pollution," Mr. Yim added.

"This highlights the

need to understand and account for these climate patterns when tackling air pollution to protect the health of the global population," he added.

The Singapore researchers studied satellite data from the U.S. National Aeronautics and Space Administration (NASA) on the levels of particulate matter in the earth's atmosphere.

They analysed statistics on deaths from diseases linked to pollution from the U.S.-based Institute for Health Metrics and Evaluation, an independent research centre.

Information on weather patterns during the period was taken from the National Oceanic and Atmospheric Administration in the United States.

Researchers from universities in Hong Kong, Britain and China were also involved in the study.



# Report on pollutants

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- **The tiny particles called particulate matter 2.5 (PM 2.5), are harmful to human health when inhaled because they are small enough to enter the bloodstream.**



- They come from vehicle and industrial emissions as well as natural sources like fires and dust storms.
- The fine particulate matter “was associated with approximately 135 million premature deaths globally” from 1980 to 2020,





- **It found that people were dying younger than the average life expectancy from diseases or conditions that could have been treated or prevented, including stroke, heart and lung disease, and cancer.**
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- **Pakistan, Bangladesh, Indonesia and Japan also had significant numbers of premature deaths, ranging from 2 to 5 million people, it added.**

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- Bustillos Lagoon.
- Hydrogen Line
- Litigotiation
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- National Health Claim Exchange (NHCX)
- Mains



By saurabh Pandey



THE HINDU

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**Target Mains -2024/25 -**

**Q "Explain the impact of drought on aquatic/marine ecology"**

प्रश्न "जलीय/समुद्री पारिस्थितिकी पर सूखे के प्रभाव की व्याख्या करें"

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Custom can never overshadow constitution.  
Discuss.

Custom is important role in societies, which reflects traditional practices, behaviour and norms that characteristic of particular community.

However, Custom can never overshadow Constitution. Here are some factors are:

Religious Customs ⇒ Child Marriage in India.

- Prohibition of Child Marriage Act 2006, which set minimum age for girl 18 and Boy 21.
- Prohibition of Sati Pratha 1987 by government.
- Constitution Guarantee Fundamental Rights as Article 14, 15, 21.

Social Customs • Constitution overriden Sabarimala Temple entry.

- Where women of menstruating (10 to 50 yrs) were not allowed to entry in temple.
- Discrimination with Dalits in context of Caste hierarchy.

Judicial Constitution are supreme laws that provide legal framework and practices for government.  
→ Customs impact on development of legal practices and principles  
→ Protection of Rights regarding with every customs.

Challenges

- Diversity Societies and their custom evolved.
- Through very time, Custom evolved.
- Fundamental Right Protection.
- Unaware about their effect of customs.

However, Customs never overshadow of Constitution which constitution undermines. ~~the~~ to ensure justice, equality, liberty and stability in the system.

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## BIG SHOT



▲ Municipal workers spread quicklime over dead fish on June 7, to reduce the stench. This is the dry bed of the Bustillos Lagoon. High temperatures have caused an intense drought, in Anahuac, Chihuahua state, Mexico. REUTERS

# Mapping



- **dry bed of the Bustillos Lagoon.**
- **High temperatures have caused an intense drought, in Anahuac, Chihuahua state, Mexico.**
- **form of drought is afflicting nearly 90% of Mexico, the highest rate since 2011, according to government data.**
- **Chihuahua state has been hit particularly hard with most of its territory engulfed by the most extreme levels of dryness.**
- **“When the amount of water decreases, the pollutants become more concentrated and therefore they also affect the species that live here,**

# Hydrogen line: a unique signal

**Karthik Vinod**

The hydrogen line is an important instrument in modern astronomy — from studying distant stars to looking for extraterrestrial intelligence (if it exists).

Each hydrogen atom is made of one proton and one electron. Both these particles have a property called spin. Colloquially, we can say the spin can point up or down at any given time. When the spins of both particles are pointing up (or down), they are said to be aligned. When they are pointing in opposite directions, they are anti-aligned.

When the spins are anti-aligned, the atom will have more energy than if they are aligned. The atom will shed this 'excess' energy when the electron flips its spin, emitting electromagnetic radiation of wavelength 21 cm.

In some detectors, this emission shows as a characteristic line, thus the name 'hydrogen line'.

Scientists discovered this emission in 1951 and it transformed radio astronomy. By looking for this emission, they could detect clouds of cold, neutral hydrogen atomic gas in interstellar space. Soon after, they were able to create a map of the Milky Way galaxy for the first time, and discover its spiral arms.

Today, astronomers are also using the 21 cm as a probe to spot



The Rosette Nebula is the large hydrogen, sulfur and oxygen gas cloud in the constellation of Monoceros. The nebula is 5,200 light years away from Earth.

GETTY IMAGES/ISTOCKPHOTO

the first light emitted by the universe's earliest galaxies. Because the emission doesn't require complicated technologies to spot, astronomers also think it can be used to send information across space that, some day, an alien civilisation might detect.

### **For feedback and suggestions**

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with the subject 'Daily page'

# Hydrogen line

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# Settling trade disputes through 'litigotiation'

**M**uch of international diplomacy involves walking on eggshells. Major differences, especially on trade and commerce, are often allowed to hibernate while countries focus on the big picture of bilateral ties. Bold leaps of statecraft are sometimes needed to help industry on both sides to settle such trade frictions. Quite remarkably, India and the U.S. have managed to do exactly that in just under a year, burying differences in the seven-long outstanding trade disputes at the World Trade Organization (WTO).

In late March this year, the two countries settled their last lingering trade dispute on poultry products at the WTO. India and the U.S. notified the WTO of reaching a mutually agreed solution in the poultry dispute, withdrawing their respective pending WTO cases in the matter, following the settlement reached between the two countries last September. This comes on the heels of the settlement of six other WTO disputes between the two countries, following Prime Minister Narendra Modi's visit to the U.S. Yet the poultry dispute stands out for several reasons.

## The dispute

To begin with, this dispute was filed more than a decade ago, relating to certain import restrictions taken by India against the imports of poultry products from the U.S. on grounds of avian influenza or bird flu. This is an unusually long time for a WTO dispute to remain unresolved, making it the oldest of the seven disputes between the two countries. Initiated by the U.S. in 2012, the dispute challenged India's import restrictions on poultry products on account of avian influenza which could potentially transmit to humans. This dispute marked one of the earliest instances where animal, and human health and safety-related measures, broadly referred to as 'sanitary and



**James Nedumpara**

is Professor and Head at the Centre for Trade and Investment Law, New Delhi. Views are personal



**Shailja Singh**

is Legal Consultant (Associate Professor) at the Centre for Trade and Investment Law, New Delhi. Views are personal

The artful settlement of complex disputes during litigation, or broadly 'litigotiation', was key to solving the long pending India-U.S. poultry dispute

phytosanitary (SPS) measures' initiated by a developing WTO member was brought before a WTO panel. The U.S.'s primary contention was that India, in deviating from internationally recognised standards set by the World Organization for Animal Health (formerly the OIE), failed to provide scientific justifications for its poultry measures, as mandated by the WTO's SPS Agreement.

Both the panel and the WTO Appellate Body ruled in favour of the U.S. Subsequently, India was given a year to modify or withdraw its inconsistent measures. The U.S. later alleged that India had still failed to meet its obligations, and filed a retaliation claim at the WTO. In response, India filed its own counter-dispute to establish that its revised measures conformed with WTO rules. Over the past decade, both these disputes have largely been kept in abeyance by the parties as they attempted to settle the matter mutually.

Now, with the fresh impetus and persistent efforts from both sides, India has dodged a yearly \$450 million claim, as part of the larger settlement of pending disputes between the two countries. In exchange, India has agreed to reduce tariffs on select products such as cranberries, blueberries, frozen turkey, and premium frozen duck meat destined for luxury hotels. This is a fair trade-off, given the overall balance of interests and the long pendency of the dispute.

While this dispute may not rank as the most economically significant for India, particularly when contrasted with some of the other WTO disputes settled with the U.S. involving challenges to various Indian foreign trade policy schemes such as special economic zones and export-oriented unit schemes, its resolution represents a significant diplomatic breakthrough. The uphill task for negotiators from both sides in resolving this dispute is evident from the fact that it could not be settled alongside the six other

pending disputes by mid-2023.

Collectively, the resolution of these seven disputes has achieved something unprecedented in international trade dispute settlement. It has demonstrated that despite complicated domestic compulsions, major trading partners can still rely on the advantages of diplomatic channels to effectively resolve sensitive trade matters. Along with India's participation in the U.S.-led Indo-Pacific Economic Framework, this puts wind in the sails of the India-U.S. partnership.

## Takeaways from the outcome

Admittedly, settling disputes by arriving at a bilateral solution is not uncommon at the WTO. For example, the U.S. and the European Union's disputes over aircraft subsidies to Boeing and Airbus ultimately required a diplomatic resolution, despite several iterations of challenges before the WTO panels and the Appellate Body. In fact, WTO rules encourage countries to resolve disputes amicably, with litigation only to be pursued as a last resort. However, the significance of this settlement package lies in both the total number of disputes settled and the diversity and complexity of their subject matter – ranging from different types of subsidies to countervailing duties to SPS measures. In the absence of a functional Appellate Body (it became defunct in 2019), resolution of long-standing trade conflicts requires out-of-the-box solutions. It also points to a greater emphasis and thrust on using bilateral diplomatic channels to resolve such issues.

This outcome demonstrates that paralysis within a multilateral body need not prevent large trading partners from resolving differences through focused bilateral negotiations within the framework of litigation. This bodes well for newer attempts at fostering a more stable international trade environment where trade disputes are not allowed to simmer.





# Litigotiation

- Litigotiation means a **combination of negotiation and litigation.**
- The term was coined by Professor Marc Galanter to describe the zig-zag course that **negotiation often takes in cases that have been filed in court** and therefore are punctuated by trips to the courthouse for motion hearings or to depositions for pre-trial discovery, and then back to the bargaining table.

# Is it time for proportional representation

Which are the countries which follow proportional representation in their electoral democracies? Will it work in a large and diverse country like India? What is mixed member proportional representation?

## EXPLAINER

Rangarajan R.

The story so far:

The results of the Lok Sabha elections were declared last week. The ruling National Democratic Alliance (NDA) has won 293 seats with a 43.3% vote share while the Opposition bloc (INDIA, including Trinamool Congress) has secured 234 seats with a 41.6% vote share. Other regional parties and independents pooled around 15% but ended up with only 16 seats in total.

What is first past the post system?

We follow the First Past the Post System (FPTP) in our elections to the Lok Sabha and Legislative Assemblies. Under this system, the candidate who polls more than any other in a constituency is declared elected. This is the system that is followed for elections in democracies like the U.S., the U.K. and Canada. The primary advantage of the FPTP system is that it is simple and the most feasible method in a large country like India. Secondly, FPTP provides greater stability to the executive in our parliamentary democracy because the ruling party/coalition can enjoy a majority in the Lok Sabha Legislative assembly without obtaining majority of the votes (more than 50%) across constituencies.

The issue with FPTP is that it may result in over or under representation of political parties when compared to their vote share. In the first three elections after independence, the Congress party won close to 75% of seats in the then Lok Sabha with a 45-47% vote share. Table 1, depicts a sample of this scenario after the general elections of 2014 and 2019.

What is proportional representation?

The Proportional Representation (PR) system ensures representation of all parties based on their vote share. The most commonly used PR system is the 'party list PR' where voters vote for the party (and not individual candidates) and then the parties get seats in proportion to their vote share. There is usually a minimum threshold of 3-5% vote share for a party to be eligible for a seat. India is a federal country and this principle is implemented should ideally be carried out at each State/Union Territory (UT) level. The scenario as it would have played out after the 2024 election results based on applying the PR system at each State/UT level is summarised in Table 2.

As can be seen, the PR system would have resulted in representation of parties according to their vote share. For example, in Gujarat, Madhya Pradesh and Chhattisgarh, totalling 66 seats, the NDA won 64 seats with a vote share of 62%, 60% and 53% respectively. Under the PR system, the INDIA bloc would have secured 22 seats in these States. The Biju Janata Dal (classified in 'Others') with a 42% vote share in Odisha would have secured nine seats as against no representation at present under the FPTP system. Similarly, the NDA and the All India Anna Dravida Munnetra Kazhagam (classified in 'Others') would have had representation in Tamil Nadu where the INDIA bloc secured all 29 seats with a 47% vote share under the FPTP system.

The main criticism against the PR system is that it could potentially result in instability as no party/coalition may obtain a majority to form the government in our parliamentary democracy. Further, it may result in the proliferation of political parties based on regional, caste, religious and linguistic considerations that

## An alternative seat-sharing mechanism

A Proportional Representation (PR) system ensures representation of all parties based on their vote share. The most commonly used PR system is the 'party list PR' where voters vote for the party, and the parties get seats in proportion to their vote share.

Table 1: The results of the 2014 and 2019 general elections

Political party (congressional State)	2014 % of votes	2014 No. of seats	2019 % of votes	2019 No. of seats
Bharatiya Janata Party (BJP) (All India)	31%	282	37.3%	303
Indian National Congress (INC) (All India)	19.3%	44	19.5%	52
Bahujan Samaj Party (BSP) (Uttar Pradesh)	4.1%	0	3.6%	10
Samajwadi Party (UP) (Uttar Pradesh)	3.4%	5	2.6%	5
Trinamool Congress (West Bengal)	3.8%	34	4.1%	22
All India Anna Dravida Munnetra Kazhagam (AIADMK) (Tamil Nadu)	1.7%	0	2.3%	24
Dravida Munnetra Kazhagam (DMK) (Tamil Nadu)	2.6%	16	2%	3
Telugu Desam Party (Andhra Pradesh)	2.6%	9	2.5%	22
Yashwantrao Chavan Party (Andhra Pradesh)	1.9%	18	2.1%	18
Shiv Sena (Maharashtra)	1.7%	20	1.7%	12
Biju Janata Dal (BJD) (Odisha)	24.6%	78	20.9%	71
All other parties/independents	1.0%	443	1.0%	443
<b>Total</b>	<b>100%</b>	<b>543</b>	<b>100%</b>	<b>543</b>

Note: The conversion of vote share to seats is calculated at each State/UT level and aggregated. It is an overall calculation without the exclusion of smaller parties based on any threshold. \*Sarkis has been added to the NDA.



Election fervour: Supporters of the Samajwadi party celebrate after the counting of votes for the Lok Sabha elections, in Lucknow on June 4, 2024 (PTI/ANNA)

Table 2: If the PR system is applied for the 2024 election

Political formation	% of votes	Actual number of seats	Seats as per PR
National Democratic Alliance (NDA)	43.3%	293*	243
INDIA bloc	41.6%	234	225
Others/independents	15.1%	16	75
<b>Total</b>	<b>100%</b>	<b>543</b>	<b>543</b>



Complete sweep: TDP supporters celebrate in Hyderabad on June 4; Trinamool Congress supporter celebrates in Kolkata on June 4. (NAGARA GOHIL/ANI)

may promote casteist or communal voting patterns. However, the second criticism is not well founded since the present FPTP system has also not inhibited the formation of parties based on caste or communal considerations. This issue can be addressed by specifying minimum threshold for votes polled in order to make a party eligible for seats in legislative houses.

In order to maintain balance between stability and proportionate representation, the system of Mixed Member Proportional Representation (MMPR) can be considered. Under this system, there is one candidate who is elected through the FPTP system from each territorial constituency. There are also additional seats that are filled based on various parties' percentage of votes.

What are international practices?

Presidential democracies like Brazil and Argentina have the party list PR system. So do parliamentary democracies like South Africa, the Netherlands, Belgium and Spain. In Germany, that follows the MMPR system, out of the 598 seats in the Bundestag (their equivalent to our Lok Sabha), 299 seats (50%) are filled from

constituencies under the FPTP system. The voters also provide their preference for a party in the ballots. The balance 299 seats (50%) are filled by apportioning them amongst parties, that secure at least 5% votes, based on their percentage of votes. Similarly, in New Zealand, out of the total 120 seats in the House of Representatives, 72 seats (60%) are filled through the FPTP system from territorial constituencies. The balance 48 seats (40%) are allotted to various parties, that secure at least 5% votes, based on their vote share. This system is likely to provide the required stability in a parliamentary democracy like India while also ensuring representation for all parties based on their vote share.

What can be the way forward?

The law commission in its 170th report, 'Reform of the electoral laws' (1999), had recommended the introduction of the MMPR system on an experimental basis. It had suggested that 25% of seats may be filled through the PR system by increasing the strength of the Lok Sabha. While it had recommended to consider the entire Bundestag (their equivalent to our Lok Sabha), 299 seats (50%) are filled from

to consider it at every State/UT level considering our federal polity. It is also pertinent to note that the delimitation exercise for increasing the number of seats is due based on the first Census to be conducted after 2026. The population explosion that happened in our country during the last five decades has been uneven among various regions. Determining the number of seats in Lok Sabha solely in proportion to population may go against the federal principles of our country and may lead to a feeling of disenchantment in the States that stand to lose through such representation. However, in the event of increasing the seats during such the delimitation exercise, the MMPR system may be considered for incremental seats or at least 25% of the total seats to be filled from each State/UT. This could assuage the apprehension of southern, northeastern and smaller States in the northern region by limiting the domination of larger States with increased seats solely through the FPTP system.

Rangarajan R is a former IAS officer and author of 'Polity Simplified'. He currently trains as one unit for PR based on vote share, the appropriate approach would be

## THE GIST

➤ The First Past the Post System (FPTP) is followed in our elections to the Lok Sabha and Legislative Assemblies. Under this system, the candidate who polls more than any other in a constituency is declared elected.

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- **What is first past the post system?**
- We follow the First Past the Post System (FPTP) in our elections to the Lok Sabha and Legislative Assemblies.
- Under this system, **the candidate who polls more than any other in a constituency is declared elected.**
- This is the system that is **followed for elections in democracies like the U.S., the U.K. and Canada.**
- The primary advantage of the FPTP system is that it is simple and the most feasible method in a large country like India.
- Secondly, **FPTP provides greater stability to the executive in our parliamentary democracy** because the ruling party/coalition can enjoy a majority in the Lok Sabha/Legislative assembly without obtaining majority of the votes (more than 50%) across constituencies.

- The issue with FPTP is that it may result in over or under representation of political parties when compared to their vote share.
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# What is proportional representation?

- The **Proportional Representation (PR) system ensures representation of all parties based on their vote share.**
- The **most commonly used PR system is the 'party list PR' where voters vote for the party** (and not individual candidates) and then the parties get seats in proportion to their vote share.
- There is usually **a minimum threshold of 3-5% vote share for a party to be eligible for a seat.** India is a federal country and this principle if implemented should ideally be carried out at each State/Union Territory (UT) level.

- The main criticism against the PR system is that it could potentially result in instability as no party/coalition may obtain a majority to form the government in our parliamentary democracy.
- Further, it may result in the proliferation of political parties based on regional, caste, religious and linguistic considerations that may promote casteist or communal voting patterns.
- However, the second criticism is not well founded since the present FPTP system has also not inhibited the formation of parties based on caste or communal considerations.

- This issue can be addressed by specifying minimum threshold for votes polled in order to make a party eligible for seats in legislative houses.
- In order to maintain balance between stability and proportionate representation, the system of Mixed Member Proportional Representation (MMPR) can be considered.
- Under this system, there is one candidate who is elected through the FPTP system from each territorial constituency.
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## What can be the way forward?

- The law commission in its 170th report, 'Reform of the electoral laws' (1999), had recommended the introduction of the MMPR system on an experimental basis.
- It had suggested that 25% of seats may be filled through a PR system by increasing the strength of the Lok Sabha.
- While it had recommended to consider the entire nation as one unit for PR based on vote share, the appropriate approach would be to consider it at every State/UT level considering our federal polity.

- The **population explosion** that happened in our country during the last **five decades has been uneven among various regions.**
- Determining the number of seats in **Lok Sabha solely in proportion to population may go against the federal principles of our country** and may lead to a feeling of disenchantment in the States that stand to lose through such representation.
- However, in the event of increasing the seats during such the delimitation exercise, **the MMPR system may be considered for incremental seats or at least 25% of the total seats to be filled from each State/UT.**

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# Why is China probing the far side of the moon?

What is the latest in its ambitious space odyssey? How did China's other moon mission fare?

## Yamdevant Mukund

**I**n the pre dawn hours (IST) of June 4, a small spacecraft bearing lunar samples took off from the moon's far side, headed for an orbit that would bring it in contact with an orbiter waiting for it. There, the spacecraft 'handed over' the samples to a capsule on the return, which will bring the samples back to the earth in a two-week journey. Scientists will then finally have access to pieces of moon soil and rocks from its far side. This is China's ambitious and ongoing Chang'e 6 mission.

**What are the Chang'e missions?**  
China's moon missions are called Chang'e, named for the goddess of the moon in Chinese mythology. The Chinese National Space Administration (CNSA) launched the Chinese Lunar Exploration Programme (CLEP) in 2003, and the first Chang'e mission happened in 2007. Chang'e 1 created a map of the moon's surface. With Chang'e 2, CLEP launched phase 1 of its moon missions, and equipped the orbiter with a better camera. Its images were used to prepare the Chang'e 3 mission's lander and rover for their descent on the moon, which they successfully achieved on December 14, 2013, starting CLEP's phase II missions.

In 2013, Chang'e 4 carried the first lander and the rover to descend on the moon's far side and explore its more mysterious region. Phase III began to replicate its predecessor's feat but with the Chang'e 5 mission. In late 2020, it deployed a lander on the moon's near side. The scientific goal is to understand why the far side is so different from the near side. It included a mission component called an ascender, which, after collecting and storing some lunar soil samples, launched itself into orbit. There, an orbiter collected the samples, transferred them to a returner, which brought them to the earth. Chang'e 6 is attempting to replicate its predecessor's feat but from the moon's far side. The scientific goal here is to understand why the far side is so different from the near side.

## What is the far side?

The moon is tidally locked to the earth: the lunar hemisphere facing the earth will always face the earth, and the hemisphere facing away (far side) will always face away. The far side has rocky terrain and fewer smooth plains. Thus, it's harder to land a spacecraft on the far side – more so since it's impossible to communicate directly from the earth with a spacecraft here: there's no line of sight. A workaround is to have a second spacecraft in space that relay signals between ground stations on the earth and the surface spacecraft. This makes the mission more complex. The far side is expected to be a good place to install large telescopes, which would have a view of the universe unobstructed by the earth. ISRO and scientists at the Ramon Research Institute, Bengaluru, are currently working on such a device, called PRATUSH.

## What is the status of Chang'e 6?

CNSA launched the 4.2-tonne Chang'e 6 orbiter lander assembly on May 3 and it entered a lunar orbit on May 8. On May 20, the lander complex split from the orbiter and descended over a large crater called Apollo on June 1. CLEP scientists coordinated this part of the mission with help from the Queqiao 2 relay satellite, which the CNSA launched in February this year into an elliptical orbit around the moon. Once within Apollo, a drill plunged into the soil, and with help from a scoop extracted about 2 kg of material, and transferred it to the ascender. On June 4, the ascender took off from moon orbit. There, it rendezvoused with the orbiter and transferred the samples to a capsule in the returner on June 6. The returner is expected to bring them to the earth on June 25.

## What might the samples reveal?

Since Chang'e 6 is a Chinese mission, the 'what' depends on the samples as much as 'by whom' and 'where'. CNSA hasn't been sharing periodic and detailed updates, as has been expected from other moon missions. Over CNSA arrives the sample-bearing capsule, Chinese scientists will have first crack at it before sharing access with foreign research groups based on their proposals. It's unknown whether any Indian research groups have applied for access. Scientifically, the far side samples are expected to inform insight about why the moon is the way it is and the formation of planets. For example, scientists believe the terrain asymmetry between the two lunar hemispheres is because of heat released by the earth when the moon was forming and thermochemical characteristics near the moon's surface. The details in this article are as of 4 pm on June 6, 2024.

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- **ISRO and scientists at the Raman Research Institute, Bengaluru, are currently working on such a device, called PRATUSH.**

# What is the National Health Claim Exchange?

Will the platform help patients access healthcare easily? Will it bring about transparency in the healthcare claims ecosystem? What are the hurdles to the Insurance Regulatory and Development Authority of India's objective of achieving 'Insurance for All by 2047'?

**Bindu Shajan Perappadan**

## The story so far:

**T**he Health Ministry along with the Insurance Regulatory and Development Authority of India (IRDAI) are working on measures aimed at allowing patients to access quality healthcare swiftly and with reduced out-of-pocket expenditure. The Ministry and IRDAI are launching the National Health Claim Exchange (NHCX), a digital platform which will bring together insurance companies, healthcare sector service providers and government insurance scheme administrators.

## How is the NHCX expected to work?

The NHCX will serve as a gateway for exchanging claims-related information among various stakeholders in the healthcare and health insurance ecosystem. The integration with NHCX is expected to enable seamless interoperability of health claims processing, enhancing efficiency and transparency in the insurance industry, benefiting policyholders and patients, said the Health Ministry.

'The primary challenge in health insurance lies in improving the relationship between hospitals and insurance companies'

Asked if the system will help to accommodate the dynamic and diverse healthcare system of India, S. Prakash, MD & CEO designate, Galaxy Health and Allied Insurance Company Limited, said the healthcare landscape has been evolving to align with IRDAI's objective of achieving 'Insurance for All by 2047'. "The insurance industry is poised to support the implementation of this system by facilitating streamlined interactions between hospitals and insurers, establishing a seamless, paperless, and secure contractual framework. Acting as a centralised hub for all health claims, the NHCX will significantly alleviate the administrative burden on hospitals, which currently contend with multiple portals for various insurers," he explained. Twelve insurance companies and one TPA (Third Party Administrator) have completed the NHCX integration.

## What about cashless claims?

A timeline has been fixed for insurance claims of cashless claims. The insurance authority has said that all cashless claims have to be processed within three hours of the receipt of discharge authorisation from the hospital. The insurance regulator has set the insurance provider a deadline of July 31 to put systems and processes in place to ensure the smooth facilitation of this latest directive.

## What are some other incentives on offer?

To encourage adoption of digital health transactions and digitisation of patient health records in the country, the National Health Authority had announced financial incentives under the Digital Health Incentive Scheme (DHIS) from January 2023. Under the DHIS, there is a provision that for every insurance claim transaction through NHCX, financial incentives of ₹500 per claim or 10% of the claim amount, whichever is lower, would be given to hospitals, according to a Health Ministry note.

## Why is NHCX being brought in?

A paper titled, 'Health Insurance Coverage in

India: Insights for National Health Protection Scheme', noted that health insurance is an important policy strategy to provide health care services as well as reduce high out-of-pocket expenditure which burden individuals. It points out that for all India, the hospitalisation cases are highest when insured from private purchase (54.4 per 1,00,000 persons). In urban areas, cases for inpatient care are observed to be highest for those covered by government-funded schemes (60.4 cases per 1,00,000 persons). On the contrary, in rural areas, in-patient cases are substantially higher for those purchasing private insurance (73.5 cases per 1,00,000 persons). Also, overall in-patient cases are higher for urban areas compared to rural areas.

Arguing for the NHCX, the Health Ministry states that the platform will help in standardisation and interoperability of health claims and will bring in seamless exchange of data, documents and images between payer (insurance company/TPA/government scheme administrator) and provider (hospital/lab/poly clinic). Industry experts also note that the platform, through uniform data presentation and centralised validation of claims data, could bring in a more standardised approach to healthcare pricing.

## What are the challenges?

Health insurance contributes to approximately 29% of the total general insurance premium income in India. The primary hurdle in health insurance today lies in improving the relationship between hospitals and insurance companies, said Dr. Prakash, adding that the push towards digitisation requires active involvement from both parties, necessitating upgrades to current IT systems and enhanced workforce training. "Issues such as discharge delays and miscommunication between hospitals and insurers further complicate matters. Building trust among policyholders hinges on delivering efficient services. The NHCX portal aims to streamline the claims process by bringing all stakeholders onto one platform, reducing claim times and standardising procedures. While challenges like data breaches are being effectively tackled, the NHCX stands as an ongoing benefit for all involved, facilitating smoother operations within the healthcare space," he said.



GETTY IMAGES



# National Health Claim Exchange (NHCX)

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# Topics



- The Volkhov River
- Global Plastic teaty
- Pizhala island
- Credit Default Swap (CDS)?
- AITGA
- Sanke Mon
- Mains



By saurabh Pandey



# Four Maharashtra medical students drown in Russia's Volkhov river



**Purnima Sah**

MUMBAI

Four medical students from Maharashtra studying at Yaroslav-the-Wise Novgorod State University in Russia drowned in the Volkhov river.

The External Affairs Ministry said the unfortunate incident took place while the students were on an outing in Veliky Novgorod city.

A fifth member of the group, a girl student, survived and is undergoing medical care. All the students were in the 18-20 age

**Two bodies were recovered from the river, while a fifth member of the group survived**

group. The local emergency services in Russia have recovered two bodies and are searching for two more.

The deceased were identified as Harshal Anantrao Desale from Bhadgaon in Jalgaon district; siblings Jishan Ashpak Pinjari and Jia Firoj Pinjari from Amalner in Jalgaon; and Malik

Gulamgous Mohammad Yakub from Mumbai. The survivor is Nisha Bhupesh Sonawane from Pune.

The Ministry in an official release on Friday said, "Our Consulate in St. Petersburg remains in contact with the university and local authorities. Local emergency services have so far recovered two bodies from Volkhov river."

"We offer our condolences to the families. The search for the remaining two missing students continues. The five students involved in the accident belong to the Jalgaon district

of Maharashtra. Our Consulate in St. Petersburg is coordinating with local authorities for the repatriation of the mortal remains," the Ministry stated.

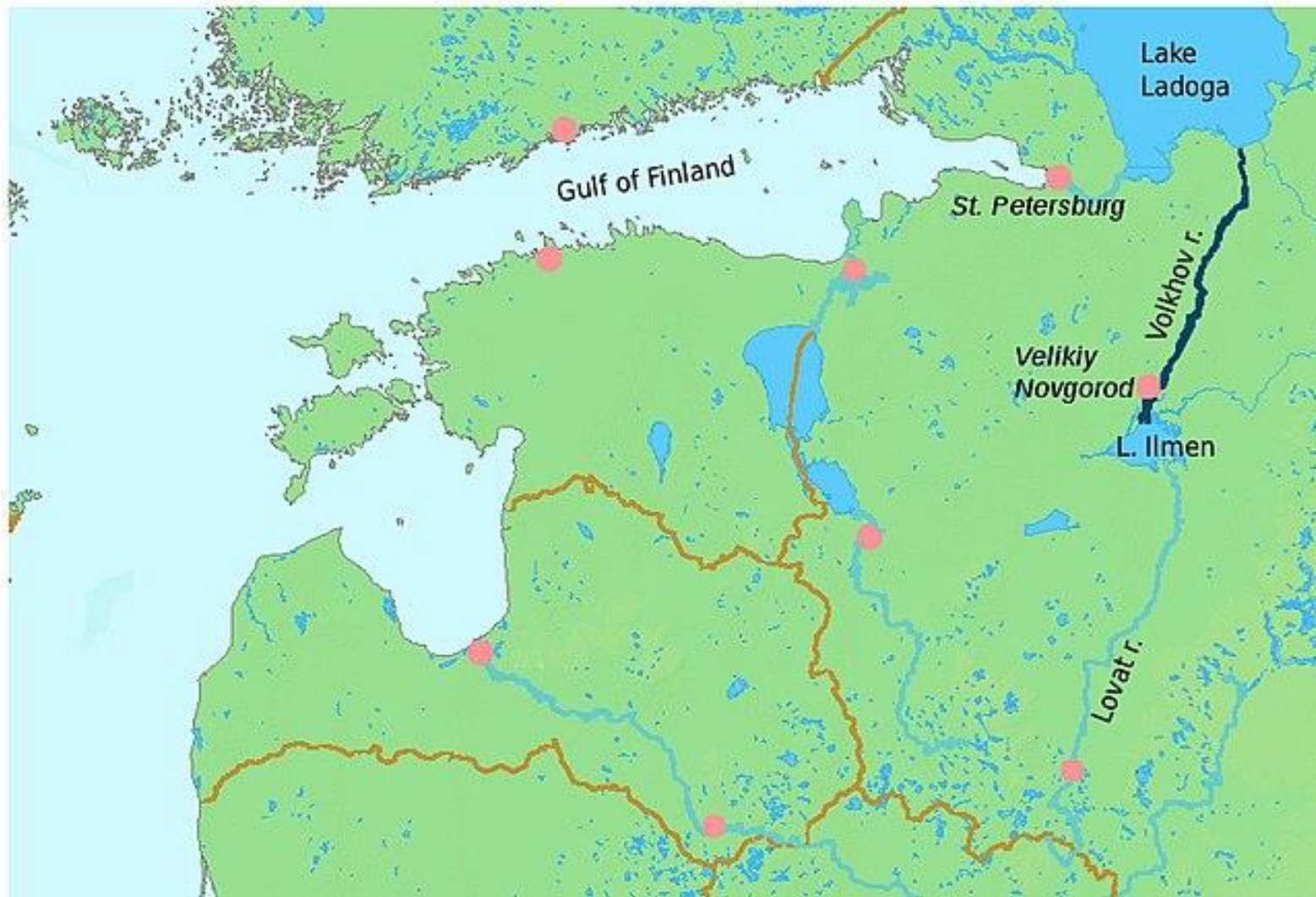
Harshal's father, Anant Bhilaji Desalesaid, "On June 4, he had video called us. He said he was taking a stroll by the riverbank with other students. We told him not to venture into the water at that hour. We spoke for 15-20 minutes. The next day on June 5, the university reached out to us saying he was found drowned."





# The Volkhov River

- The Volkhov is a river in northwestern **Russia**. It connects **Lake Ilmen** and **Lake Ladoga** and forms part of the basin of the **Neva**.
- The Volkhov flows out of **Lake Ilmen** north into **Lake Ladoga**, the largest lake in Europe.
- It is the second largest **tributary** of Lake Ladoga.
- It is **navigable** over its whole length.



# Remoulding the Global Plastics Treaty



As discussions still continue for an international legally binding treaty on plastic pollution, it becomes crucial to consider how it can support a fair transition for individuals who collect and recycle waste informally. According to the OECD Global Plastic Outlook, global production of plastic waste was 353 million tonnes in 2019 – more than double since it was in 2000, and is set to triple by 2060. Only 9% of this was recycled, 50% sent to landfills, 19% incinerated, and 22% disposed of in uncontrolled sites or dumps. According to the United Nations Environment Programme, of the 9% recycled, 85% was done by informal recycling workers.

These workers collect, sort and recover recyclable and reusable materials from general waste, alleviating municipal budgets of financial burdens around waste management and, at large, subsidising the environmental mandate of the producers, consumers and the government. The Centre for Environment Justice and Development has also observed that they promote circular waste management solutions and help mitigate greenhouse gas emissions, valuably contributing to sustainability. Their efforts significantly reduce plastic content in landfills and dump sites, effectively preventing plastic leaking into the environment.

## The need for recognition

Yet, these workers are often overlooked and remain highly vulnerable in plastic value chains. They face risks such as increasing privatisation of waste management, waste-to-energy or incineration projects, and exclusion through other public policy interventions in plastic waste management in the norms of Extended Producer Responsibility (EPR).

The informal waste and recovery sector (IWSR) is more than a minor player in worldwide



## Neethi P.

is Senior Researcher at the Indian Institute for Human Settlements (IIHS), Bangalore and an Advisory Member to the Karnataka Labour Policy Committee



## Akbar A.

is the Director, Programme Design at Hasiru Dala, a social impact organisation that works with waste pickers and other waste workers in Karnataka

As an instrument to end plastic pollution, it needs to ensure social justice and equity principles for the informal recycling worker

municipal solid waste management systems. According to the UN-Habitat's Waste Wise Cities Tool (WaCT), the informal sector accounts for 80% of municipal solid waste recovery in many cities.

A recent study by UN-Habitat and the University of Leeds estimates that around 60 million tonnes of plastic from municipal solid waste pollute the environment, including waterbodies, due to inadequate collection services and mismanagement of solid waste. Without the IWSR, the volume would be higher. However, as highlighted in the recent Leave No One Behind Report, strategies to reduce plastic pollution often neglect to effectively involve the recovery capacities, skills, and knowledge of the IWSR. This oversight worsens livelihood vulnerabilities and undermines existing informal recovery systems.

## Global treaty, need for a just transition

The Global Plastics Treaty is a significant attempt to establish a legally binding agreement aimed at reducing and eliminating plastic pollution. The decision to establish an Intergovernmental Negotiating Committee (INC) was made in early 2021 during the fifth UN Environment Assembly in Nairobi, Kenya. The INC's journey, beginning with an Ad Hoc Open-Ended Working Group meeting in Dakar, Senegal, in mid-2022, was followed by subsequent meetings in Uruguay, Paris, and Nairobi, with the fourth INC-4 in Canada in April this year. The final INC-5 meeting in South Korea will continue to see active participation from the International Alliance of Waste Pickers (IAWP).

The IAWP, a vocal participant in the UNEA Plastic Treaty process, emphasises the importance of supporting the formalisation and integration of informal waste pickers into discussions on addressing plastics. It also

advocates including waste pickers' perspectives and solutions at every stage of policy and law implementation.

These measures aim to acknowledge waste pickers' historical contributions, protect their rights, and promote effective and sustainable plastic waste management practices. There is no universally agreed-upon terminology for a just transition or a formal definition of the informal waste sector and its workforce. Clarifying these definitions is crucial.

## India's voice is important

As a key representative from the Global South, India promotes an approach that enhances repair, reuse, refill, and recycling without necessarily eliminating the use of plastics altogether.

India has also stressed the importance of adopting country-specific circumstances and capacities. Hence, India's informal waste pickers, who are indispensable, remain central to the discussion.

We, therefore, need to rethink the formulation of our EPR norms and raise questions on how to integrate this informal worker cohort into the new legal framework.

As the final round of negotiations for the Global Plastics Treaty approaches the INC-5, a key question remains – on how a global instrument to end plastic pollution can enable a just transition for nearly 15 million people who informally collect and recover up to 58% of global recycled waste, thereby shaping a sustainable future. By incorporating their perspectives and ensuring their livelihoods are protected, the treaty can embody social justice and equity principles while leaving no one and no place behind.



# Global plastic treaty

- **According to the OECD Global Plastic Outlook, global production of plastic waste was 353 million tonnes in 2019 — more than double since it was in 2000, and is set to triple by 2060.**
- **Only 9% of this was recycled, 50% sent to landfills, 19% incinerated, and 22% disposed of in uncontrolled sites or dumps.**
- **According to the United Nations Environment Programme, of the 9% recycled, 85% was done by informal recycling workers.**



- **In March 2022, the UN Environmental Assembly convened in Nairobi, Kenya, to debate the global plastic crisis.**
- **In a historic move, 175 nations voted to adopt a global treaty for plastic pollution—agreeing on an accelerated timeline so that the treaty could be implemented as soon as 2025.**
- **The unique potential of a global, United Nations-led treaty is to hold all countries to a high common standard on plastic consumption and create a clear path toward a future free from plastic pollution.**
- **This will create a level playing field that incentivizes and supports national actions.**

- **The power of moving beyond fragmented national plans is demonstrated by other successful environmental agreements.**
- **For example, through unified global bans, the Montreal Protocol has phased out more than 99% of ozone-depleting substances since its establishment, setting the ozone layer on a gradual path to recovery.**



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## India's Approach

- **As a key representative from the Global South, India promotes an approach that enhances repair, reuse, refill, and recycling without necessarily eliminating the use of plastics altogether.**
- **India has also stressed the importance of adopting country-specific circumstances and capacities. Hence, India's informal waste pickers, who are indispensable, remain central to the discussion.**

- **These workers collect, sort and recover recyclable and reusable materials from general waste, alleviating municipal budgets of financial burdens around waste management and, at large, subsidising the environmental mandate of the producers, consumers and the government.**
- **The Centre for Environment Justice and Development has also observed that they promote circular waste management solutions and help mitigate greenhouse gas emissions, valuably contributing to sustainability**



**Lost lives and livelihoods:** Dead fish found floating in a cage farm at Shikadipada, near Chennamangalam, Kuttanur May 21. Cage farmers were getting ready to harvest premium varieties such as pearl spot, so as to earn a profit during the breeding ban, when the fish died. A witness

# Fish kill spotlights pangs of Periyar

The latest fish kill reported in the Periyar on May 21 and 22 has brought to light uncontrolled pollution of the river and the misery it heaps on the fish farmers who depend on this lifeline for subsistence. **K.A. Martin** takes stock of the situation

**I**t was the changing colour of the water that first caught the attention of veteran paddy cultivation cum fish farmer T.J. Jolly, 41, on Puthala Island located less than a kilometre northwest of Nellikuda bazaar house on Grattale Road, and cage farmer T.R. Subbayan, 42, a resident of Tharuvathur Tharuvath, a tiny island located across the Container Island to southeast of Puthala. Innumerable rats over the previous day had left its effect on the flow of the waters they depend on for their farms.

But the fishermen were not expecting what followed. They were familiar with the change in the water's colour and sometimes a sharp smell rising out of it. But these signs on May 21 changed to fish appearing to struggle to breathe and float up to the surface in large numbers in the waters of the river Periyar.

Subbayan, living in a modest dwelling, is among the fishermen who pick mussels in Vembanam Lake. He is into cage farming for years in come. He found the fish in the cage floating to the surface, either dying or near the point of death, he says.

Soon he realised there was something wrong by wrong as news spread of mass fish death in the Puthala Island segment — an industrial area — of the Periyar by May 21 afternoon. The phenomenon continued into the following day when the scale of losses were up with hundreds of tonnes of fish floating dead in this segment of the mighty river.

**The Periyar is no doubt. Reckoning it to its glory looks almost impossible. Its summer flow has shrunk to negligible levels over the last 40 years.**

**S.K. KAVI**  
Environment expert

be harvested from a cage in this period, but it fish short more often than not, given the rise of salinity in water and change in weather conditions.

Cage farmers like Subbayan were getting ready to harvest varieties like pearl spot, which fetch a premium in the market, and tilapia, to garner profit during the annual trading ban that is set to come into effect on June 1. During the 32 day ban period for large boats, fish scarcity drives up prices and farmers find it is a great demand. Each of the more than a dozen farmers active in Subbayan's group may have lost at least 40 lakh, he says.

On the Puthala Island, Jolly has been running his fish farms out of naturally occurring enclosures in public fields along the coast. He finds it in the business of maintaining paddy fields and fish farms for the third generation. He has a family of four, including his two children, wife and mother, and the latest bout of fish death and massive river pollution has resulted in substantial

losses, enough to break a farmer's back, he says.

Baby says most of the farmed fish in his tanks just disappeared over two days, while he was preparing for a harvest. The loss cannot be quantified but an indication is that he had caught shrimp worth about ₹2,000 on May 20 but on May 21, the catch dwindled to around ₹1,000, he says.

The case of Jackson Schemm in Kandanoor and a joint Liability Group (JLG) with him is another example of how pollution of waterbodies hit the fortunes of the small and marginal fishermen and aquaculturists. (JLGs are groups formed to take bank loans with joint liability so that if one fails the others can pay back).

Around 5.5 million people in central Kerala rely on the Periyar for a range of requirements from drinking water supply to irrigation of farms to fishing and aquaculture. The 244 km river has entered poets to call it the conveyor of cool winds from the Western Ghats. It is inextricably linked to the love of fish century Vedic scholar Shukrascharya and the riverbanks form the sacred ground where millions offer prayers for the deceased every year.

**'A carrier of death'**  
But the mass fish kill has once again highlighted the river condition, prompting environmentalists to call it a carrier of death, a conveyor of toxic pollutants, threatening the health and lives of the millions, who drink in water.

"The river, if not dead, is on its deathbed. Reverting to its old glory looks almost impossible, summer flow has shrunk to negligible levels over the last 40 years," says river protection activist S.P. Ravi.

Paruthan Ravi, who has watched the fortunes of the river for about four decades, says, "This is the ninth instance of fish death in the river in 2024." The last instance was on May 12 when the newspapers take notice of these incidents only when there is a massive die-off of fish and loss of riverine flora and fauna, he says.

The fish death of May was allegedly caused by industrial units located along the Periyar bank in the segment flanking around Kandanoor and solids into the river, alleges the community



This is the ninth instance of fish death in the river in 2024. The media take notice of these incidents only when there is a massive casualty.

**PURUSHAN RAO**  
Environmental activist

of river watchers and protection activists. But the Kerala Pollution Control Board (PCB) said in its preliminary report that industrial effluents were not detected in the water samples collected immediately after the fish death. The study, however, indicated low oxygen levels in the water.

**Suspicion of sulphur release**

A preliminary report by the Kerala University of Fisheries and Ocean Studies pointed to low oxygen level and chemical pollutants in the water sample collected at the site of the fish death even as it expressed the suspicion that sulphur may have been released directly into the water. The university also called for a standing monitoring system and money to back the programme. The university did not specify the origin of the chemicals either as organic or inorganic.

The PCB, directly in charge of monitoring the health of the river especially along its industrial reaches, said in its preliminary report that there was no indication of industrial pollutants in the water samples collected by the board for tests.

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But environmental activists damned the tin miner's claim that the level of pollution had seen some let-up. Paruthan says that if the studies conducted by officially appointed bodies of the government's lack of concern is obvious from the fact that a 500-tonne fish processing plant is awaiting government clearance and may get permission to set up business.

The protest of Periyar has been rampant, he says. Such instances come to public notice only due to their enormity. The option is hatched by fish farmers like Baby, who save the media pay attention only when there is a big die and cry.

**Frequent and frustrating**

But the incidents have been so frequent and frustrating that the farmers like him are thinking in terms of switching to farm tourism and associated activities that have begun to draw a large number of visitors, thanks to improved facilities for movement between islands near Kochi.

It is possible that farmers like him will one day totally give up fish farming for more lucrative fields occupying the chequered history of the Periyar as an icon of life support system to the masses of humanity.



**Denying answers:** Environmental activists block the Pollution Control Board chairman's vehicle in Kuttanur to protest against the mass fish kill. They blame the release of untreated effluents from industrial units on the Kuttanur dam for the incident, against the mass

**Cage farmers' huge losses**  
While fishermen, scattered throughout banks of stocks, farmers like Subbayan and his friends lost around 400 cages in the waters of Mondanipally, Tharuvathur, Tharuvath, Puthala, Chennamangalam and Kottal, which were hit by what environmental activists called release of untreated toxic effluents into the Periyar in the industrial Puthala Island reach.

Like many fish farmers in the region, Subbayan takes up different jobs, including fishing and cage farming, to look after his family. Each cage used for growing varieties such as pearl spot, tilapia and cobia, costs at least ₹1 lakh. A cage measures, in most cases, about 60 metres. While the price of fish varies depending on their size and varieties, income from a cage ranges between ₹65,000 and ₹75,000 for a season of six months. Around 2.5 tonnes to three tonnes can

# Pizhala island

Pizhala is an island village, one among the fourteen islands of **Kadamakkudy** archipelago, located near to the main land of the city **Ernakulam**. The island is surrounded by tributaries of river **Periyar**.



# About Sulphur

- Sulphur occurs in nature as an element and also as sulphates in soil, water and rocks. Major reservoir of sulphur is sulphate rocks.
- Soil and water also receive sulphates from rocks.
- Rainwater running over rocks gradually wears away their surface and carries off sulphur with it.
- Some of this sulphur soaks into the soil and some reaches ponds and lakes.

- **A large part of sulphur is carried by the rivers to the sea where it may get locked up in sedimentary rocks.**
- **Wind may also erode the rocks, and the materials may be blown into the air as dust.**
- **Rain washes a significant amount of this matter from the atmosphere into the oceans.**

# SEBI to allow MFs unveil new products on CD swaps

**Suresh P. Iyengar**  
MUMBAI

Market regulator SEBI will soon allow mutual funds to sell a new investment product on credit default swaps (CDS).

A CDS is a credit derivative contract which acts as an insurance against credit default. For instance, if a mutual fund invests in a corporate bond yielding 7% per annum, it can sell CDS as an insurance by paying a premium of about 0.50 bps. In case of default in the corporate bond, the buyer of CDS (insurance company) will pay principle with the interest.

However, SEBI will allow MFs to buy CDS only for the purpose of hedge and any naked exposure may not be allowed as it leads to speculative position being held by mutual funds, clarified SEBI.

Hence, mutual funds have to buy a secured instrument such as government securities or treasury bills to protect investors' interest.

In a consultation paper issued on Friday, SEBI said to provide additional investment products for the mutual funds, SEBI is considering to allow them to sell CDS for the purpose of taking exposure in synthetic corporate bonds, i.e., a position created by selling credit default swap and buying G-Sec/ T-bills.

In the recently-revised guidelines, RBI has included mutual funds under CDS sellers and based on consultation with the stakeholders, SEBI has proposed to allow greater flexibility for the mutual funds to both buy and sell.

*(The writer is with The Hindu businessline)*





## What Is a Credit Default Swap (CDS)?

- A credit default swap (CDS) is a financial derivative that allows an investor to swap or offset their credit risk with that of another investor.
- To swap the risk of default, the lender buys a CDS from another investor who agrees to reimburse them if the borrower defaults.
- Most CDS contracts are maintained via an ongoing premium payment similar to the regular premiums due on an insurance policy.



- **In a credit default swap contract, the buyer pays an ongoing premium similar to the payments on an insurance policy.**
- **In exchange, the seller agrees to pay the security's value and interest payments if a default occurs**

# ASEAN FTA: govt. seeks industry inputs to up demand pitch

**Amiti Sen**  
NEW DELHI

To sharpen its negotiating stance with the 10-member ASEAN, the Commerce Department has sought more inputs from various industry and export promotion bodies on items where deeper tariff concessions can be demanded ahead of the next round of negotiations on the ASEAN-India FTA review in Indonesia next month, sources said.

"Commerce Ministry officials are meeting industry and export body representatives to get their views on the items to focus on for greater market access. Other inputs, include those related to non-tariff barriers, are also being solicited," the source told *businessline*.

## 'Disproportionate'

The India-ASEAN FTA, formally known as the ASEAN-India Trade in Goods Agreement (AITGA), has resulted in disproportionate gains for the ASEAN countries which India wants to correct through the review.

In 2023-24, India's trade deficit with the bloc widened to \$38.46 billion from \$7.5 billion during the implementation of the agreement in 2010. India exported goods worth \$41.2 billion to the region while its imports were valued at \$79.66 billion.

New Delhi is seeking greater market access for its goods, more flexibility in determining rules of origin (ROO) for products through product specific rules, and redressal of non-tariff barriers, to address its growing trade deficit with the bloc, sources said.



"Since the ASEAN countries, too, are seeking more market access for their goods as part of the review despite India's attempt to level the uneven field, our negotiators have to pro-actively demand lower duties wherever there is a scope. That is why Commerce Ministry officials are holding meetings with the industry so that there is a better understanding of what it wants," the source said.

The 10-member ASEAN includes Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Vietnam, Laos, Myanmar and Cambodia.

## Review of AITGA

India had been asking for a review of the AITGA for a long time as its trade deficit with the bloc widened significantly since the trade pact was implemented in January 2010. Four meetings of the 'joint committee' for the review of AITGA have already taken place while the fifth is scheduled for July 29-31.

In the earlier meetings, India sought product specific rules (PSRs) in ROO determination so that requirements can be relaxed for high value items where the value addition is low.

*(The writer is with The Hindu businessline)*

# AITGA

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- **The Framework Agreement on Comprehensive Economic Cooperation between ASEAN and India was signed in October 2003 and served as legal basis to conclude further agreements, including Trade in Goods Agreement, Trade in Services Agreement, and Investment Agreement that form the ASEAN-Indian Free Trade Area (AIFTA)**
- **The ASEAN-India Trade in Goods Agreement was signed and entered into force on 1 January 2010.**

- **The ASEAN-India Trade in Services Agreement was signed in November 2014.**
- **It contains provisions on transparency, domestic regulations, recognition, market access, national treatment and dispute settlement.**
- **The ASEAN-India Investment Agreement was also signed in November 2014.**



# Association of Southeast Asian Nations (ASEAN)

Established on 8 August 1967 in Bangkok, with the signing of the **ASEAN Declaration (Bangkok Declaration)** by the Founding Fathers of ASEAN, namely Indonesia, Malaysia, Philippines, Singapore and Thailand.

**Aims and purposes of ASEAN are:**

To accelerate the **economic growth, social progress**  
**and cultural development** in the region

To promote *regional peace and stability*

To **promote active collaboration** and mutual  
assistance

To provide training and research facilities

To collaborate more effectively

To promote Southeast Asian studies; and

Cooperation with existing international and regional

## ASEAN Member Countries



## ASSOCIATION OF SOUTHEAST ASIAN NATIONS (ASEAN)

ASEAN Secretariat: Jakarta, Indonesia

Population: 650 million

Chair rotates annually among member states.

The ASEAN Community was realized on December 31, 2015.



ASEAN.org

### BRUNEI

Capital: Bandar Seri Begawan

Population: 434 thousand

Member Since: 1984

US-Brunei treaty relations have been active since 1850.



### INDONESIA

Capital: Jakarta

Population: 265.3 million

Member Since: 1967

Indonesia, the world's 4<sup>th</sup> most populous country, and the United States upgraded their relations to a "strategic partnership" in 2015.



### CAMBODIA

Capital: Phnom Penh

Population: 16.3 million

Member Since: 1999

The United States is the largest purchaser of Cambodia's exports, including over \$2 billion in apparel.



### LAOS

Capital: Vientiane

Population: 6.7 million

Member Since: 1997

In 2016, then President Barack Obama became the first sitting US President to visit Laos.



### MALAYSIA

Capital: Kuala Lumpur

Population: 32.4 million

Member Since: 1967

Malaysia is the United States' 2<sup>nd</sup> largest trading partner in ASEAN.



### SINGAPORE

Capital: Singapore

Population: 5.6 million

Member Since: 1967

Singapore was the first US bilateral free trade partner in the Indo-Pacific and in 2015 the two countries signed an enhanced Defense Cooperation Agreement.



### MYANMAR

Capital: Nay Pyi Taw

Population: 52.8 million

Member Since: 1997

The United States restored full diplomatic relations with Myanmar in 2012 and removed all sanctions in 2016.



### THAILAND

Capital: Bangkok

Population: 69.1 million

Member Since: 1967

Thailand is the oldest US treaty partner in the Indo-Pacific, dating from 1833.



### PHILIPPINES

Capital: Manila

Population: 107 million

Member Since: 1967

The largest Filipino diaspora is in the United States and remittances from the United States to the Philippines are valued at \$11 billion.



### VIETNAM

Capital: Hanoi

Population: 94.6 million

Member Since: 1995

Since 1995, US trade with Vietnam grew 230-fold to \$58 billion. US-Vietnam security cooperation has enhanced steadily including high-level defense visits, military sales, and exchanges.



Source (Population): International Monetary Fund World Economic Outlook, 2018 data



EAST-WEST CENTER



US-ASEAN  
BUSINESS COUNCIL, INC.

ISEAS

YUSOF ISHAK  
INSTITUTE

## *Annual catch*



**Coming together:** The Sanke Mon collective fishing rite in in San, in the Sego region of Mali. The rite commemorates the founding of the town of San and marks the beginning of the rainy season. Thousands take part in the rites which last for 15 hours. AFP



# Sanke Mon

- **The Sanké mon collective fishing rite takes place in San in the Ségou region of Mali every second Thursday of the seventh lunar month to commemorate the founding of the town.**
- **The rite begins with the sacrifice of roosters, goats and offerings made by village residents to the water spirits of the Sanké pond.**
- **The collective fishing then takes place over fifteen hours using large and small mesh fishing nets.**
- **It is immediately followed by a masked dance on the public square featuring Buwa dancers from San and neighbouring villages who wear traditional costumes and hats decorated with cowrie shells and feathers and perform specific choreography to the rhythms of a variety of drums.**

- **Traditionally, the Sanké mon rite marks the beginning of the rainy season.**
- **It is also is an expression of local culture through arts and crafts, knowledge and know-how in the fields of fisheries and water resources**



# RBI keeps repo rate unchanged, raises GDP forecast to 7.2%

## Upward revision

On Friday, the RBI revised the GDP growth projection for FY25, to 7.2% from 7%



SOURCE: PTI & CME

### Lalatendu Mishra

MUMBAI

The Monetary Policy Committee (MPC) of the Reserve Bank of India (RBI) on Friday decided to keep the repo rate unchanged at 6.5%.

The decision, taken at the MPC's meeting, marks the eighth time in a row that the policy rate has been put on hold to keep the focus on battling high inflation.

The MPC has revised its GDP growth forecast upwards from the earlier 7% estimate to 7.2% for the financial year 2024-2025.

It has also decided to remain focused on withdrawal of accommodation to ensure that inflation does not accelerate, while supporting growth.

"These decisions are in consonance with the objective of achieving the medium-term target for consumer price index (CPI) inflation of 4% within a band of +/- 2% while supporting growth," RBI governor Shaktikanta Das said after the meeting.

### Divided MPC

Mr. Das, along with MPC members Shashanka Bhide, Rajiv Ranjan, and Michael Debabrata Patra voted to keep the policy repo rate unchanged at 6.5% and to remain focused on the withdrawal of accommodation, while their colleagues Ashima Goyal and Jayanth R. Varma voted to reduce the policy repo rate by 25 basis points and for a change in stance to neutral.

"There were signs of a more divided policy com-

mittee, with one additional member voting for a softening in stance as well as policy direction. The majority retained their cautious stance to guide inflation towards the 4% target on a durable basis, despite recent signs of disinflation," said Radhika Rao, Executive Director and Senior Economist, DBS Bank, commenting on the decision.

According to the MPC, high frequency indicators of domestic activity are showing resilience in 2024-25. The south-west monsoon is expected to be above normal, which augurs well for agriculture and rural demand, but headwinds from geopolitical tensions, volatility in international commodity prices, and geoeconomic fragmentation pose risks to the outlook.

Taking various factors into consideration, real GDP growth for 2024-25 was projected at 7.2% as compared with the earlier projection of 7%, with the first quarter (Q1) growth estimate at 7.3%; Q2 at 7.2%; Q3 at 7.3%; and Q4 at 7.2%. The risks are evenly balanced.

Emphasising that inflation has seen sequential moderation since February 2024, albeit in a narrow range from 5.1% in February to 4.8% in April 2024, the RBI Governor said that food inflation, however, remains elevated due to persistence of inflation pressures in vegetables, pulses, cereals, and spices.

'AUGURS WELL'

» PAGE 11

# Target Mains -2024/25 -

**Q "Plastic pollution is a problem by the people ,for the people and of the people "**  
**Discuss**

प्रश्न "प्लास्टिक प्रदूषण लोगों के लिए, लोगों के लिए और लोगों की एक समस्या है" चर्चा करें

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# Topics



- Foreign investment
- **Buddhavanam**
- ***Nastaliq***
- Wholesale price index
- All about G7
- Mains



By saurabh Pandey



# India growth story has a 'beneficial ownership' hurdle



**F**oreign investments will play a crucial role in aiding the government's goal of a \$5 trillion economy by the end of the financial year 2025-26. But, in order to attract foreign investment, it is essential to remove all the bottlenecks for the Indian companies receiving this investment, and also foreign investors who are willing to bet on the India growth story.

## Amendment conundrum

The amendment to the Indian Foreign Exchange Management (Non-debt Instruments) Rules, 2019 ("FEMA NDI") through the press note number 3 of 2020, has posed a significant challenge for Indian companies, especially start-ups and smaller enterprises seeking foreign investments. This amendment stipulates that any investments in Indian companies, whether direct or indirect, originating from entities located in countries that share land borders with India ("Neighbouring Countries"), or where the "beneficial owner" of the said Indian investment is situated in, or is a citizen of any of these Neighbouring Countries would necessitate prior government approval ("PN3 Requirement").

While the aim of the amendment which was promulgated during the COVID-19 pandemic was salutatory – i.e., to curb opportunistic takeovers or acquisitions of Indian companies by Neighbouring Countries during difficult times created by a black swan event – it created vast incertitude as the term 'beneficial owner' has not been explained or defined, and other laws that have a definition of the term are context-specific. When the PN3 requirement was first introduced, the industry in general was comfortable taking a lenient view, relying on the beneficial ownership thresholds that were legislated in other laws. But since the latter half of 2023, the Reserve Bank of India (RBI) has begun taking a more conservative view concerning issues on which the law was silent, especially under FEMA NDI.

For example, last year, numerous Foreign Owned or Controlled Companies ("FOCCs")



**Dev Jain**

is a corporate lawyer and has previously worked with AZB & Partners and TTA

The amendment to the Indian Foreign Exchange Management (Non-debt Instruments) Rules, 2019 is a challenge

began receiving notices from the RBI regarding their downstream investments. The industry has since taken the view that FOCCs will be placed under the same restrictions as non-residents on the aspects on which the law is silent. However, when this notion was challenged by the RBI recently, investors began to question other industry practices on which the FEMA NDI was silent. Even law firms that were once fine with adopting a lenient view in cases of beneficial ownership thresholds, are now advising clients that they cannot offer assurance by relying on the beneficial ownership thresholds legislated under other laws.

Further, the obstacle of navigating the prior government approval route is exacerbated by its time-consuming nature and high rejection rate. Although consolidated official data on pending or rejected applications is not published by the Government of India, some government officials have stated that proposals worth ₹50,000 crore from the Neighbouring Countries are either pending, withdrawn or rejected; and a staggering 201 applications have been rejected in the past three years.

With the PN3 Requirement, the onus of compliance is on the Indian company that receives foreign investment, with the regulatory authorities having the discretion to impose fines of up to three times the investment received. The inherent vagueness within the legislation, along with severe penalties, can cast doubts on the survivability of these companies.

Many of these start-ups receive investments far beyond their revenue or assets. So, such fines could leave them insolvent, even if they liquidate. Non-compliance would likely trigger legal battles, adding to India's already significant backlog of court cases.

## Issues and solutions

First, the indemnity challenge. Indian companies could consider having foreign investors to furnish representations backed by indemnities regarding

their compliance with the PN3 Requirement. However, this may discourage foreign investment due to potential liabilities.

Therefore, there is a pressing need to amend the PN3 Requirement to define "beneficial owners" comprehensively, including ownership thresholds and control tests.

Second, defining 'Beneficial Owners'. The definition of 'beneficial owner' should specify a precise threshold for ascertaining beneficial ownership, potentially ranging from 10% (as provided under the Indian company law) to 25% (as recommended by the Financial Action Task Force). The selection of the specific threshold can be customised to align with the government's objective of scrutinising varying levels of foreign investment across different sectors. For example, sectors such as telecom and defence, which are sensitive in nature, may warrant heightened scrutiny when compared to sectors such as manufacturing and construction, where India requires additional capital.

The definition should also specify control-conferring rights, beyond ownership thresholds, to capture entities with significant influence. For example, rights regarding board meeting quorums or veto powers over operational matters such as incurring any capital expenditure or availing any loan may confer control and should be outlined. However, investor value protection rights, such as veto powers over mergers or right of first offer, should be excluded from the definition, as they do not constitute control.

Third, consultation mechanism. Even with the clarification of control-conferring rights in the definition, some ambiguity may persist due to the skilful drafting of peculiar clauses in the charter documents. To mitigate this issue, FEMA NDI, akin to Indian competition law, could be amended to incorporate a time-bound consultation mechanism with regulatory authorities, to determine whether specific clauses are control-conferring.

# Foreign Investment



- **Foreign investments will play a crucial role in aiding the government's goal of a \$5 trillion economy by the end of the financial year 2025-26.**
- **But, in order to attract foreign investment, it is essential to remove all the bottlenecks for the Indian companies receiving this investment, and also foreign investors who are willing to bet on the India growth story.**
- **Amendment conundrum The amendment to the Indian Foreign Exchange Management (Non-debt Instruments) Rules, 2019 ("FEMA NDI") through the press note number 3 of 2020, has posed a significant challenge for Indian companies, especially start-ups and smaller enterprises seeking foreign investments.**

# What is Foreign Investment?

## A: Foreign Direct Investment

A company buying or building a factory in another country



## B: Foreign Portfolio Investment

Buying stocks and bonds from another country



- **This amendment stipulates that any investments in Indian companies, whether direct or indirect, originating from entities located in countries that share land borders with India (“Neighbouring Countries”), or where the “beneficial owner” of the said Indian investment is situated in, or is a citizen of any of these Neighbouring Countries would necessitate prior government approval (“PN3 Requirement”).**

- **While the aim of the amendment which was promulgated during the COVID-19 pandemic was salutatory — i.e., to curb opportunistic takeovers or acquisitions of Indian companies by Neighbouring Countries during difficult times created by a black swan event — it created vast incertitude as the term ‘beneficial owner’ has not been explained or defined, and other laws that have a definition of the term are context-specific.**



## What is PN3??

- On April 17, 2020, the Government of India (“Government”) issued Press Note No. 3 (2020 Series) (“PN3”) with an objective to limit ‘opportunistic’ foreign direct investments (“FDI”) from countries sharing land border with India (“Neighbouring Countries”).
- The PN3 mandated that where an investing entity is situated in a country sharing land border with India or where the beneficial owner of an investment into India is situated in or is a citizen of any such country, FDI shall be permitted only with prior Government approval.
- Against the backdrop of the pandemic and concerns of Chinese consolidation of investment in Indian entities, the PN3 aims to protect vulnerable Indian companies from foreign takeovers.



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# Dividing a culture

Ten years after the creation of a separate Telangana from united Andhra Pradesh, the division of antiquities, manuscripts and cultural objects between the two States remains a bone of contention. Are provenance and time of acquisition the only yardsticks for division of heritage? **Serish Nambetti** finds out

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"We find a number of Telugu manuscripts in the border region of Maharashtra. Do they belong to Maharashtra? Western region is an odd concept in the modern world where boundaries are changing. Khumman and Nalgunda have

been divided and contrived. The manuscript should stay at one place. If they divide, let all the Telugu documents go to one State and not split to another State. That way, scholars and researchers would find it easy."

**How can they bifurcate culture and history?** It is not just the division of assets that will affect the assets of Telangana. Some of the prized assets have disappeared over the years. Among them is a painting of Al-Biruni, one of the last rulers of the Delhi Sultanate, reclining which used to be with the Andhra Pradesh Library (OML).

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# Buddhavanam

- **Buddhavanam is a tourism project in Nagarjuna Sagar, Telangana created by the Telangana State Tourism Development Corporation.**
- **The project was sanctioned by the Government of India viz., Integrated Development of Nagarjunasagar as part of Lower Krishna valley Buddhist circuit with a view to attract large number of domestic and foreign tourists particularly from the South-East Asian countries.**



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# Nastaliq

- . *Nastaliq* also **romanized** as *Nasta‘līq* or *Nastaleeq*, is one of the main **calligraphic hands** used to write the **Perso-Arabic script** and it is used for some **Indo-Iranian languages**, predominantly **Classical Persian**, **Kashmiri**, **Punjabi (Shahmukhi)** and **Urdu**.
- It is often used also for **Ottoman Turkish** poetry, but rarely for **Arabic**.
- *Nastaliq* developed in **Iran** from **naskh** beginning in the 13th century and remains widely used in **Iran**, **Afghanistan**, **India**, **Pakistan**, and other countries for written poetry and as a form of art.



# May WPI inflation spikes to 15-month high on food prices

Food inflation surges to 10-month peak of 7.4% driven by steeper fruit, vegetable, cereal prices; manufactured products see return of price rise

**Vikas Dhoot**  
NEW DELHI

Inflation in India's wholesale prices accelerated to a 15-month high of 2.61% in May, more than double April's pace, with food inflation surging to a 10-month peak of 7.4% driven by steeper prices for vegetables, fruits, pulses and cereals, and a resurgence of price rise in manufactured products after 14 months of deflation.

Economists said the acceleration in wholesale inflation in May signals there is room for a further surge in consumer prices despite retail inflation easing to a 12-month low of 4.75% last month, especially as food and industrial input prices are spiking globally. May was the seventh month in a row that the WPI rose on a YoY basis after seven straight months of deflation, and wholesale inflation is expected to quicken more than 3% this month.

## Sequential easing

On a month-on-month basis, the Wholesale Price Index (WPI) was up 0.2% in May, easing from an upwardly revised 9-month high of 1.06% a month earlier, with food prices rising 1.14% over April levels and manufactured products' prices up 0.64%.

The heatwaves in May

## Wholesale worries

WPI inflation accelerated to a 15-month high of 2.61% in May, more than double April's pace

- Manufactured products see a resurgence of inflation after 14 months of deflation
- May was the seventh month in a row that the WPI rose on a year-on-year basis
- Sequentially, the WPI rose 0.2%, easing from April's upwardly revised 9-month high of 1.06%



helped fire up the inflation rate for vegetables to the highest level in nine months at 32.4%, and a six-month high of 5.8% for fruits.

Price rise in cereals sped to 9%, while that for pulses reversed direction to hit a six-month high of 22%.

Within vegetables, tomato prices were up 64.5% in May from 40.6% in April, while inflation in onion and potato eased slightly to a tad over 58% and 64%, respectively.

## 'Supply shortfalls'

Bank of Baroda chief economist Madan Sabnavis said the spikes in vegetable prices were partly due to supply shortfalls and that the heatwave aggravated the challenge.

"This is a major concern as it will keep up the pressure on the inflation till the next crop comes," Mr. Sabnavis told *The Hindu*.

India Ratings flagged si-

milar concerns about pulses prices remaining elevated in double digits as the new crop would be harvested only in October-November.

## 'Worrisome for retail'

"Elevated food inflation at the wholesale level is worrisome as this would keep retail food prices firm even going forward," senior director and principal economist Sunil Kumar and senior analyst Paras Jasrai wrote in a note. "Retail food inflation has been above 8% for the past seven months," they added.

India Ratings expects retail food inflation to remain over 8%, with wholesale prices expected to rise further to 3.5%, in June. CareEdge Ratings' chief economist Rajani Sinha also pointed out that industrial metal prices had risen 9.3% since March-end and food prices were increasing globally.

# Wholesale price index

- **Definition:** Wholesale Price Index (WPI) represents the price of goods at a wholesale stage i.e. goods that are sold in bulk and traded between organizations instead of consumers. WPI is used as a measure of inflation in some economies.
- **Description:** WPI is used as an important measure of inflation in India. Fiscal and monetary policy changes are greatly influenced by changes in WPI. In the United States, Producer Price Index (PPI) is used to measure inflation.
- WPI is an easy and convenient method to calculate inflation. Inflation rate is the difference between WPI calculated at the beginning and the end of a year. The percentage increase in WPI over a year gives the rate of inflation for that year



# Difference between Wholesale Price Index and Consumer Price Index

**Comparative Table: Wholesale Price Index and Consumer Price Index**

	<b>Wholesale Price Index (WPI)</b>	<b>Consumer Price Index (CPI)</b>
Meaning	It measures the average change in the price in the sale of goods in bulk quantity by the wholesaler.	CPI measures the change in the price in the sale of goods or services in retail or directly to the consumer.
Area of Focus	It focuses on the goods that are traded only between wholesalers or businesses.	It focuses on the goods that the consumer is purchasing.
Numbers of Items Covered	697	448 for rural and 460 for urban
Reference Year for Calculation	Financial year	Calendar year
Releasing Date	Every week for primary products, fuel, and power for the remaining items in monthly publishing.	Every month.
Prices Bear By	By manufacturer and wholesaler.	By consumer.
Inflation Measurement	WPI measures inflation in the first stage.	WPI measures inflation in the last stage.
Price Measurement	It is restricted to only goods.	It is for both goods and services.

# G-7 leaders say they will back Ukraine ‘as long as it takes’

The group will provide financing to Kyiv that will be serviced and repaid by flows of revenues stemming from the immobilisation of Russian sovereign assets held in the EU, says summit draft

**Agence France-Presse**  
BARI

**G**-7 leaders recommitment Friday to support Ukraine “for as long as it takes”, according to a draft statement from a summit where they agreed a new \$50 billion loan for Kyiv.

“We are standing in solidarity to support Ukraine’s fight for freedom and its reconstruction for as long as it takes,” said the draft from the Italy talks.

It said the \$50 billion loan – agreed in the presence of Ukraine President Volodymyr Zelenskyy – sent “an unmistakable signal to (Russian) President Vladimir Putin”.



**Show of support:** G-7 leaders with Volodymyr Zelenskyy during the summit in Fasano, Italy, on Friday. GETTY IMAGES

The loan will be backed by profits from the interest accrued on Russian central bank assets frozen by Western powers after Moscow’s February 2022 invasion of Ukraine.

“The G-7 intends to pro-

vide financing that will be serviced and repaid by future flows of extraordinary revenues stemming from the immobilisation of Russian sovereign assets held in the European Union and other relevant jurisdic-

tions,” the draft statement said. “To enable this, we will work to obtain approval in these jurisdictions to use future flows of these extraordinary revenues to service and repay the loans.”

It said the money would be disbursed through “multiple channels that direct the funds to Ukraine’s military, budget, and reconstruction needs – within the constraints of our respective legal systems and administrative requirements”.

The leaders tasked ministers and officials to start working on the technicalities to start providing the funds to Ukraine before the end of the year.

# All about G7

## .What is the G7?

- The G7 (Group of Seven) is an organisation of the world's seven largest so-called "advanced" economies, which dominate global trade and the international financial system.
- They are Canada, France, Germany, Italy, Japan, the UK and the United States.
- Russia joined in 1998, creating the G8, but was excluded in 2014 for its takeover of Crimea.

- **China has never been a member, despite its large economy and having the world's second-largest population.**
- **Its relatively low level of wealth per person means it is not seen as an advanced economy in the way the G7 members are.**
- **Both these nations are in the G20 group of developed and developing nations.**
- **The EU is not a member of the G7, but attends the annual summits.**
- **Throughout the year, G7 ministers and officials hold meetings, form agreements and publish joint statements on global event**

## **What is Italy's agenda for the 2024 summit?**

- The 2024 G7 summit will be held from 13 to 15 June in Apulia, in Italy.
- It will be the first major international forum hosted by the Italian prime minister, Giorgia Meloni, since she took office in October 2022.
- As well as the wars in Ukraine and Gaza, Italy says it wants the summit to focus on Africa and migration, economic security, and international co-operation on artificial intelligence (AI).



## G7 in numbers

**7** member countries

**30%** of global GDP

**1/10** of world's population

**2014** Russia suspended for annexing Crimea

Source: BBC research

## . How could the G7 work with developing nations?

- Italy says "the relationship with developing nations and emerging economies will be central" to the G7 summit, and that it "will work to build a co-operation model based on mutually beneficial partnerships".
- It has invited leaders from 12 developing countries in Africa, South America and the Indo-Pacific region.
- Under the the Mattei Plan, Italy will give grants and loans worth 5.5bn euros (£4.6bn) to several African countries, to help develop their economies.





- . The scheme would also position Italy as an energy hub, building gas and hydrogen pipelines between Africa and Europe.
- In December 2023, Italy pulled out of the Belt and Road Initiative - a scheme to expand China's ports and transport routes worldwide to boost trade.
- Ms Meloni said that joining had been "a serious mistake". The US has called the initiative "debt-trap diplomacy" on China's part.
- It is thought that the US is keen for G7 leaders to take further action on economic security at the summit in Italy.
- The safety of AI was raised at the 2023 summit in Japan and resulted in the Hiroshima AI Process, intended to promote "safe, secure, and trustworthy AI worldwide".

# . Does the G7 have any power?

- The G7 cannot pass laws. However, some of its past decisions have had global effects.
- For example, the G7 played a crucial role in setting up a global fund to fight malaria and Aids in 2002.
- Ahead of the 2021 G7 summit in the UK, the group's finance ministers agreed to make multinational companies pay more tax.

# PN3 Requirement

The amendment to the Indian Foreign Exchange Management (Non-debt Instruments) Rules, 2019 (“FEMA NDI”) through the press note number 3 of 2020, has posed a significant challenge for Indian companies, especially start-ups and smaller enterprises seeking foreign investments.

This amendment stipulates that any investments in Indian companies, whether direct or indirect, originating from entities located in countries that share land borders with India (“Neighbouring Countries”), or where the “beneficial owner” of the said Indian investment is situated in, or is a citizen of any of these Neighbouring Countries would necessitate prior government approval (“PN3 Requirement”).

While the aim of the amendment which was promulgated during the COVID-19 pandemic was salutatory — i.e., to curb opportunistic takeovers or acquisitions of Indian companies by Neighbouring Countries during difficult times created by a black swan event — it created vast incertitude as the term ‘beneficial owner’ has not been explained or defined, and other laws that have a definition of the term are context-specific.

When the PN3 requirement was first introduced, the industry in general was comfortable taking a lenient view, relying on the beneficial ownership thresholds that were legislated in other laws.

But since the latter half of 2023, the Reserve Bank of India (RBI) has begun taking a more conservative view concerning issues on which the law was silent, especially under FEMA NDI.

For example, last year, numerous Foreign Owned or Controlled Companies (“FOCCs”) began receiving notices from the RBI regarding their downstream investments.

The industry has since taken the view that FOCCs will be placed under the same restrictions as non-residents on the aspects on which the law is silent. However, when this notion was challenged by the RBI recently, investors began to question other industry practices on which the FEMA NDI was silent.

## **Steps needed**

**There is a pressing need to amend the PN3 Requirement to define “beneficial owners” comprehensively, including ownership thresholds and control tests. Second, defining ‘Beneficial Owners’.**

**The definition of ‘beneficial owner’ should specify a precise threshold for ascertaining beneficial ownership, potentially ranging from 10% (as provided under the Indian company law) to 25% (as recommended by the Financial Action Task Force).**

Third, consultation mechanism.

Even with the clarification of control-conferring rights in the definition, some ambiguity may persist due to the skilful drafting of peculiar clauses in the charter documents.

To mitigate this issue, FEMA NDI, akin to Indian competition law, could be amended to incorporate a time-bound consultation mechanism with regulatory authorities, to determine whether specific clauses are control-conferring.



- It is a mechanism that was constituted **to support Centre-State and Inter-State coordination and cooperation in India.**
- **Article 263:** The Inter-State Council was established under Article 263 of the Constitution, which states that **the President may constitute such a body if a need is felt for it.**
- **Objective:** The Council is basically meant to **serve as a forum for discussions among various governments.**
- **Sarkaria Commission:** In 1988, the Commission suggested the Council should exist as a permanent body, and in 1990 it **came into existence through a Presidential Order.**

## **Functions:**

- **To investigate and discuss subjects in which the states or the centre have a common interest.**
- **To make recommendations upon any such subject for the better coordination of policy and action on it, and**
- **To deliberate upon such other matters of general interest to the states as may be referred to it by the chairman.**
- **It also facilitates consideration of all pending and emerging issues of the Centre-State and inter-State relations by the zonal councils and inter-State council**
- **It develops a sound system of monitoring the implementation of the recommendations of the inter-State council and zonal councils.**

- The **Prime Minister** is the chairman of the Council.
- **Members** include the:
  - Chief ministers of all the states
  - Chief ministers of union territories having legislative assemblies
  - Administrators of union territories not having legislative assemblies
  - Governors of States under President's rule.
  - Six Central cabinet ministers, including the home minister, are to be nominated by the Prime Minister.
  - Ten Ministers of Cabinet rank / Minister of State (independent charge) nominated by the Chairman of the Council (i.e., Prime Minister) are permanent invitees to the Council.

# Topics

- Tarang Shakti 2024
- The Pradhan Mantri Kisan Samman Nidhi Yojana
- General theory of relativity
- Dark matter and dark energy
- Electromagnet
- Gender gap report (world economic forum )
- Special marriage act
- Kafala system
- Council of minister
- Mains



By saurabh Pandey



THE HINDU

# Topics-2



- SWM Cess
- Enmetozobactum
- *More Miles Less Plastic*
- Wearable fabric
- Gene therapy
- Artemisinins
- Lomerizine
- Pigeon behaviour
- Mains



By saurabh Pandey



# India ready to host its first multinational air exercise ‘Tarang Shakti’ in August

**Dinakar Peri**

NEW DELHI

The Indian Air Force's first multinational air exercise, Tarang Shakti-2024, will be held in August, and is likely to see the participation of 10 countries, in addition to a few others acting as observers.

“Enriched with the Red Flag exercise experience, the IAF keenly looks forward to hosting the participating contingents from other countries during Tarang Shakti-2024, which is the first ever Indian multinational air exercise to be held later this year,” the IAF said on Sunday in a statement on the just concluded Red Flag exercise hosted by the U.S. Air Force.

The plan is to invite friendly foreign countries with whom the IAF interacts regularly and has a certain degree of interoperability, officials said. Tarang Shakti was earlier planned to be held at the end of 2023, but got de-



Two IAF Rafale jets being refuelled mid-air by an IL-78 aircraft on their way to Exercise Red Flag in Alaska.

ferred. The exercise is now scheduled to be held in two phases.

The first will be held in southern India in the first two weeks of August and the second will be in the western sector from the end of August to mid-September, officials said. Some countries will participate in both phases, while others will join one of the two phases, it has been learnt.

Among the countries sending contingents are Australia, France, Germany, Japan, Spain, the United Arab Emirates, the Unit-

ed Kingdom, and the United States. Germany will deploy fighter jets and also an A-400M transport aircraft, as reported by *The Hindu* earlier. The A-400M aircraft will be on showcase for the IAF, given that it is a contender for the open tender for medium transport aircraft.

## U.S. event

The Red Flag exercise, hosted by the U.S. Air Force (USAF) from June 4 to 14, concluded at the Eielson Air Force Base, Alaska. This was the second edition of Red Flag this year; the exercise is hosted four times a year by the USAF. Apart from the IAF, this edition saw the participation of the Singapore Air Force, the U.K.'s Royal Air Force, the Royal Netherlands Air Force, and the German Luftwaffe. The IAF deployed eight Rafale fighters, a first at Red Flag, supported by IL-78 mid-air refuellers for the transatlantic ferry, as well as C-17 Globemaster aircraft.

# Tarang Shakti 2024

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## **The Red Flag exercise,**

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# PM to release Kisan Samman Nidhi fund

**The Hindu Bureau**

LUCKNOW

Prime Minister Narendra Modi will visit Varanasi, his Lok Sabha constituency in Uttar Pradesh, on Tuesday for the first time after taking oath for a third consecutive term.

He is expected to release the 17th instalment of

the PM-Kisan Samman Nidhi, amounting to over ₹20,000 crore, for 92.6 million beneficiary farmers across the country.

## **Income support**

The scheme, fully funded by the Union government, extends income support of ₹6,000 a year in three equal instalments to all

land-holding farmer families, with a family defined as husband, wife, and minor children.

Earlier, on June 14, Uttar Pradesh Chief Minister Yogi Adityanath arrived in Varanasi to review preparations for Mr. Modi's visit. The venue for the programme is Mehndiganj, Sevapuri. Mr. Adityanath re-

viewed the Prime Minister's security, parking, public movement, and the routes planned.

During his visit, Mr. Modi will give away certificates to over 30,000 members of self-help groups trained as 'Krishi Sakhis' to work as para-extension workers, supporting fellow farmers in farm practices.

# **The Pradhan Mantri Kisan Samman Nidhi Yojana**

- **The Pradhan Mantri Kisan Samman Nidhi Yojana is a central government scheme which aims to provide financial support to all small and marginal farmers of India.**
- **The Scheme offers additional financial aid to farmers for procuring diverse inputs needed for agriculture and related activities, including ensuring good crop yield and health while meeting their domestic necessities.**

- **PM-Kisan scheme aiding annually with the financial help of Rs. 6000 per year in 3 installments of 2000 to all landholding farmers' families of India.**
- **The Central Government of India is funding 100% for this scheme.**
- **The identification of the eligible farmer families will be done by the state and UT governments for the financial aid. In the scheme the monetary help will be directly transferred to the eligible beneficiaries bank account.**

## Overview of PMKSNY

Scheme	PM Kisan
Full-Form	PM Kisan Samman Nidhi Yojana
Date of Launch	24th February 2019
Scheme Objective	<ul style="list-style-type: none"> <li>• To provide Financial support to all land-holding eligible farmer families</li> <li>• To double the income of farmers by 2022</li> </ul>

# Indirect evidence builds, yet the 'dark' universe remains murky

By mapping the position of thousands of galaxies over many years, we can keep measuring how much the universe's expansion is accelerating due to dark energy. But for now, we have no choice but to draw all our inferences about dark matter and dark energy from indirect evidence alone

Oudsia Gani

**T**he general theory of relativity has been very successful at explaining gravity and an astonishing array of other related phenomena, such as gravitational waves, gravitational lensing, gravitational red shift, the existence of black holes, and time dilation. This theory refines Isaac Newton's laws and provides a unified description of gravity as a geometric property of spacetime.

We have observed gravity operating at different scales, from microscopic to macroscopic. But as we zoom out to look at the universe as a whole, it seems as if space is permeated with a mysterious form of gravity-defying energy. This so-called dark energy – which physicists have come to believe is made up 70% of energy that the Big Bang blew out 13.8 billion years ago – creates a sort of negative pressure that stretches the fabric of spacetime and allows celestial objects like stars and galaxies to drift apart. This is in contrast to the Newtonian idea of gravity: as an attractive force that causes objects to come closer together.

In places with lots of matter, gravity has more of an effect than dark energy. But when space is empty of matter, dark energy dominates.

## A 'hidden' universe

Similarly, based on some cosmological observations, researchers have proposed the presence of an invisible form of matter called dark matter. In fact, 44 years ago this month, astronomer Vera Rubin published her famous paper with indirect evidence about the need for dark matter.

Theories of gravity say the rotation rate is highest near the galaxies' centre and lowest at the outer rim. Yet scientists like Dr. Rubin found many rotating galaxies in which the velocities of the stars didn't decrease away from the galactic centre. One way to explain this is if the galaxy had more matter than was visible, exerting more gravitational force that pushed stars at the rim to move faster than they would otherwise. This additional matter is dark matter.

Both dark matter and dark energy are assumptions. They have a very strong hypothetical basis but we haven't been able to find physical evidence of them. Scientists postulated the existence of these two entities so that they can explain their observations without having to break the general theory of relativity.

Not all scientists agree with this approach. Some have attempted to create an alternate paradigm of gravity – one in



The Bullet Cluster formed after the collision of two large clusters of galaxies. Most of the matter in the clusters (blue) is clearly separate from the normal matter (pink), indicating that nearly all of the matter in the clusters is dark. NASA/CXC/CfA/M. MARKEVITCH

which some unknown properties of the force could cause the observed phenomena without invoking dark matter or dark energy.

However, these alternatives suffer from an important problem: they don't explain away all the disparities, whereas the dark matter and dark energy hypotheses do.

## What have we found?

If we need to fully understand the general theory of relativity, we need to figure out what dark matter and dark energy are. Many researchers are working on this around the world, including in India.

Their studies make heavy use of simulations to understand how the universe would look if there were certain kinds of dark matter or dark energy. For example, a study published on April 16 in the *Monthly Notices of the Royal Astronomical Society* by researchers in the U.S. reported being able to explain the observed behaviour of real galaxies and the motions of their stars and gases in simulations that assumed the galaxies contain dark matter.

We also have telescopes constantly making new observations of space. They have been becoming more sophisticated, allowing scientists to collect more fine-tuned data they can use to improve their theories.

For example, an April 11 paper in *The Astrophysical Journal Letters* reported that the James Webb Space Telescope had observed indirect evidence of normal



The general theory of relativity refines Isaac Newton's laws and provides a unified description of gravity as a geometric property of spacetime

regular and dark matter in the ring of an old galaxy named JWST-ERIG.

When looking for something that is really hard to find, it's also useful if researchers share information about where they *couldn't* find dark matter, allowing others to focus on places where it can be. On March 28, for example, scientists published the first results of the Broadband Search for Dark Photon Dark Matter (BREAD) experiment. The preliminary data ruled out dark-matter particles in a certain mass range.

## Turning on lambda

Similarly, the Dark Energy Spectroscopic Instrument (DESI) in Arizona, in the U.S., is attempting to make the largest 3D map of the universe.

This mountain-top telescope is fitted with 5,000 small robots that help it look 11 billion years into the past with greater precision than before.

So far, data from DESI has agreed at a basic level with the  $\Lambda$ CDM model of the universe, our best mathematical model that explains the Big Bang and the universe

today. 'CDM' is short for 'cold dark matter'.

$\Lambda$  (lambda) is the cosmological constant: it represents the energy density of space and is closely associated with dark energy. It appears in equations of the general theory of relativity. Some studies have found that dark energy might be changing with time, which is at odds with assumptions of the CDM model.

In fact,  $\Lambda$  also makes a surprising appearance in the modified theories of gravity that some researchers have been working on. One of them is MOND, an acronym of 'modified Newtonian dynamics'. It doesn't require the existence of dark energy; instead, it proposes that when gravity is weak, such as at the outer rims of large galaxies, it also behaves differently. While it enjoys some popularity, one research group reported on April 5 that data from the Cassini mission (1997-2017) showed no sign that Saturn's orbit had a slight deviation that MOND says there should be.

By mapping the position of thousands of galaxies over many years, we can keep measuring how much the universe's expansion is accelerating due to dark energy. But for now, we have no choice but to draw all our inferences about dark matter and dark energy from indirect evidence alone.

Oudsia Gani is an assistant professor in the Department of Physics, Government Degree College Pattan, Baramulla.)

## THE GIST

Dark energy apparently creates a negative pressure that stretches the fabric of spacetime and allows celestial objects to drift apart. In places with lots of matter, gravity has more of an effect than dark energy. But when space is empty of matter, dark energy dominates

Scientists found that in many rotating galaxies the velocities of stars didn't decrease away from the centre. One explanation is that the galaxy has more matter than visible, exerting gravitational force that pushes stars at the rim to move faster. This additional matter is dark matter

Dark matter and dark energy are assumptions. They have a very strong hypothetical basis but no physical evidence of them has been found. Scientists postulated the existence of these two entities so that they can explain their observations without having to break the general theory of relativity

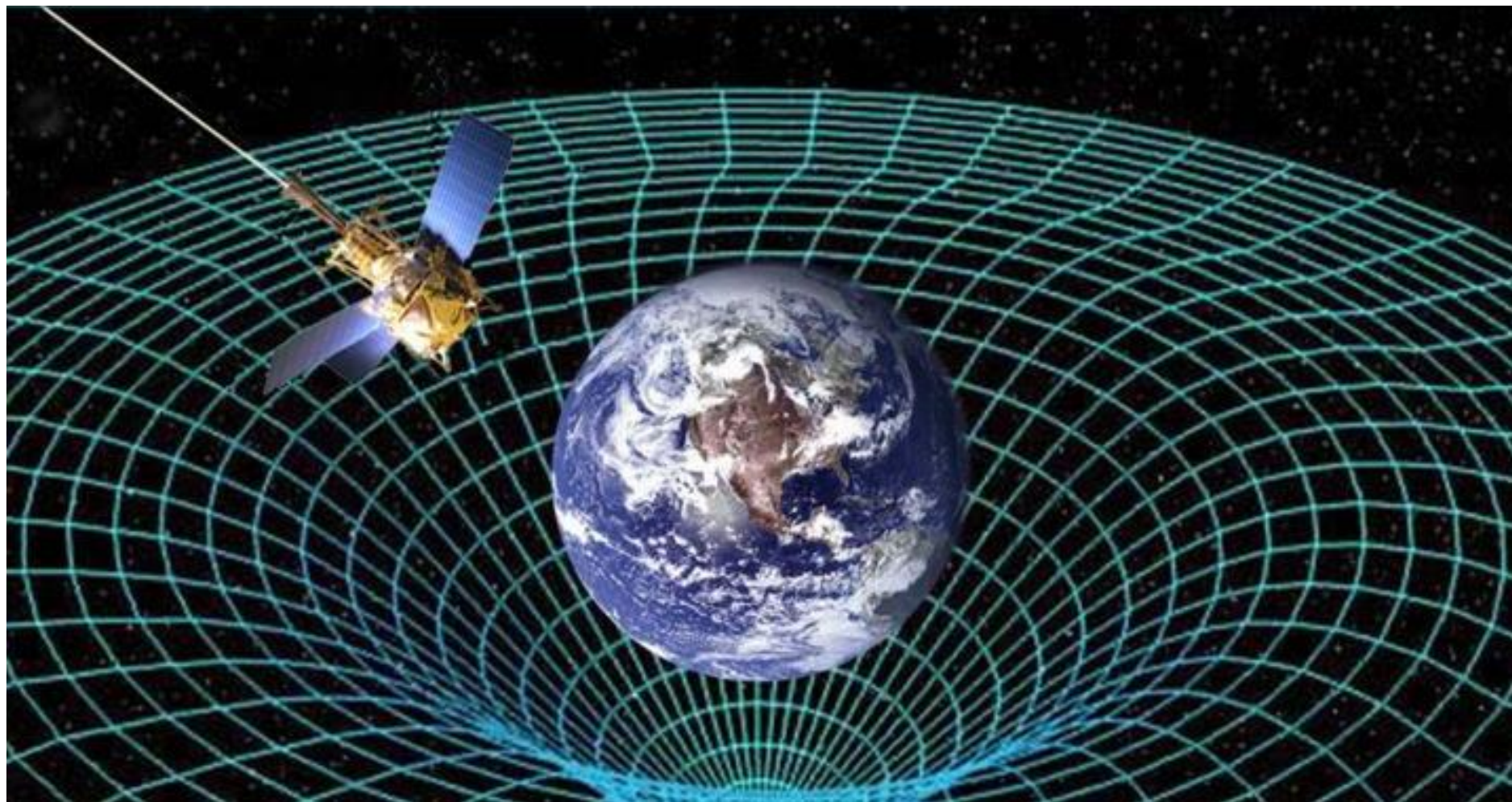


- **The general theory of relativity has been very successful at explaining gravity and an astonishing array of other related phenomena, such as gravitational waves, gravitational lensing, gravitational red shift, the existence of black holes, and time dilation.**
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# General theory of relativity

- General relativity is physicist Albert Einstein's understanding of how gravity affects the fabric of space-time.
- The theory, which **Einstein** published in 1915, expanded the **theory of special relativity** that he had published 10 years earlier. Special relativity argued that space and time are inextricably connected, but that theory didn't acknowledge the existence of gravity.

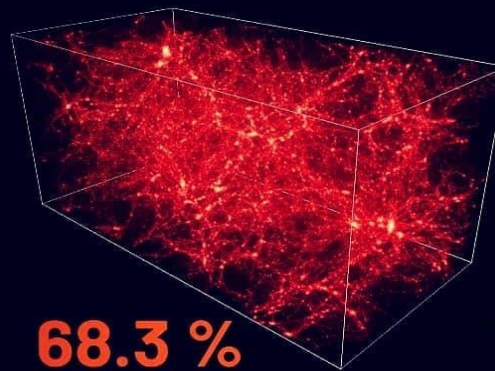
- General relativity follows from Einstein's principle of equivalence: on a local scale it is impossible to distinguish between physical effects due to gravity and those due to acceleration.
- Gravity is treated as a geometric phenomenon that arises from the curvature of **space-time**.
- The solution of the field equations that describe general relativity can yield answers to different physical situations, such as planetary dynamics, the birth and death of stars, black holes, and the evolution of the universe.



# Dark matter and Dark energy



## Dark Energy Vs Dark Matter



68.3 %



26.8 %

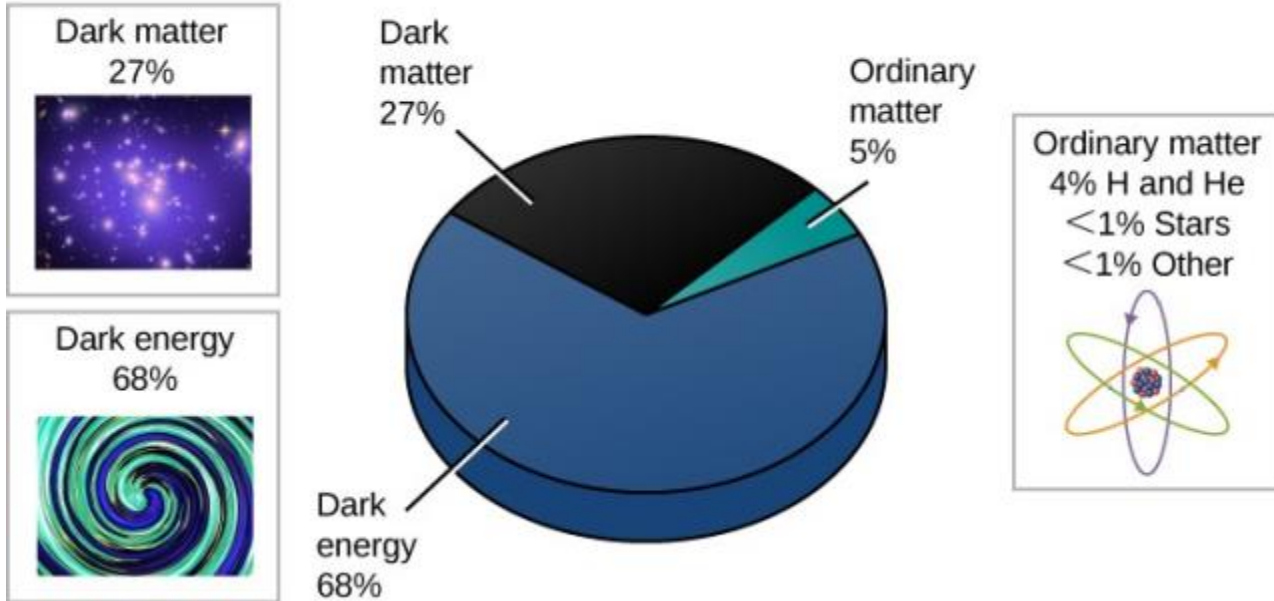
@science\_cosmo

- > **Single largest** constituent of the Universe.
- > Tends to drive **Universe apart**.
- > **No interaction** with Normal Matter.
- > Can be thought as **5th** Fundamental **force**.

- > **Second largest** constituent of the Universe.
- > Tends to drive **Universe together**.
- > **Interacts** with Normal matter via Gravity (**Gravitational Lensing**).
- > Dark matter is **Not Antimatter** and **Not Black Holes**.



## Composition of the Universe



- **Dark matter isn't simply dark: it's invisible. Light of all types seems to pass through as though it's completely transparent. However, dark matter does have mass, which we see by its gravitational influence.**
- **Studies of galaxies show stars and gas moving as though there's a lot more mass than we can see pulling them along.**
- **Based on the motion of what we can observe, galactic dark matter resides in a "halo" surrounding the ordinary matter of the galaxy.**
- **Astronomers also study dwarf galaxies, which are less bright and therefore harder to observe, but which contain a higher fraction of dark matter than their larger cousins.**



- **Galaxy clusters can contain hundreds or thousands of galaxies, each of which have their own dark matter halo.**
- **However, the cluster has its own dark matter, which outweighs everything else put together. This dark matter influences how individual galaxies and hot gas move inside the cluster.**

- **Dark energy apparently creates a negative pressure that stretches the fabric of spacetime and allows celestial objects to drift apart.**
- **In places with lots of matter, gravity has more of an effect than dark energy. But when space is empty of matter, dark energy dominates**
- **Scientists found that in many rotating galaxies the velocities of stars didn't decrease away from the centre.**

- **One explanation is that the galaxy has more matter than visible, exerting gravitational force that pushes stars at the rim to move faster.**
- **This additional matter is dark matter**
- **Dark matter and dark energy are assumptions.**
- **They have a very strong hypothetical basis but no physical evidence of them has been found.**

- dark energy fills all space. It has repulsive gravity and is thought to be pushing galaxies apart and accelerating the expansion of the Universe. Whereas dark matter is a mystery, dark energy is perhaps the biggest mystery in the Universe
- **The Bullet Cluster** formed after the collision of two large clusters of galaxies.
- **$\lambda$  (lambda)** is the cosmological constant: it represents the energy density of space and is closely associated with dark energy. It appears in equations of the general theory of relativity

# Electromagnet: driven by current

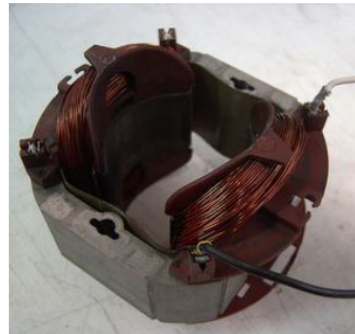
### The Hindu Bureau

Invented in 1824 by the British physicist William Sturgeon, electromagnets are a fixture of modern life, appearing in loudspeakers, motors, magnetic resonance imaging (MRI) machines, maglev trains, and particle accelerators.

When an electric current flows through a wire, it creates a magnetic field around the wire. So when the wire is coiled, the magnetic field becomes concentrated in the coil's hole. This is an electromagnet: a device in which an electric current produces the magnetic field. When the wire is coiled around a magnetic material, the material — called the core — amplifies the strength of the magnetic field.

This is because ferromagnetic metals like iron already contain small magnetic fields inside their bulk produced by its atoms. Because these fields point in random directions, the fields cancel themselves out. When the iron is used as the core in an electromagnet and a current is passed, the magnetic field it produces penetrates the iron's bulk and forces the tiny fields to align along the external field's direction. This way, the domains' fields add to the external field, producing a stronger field overall.

A magnetic field will be produced



The stator of a vacuum cleaner showing two electromagnets. MARRRCI (CC BY-SA 3.0)

as long as a current flows through the coil. When the current is switched off, some core materials remain weakly magnetised. In a superconducting electromagnet, such as in an MRI, superconducting wire is coiled around a core to produce magnetic fields of up to 30 tesla (600,000-times as powerful as the earth's). In Bitter electromagnets, current flows in wires coiled through a helical stack of electromagnets, producing magnetic fields of up to 40 tesla.

#### **For feedback and suggestions**

for 'Science', please write to  
**science@thehindu.co.in**  
with the subject 'Daily page'

# Electromagnet



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## Two steps back

### India needs to close the gender gap in education and politics

**G**ender parity may be climbing upwards worldwide with the global gender gap standing at 68.5% closed in 2024, but the glacial pace of change – it was 68.4% in 2023 – is a grim statistic. At this rate, it will take 134 years to reach full parity, the Global Gender Gap report released by the World Economic Forum (WEF) last week pointed out, “roughly five generations beyond the 2030 Sustainable Development Goal (SDG) target”. Iceland maintains its number 1 rank (93.5%), and is also the only economy to have closed over 90% of its gender gap. India has slipped two places to 129 out of 146 countries. Last year, it was ranked 127, after having jumped eight places from 135 in 2022. India has closed 64.1% of its gender gap in 2024, the report noted, leaving policy-makers with a huge window of opportunity to do better. The “slight regression,” according to the report, is mainly due to “small declines” in the spheres of education and political empowerment. With a population of over 140 crore, even two steps back mean staggering numbers. Though India, it pointed out, had shown a slight improvement in economic participation and opportunity for the last few years, it would need 6.2 percentage points more to match its 2012 score of 46%.

One way of achieving the objective will be through bridging gender gaps in, say, the labour force participation rate (45.9%). To do that, a slew of measures must be in place, from ensuring that girls do not drop out of higher education, providing them job skills, ensuring safety at the workplace, and helping them keep a job after marriage by sharing responsibility for chores at home. In education, the gap between men and women's literacy rate is 17.2 percentage points wide, leaving India ranked 124th on this indicator. India has fared better in the political empowerment index, but women's representation in Parliament continues to be low. For confirmation, look no further than the newly elected Lok Sabha. Close to 800 women contestants were in the fray, but the number of women Members of Parliament has dipped to 74 from 78 (2019) of 543 members, which is 13.6% of the total. These numbers are not a good sign in the backdrop of the Women's Reservation Bill, 2023, yet to come into effect, which aims to reserve one-third of the seats in the Lok Sabha and State legislative Assemblies for women. All under-performing countries, including India, must heed WEF Managing Director Saadia Zahidi's words, calling for “Governments to strengthen the framework conditions needed for business and civil society to work together to make gender parity an economic imperative”.



## Gender gap report (world economic forum )

- The global gender gap score in 2024 for all 146 countries included in this edition stands at 68.5% closed. Compared against the constant sample of 143 countries included in last year's edition, the global gender gap has been closed by a further +.1 percentage point, from 68.5% to 68.6%.
- When considering the 101 countries covered continuously from 2006 to 2024, the gap has also improved +.1 points and reached 68.6%.

**Based on current data, it will take 134 years to reach full parity – roughly five generations beyond the 2030 Sustainable Development Goal (SDG) target. In addition:**

- The 2024 Global Gender Gap Index shows that while no country has achieved full gender parity, 97% of the economies included in this edition have closed more than 60% of their gap, compared to 85% in 2006.**
- Iceland (93.5%) is again ranked 1st and has been leading the index for a decade and a half. It also continues to be the only economy to have closed over 90% of its gender gap. Out of the remaining nine economies in the top 10, eight have closed over 80% of their gap.**

- **European economies occupy seven spots out of the global top 10. In addition to Iceland, these include Finland (2nd, 87.5%), Norway (3rd, 87.5%), Sweden (5th , 81.6%), Germany (7th, 81%), Ireland (9th, 80.2%) and Spain (10th, 79.7%).**
- **The remaining three spots are occupied by economies from Eastern Asia and the Pacific (New Zealand, 4th, 83.5%), Latin America and the Caribbean (Nicaragua, 6th, 81.1%), and Sub-Saharan Africa (Namibia, 8th, 80.5%). Lithuania (11th, 79.3%) and Belgium (12th, 79.3%) dropped out of the top 10, with Spain and Ireland climbing +8 and +2 ranks, respectively, to join the top performers in 2024.**

- Among the 146 economies covered in the 2024 index, the Health and Survival gender gap has closed by 96%, the Educational Attainment gap by 94.9%, the Economic Participation and Opportunity gap by 60.5%, and the Political Empowerment gap by 22.5%.
- Since 2006, subindexes have shifted at different paces, based on the constant sample of 101 countries.
- Overall, the most significant shift occurs in Political Empowerment, where parity has jumped a total of 8.3 percentage points to 22.8% over the past 18 editions. In Economic Participation and Opportunity and Educational Attainment, parity has gained 4.8 and 4.2 percentage points respectively.

- **Health and Survival is the only subindex where there has been a moderate decline from 2006 (-0.2 points).**
- **With the evolving pace of each individual subindex affecting their respective timelines to parity, results from this year have extended the wait for parity in Educational Attainment to 20 years (+4 years from 2023) and Political Empowerment to 169 years (+7 years from 2023), yet brought forth the timeline for Economic Participation and Opportunity to 152 years (-17 years from 2023).**

## Case of india

- With a population of over 140 crore, even two steps back mean staggering numbers.
- Though India, it pointed out, had shown a slight improvement in economic participation and opportunity for the last few years, it would need 6.2 percentage points more to match its 2012 score of 46%.
- One way of achieving the objective will be through bridging gender gaps in, say, the labour force participation rate (45.9%).



- **To do that, a slew of measures must be in place, from ensuring that girls do not drop out of higher education, providing them job skills, ensuring safety at the workplace, and helping them keep a job after marriage by sharing responsibility for chores at home.**
- **In education, the gap between men and women's literacy rate is 17.2 percentage points wide, leaving India ranked 124th on this indicator. India has fared better in the political empowerment index, but women's representation in Parliament continues to be low.**

# High Court's take on Marriage Act, an erosion of rights



A problematic order from the Madhya Pradesh High Court has given rise to the likelihood of a misinterpretation of the law around inter-faith marriages and a calling into question the scope of the Special Marriage Act, 1954. If unresolved, this could potentially lead to consequences contrary to the objectives of the Act, which sought to provide a viable legal avenue for inter-religious marriages.

The issue has risen out of a petition that sought protection for an inter-faith marriage, jointly filed by an unmarried Hindu-Muslim couple before the Madhya Pradesh High Court. While hearing the arguments, the High Court went into the question of whether such a marriage of “a Muslim boy with a Hindu girl” under the Act would constitute a “valid marriage or not”. The High Court then proceeded to not grant police protection to the unmarried couple on the grounds that theirs would amount to an invalid marriage. By doing so, the High Court has reversed the gains in the jurisprudence on the right to choice of partner and has rewritten the well-settled objectives of the Special Marriage Act.

## Erroneous considerations

It is common practice that when a petition seeking police protection is filed under Article 226 of the Constitution of India, the High Court looks into the violation of rights of the petitioners and the extent of threat faced by them. Such petitions are usually filed by couples in inter-faith and inter-caste marriages. However, it is now seen that even in cases of unmarried persons, High Courts have extended them protection after considering the various threats emanating from society. In similar circumstances, Justice N. Anand Venkatesh of the High Court of Madras recognised the precarious situation encountered by same-sex couples and granted police protection to a lesbian couple.

Similarly, the Punjab and Haryana High Court



**Manuraj  
Shunmuga-  
sundaram**

is a media spokesperson for the Dravida Munnetra Kazhagam (DMK) and advocate practising before the High Court of Madras. He appeared for the petitioners in the case where the Madras High Court granted protection to a same-sex couple



**Haripriya  
Venkatakrishnan**

is an advocate practising before the High Court of Madras

The M.P. High Court order goes against the very basis of the Special Marriage Act

granted police protection to a live-in couple holding that “the key issue at hand is not the legality of the petitioners’ relationship, qua which they may be liable for civil as well as criminal consequences in accordance with law, but whether they are entitled to protection of their fundamental right under Article 21 of the Constitution”.

In contrast, the Madhya Pradesh High Court, without weighing in on the real and apparent dangers faced by an inter-faith couple and adjudicating on the prayer for protection based on a threat assessment, has gone into the merits of an impending marriage itself. Even if the couple does not get their marriage registered, their claim for protection ought to have been decided in accordance with Article 21 of the Constitution, which provides for the protection of the right to life and liberty of an individual.

## Dilution of the Special Marriage Act

Another serious concern is that the order passed by the Madhya Pradesh High Court goes against the very basis and objects of the Special Marriage Act. The order refers to a precedent from the Supreme Court of India in *Mohammed Salim vs Shamsudeen* (2019), a case which dealt with the issue of property succession arising out of a marriage between a Muslim man and Hindu woman under the Mohammedan Laws. This judgment should never have been considered as a precedent in either deciding the validity of an inter-faith marriage or for police protection.

The order also goes into Section 4 of the Special Marriage Act which excludes marriages between persons within the “prohibited degrees of relationship”. The reliance of the Madhya Pradesh High Court on this prohibition is entirely untenable and factually flawed as this provision only bars marriages between those who are

related. By doing so, the High Court failed to recognise that the objective of the Act is to facilitate marriage between any two Indian nationals “irrespective of the faith with either party to the marriage may profess”.

## The India of today and special marriages

The Madhya Pradesh High Court order assumes importance in the current social and political climate, where there is a real threat of vigilantism against inter-faith and inter-caste marriages, which do not have the sanction of the parents. The love jihad conspiracy, right-wing propaganda and consequent vigilantism have directly challenged our constitutional morality. While these are yet to be resolved, there is also a batch of petitions challenging unconstitutional provisions within the Special Marriage Act, such as prior notice which are pending before the Supreme Court. Tying these together is a common thread of individual autonomy, liberty, and equality. The Supreme Court in *Shafin Jahan vs Asokan K.M.* (2018), held that “intimacies of marriage lie within a core zone of privacy, which is inviolable”. Dealing with a case of inter-faith marriage, Justice D.Y. Chandrachud, as he was then, wrote that “social approval for intimate personal decisions is not the basis for recognising them” and further, that “the Constitution protects personal liberty from disapproving audiences”.

The *ratio decidendi* of the Shafin Jahan case has the effect of prioritising the absolute right of an individual to choose a life partner over any consideration of faith or caste-based dictates. With the spirit of this judgment having been lost sight of in recent years, it is wholly necessary for constitutional courts across the country to keep in mind that the arc of jurisprudence bends towards autonomy, privacy and liberty.

# Special marriage act

- All marriages in India can be registered under the respective personal law Hindu Marriage Act, 1955, Muslim Marriage Act, 1954, or under the Special Marriage Act, 1954.
- It is the duty of the judiciary to ensure that the rights of both the husband and wife are protected.
- The Special Marriage Act, 1954 is an Act of the Parliament of India with provision for civil marriage for people of India and all Indian nationals in foreign countries, irrespective of religion or faith followed by either party.

- **A marriage under the Special Marriage Act, 1954 allows people from two different religious backgrounds to come together in the bond of marriage.**
- **The Special Marriage Act, 1954 lays down the procedure for both solemnization and registration of marriage, where either of the husband or wife or both are not Hindus, Buddhists, Jains, or Sikhs.**
- **According to this Act, the couples have to serve a notice with the relevant documents to the Marriage Officer 30 days before the intended date of the marriage**

# Under Kafala, workers are dispensable



**W**ithin hours of the fatal fire that killed 49 migrant workers – a majority of whom are Indians – in Mangaf area of Al Ahmadi municipality, Kuwait, several actions were taken immediately. Kuwait's Interior Minister Fahad Al-Yousuf Al-Sabah said the fatalities were due to the greed of the employer and building owner – in this instance, both parties being the same, NBTC; he announced the company officials would be held criminally liable; and officials of the municipality were suspended for their failure to maintain building codes.

In the coming days, more announcements will be made and a few heads will roll. The names of the 49 dead are unlikely to be shared officially by Kuwait but will appear in the media in India and the Philippines. It is easy to replace a number, recruit anew and bring in more workers to fill the gap left behind by those who perished. To humanise them would mean to acknowledge their presence as more than just labour and entail safeguarding all of the rights of the migrant population, and that would only be possible by dismantling the all-pervasive Kafala system – a complex of laws and practices that ensure state and citizens hold all the power, while individual migrants are treated as temporary even if the dependency on their labour is near-permanent. This is why any announcement by Kuwait promising action must be scrutinised minutely.

Kuwait (foreigners comprise 70% of its 4.3 million) and the rest of the GCC states (Saudi, UAE, Qatar, Bahrain and Oman), in essence, follow the same practice with varying degrees of control over migration and migrants. These six states are home to roughly 35 million migrant workers, accounting for 10% of all international migrants, and Indians constitute the single largest group amongst them.

Let us look at the immediate concern – crowded, unsafe and



**Vani Saraswathi**

is the director of projects and editor-at-large of Migrant-Rights.Org, a GCC-based research and advocacy organisation

Promises in the wake of the Kuwait fire need to be scrutinised, for it is far easier to replace labour than ensure safeguards for the migrant worker population

unhygienic labour accommodation that makes its residents most vulnerable to any exigencies that may arise in a country. Just a few years ago, when the world came to a standstill due to the COVID-19 pandemic, GCC states struggled to contain the spread of the virus in these labour accommodations. Kuwait had some of the most discriminatory lockdown practices, particularly in areas densely populated by migrant workers and announced an amnesty, deporting tens of thousands of workers at the height of the pandemic in April 2020. No lessons were learned then, and tragedies recur in different forms.

Kuwait does have some kind of code on standards for workers' accommodation but its focus has been more on evicting 'bachelors' from family zones and moving them to subpar living spaces than to actually ensure employers provide suitable accommodation. As per Kuwait's labour law, employers engaged in government contracts (such as NBTC) must provide suitable housing or an allowance – 25% of wages if they earn the minimum wage (KD75) or 15% if paid above the minimum wage. The cost of decent living is roughly KD200 per person, not including rent. The extremely low value placed on their labour determines their place in the economic hierarchy.

This huge discrepancy between the cost of living and minimum wage is one of the critical control factors of the Kafala system. Work and residence visas are tied to the employer, ensuring they have a stranglehold over their employees' lives. For the nearly three million migrants in Kuwait's low-income belt, this means absolute dependency on the employer for accommodation, food and transportation. The minimum salary requirement to sponsor a family in Kuwait is KD800, so the majority of migrants are unable to bring their families. By keeping wages so low, Kuwait and the other Gulf states ensure that

workers are perpetually vulnerable. They have no choice but to live in the poor housing provided, struggle with the quality of food, and occupy as little socio-cultural space as possible in the countries they help build.

The Mangaf tragedy has been technically attributed to an electric short circuit. But the root cause clearly is the systemic indifference of the state towards the rights and well-being of low-income workers and the gross negligence of the employer.

There are many 'Ifs' as to how this tragedy could have been averted. If the employer had better safety checks, if the state had deemed them important enough to earn better and live better, but most importantly, if the workers could organise themselves, then they would have had a collective voice to air their grievances and demand better treatment.

But GCC states do not take kindly to any form of labour organising or unionisation. To allow workers to have a voice is to allow them to challenge the status quo. The easiest way to prevent this is to keep wages low enough that the workers are in a constant state of financial insecurity, and then to deport them with ease at the first sign of protest or discontent. In the heat of the aftermath, Kuwaiti officials will make promises of better safety standards and more stringent penalties but will depend on policing of employers and workers to implement this, and shy away from systemic changes that would best enforce the law. That would be to empower workers, the 'beneficiary' of these reforms, to raise their voices against the injustices they may face.

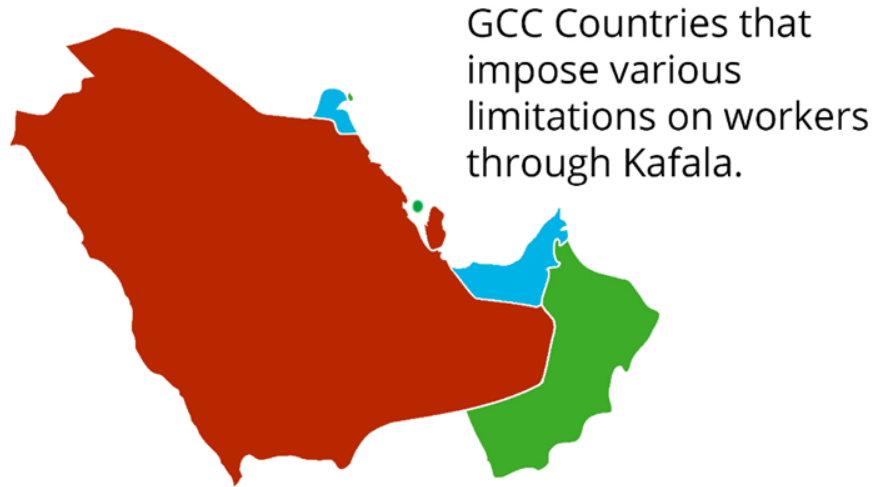
*Footnote: Domestic Workers, who constitute 27% of the entire labour force in Kuwait, are excluded from the labour law, and are amongst the most marginalised of the migrant population. This opinion piece does not have the scope to address the aggravated vulnerabilities they face.*

# Kafala system

- The kafala system is a system used to monitor migrant laborers, working primarily in the construction and domestic sectors in Gulf Cooperation Council member states and a few neighboring countries, namely Qatar, Bahrain, Kuwait, Lebanon, Oman, Saudi Arabia and the United Arab Emirates.

# Kafala كفالته

/verb./ to guarantee, take care of



GCC Countries that impose various limitations on workers through Kafala.

- Exit permit required.
- Exit permit not required but laws require sponsor.
- Implemented reforms that benefit migrant workers



Under the Kafala system, all migrant workers need to have an Emirati sponsor.

Employees need a **no-objection letter** to resign from a contract, effectively tying workers to their sponsor and immobilizing them in the job market.



Firms in free zones (Dubai) have “higher average labor productivity, pay higher wages and invest more in training for their workers.”



- **The 'Kafala' system is a legal framework that has been continued for decades in the Gulf countries. It is utilized for the employment of foreign workers in Saudi Arabia, the United Arab Emirates, Bahrain, Qatar, Kuwait, and Oman. Jordan, Lebanon, and Iraq do not follow this system.**

# On the size of council of ministers

What has been the composition of the Council of Ministers at the Centre and in States since India became a democracy? What were the instances when the council became too large and unwieldy? How were the laws brought in to rein in this trend?

## EXPLAINER

Rangarajan R

### The story so far:

**T**he Union Council of Ministers (COM) headed by Prime Minister Narendra Modi was sworn in on June 9, 2024. The present COM consists of the Prime Minister, 30 Cabinet Ministers, 5 Ministers of State (MoS) with independent charge and 36 MoS.

### Who constitutes the Council of Ministers?

India is a parliamentary democracy with the President as its nominal head. Article 74 of the Constitution provides that there shall be a COM headed by the Prime Minister (PM) to aid and advise the President. The real executive powers lie with the COM. A Minister should be a member of either the Lok Sabha or the Rajya Sabha and if not, should become one within six months of his/her appointment. A similar setup prevails in States with a COM headed by the Chief Minister (CM).

The COM consists of a Cabinet minister, MoS with independent charge, MoS and a Deputy Minister. The Constitution does not classify the members of the COM into different ranks. All this has been done informally, following the British practice. Cabinet Ministers are higher in rank and handle large portfolios while MoS assist the Cabinet Ministers and work under them. MoS with independent charge directly reports to the Prime Minister for their respective ministries.

### What is the constitutional limit?

The first COM at the time of independence had only 15 Ministers headed by Prime Minister Jawaharlal



**Number game:** Prime Minister Narendra Modi, left, with his Council of Ministers at the Rashtrapati Bhavan in New Delhi on June 9, 2024.

Nehru. After the first general elections in 1952, Nehru inducted around 30 Ministers into his COM. Over the years, the size of the COM had gradually increased to around 50-60. Interestingly, it is the United Front governments led by Deve Gowda (June 1996) and I.K. Gujral (April 1997) that were sworn in with just 21 and 34 Ministers respectively. In 1999, when Atal Bihari Vajpayee became Prime Minister, his COM had 74 Ministers. However, the size of COM was becoming unwieldy in some of the larger States. For instance, in 2002 when Mayawati was the Chief Minister of Uttar Pradesh, she had 79 Ministers.

The National Commission to review the working of the Constitution under the Chairmanship of Justice Venkatachaliah set up in February 2000, had suggested a ceiling of 10% of the total strength of Lok

Sabha/Legislative Assembly for the number of Ministers at the Centre/State level. Finally, through the 91st Constitutional Amendment in 2003, the total number of Ministers including PM/CM in the COM was limited to 15% of the total strength of the Lok Sabha/State Legislative Assembly. There is no minimum requirement at the Central level whereas even the smaller States should have a minimum of 12 Ministers. For Union Territories of NCT of Delhi and Jammu & Kashmir (J&K), the maximum limit is 10% of the total strength of its Assembly.

### What are the issues?

A thorny issue even after the limit on the number of Ministers is the appointment of Parliamentary Secretaries in various States. The office of Parliamentary

Secretary (PS) also has its origin in the British system. In India, the post of PS was first created in 1951. They have not been a regular feature in the Central governments thereafter and the last PS at the Centre was appointed in 1990. However, various States have continued with their appointment to circumvent the limit on COM placed by the 91st Amendment. High Courts of Punjab & Haryana, Rajasthan, Bombay, Calcutta, Telangana, Karnataka etc. have quashed or questioned the appointment of PS in the States under their jurisdiction for indirectly violating the maximum limit on COM. The Supreme Court in July 2017 had also declared a law passed by Assam in 2004 for the appointment of PS as unconstitutional. The most recent instance is the order of the Himachal Pradesh High Court in January 2024 that restrained six PS appointed in the State from functioning as Ministers or availing facilities provided to Ministers.

Appointing MLAs to the position of Ministers under the guise of PS to circumvent constitutional limits should be strictly prohibited and discontinued.

It is also pertinent to note that States like Sikkim, Goa and smaller States in the northeastern region with a current estimated population ranging from seven to forty lakhs have a minimum of twelve Ministers. However, Union Territories of Delhi and J&K with estimated population of over 2 crore and 1.5 crore, can have only a maximum of seven and nine Ministers respectively. The administration of public order, police and land in Delhi is not with the Delhi government. Similarly, public order and the police of Jammu and Kashmir will not be with its government. Nevertheless, considering the population of these Union Territories, the 10% limit for their COM may be reconsidered.

*Rangarajan R is a former IAS officer. He currently trains civil-service aspirants. Views expressed are personal.*

## THE GIST

▼ The present Council of Ministers consists of the Prime Minister, 30 Cabinet Ministers, 5 Ministers of State (MoS) with independent charge and 36 MoS

▼ The first COM at the time of independence had only 15 Ministers headed by Prime Minister Jawaharlal Nehru. When the council started expanding, through the 91st Constitutional amendment in 2003, the total number of Ministers including PM/CM in the COM was limited to 15% of the total strength of Lok Sabha/State Legislative Assembly.

▼ A thorny issue even after the limit on number of ministers is the appointment of Parliamentary Secretaries in various States. Courts have stepped in multiple times to restrain States from appointing PS to circumvent the constitutional limit set for the number of Ministers

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## What are the issues?



- A thorny issue even after the limit on the number of Ministers is the appointment of Parliamentary Secretaries in various States.
- The office of Parliamentary Secretary (PS) also has its origin in the British system. In India, the post of PS was first created in 1951.
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- **However, various States have continued with their appointment to circumvent the limit on COM placed by the 91st Amendment.**
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- However, Union Territories of Delhi and J&K with estimated population of over 2 crore and 1.5 crore, can have only a maximum of seven and nine Ministers respectively.
- The administration of public order, police and land in Delhi is not with the Delhi government. Similarly, public order and the police of Jammu and Kashmir will not be with its government.
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# Saurabh pandey upsc performance - UPSC PRELIMS 2024 ( Detailed pdf to be shared )



X 22nd october 2...



### Periodical cicada emergence disrupts food webs

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual prey – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

- The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence.

The cicadas are a superfamily, the Cicadoidea, of insects in the order

Hemiptera.



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X 10th october 2...



States as per Article 244(2).

### What are Scheduled Areas?

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

### How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.



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X 7TH DECEMBE...



### Garba dance of Gujarat makes it to UNESCO list

Sneeparna Chakrabarty  
NEW DELHI

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

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© Jharkhand Sahitya Akademi  
A Garba performance is making the world sick

UNESCO has added Gujarat's traditional dance form "Garba" to its list of Intangible Cultural Heritage. The move was announced on Wednesday. Garba is a traditional dance form of Gujarat, India. It is performed during the Navratri festival. The dance is characterized by its circular movements and the use of traditional instruments like the dhol and ghatis. The inclusion of Garba in the UNESCO list is a significant achievement for Gujarat and India. It recognizes the cultural value of the dance and its importance in the lives of the people of Gujarat. The UNESCO list is a global inventory of intangible cultural heritage, which includes traditions, customs, and practices that are part of the cultural heritage of a community or group. The list is designed to promote the protection and preservation of these traditions and to encourage their transmission to future generations. The inclusion of Garba in the list is a testament to the rich cultural heritage of India and the importance of preserving such traditions.



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PRELIMS 18th N...

• The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warrant — to show by what warrant is a person holding public office;

Prohibition — directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and

Certiorari — re-examination of an order given by judicial, quasi-judicial or administrative authorities.

In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.

When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.

Article 226, however, is not a fundamental right like Article 32.

12th BRICS...

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1:19

28th october 2...

US Pakistan South Asia UK Europe China Middle East Mad, Mad World Photos Vide

1023 Nobel Prize In Economic Sciences Awarded to Claudia Gold...

Israel Hamas War

awarded to  
of women's

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-2 Consider the following statements

- Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.
- Articles 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(3).
- The Prime Minister of India notifies India's Scheduled Areas.

How many of the above statements are correct?

- Only one
- Only two
- All three
- None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Ans- (b)

The President of India notifies India's Scheduled Areas.

- Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh. In 2015, Kerala proposed to notify 2,133 habitations, five gram panchayats, and two wards in five districts. It awaits the Indian government's approval.
- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.
- The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make regulations for a Scheduled Area, especially to prohibit or restrict the transfer of forest land by or among members of the STs, and regulate the allotment of land to STs and money-lending to STs.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

India World Opinion Sports e-Paper

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12:40

X polity 11th augu...

## Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

### Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

X 18th Septembe...

## Santiniketan finds its place on UNESCO's World Heritage List

Should body makes announcement on Sunday. Manu's says, named in Tagore, has been supported by Bengal Culture Ministry seek to bring in human values

By India Staff

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, has been added to the UNESCO's World Heritage List. The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture and its role in the development of modern Indian education.



The UNESCO World Heritage Committee, which meets in Paris, has decided to add Santiniketan to the list of World Heritage Sites. The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture and its role in the development of modern Indian education.

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum district, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the foundations of Visva-Bharati University.

## EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

By Staff

Continues

European Commission President Ursula von der Leyen has promised to take action to address the growing number of migrants arriving in Italy. She said that the EU will work with Italy to find a way to manage the situation.



The EU chief promised to take action to address the growing number of migrants arriving in Italy. She said that the EU will work with Italy to find a way to manage the situation.

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-2 With reference to Parliaments special sessions, consider the following statements

- There is specific provision in the Constitution that deals with special sessions.
- Article 352, which deals with the proclamation of Emergency, refers to a "special sitting" of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.

3- The Question Hour was suspended during the session.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.
- The Hoysala Temples, built in the 12th and 13th centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.
- The temples became targets of plundered and destruction by the Delhi Sultanate army of Ala-ud-din Khilji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughlaq in 1326 AD.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-4 Consider the following statements about SHREYAS scheme

- It comprises 4 central sector sub-schemes.
- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.
- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-5 Consider the following statements about Women's Reservation Bill

- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve 33% of seats in Lok Sabha and state Assemblies for women.



12:03

X prelims pointer...



- Que-5** With reference to Shumang Leela, consider the following statements
- Shumang Leela is a traditional form of theatre in Tripura.
  - In this the roles of women are all played by men, called Nupi Shabis.
  - It is performed in an open courtyard surrounded by spectators on all four sides.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- Shumang Leela is a traditional form of theatre in Manipur.
  - In the case of women's theatre groups, the roles of men are played by women.
  - Shumang Leela translates to "courtyard performance".
  - Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.
- Que-6** Consider the following statements about Red Sanders also called Red Sandalwood
- It is a species found in the southern tropical dry deciduous forest of Telangana.
  - The tree reaches an average height of 10 to 15 metres.
  - The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.
- Which of the following given above is/are correct
- a) 1 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
  - CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
  - In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
  - The heartwood of Red Sanders is in demand in the domestic and international markets for making

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CURRENT AFFAIRS FEB 2<sup>nd</sup> by SAURABH PANDEY SIR

furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

**Que-7** Consider the following statements about Compressed Biogas (CBG) and compressed natural gas (CNG)

- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.
- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.
- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

a) 1 and 2 only    b) 3 only

**Que-8** Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARDHAN) in the Union Budget 2023. Consider the following statements about this

- The new GOBARDHAN scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.
- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.
- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

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

12:05

X prelims pointer...



- Que-7** Lamu Archipelago, recently in News, belongs to which country
- a) Somalia  
b) Malaysia  
c) Indonesia  
d) Kenya
- Ans: (d)
- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.
- Que-8** Consider the following statements about "Operation Sadbhavana", recently in News
- Launched by an Indian Army.
  - For development of Jammu and Kashmir.
  - Some of the objectives achieved through Operation Sadbhavana are national integration, tourism, women's empowerment, employment generation, education, and
- development activities geared towards nation-building.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 only
- Ans: (b)
- For development of Ladakh.
  - The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

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**Que-1** Consider the following statements

- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.
- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.
- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

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

- Ans: (c)
- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.

of what we call persistence, allowing satellites to capture images continuously.

**Que-2** With reference to Paris Club, consider the following statements

- The Paris Club is a group of mostly western creditor countries.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

Which of the following given above is/are correct

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

- Ans: (b)
- It grew from a 1956 meeting in which

12:35

X may 2024 impo...



## Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.
- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

## Pros and Cons of Exchange-Traded Funds



## BIMSTEC

WHAT YOU SHOULD KNOW



11:29



X 12th august 2023



## DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission

- In India, such Delimitation Commissions have been constituted 4 times - in 1952 under the Delimitation Commission Act, 1952, in 1962 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.

- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.



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defends use of  
Saurabh Kutumbak

11:37



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productivity, uphold good health and prevent poverty.

- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 5 With reference to Doppler radar network, consider the following statements

- It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.
- It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.
- The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

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

CURRENT AFFAIRS BY SAURABH PANDEY SIR

- 5- (c)
- It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?

- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?

- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?

- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 6 Consider the following statements about Army Day

- India celebrates Army Day on January 15 every year.
- The Army Day is celebrated every year to honour Cariappa and the defence forces.
- 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

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

CURRENT AFFAIRS BY SAURABH PANDEY SIR

5- (d)

- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004, with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)

- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)

- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)

- The Chief of Defence Staff is principally responsible for getting the armed forces better integrated rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, and Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Minister only on tri-services matters. The three service chiefs will continue to advise the Defence Minister exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance of the three services.



# What is SWM cess and why is it levied on waste generators?

How has the SWM cess fared so far and why has it hit the headlines suddenly? How has Bengaluru been handling its solid waste management and what is about to change going forward?

**Pushkara S.V.**

## The story so far:

**T**he Bruhat Bengaluru Mahangara Palike (BBMP) has proposed a Solid Waste Management (SWM) Cess of ₹100 per month for each household. While the proposal has sparked debate and criticism among residents and stakeholders, it is important to understand the rationale behind SWM cess, its intended use, and the broader context of solid waste management challenges faced by Urban Local Bodies (ULBs) in India.

Urban Local Bodies (ULBs) levy user fees or SWM cess as per the provisions of Solid Waste Management Rules, 2016. According to these guidelines, ULBs must collect user fees/cess for SWM services provisions provided. ULBs typically charge about ₹30-50 per month as SWM cess, which is collected along with property tax. ULBs are now considering revising these rates and imposing higher

charges on bulk waste generators to meet a portion of the costs incurred in providing SWM services.

## What are the costs?

Offering SWM services is complex and resource-intensive. ULBs typically deploy about 80% of their manpower and up to 50% of their annual budgets to provide SWM services to city residents.

In a city like Bangalore, an urban resident generates about 0.6 kg of waste per day, totalling 0.2 tonnes per person per year. Overall, Bangalore generates about 5,000 tonnes of solid waste per day. Managing this volume of waste requires around 5,000 door-to-door waste collection vehicles, 600 compactors, and about 20,000 Paurakarmikas.

SWM services comprise four components: collection, transportation, processing and disposal. ULBs package collection and transportation together, and processing and disposal together. Collection and transportation are

resource and labour-intensive and come up to 85-90% of the SWM budget, whereas only about 10-15% is spent on processing and disposal of waste.

## What are the challenges?

Solid waste generated in Indian cities consists of about 55-60% wet biodegradable material and 40-45% non-biodegradable material. The portion of recyclable material in the dry waste is minimal, only about 1-2%, with the rest being mostly non-recyclable and non-biodegradable waste. Although 55% of the wet waste can be converted into organic compost or biogas, the yield is as low as 10-12%, making both composting and biogas generation from solid waste financially unviable. Typically, operational revenue from waste processing facilities covers only about 35-40% of operational expenses, with the rest subsidised by the ULB.

Apart from financial challenges, ULBs face other challenges associated with SWM services, such as extra work of

clearing open points and drains, preventing open littering, seasonal changes in waste generation, and sweeping operations. Additionally, the disposal of non-compostable and non-recyclable dry waste, such as single-use plastic, textile waste and inert materials, is expensive since the material needs to be shipped to cement factories or waste-to-energy projects located about 400-500 km from cities.

Large cities like Bangalore spend about 15% of their budget—about ₹1,643 crore out of ₹11,163 crore – whereas the revenue from SWM services is almost negligible at ₹20 lakh per year. Smaller cities tend to spend up to 50% of their budget but also end up with almost negligible revenue. Hence, ULBs charge SWM cess to cover a portion of the costs.

## What is the solution?

Although collection and transportation of waste generate no revenue, several strategies can reduce overall expenditure on SWM and lower user charges. These are segregation of waste at source, reducing single-use plastic, decentralised composting initiatives, Information, Education and Awareness (IEC) to prevent open littering, and asking bulk waste generators to process their own waste.

A balanced approach, combining marginal user charges with efficient operations, could help make our cities cleaner.

*Pushkara S.V. works with the Indian Institute for Human Settlements, Bengaluru.*

## THE GIST

➤ The Bruhat Bengaluru Mahangara Palike's decision to levy a Solid Waste Management cess of ₹100 per household has sparked debate and criticism among residents and stakeholders.

➤ Offering SWM services is complex and resource intensive. The yield from waste conversion is low and typically, operational revenue from waste processing facilities covers only about 35-40% of operational expenses, with the rest subsidised by the Urban Local Bodies.

➤ Large cities like Bangalore spend about 15% of their budget whereas the revenue from SWM services, is almost negligible at ₹20 lakh per year. Smaller cities tend to spend up to 50% of their budget but also end up with almost negligible revenue. Hence, ULBs charge SWM cess to cover a portion of the costs

# **SWM CESS**

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- **Although 55% of the wet waste can be converted into organic compost or biogas, the yield is as low as 10-12%, making both composting and biogas generation from solid waste financially unviable.**

# Orchid blossoms with new drug to treat anti-microbial resistance



The pharmaceutical company's India-discovered drug Enmetazobactam, the first to receive U.S. FDA approval, will help it flower with strength; for 2023-24, Orchid achieved a turnover of ₹819 crore, net of ₹94 crore; following a ₹400-crore QIP last year, its debt has come down to ₹120 crore

## NEWS ANALYSIS

**M. Ramesh**  
CHENNAI

**O**n June 6, Orchid Pharma made a significant announcement in the stock exchanges that went largely unnoticed in the post-election din.

The company said it had received approval from the Drugs Controller General of India to make and sell Enmetazobactam. Normally, a pharma firm getting approval to make a drug should not be an occasion for any excitement but this was different.

Enmetazobactam is not only among the few drugs discovered in India by an Indian company – there are less than 20 of them – but it is the first India-discovered drug to get U.S. FDA approval. And there is more. Disease-causing bacteria are getting cleverer by the day, developing resistance to many antibiotics doctors prescribe.

Anti-microbial resistance (AMR) is estimated to kill about five million people every year (the same as the population of Norway or Denmark). Any drug that overpowers these superbugs is a godsend. Enmetazobactam is an AMR drug. It will be given to patients together with Cefepime, a medicine that falls under the Cephalosporin



**Huge potential:** Dhanuka sees companies shifting base to India. SPECIAL ARRANGEMENT

category of antibiotics.

This development, along with a few others – such as the firm's backward integration moves and getting into a new drug under a licence – underscores the growth phase of Orchid Pharma that has only recently stabilised after a financial wobble.

### Orchid's origins

Orchid Pharma was established in 1992 by Kailasam Raghavendra Rao, an IIM-A alumnus, with the money he had earned working in West Asia, to manufacture the Cephalosporin class of drugs, as and when they came out of the patent-protected period. For some years it was successful but fell into a financial distress, due largely to overseas acquisitions. EBITDA fell from ₹320 crore in the 18-



month year 2013-15 (margin 18%) to ₹14 crore (2%) in 2017-18, as stressed working capital delayed order execution leading to cancellations.

In 2019, Lakshmi Vilas Bank, a financial creditor, hauled Orchid to the National Company Law Tribunal. In March 2020, Dhanuka Laboratories stepped in with an offer of ₹1,116 crore against the ₹3,200 crore debt the company had and the liquidation va-

lue of ₹1,300 crore. Orchid Pharma came to Dhanuka after the Supreme Court ruled the offer did not have to be equal to or more than the liquidation value.

Things stabilised under the Dhanuka management. For 2023-24, Orchid achieved a turnover of ₹819 crore and made a net profit of ₹94 crore. Its share price has had a remarkable journey – rising from ₹18 in November 2020 to about ₹2,500 in April 2021. On June 14, it was quoting around ₹1,050.

Enmetazobactam was discovered by Orchid in 2008, but financial difficulties forced the company to license the molecule to Allegra of Germany, which would have the right to manufacture and sell the drug anywhere in the world except India, paying (6-9%)

royalty to Orchid. Indeed, it is Allegra's application that has been approved by the U.S. FDA.

"Enmetazobactam would be another weapon in a clinician's arsenal," says Mridul Dhanuka, Director, Orchid Pharma. In a conversation with *businessline*, Mr. Dhanuka said in clinical trials, the drug had recorded an efficacy of 79% compared with 59% of a comparable drug, Piperacillin Tazobactam. The latter commands a market revenue of about ₹1,000 crore, but Mr. Dhanuka stressed Enmetazobactam cannot just replace Piperacillin Tazobactam in the market, as considerations such as costs and doctors' cautious approach to new drugs come into play.

The firm recently said Enmetazobactam could be worth ₹75-100 crore a year, but Mr. Dhanuka said the level would be reached after about 2-3 years.

### Backward integration

Even as Orchid Pharma is making plans for manufacturing the drug at its Chennai plant, it is busy buying land in Jammu. Its wholly-owned subsidiary, Orchid Bio Pharma, is on to a ₹750-crore project to make TACA, a drug intermediate not produced in India, with PLI assistance from the Government of India. When completed, the project is expected to be beneficial to Orchid, as TACA

"is the raw material for 75% of Orchid's products."

While the production of TACA is a backward integration for Orchid Pharma, it also means entry into 'fermentation'. China is the 'big daddy' in fermentation, but Mr. Dhanuka expects due to certain recent regulations in the U.S., Chinese companies could shift base to India. Orchid wants to get into fermentation.

And then, the company is preparing for the manufacture of Cefiderocol, another Cephalosporin discovered by Shionogi of Japan. The licensee Global Antibiotic Research and Development Partnership (GARDP) has sub-licensed the drug to Orchid under a 'fixed margin, no royalty' deal, meant to make low-cost drugs available to everyone. Cefiderocol is a "reserve category" drug that will be used if the first two lines of treatment fail.

Financially, Orchid appears to have put itself on an even keel. Thanks to a ₹400-crore QIP last year, its debt has come down to ₹120 crore, while its current liabilities are easy against its current assets – ₹260 crore versus ₹790 crore. The promoter, the ₹500-crore Dhanuka Laboratories, is to be merged with Orchid, which should make the balance sheet look prettier. The merger is pending NCLT approval.

(The writer is with *The Hindu businessline*)



## **Enmetozobactam**

- **Orchid blossoms with new drug to treat anti-microbial resistance.**
- **Enmetozobactam is not only among the few drugs discovered in India by an Indian company — there are less than 20 of them — but it is the 1st India-discovered drug to get U.S. FDA approval.**
- **And there is more. Disease-causing bacteria are getting cleverer by the day, developing resistance to many antibiotics doctors prescribe**



Activists from the environmental organisation Greenpeace drawing a message in the sand to raise awareness of caring for turtles and the oceans as part of a campaign called 'Oceans without Plastics' at Pie de la Cuesta beach in Acapulco, Guerrero State, Mexico. AFP

## ***More Miles Less Plastic***

- ***More Miles Less Plastic*** is an environmental initiative that One Ocean Foundation has developed and implemented for the nautical world and more specifically for sailing events.
- The two main objectives of this project consist in creating awareness on ocean issues while at the same time having a concrete impact through the collection of plastic waste from marine and coastal areas.
- The initiative is part of the project ***No Plastic in the Ocean that*** aims to fight marine pollution from plastics and microplastics.

# New fabric found to make urban 'heat islands' more bearable

## The Hindu Bureau

As global temperatures and urban populations rise, the world's cities have become "urban heat islands," with tight-packed conditions and thermal radiation emitting from pavement and skyscrapers trapping and magnifying these temperatures. With 68% of all people predicted to live in cities by 2050, this is a growing, deadly problem.

In a paper published in

*Science*, researchers from the University of Chicago detail a new wearable fabric that can help urban residents survive the worst impacts of massive heat caused by global climate change, with applications in clothing, building and car design, and food storage.

### **Test results**

In tests under the Arizona sun, the material kept 2.3 degrees Celsius cooler

than the broadband emitter fabric used for outdoor endurance sports and 8.9 degrees Celsius cooler than the commercialised silk commonly used for shirts, dresses and other summer clothing. This, the team hopes, will help many avoid the heat-related hospitalisations and deaths seen in global population centres this year alone.

Existing cooling fabric for outdoor sports works by reflecting the sun's light

in a diffuse pattern so it does not blind onlookers. But in an urban heat island, the sun is only one source of heat. While the sun bakes from above, thermal radiation emitted from buildings and pavement blast city-dwellers with blistering heat from the sides and below. About 97% of the clothes are being heated by the thermal radiation coming at them from the sides and below, which broadband emitter

fabric does not fight. This means many materials that perform well in lab tests will not help city-dwellers in Arizona, Southeast Asia and China when massive heat waves hit them.

The University of Chicago team's new textile, which has received a provisional patent, can help provide a passive cooling system that can supplement and reduce the need for energy- and cost-intensive systems.

The applications go far beyond clothing. A thicker version of the fabric protected by an invisible layer of polyethylene could be used on the sides of buildings or cars, lowering internal temperatures and reducing the cost and carbon impact of air conditioning. Similarly, the material could be used to transport and store milk and other foods that would otherwise spoil in the heat, cutting refrigeration's impact.

## **Wearable fabric**

- In a paper published in Science, researchers from the University of Chicago detail a new wearable fabric that can help urban residents survive the worst impacts of massive heat caused by global climate change, with applications in clothing, building and car design, and food storage.
- In an urban heat island, the sun is only one source of heat.
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- **The University of Chicago team's new textile, which has received a provisional patent, can help provide a passive cooling system that can supplement and reduce the need for energy- and cost-intensive systems.**



# Gene therapy offers hope for patients with hearing loss

It is widely estimated that approximately 50-60% of congenital hearing loss cases are attributed to genetic causes; among the various populations, genetic variants play a significant role

Vinod Scaria  
Rahul Bhoyar

**H**earing loss is one of the most prevalent disorders and it is estimated that over one billion people suffer from hearing loss and approximately one-two children in every 1,000 births are born with congenital hearing loss.

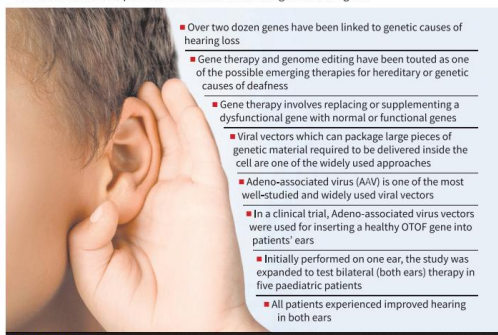
Hearing loss is a complex condition that can result from a variety of environmental and genetic factors including ear infections. Often, hearing loss serves as symptoms indicating defects or pathologies in the ear's process that converts sound into electrical signals sent to the brain.

It is widely estimated that a significant majority, amounting to approximately 50-60% of congenital hearing loss cases, are attributed to genetic causes. Among the various populations, genetic variants play a significant role. For example, mutations in the GJB2 gene are the most common genetic cause of hearing loss in Caucasian, Asian and Hispanic populations. In Africa, the MYO15A and ATP6V1B1 genes are more frequently implicated.

In total, over two dozen genes have been linked to genetic causes of hearing loss. Besides genomic mutations, mitochondrial genetic defects can also lead to hearing impairment. Genetic variants could also play a role in the complex interplay with other factors, like medications. For instance, a prevalent genetic defect in the mito-

## Hope for children with congenital hearing loss

Genetic causes are responsible for about 50-60% of congenital hearing loss



- Over two dozen genes have been linked to genetic causes of hearing loss
- Gene therapy and genome editing have been touted as one of the possible emerging therapies for hereditary or genetic causes of deafness
- Gene therapy involves replacing or supplementing a dysfunctional gene with normal or functional genes
- Viral vectors which can package large pieces of genetic material required to be delivered inside the cell are one of the widely used approaches
- Adeno-associated virus (AAV) is one of the most well-studied and widely used viral vectors
- In a clinical trial, Adeno-associated virus vectors were used for inserting a healthy OTOF gene into patients' ears
- Initially performed on one ear, the study was expanded to test bilateral (both ears) therapy in five paediatric patients
- All patients experienced improved hearing in both ears

**Early detection:** : Newborn screening programmes help detect children born with congenital hearing loss

chondrial MTRNR1 gene can predispose individuals to hearing loss when administered with the aminoglycoside antibiotics, widely used in treatment of TB.

### Emerging therapies

Correction of the gene defect underlies the genetic cause of hearing loss, and therefore gene therapy and genome editing have been touted as one of the possible emerging therapies for hereditary or genetic causes of hearing disability. Gene therapy typically involves replacing or supplementing a dysfunctional gene with normal or functional genes. There are a number of molecular approaches that have been widely used for such replacement or supplementation.

Adeno-associated virus (AAV) is one of the most

well-studied and widely used vectors for this purpose. AAV offers several advantages: it is a safe vector, as it does not cause human diseases, and it can infect both dividing and non-dividing cells, thus having a broad spectrum of cells it can target for genetic editing.

In a recent report published in *Nature Medicine*, Chinese researchers provide early promise towards using gene therapy for at least one genetic hearing loss. Researchers at the Fudan University, in collaboration with a number of research and clinical centres in China, proposed that gene therapy could effectively treat a form of genetic deafness involving the OTOF gene, known as hereditary deafness 9. Mutations in the OTOF gene account for approximately

2-8% of all genetic hearing loss cases. In this clinical trial, researchers employed Adeno-associated virus vectors with the intention of inserting a healthy OTOF gene into patients' ears using a harmless virus. All patients experienced improved hearing in both ears. Initially performed on one ear, the study was expanded to test bilateral (both ears) therapy in five paediatric patients.

The researchers in the report suggest that no severe side effects were observed, while among the recorded 36-odd minor side effects, the most common were increased lymphocyte counts and cholesterol levels apart from an increase in lactate dehydrogenase levels, which is a marker for tissue damage in the body. Hearing tests

showed significant improvement in all patients reported and all patients regained the ability to understand speech and locate sound sources. The promising results indicate that AAV gene therapy is safe and effective for treating hereditary hearing disability.

### Set of caveats

While the initial results are encouraging, Adeno-associated virus vectors come with their own set of caveats. The foremost being that our immune system can recognise and eliminate the virus making it less effective in individuals who are immunised, and also limits the re-administration of the gene therapy vector, since the primary administration would produce antibodies against the virus. Previous studies have suggested that approximately one-fifth to one-third of the patients have neutralising antibodies against AAV.

The present report is limited by the small number of patients studied and reported over a short follow-up period. However, it is encouraging that the clinical trial is ongoing and longer-term follow-up data of the patients would be available soon. While the results are encouraging and provide immense hope, we are not yet on a firm ground to assert that gene therapy for hearing loss is paving the way towards a sound future.

(Vinod Scaria is a consultant at Vishwanath Cancer Care Foundation, and Rahul Bhoyar is a senior scientist at Karkinos Healthcare. Opinions are personal)



# Hope for children with congenital hearing loss

Genetic causes are responsible for about 50-60% of congenital hearing loss



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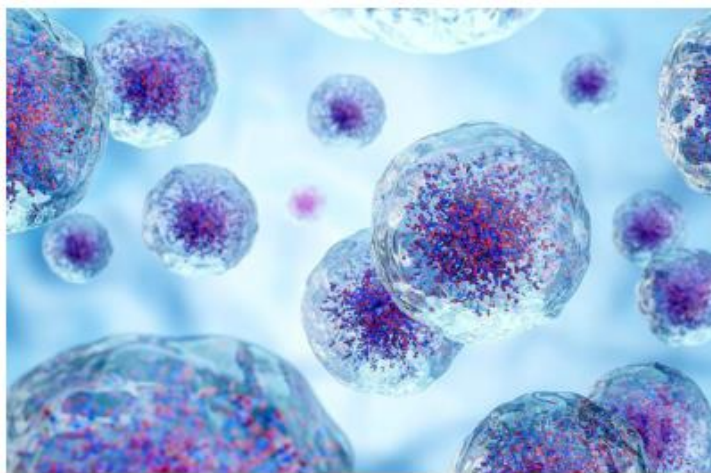


## Antimalarials may relieve polycystic ovary syndrome

Plant-derived compounds best known for their antimalarial properties relieve polycystic ovary syndrome, a major public health problem that affects millions of women worldwide. These compounds, called artemisinins, achieve their effect by suppressing ovarian androgen production in multiple rodent models as well as in a small cohort of human patients. Nineteen women taking dihydroartemisinin, a drug used to treat malaria, for 12 weeks substantially reduced key PCOS biomarkers.

# Artemisinin

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- **These compounds, called artemisinin, achieve their effect by suppressing ovarian androgen production in multiple rodent models as well as in a small cohort of human patients**



## Migraine drug weakens leukemic stem cells in mice

A drug approved for the treatment of migraines can also disrupt energy-producing processes that fuel hardy leukemic stem cells, according to a new study in mice. The findings show that the medication, named lomerizine, could sensitise treatment-resistant leukemia tumors to drugs such as imatinib, suggesting a new potential type of combination therapy. Combining imatinib and lomerizine shrank chronic myeloid leukemia tumors in mice, suppressed leukemic stem cells, and prolonged survival.

# lomerizine

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## Question Corner

# Pigeon proximity

### **Does seeking social proximity improve flight routes among pigeons?**

A new study looked at the social influences on pigeon flight routes. Researchers have found that flight paths are improved as younger birds learn the route from older birds, leading to overall more efficient routes over generations. The researchers compared the pigeon flight data to a computer model that prioritised four main factors representing what might be involved in choosing a flight path with minimal cognition, including: direction to the goal, representing the bird's internal compass;

proximity to the other pigeon; the remembered route; and general consistency, since the birds are unlikely to make erratic turns. The younger agent benefits from the older agent by learning the route. However, it also shows that the older agent benefits from the younger agent. Since younger agents are not following an internal route, they are more oriented to the final destination. The agents' desire for social proximity between the two balances these draws, leading to an overall more efficient route.

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Readers may send their questions / answers to  
[questioncorner@thehindu.co.in](mailto:questioncorner@thehindu.co.in)

# Pigeon behaviour



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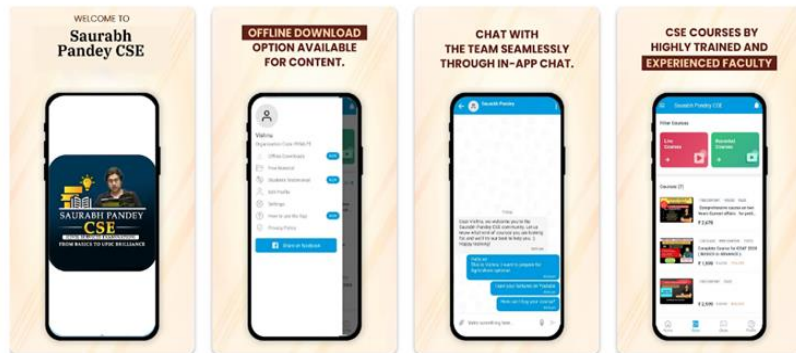
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# Topics

- Pobitora Wildlife Sanctuary
- Gene Therapy for sickle cell disease
- AI for protein structure
- Heat Traps
- World Refugee Day
- Snow persistence
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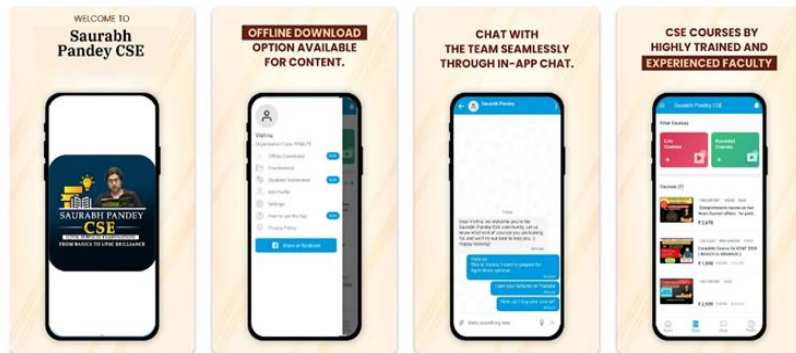
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# Target Mains -2024/25 -

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## Walk in the park



A one-horned rhinoceros and its calf wading through flood waters in the Pobitora wildlife sanctuary in Morigaon district of Assam on Wednesday. The monsoon has brought a measure of relief to animals dealing with extreme heat. RITU RAJ KONWAR

# Pobitora Wildlife Sanctuary

- Pobitora Wildlife Sanctuary is a **wildlife sanctuary** on the southern bank of the **Brahmaputra** in **Morigaon district** in **Assam, India**.
- It was declared in 1987 and covers 38.85 km<sup>2</sup> (15.00 sq mi), providing grassland and wetland habitat for the **Indian rhinoceros**.
- It holds one of the largest Indian rhinoceros population in Assam

- It is known for holding the **highest density of Greater One Horned Rhinoceros** in the country.
- Pobitora Wildlife Sanctuary also known as “**Mini Kaziranga**” due to its comparable landscape and notable population of the one-horned rhinoceros.



# India eyes breakthrough against sickle cell

Researchers working to develop gene therapy using CRISPR-Cas9, a gene-editing tool, to fight the genetic blood disorder that has a high prevalence rate among the Scheduled Tribes; Tribal Affairs Ministry wants ground-level healthcare workers such as ASHAs trained to screen for the disease

**Abhinav Lakshman**

NEW DELHI

India is getting closer to developing a gene therapy for sickle cell disease, a genetic blood disorder with a high prevalence rate among the Scheduled Tribes, officials of the Union Tribal Affairs Ministry said on Wednesday.

Vibhu Nayyar, Secretary, Tribal Affairs Ministry, said the government was expecting to hear “good news” by January 2025 on the laboratory tests that are being run.

M. Srinivas, Director of the All India Institute of Medical Sciences (AIIMS), said researchers were working to develop a gene therapy using CRISPR-Cas9, a gene-editing tool.

“We want that in the next six months to one year, we will be able to go forward with using this method for treating sickle

cell disease – making India one of the first countries to do so,” Mr. Srinivas said.

He was speaking at the National Conclave on Generating Awareness on Sickle Cell Disease, organised by the Tribal Affairs Ministry in collaboration with the Birsa Munda Centre at the AIIMS.

Union Tribal Affairs Minister Jual Oram, addressing the opening of the conclave, lauded the efforts but said it was important to involve and coordinate with ground-level healthcare workers such as ASHAs and anganwadi workers for these plans to be implemented properly.

“They will be the ones doing the heavy lifting on the ground,” Mr. Oram said.

Officials of the Tribal Affairs Ministry told *The Hindu* that the “good news” Mr. Nayyar was referring to was related to the tests that



Tribal Affairs Ministry official says the government was expecting to hear “good news” by January 2025 on laboratory tests being run. AP

are currently being run by the Council of Scientific and Industrial Research-Institute of Genomics and Integrative Biology (CSIR-IGIB).

“Following this, the tests will proceed to the next phase and eventually move on to being tested on patients,” a senior official said.

This comes months after the U.S. Food and Drug Administration approved the CRISPR-Cas9 technology for a cell-based gene therapy to treat sickle cell disease in December 2023.

## Making it cost-effective

Ministry officials said one of the main challenges for India was to find a way to

make this therapy cost-effective. Developing a gene therapy using CRISPR has been part of India’s mission to eradicate sickle cell disease by 2047.

A government dossier on the mission, which was launched by Prime Minister Narendra Modi in July 2023, said the technology had “the potential to be a single dose cure for blood disorders like sickle cell anaemia”.

Part of this mission is to also conduct over seven crore screenings among vulnerable tribal populations across 17 States and Union Territories, of which three crore screenings have been achieved so far, Ministry officials said.

The CRISPR-Cas9 system consists of an enzyme that behaves like molecular scissors, which can be directed to cut a piece of DNA at a precise location. This will then allow a guide

RNA to insert a changed genetic code at the sites of the incision.

While there are a few ways to effect such changes, the CRISPR system is believed to be fast and the most versatile of all.

Addressing the gathering of doctors, experts, and healthcare professionals, Mr. Oram said the Union government was committed to working on the sickle cell disease eradication mission and called for officials from across Ministries and departments to ensure that grassroots workers were roped in for the implementation process and that they should themselves engage with them.

Following the addresses by senior officials and the Minister, a series of technical panel discussions were also held on recognising and screening for sickle cell disease, managing the disease, and other issues.

# Gene Therapy for sickle cell disease

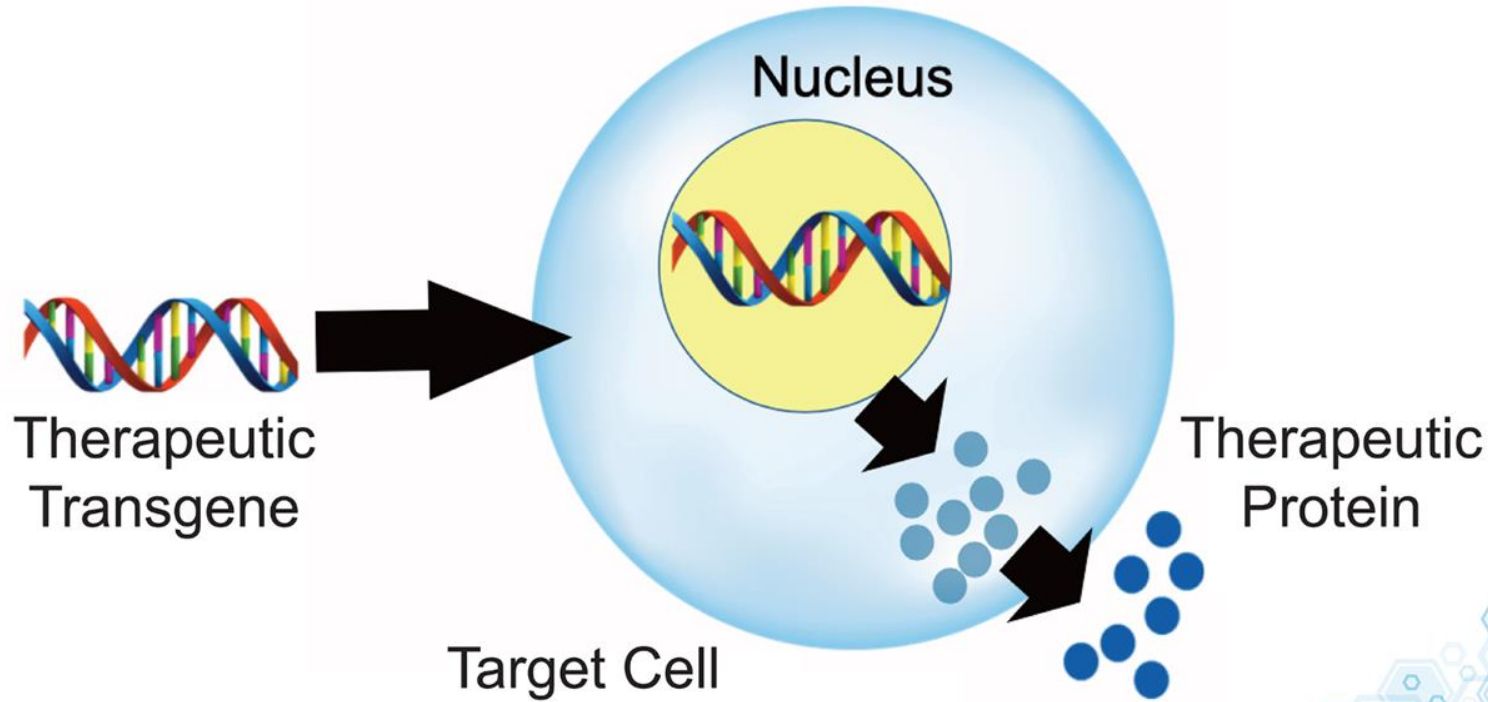
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## What is Gene Therapy??

- **Gene therapy aims to fix a faulty gene or replace it with a healthy gene to try to cure disease or make the body better able to fight disease.**
- **It holds promise as a treatment for a wide range of diseases, such as cancer, cystic fibrosis, heart disease, diabetes, hemophilia and AIDS.**



# The Principle of Gene Therapy

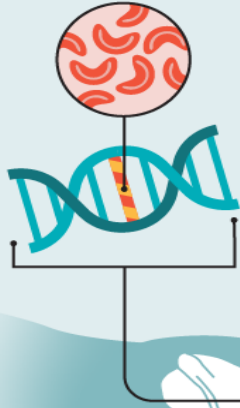






# Gene therapy to cure sickle cell anemia

**1.**  
Extract stem cells  
from patient's bone  
marrow



**2.**  
Infuse stem cells  
with normal gene  
for hemoglobin



**3.**  
Condition  
patient's bone  
marrow to receive  
new stem cells



**4.**  
Insert treated  
stem cells into  
patient



# What are Sickle Cell Disorders?

ka  
hos



- A group of disorders that cause red blood cells to become misshapen and break down.
- The cells die early, leaving a short age of healthy red blood cells and can block blood flow causing pain.



## Types:

### Sickle Cell Anaemia

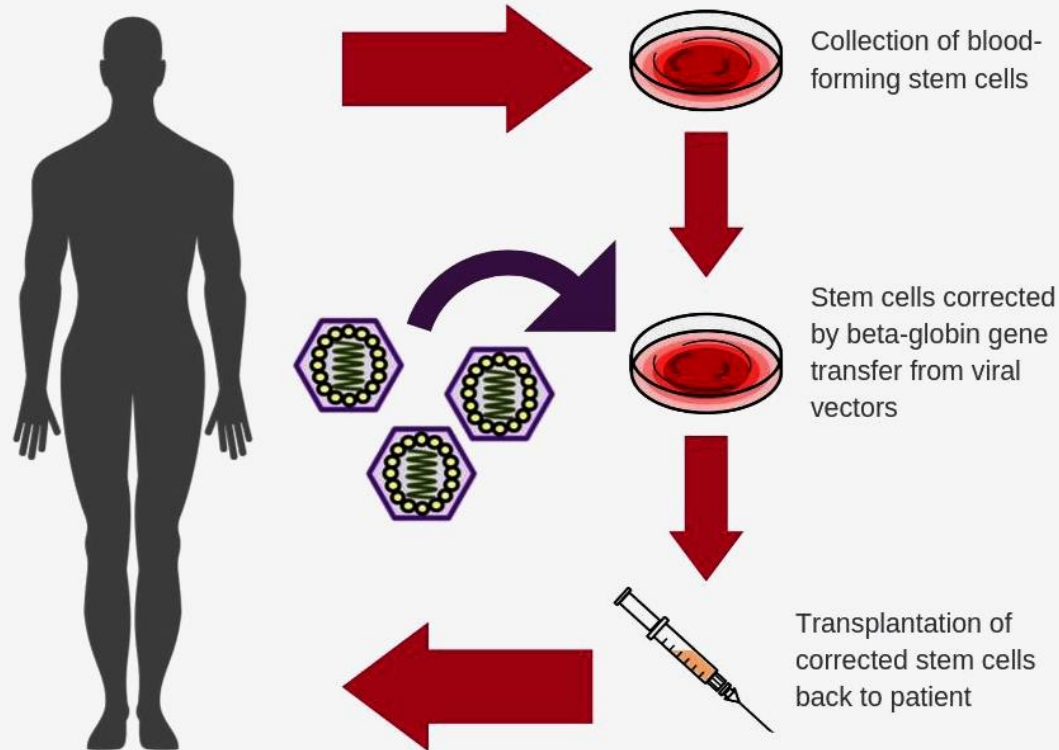
Dysfunctional red cells due to abnormal haemoglobin

### Sickle Cell Crisis

Blockage of blood vessels causing severe pain or organ damage

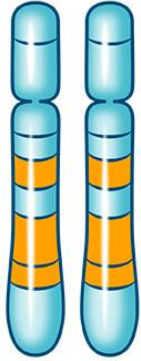


# Gene therapy for sickle cell disease



# What is Sick Cell Disease (SCD)?

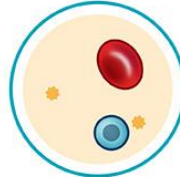
Chromosome 11



Two copies of a mutated Hemoglobin Subunit Beta (HBB) gene



Pain crises due to ischemia



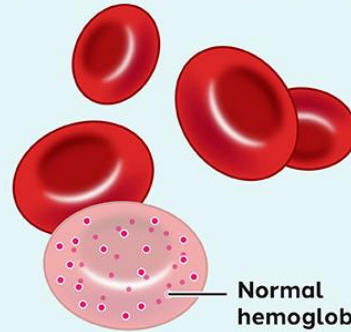
Anemia



Susceptibility to infections

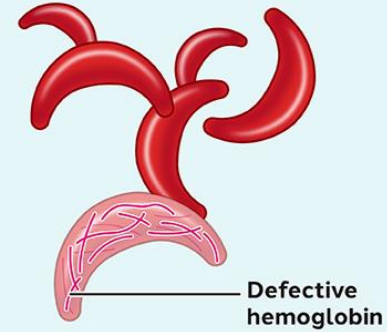


Normal red blood cells



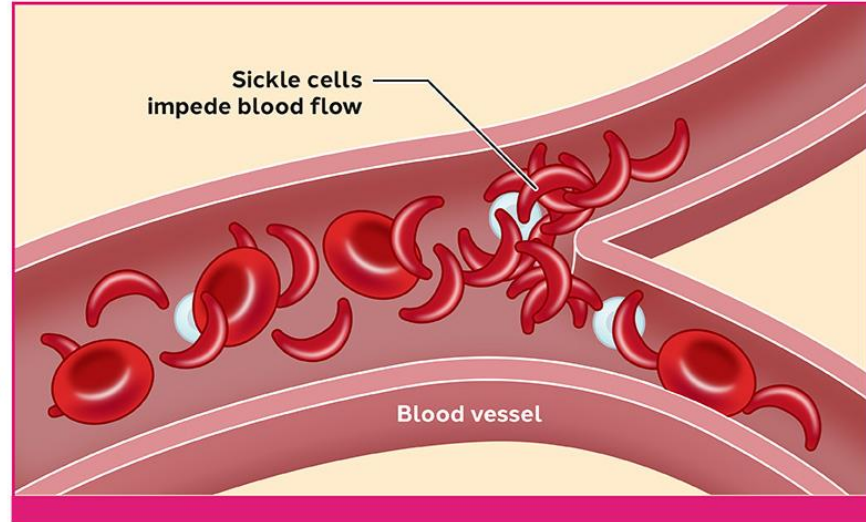
Normal hemoglobin

Sickle cells



Defective hemoglobin

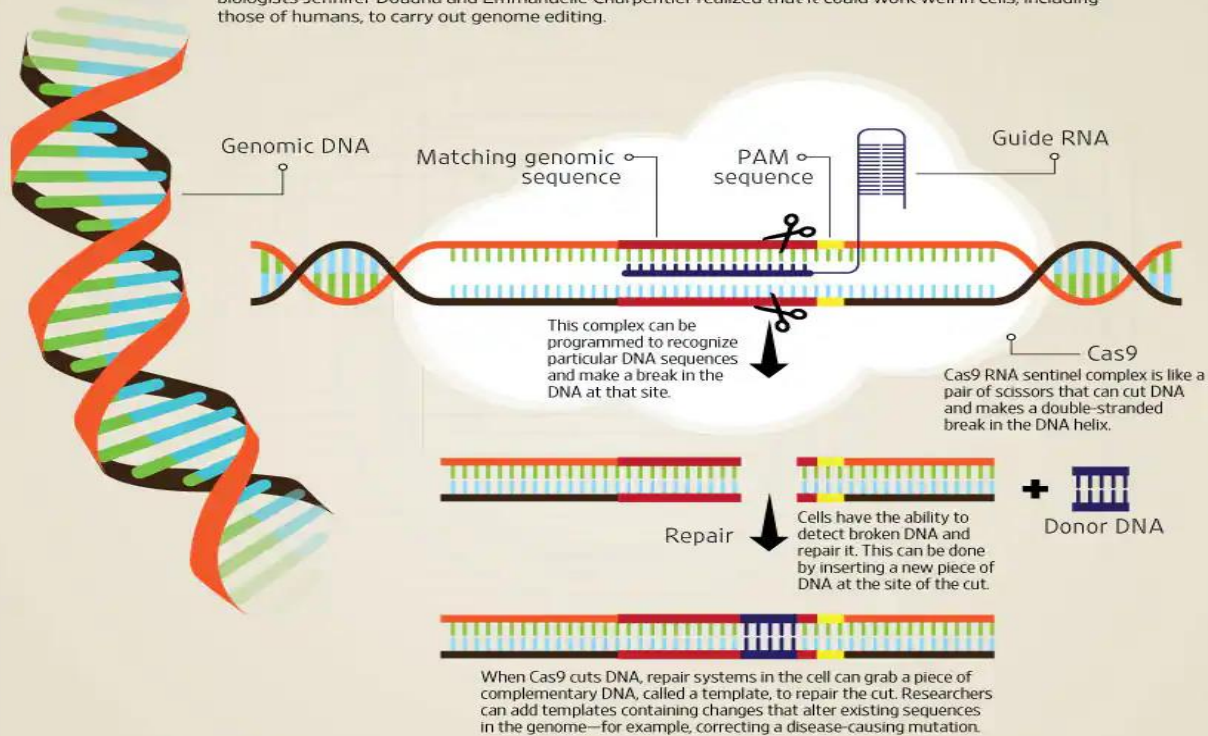
Sickle cells impede blood flow



Blood vessel

# HOW CRISPR WORKS

CRISPR-Cas9, abbreviated from clustered regularly-interspaced short palindromic repeats, is a hybrid of protein and ribonucleic acid (RNA) which works as an efficient hunt-and-cut system in bacteria. Molecular biologists Jennifer Doudna and Emmanuelle Charpentier realized that it could work well in cells, including those of humans, to carry out genome editing.



When viruses infect a cell, they inject their DNA. In bacterium, the CRISPR system allows that DNA to be plucked out of the virus and inserted in little bits

into the chromosome of the bacterium.

These integrated bits of viral DNA get inserted at a site in the bacteria.

CRISPR allows cells to record over time the viruses that they have been exposed to, so that cells are protected from those viruses.

# How will AI that predicts protein structures change the life sciences?

If the protein folding problem was set to us by God to teach us how to learn molecular interactions from first principles, we cheated; pharmaceutical researcher Derek Lowe told *The Hindu*. We have figured out how they usually do it, even if we don't know why

Rohini Subrahmanyam

**P**roteins are one of the most important molecules of life, with almost every biological function from birth to death being regulated by them in some way. Each protein is made up of a string of smaller building blocks called amino acids, which contain all the information to transform proteins – from a single sequence to a folded, functional 3D structure.

The steps a protein takes to go from its straight form to its final form are too many to count and too hard to follow, leaving the question of how every protein folds – the famous protein-folding problem – unanswered. “If you want to understand the molecular basis of how cells work, how organisms work, how life works, you need to understand how proteins get their shape,” Frank Uhlmann, a biochemist at the Francis Crick Institute in London, said.

## Answers ex machina

Things changed when Google DeepMind’s protein-structure prediction software AlphaFold burst onto the scene in 2020. The highly improved AlphaFold 2 was introduced in 2021. AlphaFold uses machine learning and artificial intelligence (AI) to accurately predict protein structures from an amino acid sequence, seemingly solving the protein-folding problem without learning any of the deeper physical principles that drive this biological process.

“If the protein folding problem was set to us by God to teach us how to learn molecular interactions from first principles, we cheated,” Derek Lowe, author of the *Science* column “In the pipeline” and long-time pharmaceutical researcher, told *The Hindu*. “We haven’t learned a tremendous amount more about that. We have figured out how they usually do it, even if we don’t know why.”

“It’s startling how it works as well as it does.”

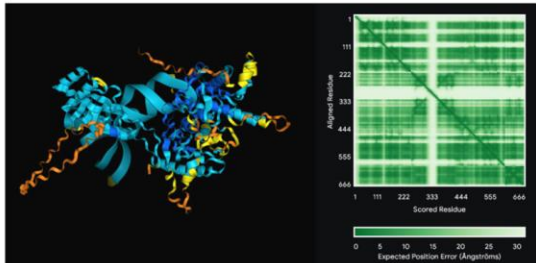
New, in a *Nature* paper published in May 2024, scientists at DeepMind led by John Jumper introduced AlphaFold 3, building on its predecessors with even more transformative capabilities. AlphaFold 3 can predict protein-protein interactions as well as the structures of other molecules like DNA and RNA, along with the interactions of proteins with all these other compounds.

## Democratising research

“AlphaFold 2 predicted the structure of proteins with revolutionary levels of accuracy,” Josh Abramson, a research engineer at DeepMind and lead author of the new paper, told *The Hindu* in an email.

“AlphaFold 3 is even more accurate for proteins, but can also predict the structure of DNA, RNA, and all the other molecular components that make up biology. The interaction of all these biomolecules is what makes up the processes of life, so it is important to be able to predict the structure of these interactions.”

Apart from being able to give us a lot more insight into biological processes, the new AlphaFold is also more usable by scientists who aren’t experts in machine learning. Dr. Uhlmann, who has been using AlphaFold 3 to study how proteins



The three-dimensional structure of the protein-RNA complex PDB 8AW3, as predicted by AlphaFold 3. The plot on the right shows the expected position error in the prediction. ALPHAFOLD 3/OWS

and DNA interact in chromosomes, said, “You don’t need to know anything about coding, now literally everybody can do it. All you need is a Google account, you can upload protein sequences in the DeepMind server, and 10 minutes later you get your results. That completely democratizes structure prediction research.”

## From noise to signal

The original AlphaFold was trained on the thousands of sequences and protein structures present in the protein data bank, a giant protein repository where scientists submit experimentally determined protein structures. “It completely ignores all the fundamental physics and thermodynamics, it’s modelling based on learning what real structures tend to look like, taking advantage of tendencies of protein structures that are too subtle for humans to realise,” Dr. Lowe said.

Unlike its predecessors, AlphaFold 3 uses a diffusion model, which is what image-generating software also uses. The model works by first training on protein structures, adding noise to the data, and then trying to de-noise it. This way, the model becomes able to work its way back from a noisy structure to a real protein structure. This architecture also helps AlphaFold 3 handle a much larger input dataset.



AlphaFold 3 can predict protein-protein interactions as well as the structures of other molecules like DNA and RNA. GETTY IMAGES



If you want to understand the molecular basis of how cells work, how organisms work, how life works, you need to understand how proteins get their shape

## A reliability problem

Its accuracy at predicting protein-protein interactions is also incredibly high – but not its reliability when it comes to interactions between small molecules and proteins. Proteins use a language of 20 amino acids whereas small molecule ligands “have a much larger vocabulary”, according to Dr. Lowe.

Greater variations in the dataset and the use of diffusion techniques can lead to the model coming up with answers that look plausible but aren’t real. Adding more training data can help circumvent this problem, but not entirely get rid of it.

Nevertheless, AlphaFold 3 predicts protein structures and interactions better than other models right now. Academics and companies can potentially use it to find drug candidates that can bind to proteins and help cure diseases. In fact, DeepMind’s spin-off company Isomorphic Labs is using AlphaFold 3 for this very purpose: drug discovery. However, this option isn’t open to everyone yet.

## A peek under the hood

Additionally, even though scientists are free to use the AlphaFold server to upload their protein sequences, many researchers are irked at not being able to access the model’s full code. This means they can’t play around with its nuts and bolts and modify it for specific use-cases.

An important implication of this lack of access is that it’s currently impossible to use AlphaFold 3 to find structures of proteins bound to drug candidates. Researchers expressed their disappointment in an open letter signed by more than 600 to date. According to the text, the restriction “does not align with the scientific progress, which rely on the ability of the community to evaluate, use, and build on existing work.” Different groups have also begun a race to crack the model’s code and make open-source versions. Responding to the backlash, DeepMind scientists have also changed their initial stance of not releasing the whole code to saying they will do so in six months.

## The journey begins

For now, we need to wait and watch how DeepMind decides to let scientists examine AlphaFold 3 more closely, to appreciate its full power. But until then, the model remains one of the best AI-based protein structure prediction models out there, now with the ability to predict interactions with other kinds of biological structures as well.

At the same time, both Dr. Lowe and Dr. Uhlmann wanted to be clear that even if AlphaFold 3 makes very good predictions, it shouldn’t be treated as an “infallible oracle”. Instead, it offers a good starting point where scientists can obtain some answers, which they can then build on with further experiments and expert analysis. “It’s a prediction, you can’t take it for granted,” Dr. Uhlmann said. “It’s not solving your question, but it’s a new and exciting discovery tool that helps you build and test new hypotheses.”

(Rohini Subrahmanyam is a freelance journalist with a PhD in biology from the National Centre for Biological Sciences, Bengaluru.)

# AI for protein structure



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A woman in Guwahati, Assam, on May 25. Most water conditions across India make this a summer no one will forget in a hurry. [AP](#)

## Indian cities are 'heat traps' that make summers worse: official

Reuters

Indian cities have become "heat traps" due to their unbalanced growth devouring water bodies and increasing greenhouse emissions, a senior government official said on June 17, as a scorching summer killed dozens in some parts of the country.

The India Meteorological Department (IMD) has forecast above normal temperatures for June in the northwest and central parts of the country including Delhi, making it one of the longest heatwave spells.

The highest daily temperatures in the capital have stayed above 40 degrees Celsius since May 12 and are forecast to fall below that mark only on June 26. The IMD's heatwave criteria start with 40 degrees in the plains and 30 degrees for hills where it is generally cooler because of elevation.

Delhi, which is also facing a water shortage, recorded about 44 degrees late Monday afternoon but the IMD said it is not like 49.2 degrees.

"Climate change plays an important role," Krishna S. Varma, a member of the National Disaster Management Authority, told Reuters.

Unbalanced urban growth, which has reduced wetlands and water bodies, was another factor, Mr. Varma said.

"The emission of greenhouse gases has gone up. The permeable spaces have gone down considerably. The cities actually have become 'heat traps'."

As a result, he said, nights are nearly as uncomfortable as days.

**Above-normal temperatures have been forecast for June in the northwest and central parts of the country, including Delhi, making it one of the longest heatwave spells**

According to a study by the Centre for Science and Environment (CSE) published last month, land surface temperatures during summers from 2003 to 2010 in cities such as Delhi, Hyderabad, Kolkata and Mumbai went to drop by up to 13.2 degrees C during the night from their day-time peak.

Between 2004 and 2002 they were only cooling off by up to 11.5 degrees C.

"The nights are as dangerous as mid-day peak temperatures," the Centre's report said. "People get little chance to recover from day time heat if temperatures remain high overnight."

Varma said most Indian states were implementing heat action plans that include providing drinking water and better medical facilities, as well as rescheduling outdoor work and school vacations.

But Ananta Roychowdhury, CSE's executive director, said there was no clear mandate to implement long-term strategies.

Delhi's long-term plan includes increasing heat insulation of buildings, developing shelters for urban poor and slum dwellers, and investing in cooling water bodies.

Such plans need to be backed financially, said Vishwas Chitale of the Council on Energy, Environment and Water, a think-tank in New Delhi.

"States are struggling with their own finance and they don't have additional budgets to implement actions for heat," he added.



# Heat Traps

- **Indian cities have become "heat traps" due to their unbalanced growth devouring water bodies and increasing greenhouse emissions.**
- **Unbalanced urban growth, which has reduced wetlands and water bodies, was another factor.**
- **most Indian states were implementing heat action plans that include provisioning drinking water and better medical facilities, as well as rescheduling outdoor work and school vacations**

- **increasing heat insulation of buildings, developing shelters for urban poor and slum dwellers, and investing in cooling water bodies.**

# Invisible suffering of Rohingya refugees



**A**t a recent group psychosocial support session for Rohingya women refugees in Delhi, women burst into laughter when the therapist asked about feeling anxious at night. "I wake up paralysed on many nights. My hands and legs numb thinking there is a fire in our camp again." Rozina laughed, acting out her paralysis. Another added, "everytime there is a loud sound we run out half naked, without our burqas, fearing another fire. There is no time to cover". All 20 women in the room were laughing with tears in their eyes.

Psychotherapists say that laughter can be a defense mechanism that protects trauma survivors from feeling the depth of their actual pain. According to United Nations High Commissioner for Refugees (UNHCR) data from December 2023, more than 22,000 Rohingya refugees live in India.

Most of them fled Myanmar between 2012 and 2017 when the Myanmar military started the "clearance operation," killing Rohingya people, raping women, and destroying their villages in Rakhine state. "I fled from Myanmar when I was 16 years old. I remember everything along the route; murdered and beheaded bodies lying", says Momina, a 24-year-old mother of two. Living in shanty-like huts in Delhi, she and others here have witnessed fires burning down their huts. These fires are accidental sometimes, but at other times, they are started by members of nationalist extremist groups, who have claimed responsibility for them on social media.

The repeated fires in the refugee settlement in Delhi trigger and re-traumatise Momina. "I get so scared when a fire starts or even when there are loud noises, that I pass out."

She has been diagnosed with severe depression and dissociative identity disorder, a mental health condition where the patient can have two or more separate



**Priyali Sur**

Founder and executive director of The Azadi Project

identities. Momina manifests at least three to four different identities, all connected to her extremely traumatic past. Sometimes she becomes a four-year-old child whose mother was killed by the junta army in Myanmar, a child Momina then took under her wing. At other times she takes on the identity of a teenage Rohingya boy who is angry and violent.

Momina isn't alone in reporting acute mental health illness. At a women's center run by my organisation, The Azadi Project and supported by Mariwala Health Initiative, many women have reported fainting incidents after bouts of anxiety, dissociative episodes, and self-harm. The organisation works only with women, but many men are also dealing with acute mental health illnesses.

While their trauma dates back to the genocide in Myanmar, the discriminatory conditions they face in India, where they are officially labeled as "illegal immigrants", and denied full access to education, basic health, legal services and formal livelihood opportunities, make matters worse. The growing anti-Muslim, anti-refugee xenophobia pushed them further to live in shadows and absolute fear.

The fear of arbitrary detention and deportation, despite most Rohingya having UNHCR cards recognising them as refugees, adds to their debilitating anxiety and fear. Based on interviews with Rohingya families and lawyers, there are at least 500 Rohingya detainees, including women and children, languishing in detention centers across India. In many cases, these people have been behind bars for decades, held illegally with no criminal charges against them. A walk through any Rohingya settlement in India will reveal that in every other family, there are either people currently detained or those who have spent

considerable time in detention. Momina's own sister-in-law, Amira, was also in detention for nearly three years after being randomly locked up during the pandemic. She was released only after she became paralysed and very sick. Amira, like most other Rohingya refugees, didn't have a place to process her trauma and heal. An introvert who barely stepped outside, limiting herself to

housework, Amira became further withdrawn after her years in detention.

Both Amira and Momina are now receiving mental health support but this support is just a drop given the pressing need for this population.

Civil society organisations in India that work for Rohingya refugees are starved for funding as most FCRA licences that permit receiving foreign funding have been cancelled. In the last few years, many programs that support Rohingya refugees have either shut down or been reduced to a bare minimum. Only a few UNHCR-supported organisations continue to work in this space but they do so cautiously and not at full capacity.

While there has been considerable attention to the plight of close to a million Rohingya refugees in Bangladesh, there needs to be international attention to the escalating mental health epidemic of Rohingya refugees in India. We need an urgent multi-pronged approach. First, we must address and mitigate the core causes of re-traumatisation, providing the Rohingya people a life with more dignity, agency and official identity in India. Second, we must enable access to primary and tertiary healthcare facilities for everyone who holds a UNHCR card, and third, we must support grassroots organisations to build safe spaces where the Rohingya refugees can access support without fear and start their healing journeys.



There needs to be international attention to the escalating mental health epidemic of Rohingya refugees in India

# World Refugee Day



**Each year on 20 June, the world celebrates World Refugee Day, the international day to honour people who have been forced to flee.**

- In line with this year's theme, "Solidarity with Refugees", WHO emphasizes the importance of building inclusive health systems and ensuring equitable care for refugees worldwide.
- WHO highlights solidarity and health, celebrates refugee resilience, advocates for their health rights, and strives to create a world where everyone, regardless of migratory status, enjoys universal access to quality health care.



# UNHCR



- **UNHCR, the UN Refugee Agency, is a global organization dedicated to saving lives, protecting rights and building a better future for people forced to flee their homes because of conflict and persecution.**
- **We lead international action to protect refugees, forcibly displaced communities and stateless people.**
- **Our vision is a world where every person forced to flee can build a better future.**
- **Formally known as the Office of the High Commissioner for Refugees, UNHCR was established by the General Assembly of the United Nations in 1950 in the aftermath of the Second World War to help the millions of people who had lost their homes.**

# The Hindu Kush Himalaya snow update

What does the report by the International Centre for Integrated Mountain Development highlight? How important is snow persistence? How much of a role does climate change play in river basins receiving low levels of snowmelt this year?

## EXPLAINER

Priyati Prakash.

### The story so far:

**T**he Ganga river basin – India's largest – reached a record low snow persistence in 2024, the Hindu Kush Himalaya snow update of the International Centre for Integrated Mountain Development (ICIMOD) has reported. The Brahmaputra and the Indus basins have suffered similarly, threatening water supply to millions of people. "Tragically this is yet another postcard from the frontlines of a climate crisis that is accelerating even beyond scientists' projections and causing huge challenges in one of the most populated regions of the world," Miriam Jackson, Cryosphere Lead at ICIMOD and a contributor to reports of the UN Intergovernmental Panel on Climate Change, told *The Hindu*.

### What is snow persistence?

Snow persistence is the fraction of time snow is on the ground. When this snow melts, it provides water to people and ecosystems. In the river basins of the Hindu Kush Himalaya (HKH), snowmelt is the biggest source of water in the streams. Overall, it contributes 23% of the runoff to the region's 12 major river basins every year. The HKH mountains extend around 3,500 km over eight countries – Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar, and Pakistan. These mountains are also called the "water towers of Asia" because they are the origins of 10 crucial river systems on the continent – Amu Darya, Indus, Ganga, Brahmaputra, Irrawaddy, Salween, Mekong, Yangtze, Yellow river, and Tarim. These river basins provide water to almost one-fourth of the world's population and are a significant freshwater source for 240 million people in the HKH region.

### What does the report say?

The authors of the 2024 HKH snow update analysed data from 2003 to 2024 and found significant fluctuations in snow persistence between November and April every year, when snow accumulates above ground. Based on this, they made grim predictions of lasting impact on the people in the region as well as those downstream of the river basins.

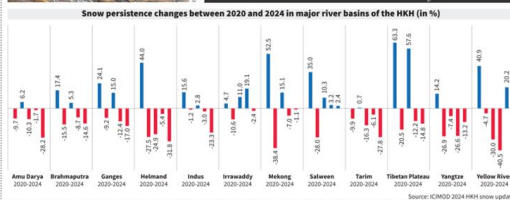
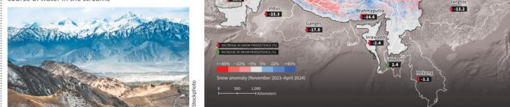
In India, snow persistence in the Ganga, the Brahmaputra, and the Indus river basins dropped significantly in 2024. The Ganga river basin noted its lowest snow persistence in 22 years, 1% below the long-term historical average (also known as 'normal'). The previous holder of this dubious distinction was 2018, when it was 15.2% below normal. In 2015, on the other hand, snow persistence was 25.6% above normal.

Similarly, snow persistence in the Brahmaputra basin was 14.6% below normal in 2024. It was worse in 2021, when the average persistence was 15.5% below normal. In the Indus river basin snow persistence fell 23.3% below normal this year although this was offset by excesses in parts of the lower altitudes.

Outside India, the basin of the Amu Darya river – which flows through Central Asia – recorded its lowest snow persistence in 2024: 28.2% below normal. The figure for the Helmand river, an important source of drinking water for Iran and Afghanistan, was almost 32% below normal in 2024, beating a record set in 2018. Persistence in the part where the Mekong river originates in the Himalaya was only slightly below normal this time. (This river's delta is Vietnam's

## Where does the snow go?

Snow persistence is the fraction of time snow is on the ground. When this snow melts, it provides water to people and ecosystems. In the river basins of the Hindu Kush Himalaya (HKH), snowmelt is the biggest source of water in the streams.



Source: ICIMOD 2024 HKH snow update



**Majestic:** The Himalayan mountain range at Munajari, Uttarakhand. GETTY IMAGES/ISTOCKPHOTO

### "rice bowl")

### What explains the lower snow persistence in 2024?

The primary reason for the lower persistence in 2024 was weak western disturbances, ICIMOD remote sensing specialist and author of the report Sher Muhammad told *The Hindu*.

"Due to changing climate and global warming, this pattern is becoming increasingly unstable. Although the exact mechanisms are not fully understood, global warming is thought to exacerbate prolonged and intense La Niña El Niño conditions. These phases of a recurring climate pattern across the tropical Pacific Ocean significantly influence global weather patterns, including western disturbances," he added.

Western disturbances are low-pressure systems that originate over the Mediterranean Sea, the Caspian, and the Black Sea and bring rain and snow to the HKH region in winter. "The region where these storms originate experienced persistently high sea-surface temperatures," Mr. Muhammad explained. "This disruption weakened and delayed the arrival of the western disturbance, resulting in reduced winter precipitation and snowfall in the HKH region. The pattern of high temperatures and altered weather systems explains both the record low snow persistence in 2024 and similar historical records."

"We have warned for years that the 1.5 degrees Celsius limit that governments signed up to in the Paris Agreement is not ambitious enough to protect the snow and ice, people and nature of the Hindu Kush Himalaya because the target is a global average, and the real temperature increase will be far higher here," Ms. Jackson added.

### What explains higher snow persistence?

The persistence of snow in China's Yellow River basin exceeded the normal value by 20.2% in 2024. "The Yellow river basin is an area where the East Asian winter monsoon brings cold, dry air from Siberia and Mongolia," Mr. Muhammad said. "When this cold air mass interacts with moist air from other regions, particularly the Pacific Ocean, it can result in snowfall over the higher altitudes of the upper Yellow River basin."

"When the cold air from the east Asian winter monsoon systems interacts with moist air masses from the Pacific Ocean, it can result in snowfall at higher elevations in the eastern Himalaya," Mr. Muhammad added.

### What about India?

Snow persisting on the ground is important for the Ganga river basin because its melt contributes to 10.3% of the latter's total water, versus 2.1% from glaciers. In the Brahmaputra and the Indus

basins as well, snowmelt brings 13.2% and around 40% of the water, respectively, versus 1.8% and 5% from glaciers.

"Lower snow in 2024 may affect water availability, particularly and most importantly in the Indus basin, if there is less rainfall in the early season," Mr. Muhammad said.

In the long term, experts say, reforestation with native tree species can help the ground retain more snow. Better weather forecasting and early warning systems can also help local communities prepare for impending water stress.

Ms. Jackson also stressed on the need to reduce emissions, which would mitigate increasing sea-surface and ground temperatures, both of which lower the persistence of snow. "The key work for all of us concerned about a livable future on the earth is to build the political will for our government representatives and business leaders to cut the cord on dirty fossil energy consumption and production, especially the latter's 20-30 percent, which account for 85% of all emissions," she said.

## THE GIST

▼ The Ganga river basin – India's largest – reached a record low snow persistence in 2024. The Brahmaputra and the Indus basins have suffered similarly, threatening water supply to millions of people.

▼ The authors of the 2024 HKH snow update analysed data from 2003 to 2024 and found significant fluctuations in snow persistence between November and April every year, when snow accumulates above ground.

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# Snow persistence

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- The Brahmaputra and the Indus basins have suffered similarly, threatening water supply to millions of people.



# What is snow persistence?

- **Snow persistence is the fraction of time snow is on the ground.**
- **When this snow melts, it provides water to people and ecosystems. In the river basins of the Hindu Kush Himalaya (HKH), snowmelt is the biggest source of water in the streams.**
- **Overall, it contributes 23% of the runoff to the region's 12 major river basins every year.**
- **The HKH mountains extend around 3,500 km over eight countries — Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar, and Pakistan.**

- **These mountains are also called the “water towers of Asia” because they are the origins of 10 crucial river systems on the continent — Amu Darya, Indus, Ganga, Brahmaputra, Irrawaddy, Salween, Mekong, Yangtse, Yellow river, and Tarim.**
- **These river basins provide water to almost one-fourth of the world’s population and are a significant freshwater source for 240 million people in the HKH region.**

- **In India, snow persistence in the Ganga, the Brahmaputra, and the Indus river basins dropped significantly in 2024.**
- **The Ganga river basin noted its lowest snow persistence in 22 years, 17% below the long-term historical average (also known as ‘normal’).**
- **Outside India, the basin of the Amu Darya river — which flows through Central Asia — recorded its lowest snow persistence in 2024: 28.2% below normal.**

## What explains the lower snow persistence in 2024?

- The primary reason for the lower persistence in 2024 was weak western disturbances.
- “Due to changing climate and global warming, this pattern is becoming increasingly unstable. Although the exact mechanisms are not fully understood, global warming is thought to exacerbate prolonged and intense La Niña–El Niño conditions.
- These phases of a recurring climate pattern across the tropical Pacific Ocean significantly influence global weather patterns, including western disturbances,” he added.



# Western Disturbances

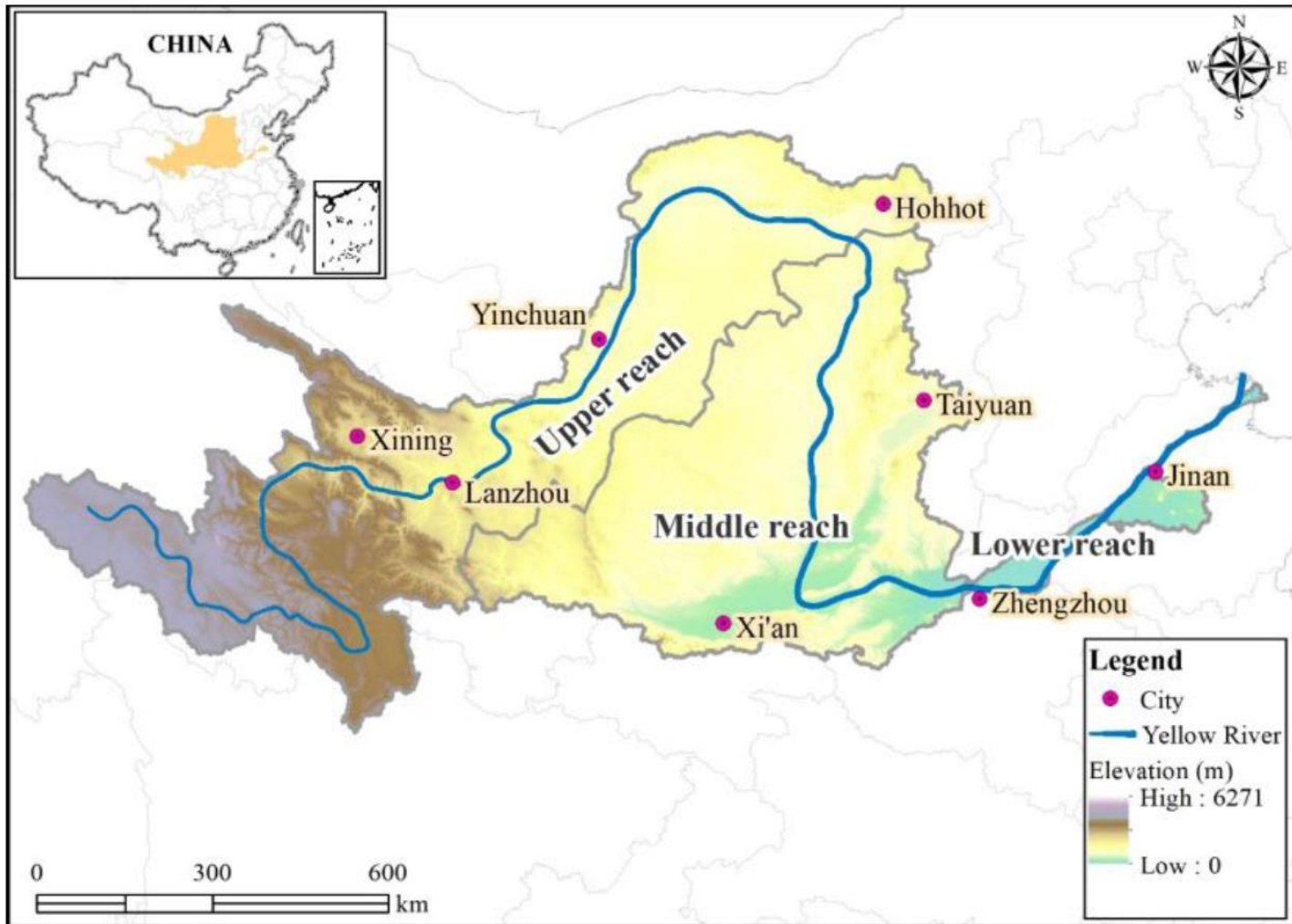


- **Western disturbances are low-pressure systems that originate over the Mediterranean Sea, the Caspian, and the Black Seas and bring rain and snow to the HKH region in winter.**
- **“The region where these storms originate experienced persistently high sea-surface temperatures,”**
- **“This disruption weakened and delayed the arrival of the western disturbance, resulting in reduced winter precipitation and snowfall in the HKH region (Himalaya - hindukush region)**

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- Snow persisting on the ground is important for the Ganga river basin because its melt contributes to 10.3% of the latter's water, versus 3.1% from glacier melts.
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- “Lower snow in 2024 may affect water availability, particularly and most importantly in the Indus basin, if there is less rainfall in the early season,”.

- **In the long term, experts say, reforestation with native tree species can help the ground retain more snow.**
- **Better weather forecasting and early warning systems can also help local communities prepare for impending water stress.**
- **“Improving water infrastructure and developing policies for protecting areas receiving snowfall are important for long-term change,**

# Australia hopes to conclude CECA negotiations with India early next year



**Amiti Sen**

NEW DELHI

Australia is keen to conclude negotiations for the Comprehensive Economic Cooperation Agreement (CECA) with India in the next six-seven months since it may not be in a position to take hard decisions from early next year as the country prepares for its federal elections, according to sources.

New Delhi may find it a challenge to fast-track the talks, especially in sensitive areas such as agriculture, digital trade and government procurement, as views of coalition partners also need to be taken into account by the new BJP-led government, an industry official said.



“India-Australia CECA negotiations were well on track before talks briefly halted due to the Indian elections. The Australian side is keen that the momentum be now maintained as it has barely a six-seven months window to conclude the talks because of the upcoming elections next year,” the source said.

Australia’s federal elections are likely in mid-2025

and the ruling government is expected to steer away from controversial decisions, the source said. The India-Australia Economic Cooperation and Trade Agreement (ECTA) came into force on December 29, 2022.

## **New areas**

It served as a stepping stone for the CECA which is to be a deeper and comprehensive agreement covering five tracks agreed in the ECTA, including goods, services, digital trade, government procurement and Rules of Origin (ROO)-Product Specific Rules Schedule. New areas in which either party has shown interest for coverage include competition policy, MSME, gender, in-

novation, agri-tech, critical minerals and sports.

“Australia, wants market access at least for premium items that are not in competition with items produced domestically in India. But with a new Minister heading the Agriculture Ministry and the interests of coalition partners that are also to be taken into account, negotiations could be tougher than earlier,” the industry official said. Moreover, areas like government procurement and digital trade, where India has not opened up significantly in any of its existing free trade deals because of sensitivities, may also be difficult to navigate.

*(The writer is with The Hindu businessline)*

- **The Comprehensive Economic Partnership Agreement (CECA) is a free trade agreement (FTA)**
- **It promotes bilateral trade and investment between the two countries.**
- **It eliminates tariffs on goods traded and liberalises services sectors to facilitate great business opportunities and cooperation between Singapore and India.**

- It is a type of free trade pact that covers negotiation on the trade in services and investment, and other areas of economic partnership.
- CEPA also looks into the regulatory aspect of trade and encompasses an agreement covering the regulatory issues.

# IR IN NEWS

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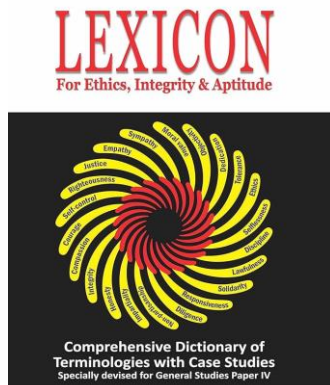
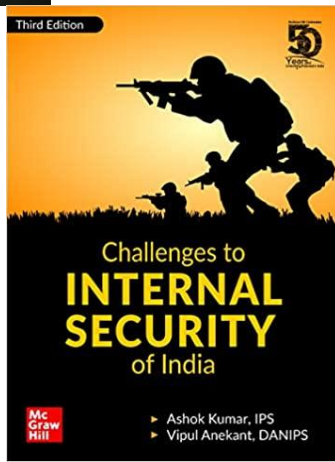
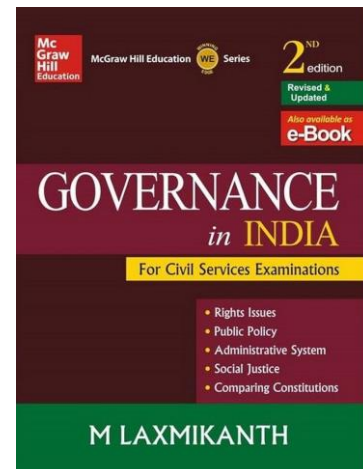
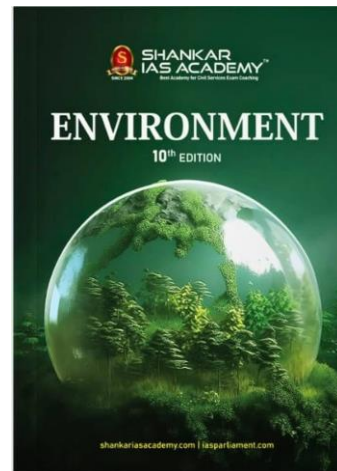
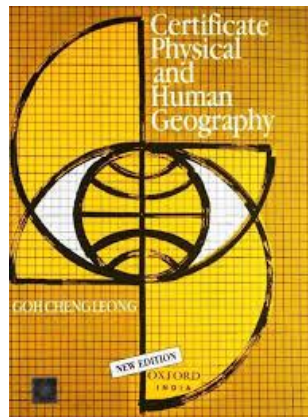
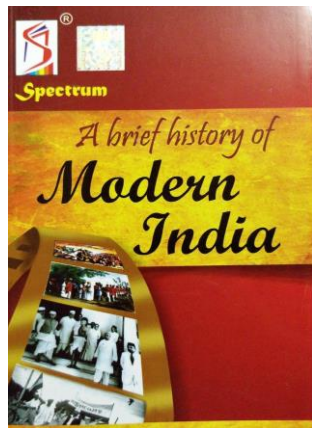
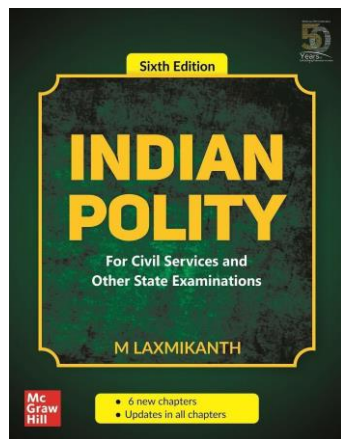
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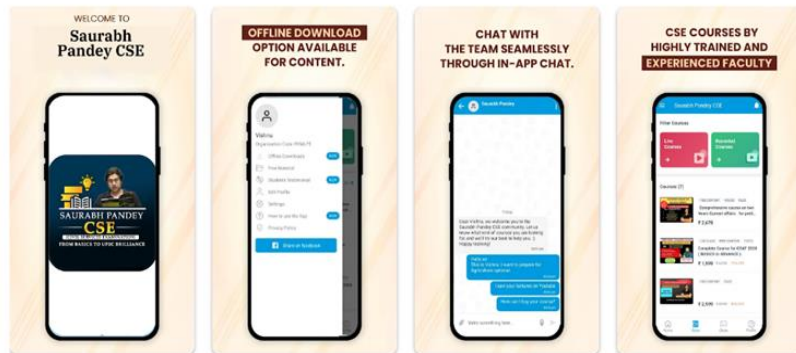
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X 22nd october 2...



### Periodical cicada emergence disrupts food webs

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual prey – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

- The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence.

The cicadas are a superfamily, the Cicadoidea, of insects in the order

Hemiptera.



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X 10th october 2...



States as per Article 244(2).

### What are Scheduled Areas?

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

### How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.



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X 7TH DECEMBE...



### Garba dance of Gujarat makes it to UNESCO list

Sneeparna Chakrabarty  
NEW DELHI

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

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- The international cultural body described the 'Garba' as a **ritualistic and devotional dance performed in India**.



© Jyoti Chavhan/Anadolu Agency via Getty Images  
A vibrant scene of people dancing Garba in a large open space at night, illuminated by colorful lights.

**Climate change is making the world sick**  
A report from the Intergovernmental Panel on Climate Change (IPCC) states that climate change is making the world sick. The report highlights the impact of climate change on human health and the environment. It calls for urgent action to reduce greenhouse gas emissions and adapt to the changing climate.



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Russia loads 'Avangard' missile into launch Silo, fears of nuclear warfare on rise | World DNA

Ques-3 With reference to exercise 'Mitra Shakti', consider the following statements

- 1- Between India and Nepal.
- 2- The aim of the exercise is to jointly rehearse sub-conventional operations under Chapter VII of the United Nations Charter, which authorises the Security Council to take enforcement measures, including the use of military force, to address threats to international peace and security.
- 3- "Exercise MITRA SHAKTI-2023" recently commenced in Goa.

How many of the above statements are correct?

- a) Only one
- b) Only two
- c) All three
- d) None

Ans 3- (a)

- "Exercise MITRA SHAKTI- 2023" recently commenced in Aundh (Pune).
- Between India and Sri Lanka.

X PRELIMS 18th N...

- The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

### Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warrant — to show by what warrant is a person holding public office;

- Prohibition — directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and
- Certiorari — re-examination of an order given by judicial, quasi-judicial or administrative authorities.
- In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.
- When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.
- Article 226, however, is not a fundamental right like Article 32.

× 28th october 2...



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[Middle East](#) [Mad, Mad World](#) [Photos](#) [Video](#)

2023 Nobel Prize In Economic Sciences Awarded To Claudia Gold

Imran Qjher Case He Jnbl Missing Israel Hamas War

## awarded to of women's

- 1- Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.
- 2- Articles 244(i) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any state other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(2).
- 3- The Prime Minister of India notifies India's Scheduled Areas.
- How many of the above statements are correct?
- a) Only one      b) Only two
- c) All three      d) None

- Scheduled Areas cover 13.3% of India's land area, and have been notified in 20 states: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. In 2005, Kerala proposed to notify 2,333 habitations, five gram panchayats and five villages in the Scheduled Areas of the state.
- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding the welfare of the STs.
- The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make laws for a Scheduled Area, subject to the President's approval. The President can also make laws for members of the STs, and regulate the allotment of land to STs and money lent to STs.



12:40

X polity 11th augu...

## Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

### Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

X 18th Septembe...

## Santiniketan finds its place on UNESCO's World Heritage List

Should body makes announcement on Sunday. Mantra says new, named in Tagore, has been supported by Bengal Culture Ministry seek to bring in human values

By India Staff

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, has been added to the UNESCO's World Heritage List. The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture, and its role in the development of modern Indian education.



The UNESCO World Heritage Committee, which meets in Paris, has decided to add Santiniketan to the list of World Heritage Sites. The committee praised the town for its unique blend of Indian and Western architecture, and its role in the development of modern Indian education.

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum district, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the foundations of Visva-Bharati University.

## EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

EUROPEAN COMMISSION

European Commission President Ursula von der Leyen, along with Italian Prime Minister Giorgia Meloni, visited the island of Lampedusa, Italy, on Sunday. The visit was part of a tour to assess the impact of the EU-Labia program, which aims to reduce the number of migrants arriving in Italy.



Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

The EU-Labia program is a joint initiative between the European Union and Libya, aimed at reducing the number of migrants arriving in Italy. The program involves the EU providing financial support to the Libyan government to improve border security and to provide training for Libyan coast guard personnel.

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-2 With reference to Parliaments special sessions, consider the following statements

- There is specific provision in the Constitution that deals with special sessions.
- Article 352, which deals with the proclamation of Emergency, refers to a "special sitting" of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.

3- The Question Hour was suspended during the session.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.
- The Hoysala Temples, built in the 12th and 13th centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.
- The temples became targets of plundered and destruction by the Delhi Sultanate army of Ala-ud-din Khilji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughlaq in 1326 AD.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-4 Consider the following statements about SHREYAS scheme

- It comprises 4 central sector sub-schemes.
- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.
- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-5 Consider the following statements about Women's Reservation Bill

- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve 33% of seats in Lok Sabha and state Assemblies for women.

12:03



prelims pointer...



- Que-5** With reference to Shumang Leela, consider the following statements
- Shumang Leela is a traditional form of theatre in Tripura.
  - In this the roles of women are all played by men, called Nupi Shabis.
  - It is performed in an open courtyard surrounded by spectators on all four sides.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- Shumang Leela is a traditional form of theatre in Manipur.
  - In the case of women's theatre groups, the roles of men are played by women.
  - Shumang Leela translates to "courtyard performance".
  - Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.
- Que-6** Consider the following statements about Red Sanders also called Red Sandalwood
- It is a species found in the southern tropical dry deciduous forest of Telangana.
  - The tree reaches an average height of 10 to 15 metres.
  - The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.
- Which of the following given above is/are correct
- a) 1 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
  - CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
  - In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
  - The heartwood of Red Sanders is in demand in the domestic and international markets for making

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CURRENT AFFAIRS FEB 2<sup>nd</sup> by SAURABH PANDEY SIR

furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

**Que-7** Consider the following statements about Compressed Biogas (CBG) and compressed natural gas (CNG)

- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.
- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.
- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

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

**Que-8** Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARDHAN) in the Union Budget 2023. Consider the following statements about this

- The new GOBARDHAN scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.
- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.
- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

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

12:05



prelims pointer...



- Que-7** Lamu Archipelago, recently in News, belongs to which country
- a) Somalia  
b) Malaysia  
c) Indonesia  
d) Kenya
- Ans: (d)
- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.
- Que-8** Consider the following statements about "Operation Sadbhavana", recently in News
- Launched by an Indian Army.
  - For development of Jammu and Kashmir.
  - Some of the objectives achieved through Operation Sadbhavana are national integration, tourism, women's empowerment, employment generation, education, and
- development activities geared towards nation-building.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 only
- Ans: (b)
- For development of Ladakh.
  - The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

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CURRENT AFFAIRS FEB 6<sup>th</sup> by SAURABH PANDEY SIR

**Que-1** Consider the following statements

- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.
- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.
- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

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

Ans: (c)

- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.

of what we call persistence, allowing satellites to capture images continuously.

**Que-2** With reference to Paris Club, consider the following statements

- The Paris Club is a group of mostly western creditor countries.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

Which of the following given above is/are correct

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

Ans: (b)

- It grew from a 1956 meeting in which Brazil agreed to meet its public

12:35



may 2024 impo...



## Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.

- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

## Pros and Cons of Exchange-Traded Funds



## BIMSTEC

WHAT YOU SHOULD KNOW



11:29



X 12th august 2023



## DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission

- In India, such Delimitation Commissions have been constituted 4 times - in 1952 under the Delimitation Commission Act, 1952, in 1963 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.

- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.



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defends use of  
Saurabh Kutumbak

11:37



X Mock Series 17t...



productivity, uphold good health and prevent poverty.

- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 5 With reference to Doppler radar network, consider the following statements

- 1 It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.
- 2 It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.

The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

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

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- 5- (c)
  - It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?

- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?

- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?

- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 6 Consider the following statements about Army Day

- 1 India celebrates Army Day on January 15 every year.
- 2 The Army Day is celebrated every year to honour Cariappa and the defence forces.
- 3 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

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

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5- (d)

- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004, with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)

- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)

- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)

- The Chief of Defence Staff is principally responsible for getting the armed forces better integrated rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, and Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Minister only on tri-services matters. The three service chiefs will continue to advise the Defence Minister exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance of the three services.





# Target Mains -2024/25 -

**Q Explain the factor responsible for reduction in "snow persistence" in himalayan - hindukush region .**

Q हिमालय-हिन्दुकुश क्षेत्र में "बर्फ की निरंतरता" में कमी के लिए जिम्मेदार कारक की व्याख्या करें।

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# Topics



- The Adyar River
- Anticipatory bail.
- India's First joint doctrine for cyberspace operations
- Kollam port
- Kudankulam Nuclear Power Project's (KKNPP)
- "spherical superhydrophobic activated carbon catalyst"
- Chichén Itzá
- Why clouds go grey before they rain
- Meaty Rice
- How do forest fires start in the State?
- Second Thomas Shoal,
- Mains



By saurabh Pandey



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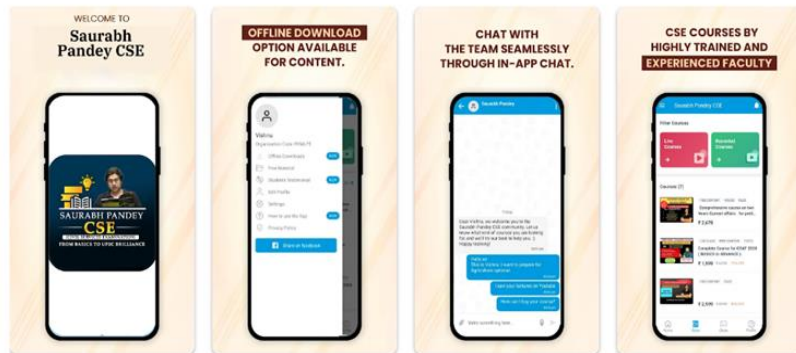
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# Target Mains -2024/25 -

**Q “Operations in cyberspace need to be dovetailed into the national security fabric, to evolve the ‘ends,’ ‘ways’ and ‘means’ to create advantage and influence events in all other operational environments and across all instruments of power” Examine**

प्रश्न "साइबरस्पेस में संचालन को राष्ट्रीय सुरक्षा ढांचे में शामिल करने की आवश्यकता है, ताकि लाभ पैदा करने और अन्य सभी परिचालन वातावरणों और शक्ति के सभी उपकरणों में घटनाओं को प्रभावित करने के लिए 'साध्य', 'तरीके' और 'साधन' विकसित किए जा सकें।"

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# Mission clean-up



**Action plan:** Workers clearing the Adyar river mouth in Chennai on Tuesday. The Water Resources Department has engaged more machinery to clear silt and complete the project by June-end. B. VELANKANNI RAJ



# The Adyar River

- The Adyar River, originating near the **Chembarambakkam Lake** in **Kanchipuram district**, is one of the three rivers which winds through **Chennai (Madras)**, **Tamil Nadu**, **India**, and joins the **Bay of Bengal** at the **Adyar estuary**.
- The 42.5-kilometre (26.4 mi) long river contributes to the **estuarine ecosystem** of Chennai.
- Despite the high pollution levels, boating and fishing take place in this river.
- Most of the **waste** from the city is drained into this river and the **Cooum**

# Abduction case: HC gives anticipatory bail to Bhavani

**The Hindu Bureau**  
BENGALURU

In a relief to Bhavani Revanna, mother of rape-accused Prajwal Revanna, former MP, the High Court of Karnataka granted regular anticipatory bail in the case of alleged abduction of one of the victims of her son's sexual assaults.

Justice Krishna S. Dixit passed the order while allowing Ms. Bhavani's petition seeking anticipatory bail.

The court said there is no material against the petitioner to *prima facie* attract Section 364A of the IPC, as the victim herself, in her statement recorded either before the police or before the judicial magistrate, has not given any such statements against Ms. Bhavani.

The court observed: "Despite vociferous submissions, why the police want custodial interrogation has not been even nearly substantiated and therefore, it cannot be granted." Referring to the SIT's arguments claiming that she is not cooperating with the probe and giving misleading answers, the court said she had answered 80 questions so far and "the police cannot insist that an accused should give answers in the way as the police desire".

Meanwhile, Mr. Prajwal Revanna was remanded in to judicial custody for 14 days by the Special Court of Magistrate for Criminal Cases against former and present MPs and MLAs on Tuesday.

## **Anticipatory bail.**

- Under Section 438 of the Criminal Procedure Code there is a provision for a person to seek 'Anticipatory Bail'. This means that an individual can seek or request to get bail in anticipation or in expectation of being named or accused of having committed a non-bailable offence.
- Anticipatory bail is meant to be a safeguard for a person who has false accusation or charges made against him/her, most commonly due to professional or personal enmity, as it ensures the release of the falsely accused person even before he/she is arrested.

- **To get anticipatory bail the person seeking it, must approach the Court of Sessions or the High Court and citing section 438 of the Criminal Procedure Code as well as giving proper reason, apply for it. If the court, based on a number of conditions and the nature of the case, sees merit in the petition the bail is granted.**
- **Hence if and when the person is arrested, he/she will be immediately released on the basis of the anticipatory bail.**

**Conditions that are taken into consideration by the court when granting anticipatory bail include, but are not limited to:**

- **The person will make him/herself available for interrogation by the police as and when required by them**
- **The individual shall not directly or indirectly make any threat, promise or offer any bribe to any person who is connected to the case or knows facts about the case, so as to keep them quiet or to get them to change their report of facts to the court or the police**
- **An assurance that the person shall not leave India without prior permission from the court**

# CDS releases blueprint for warfare in cyberspace

**The Hindu Bureau**

NEW DELHI

Acknowledging that cyberspace has emerged as a crucial and challenging domain in modern warfare, the Chief of Defence Staff, General Anil Chauhan, released India's first joint doctrine for cyberspace operations during a meeting of the Chiefs of Staff Committee on Tuesday.

The joint doctrine is a keystone publication that will guide commanders of the armed forces in conducting cyberspace operations in today's complex military operating environment, the Defence Ministry said in a statement.

Unlike territorial limits in the traditional domains of warfare, cyberspace is a "global common and hence has shared sovereignty", the Ministry statement said.

"Operations in cyberspace need to be dovetailed into the national security fabric, to evolve the 'ends,' 'ways' and 'means' to create advantage and influence events in all other operational environments and across all instruments of power," the statement added.



## **India's First joint doctrine for cyberspace operations.**

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# Kollam port designated as Immigration Check Post

**The Hindu Bureau**

NEW DELHI

The Union government has designated the Kollam port in Kerala as an authorised Immigration Check Post (ICP) for entry and exit from India with valid travel documents for all classes of passengers, an order by the Union Ministry of Home Affairs (MHA) said.

The MHA notification was issued under Rule 3 (b) of the Passport (Entry into India) Rules, 1950.

“In exercise of the powers conferred by sub-clause (2) of Clause 2 of the Foreigners Order 1948, the Central Government hereby appoints Foreigners Regional Registration Officer, Trivandrum as the ‘Civil Authority’ for the purposes of the said Order for the Immigration Check Post located at Kollam Seaport in the State of Kerala with effect from 18 June, 2024,” the notification said.

The issue was raised several times in the last Lok Sabha by Kollam Member of Parliament N.K. Premachandran.

The MHA had earlier informed a parliamentary panel that India has 31 authorised seaport ICPs and out of those 10 are under the direct control and management of the Bureau of Immigration, Ministry of Home Affairs. The remaining Immigration Check Posts are controlled by State police agencies.

# Kollam port

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- **The MHA had earlier informed a parliamentary panel that India has 31 authorised seaport ICPs and out of those 10 are under the direct control and management of the Bureau of Immigration, Ministry of Home Affairs.**
- **The remaining Immigration Check Posts are controlled by State police agencies.**
- **Kollam Port is one of the oldest ports situated 4 kilometres away from Downtown Kollam It is the second largest port in Kerala by volume of cargo handled and facilities and one of the four Kerala ports having immigration checkpoint facility**



Turbine hall valves meant for nuclear reactors of Kudankulam Nuclear Power Project ready in Russia for shipping to KKNPP site.

## Russia ready to ship turbine hall valves for Kudankulam

**The Hindu Bureau**  
TIRUNELVELI

Russia is all set to ship the first batch of 26 turbine hall pipeline valves, totally weighing about 27.5 tonnes, for the Kudankulam Nuclear Power Project's (KKNPP) reactors 5 and 6.

These specially designed valves can withstand temperature up to 350 degrees Celsius.

Russian State Atomic Energy Corporation, Rosatom's machine-building plant Petrozavodskmash is shipping the turbine hall pipeline valves to KKNPP, where 2 X 1,000 MWe VVER reactors built with Russian technical knowhow are generating power while four more reactors with similar capacity are under construction.

Currently shipped high-pressure and low-pressure

gate valves are designed for installation in the turbine hall of the nuclear power plant.

The key function of the shipped items is a tight shutoff of the fluid or gas flow to ensure reliable operation of the system. During the manufacture, each piece of equipment has been subjected to a set of factory checks including pneumatic, hydraulic and tightness tests. The pipe-

line valves are distinguished by a high class of tightness, which is confirmed by life tests under operating parameters in testing laboratories accredited by the Rosatom State Atomic Energy Corporation.

The valves are being transported from Petrozavodskmash's production site to the Great Port of St. Petersburg by road from where the equipment will

reach KKNPP site by sea. Similar pipeline valves of Petrozavodsk have been installed in reactor and turbine halls of the Leningrad Nuclear Power Plant and the Belarusian Nuclear Power Plant. These valves are used in piping systems to monitor and control the flow of fluids or gases.

Rosatom has agreed to supply fuel to the power units of the KKNPP throughout their life.

## **Kudankulam Nuclear Power Project's (KKNPP)**

- **Russia is all set to ship the first batch of 26 turbine hall pipeline valves, totally weighing about 27.5 tonnes, for the Kudankulam Nuclear Power Project's (KKNPP) reactors 5 and 6.**
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## Kudankulam Nuclear Power Plant

- Kudankulam Nuclear Power Plant is the largest nuclear power station in India, situated in Kudankulam in the Tirunelveli district of the southern Indian state of Tamil Nadu. Construction on the plant began on 31 March 2002,
- KKNPP is scheduled to have six **VVER-1000** reactors built in collaboration with **Atomstroyexport**, the Russian state company and **Nuclear Power Corporation of India Limited** (NPCIL), with an installed capacity of 6,000 MW of electricity.

# Scientists from India, China, U.K. develop catalyst to produce cheaper biodiesel



**Rahul Karmakar**  
GUWAHATI

A team of scientists from Assam and Odisha in India, China, and the U.K. has developed a water-repellent catalyst that can cut the cost of producing “environmentally benign” biodiesel substantially from the current levels.

The process of arriving at the “spherical superhydrophobic activated carbon catalyst” to withstand water byproduct during the production of biodiesel – pursued as a substitute for diesel, an exhaustible fossil fuel – has been published in the latest issue of the peer-reviewed *Advanced Functional Materials*, a high-impact journal of the international materials science community.

The authors of the study



Dr. Samuel Lalthazuala Rokhum, centre, one of the authors of the study, with his researchers. SPECIAL ARRANGEMENT

are Arpita Das, Kangkana Saikia, and Samuel Lalthazuala Rokhum of the Department of Chemistry, National Institute of Technology (NIT), Silchar; Chandrakanta Guchhait and Bimalendu Adhikari of NIT, Rourkela, Odisha; Da

Shi of the University of Cambridge in the United Kingdom; and Hu Li of the Guizhou University in China.

Superhydrophobic catalysts, imitating the anti-wetting or water-repulsing properties of natural sur-

faces such as lotus leaves, are deemed crucial for their ability to prevent the poisoning of active sites by water, produced *in situ* or as a by-product.

“Our novel superhydrophobic catalyst can be a game-changer in the field of biodiesel production. It stands out because of unmatched robustness; it can withstand the water byproduct during biodiesel production,” Dr. Rokhum told *The Hindu*.

“This means the catalyst remains highly effective and can be reused multiple times, making the catalytic process more efficient and cost-effective,” he said.

He further said the catalyst, derived from biomass (cellulose), is ecologically benign, abundant, and highly affordable. “This breakthrough has the po-

tential to significantly reduce the cost of biodiesel production, making sustainable energy more accessible,” he added.

At present, the cost of biodiesel in India is about ₹100 or \$1.2 per litre. Using the superhydrophobic activated carbon catalyst can bring down the cost to about 37 cents per litre. A litre of less fuel-efficient diesel costs at least ₹87 in India. “Biodiesel is a key player in the quest for sustainable energy. Our innovative catalyst could pave the way for broader adoption and a greener future because it makes the production process more efficient, cost-effective, and environment friendly,” Dr. Rokhum, among the world’s top five scientists in the field of biodiesel, said.

## **“spherical superhydrophobic activated carbon catalyst”**

- **A team of scientists from Assam and Odisha in India, China, and the U.K. has developed a water-repellent catalyst that can cut the cost of producing “environmentally benign” biodiesel substantially from the current levels.**
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- **“Our novel superhydrophobic catalyst can be a game-changer in the field of biodiesel production.**
- **It stands out because of unmatched robustness; it can withstand the water byproduct during biodiesel production,”**

- **catalyst, derived from biomass (cellulose), is ecologically benign, abundant, and highly affordable.**
- **“This breakthrough has the potential to significantly reduce the cost of biodiesel production, making sustainable energy more accessible,”** .

# Genomes reveal legacies of human sacrifice and medieval epidemics



In the last decade, scientists have used the tools of archaeogenetics and evolutionary medicine to study ancient human burial sites, thus understanding the origins of a bubonic plague pandemic, the evolution of malarial parasites, the spread of the mpox virus, and the historical occurrence of Down's syndrome

Sridhar Sivasubbu  
Vinod Scaria

**P**eople's practice of burying human remains throughout modern history echoes diverse cultural, spiritual, and social beliefs, and is often considered to be a line in the sands of time between modern and ancient humans. Studying burial practices is a complex endeavour, however, it's hard to say if some prehistoric cave burials are intentional commemorations or remains covered by sediment over time, for example.

Nevertheless, researchers have recorded the practice of burying since the time of our now-extinct Neanderthal ancestors. The oldest intentional modern human burial dates to more than 100,000 years ago, in a cave in Israel. This timeline overlaps with the discovery of the skeletal remains of a roughly three-year-old child buried in Kenya some 80,000 years ago.

Burial practices evolved with advancing human civilisations, with the construction of elaborate mausoleums (that continue to date). The pyramids of Egypt were monumental tombs for the pharaohs. Mughal emperor Shah Jahan commissioned the Taj Mahal in Agra as a mausoleum for his wife. These structures reflect an enduring human desire to honour the dead and remember them.

The handful of well-preserved skeletal remains at ancient burial sites also open a window into the dietary habits, environmental adaptations, microevolutionary characteristics, biological kinship, sex, and genetic history of the population. These sites, spread worldwide, have thus been sites of intense scientific investigation as well. Some famous examples include the Tollund Man Bog Bodies in Denmark and the 'Thebes Tombs' in Egypt.

Studies of these sites have accelerated in the last decade thanks to rapid technological advances in genome sequencing and medical genetics, which have expanded to seed the new fields of archaeogenetics and evolutionary medicine.

Of late, researchers have used the tools and concepts therein to understand the origins of the bubonic plague pandemic, the evolution of malarial parasites, the spread of the mpox virus, and even the occurrence of Down's syndrome in ancient genomes.

## Ancient Mayan genomes

Chichén Itzá is an ancient Mayan city located in modern-day Mexico. It is known for its grand architecture and iconic ceremonial temples, built around



The Temple of Kukulcán is the most famous structure at the Chichén Itzá archaeological site. DANIEL SCHWEN (CC BY-SA 4.0)

800-1000 AD. The temples are also infamous for having been the site of human sacrifices made as ritual offerings, and have been under constant archaeological investigation for more than a century.

The offerings were deposited in an enormous sinkhole or a subterranean cistern called the 'Sacred Cenote'. In Mayan culture, these subterranean features were often associated with water and rain. The Sacred Cenote in Chichén Itzá holds the skeletal remains of more than 200 ritually sacrificed individuals, many of them children or adolescents. But we don't know much about the lives of these individuals or their biological relationship (if any) with contemporary inhabitants of the region. European colonists used to believe these children and adolescents were "obtained" by kidnapping, purchase, or exchange of gifts with other nations.

In a recent scientific report published in *Nature*, a team of archaeologists and scientists from Germany, Mexico, Spain, the U.K., and the U.S. sequenced genetic material obtained from the human remains. They read the results along with bio-archaeological evidence collected at the site to launch an extensive investigation of the remains of 64 sub-adults from the Sacred Cenote and compared them to modern-day individuals of Mayan origin.

Their studies revealed that all sub-adults in the cenote were genetically male and closely related to each other. The findings go against 20th-century colonial accounts that claimed young women had been sacrificed here.



Studying burial practices is a complex endeavour. It's hard to say if some prehistoric cave burials are intentional commemorations or remains that have been covered by sediment over time

The study also identified two pairs of monozygotic twins among the remains. Twins held significance in Mayan spiritual life and were linked to the underworld, so their presence in the cenote wasn't surprising. The researchers also used isotopic studies to establish that all the related individuals in the cenote had similar diets, suggesting they all belonged to the same household.

The similarities also suggested they were selected for a specific purpose. It is widely believed that the Mayans organised ritual sacrifices to ensure the bountiful growth of maize and to appease the rain gods.

Genetic studies comparing the skeletal remains with those of present-day Maya people showed the latter are direct genetic descendants of the populations involved in the ritual sacrifices. This long-term continuity within the Mayan population opens doors for additional investigations on microevolutionary studies and genomic adaptations over the years, with implications for the study of population health.

## THE GIST

▼ The oldest modern human burial dates to more than 100,000 years ago, in Israel. This overlaps with the discovery of the buried remains of a three-year-old in Kenya some 80,000 years ago

▼ Skeletal remains at ancient burial sites open a window into the dietary habits, environmental adaptations, microevolutionary characteristics, biological kinship, sex, and genetic history of the population

▼ By comparing ancient and modern genomes from Mexico, researchers found evidence of positive selection in genes related to immunity. The study of genomes helps resolve mysteries, and gain new insights into the past

## Legacy of colonial epidemics

The ceaseless wars, famines, and epidemics wrought by colonial invaders decimated the Mexican population. Their numbers fell from 10-20 million to 2 million by the end of the 16th century. In this period, diseases such as smallpox, measles, influenza, typhus, typhoid, and enteric fever spread among the people, resulting in a genetic bottleneck. The rapid decline of a population also shrinks the genetic variations therein. Future populations will be based on this smaller pool, and will thus be at greater risk of disease. Such events can leave long-lasting genetic footprints in the population. By studying them, researchers may be able to identify genes that have been subjected to genetic selection.

By comparing the ancient and modern genomes from Mexico, the researchers found evidence of positive selection in genes related to immunity, especially those associated with resistance to enteric fever caused by *Salmonella enterica Paratyphi C*, a pathogen serotype previously identified with the 16th century cocoliztli epidemic in Mexico. The study of ancient genomes and their modern counterparts allows us to resolve mysteries, dispel old hypotheses, and gain new insights from the past to light the way for the future.

(The authors are senior consultants at the Vishwanath Cancer Care Foundation, Adjunct Professors at Indian Institute of Technology, Kanpur and Dr. DV Parid Medical College, Hospital and Research Center, Pune.)



# Chichén Itzá

- **Chichén Itzá is an ancient Mayan city located in modern-day Mexico.**
- **It is known for its grand architecture and iconic ceremonial temples, built around 800-1000 AD.**
- **The temples are also infamous for having been the site of human sacrifices made as ritual offerings, and have been under constant archaeological investigation for more than a century.**



- **The Maya civilization** developed in the **Maya Region**, an area that today comprises southeastern **Mexico**, all of **Guatemala** and **Belize**, and the western portions of **Honduras** and **El Salvador**.
- It includes the **northern lowlands** of the **Yucatán Peninsula** and the **Guatemalan Highlands** of the **Sierra Madre**, the Mexican state of **Chiapas**, southern **Guatemala**, El Salvador, and the southern lowlands of the Pacific littoral plain.

## Why clouds go grey before they rain

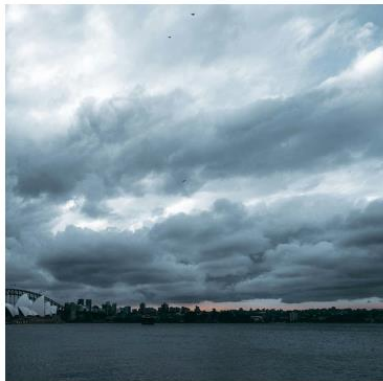


**Q: Why do clouds usually appear white but look grey when they're going to rain?**

*Vineeth E.K.*

**A:** Scattered water droplets in the clouds are the reason. When the Sun shines over clouds, water droplets in the latter act like prisms, splitting white sunlight into its component colours. They send these rays of light of different colours (frequencies) flying in different directions at haphazard angles. These rays often manage to recombine because there are several droplets in clouds, all scattering sunlight and creating white light. This is why clouds are white.

But just before clouds are going to rain, the water droplets are swollen. They coalesce to form larger droplets, of a few millimetres or more each. These droplets absorb more light and transmit less to the base of the clouds. As a result, these clouds have a greyish appearance; only their base scatters white light (image) to observers on the ground. However, because enough sunlight illuminates the clouds' upper decks, they continue scattering white light to anyone viewing them from space



Dust scatters white light the same way clouds do for the same reason, in a process called Mie scattering.

ROADTRIPWITHRAJ/UNSPLASH

or from aboard an aeroplane.

Such scattering phenomena manifest in other ways too. Dust scatters white light the same way clouds do for the same reason, in a process called Mie scattering. It takes place only when the size of the scattering particle is comparable to the wavelength of the light.

- Karthik Vinod, intern with The Hindu



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# **Why clouds go grey before they rain**

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## BIG SHOT



Professor Hong Jin-kee with a bowl containing pink “meaty rice” at the Yonsei University in Seoul on May 21. In a small laboratory in the South Korean capital, a team of scientists is injecting cultured beef cells into individual grains of rice, in a process they hope will revolutionise how the world eats. AFP

# Meaty Rice

- **this unique type of rice is prepared by embedding cultured beef cells into individual grains of rice. It is considered an eco-friendly, ethical and sustainable way for people to get their protein.**
- **What makes it unique is the faint buttery aroma due to beef muscles and fat cells and the beautiful pink hue.**

# How can Himachal Pradesh fight against forest fires?

What does the State need to do in order to democratise forest management and curtail raging forest fires?

**Tikender Singh Panwar**

**The story so far:**

**H**imachal Pradesh (H.P.) is witnessing widespread forest fires across the region. According to the Himachal Pradesh Forest department, there have been a total of 1,684 forest fires since April 15. These fires have damaged a total of 17,471 hectares of forest land, resulting in significant loss to wildlife. From 2001 to 2023, H.P. has lost 957 hectares of tree cover from fires and 4.37 thousand hectares from all other drivers of loss.

**How do forest fires start in the State?**

Fires in the Himalayas occur during the pre-monsoon summer period of moisture stress, due to the resultant depletion of snowmelt water. The moisture conditions of the pre-monsoon season, characterised by rainstorms, play a critical role in determining the nature of forest fires. The less moisture there is, the greater the impact of the fires. Human activities such

as unattended campfires, discarded cigarettes etc., are also some of the common causes for forest fires.

These fires are also a major source of pollutants, including black carbon, which significantly contribute to glacier melt in the Himalayas and negatively influences the regional climate. The primary causes of these forest fires are faulty forestry practices, and treating forests from a utilitarian perspective, excluding people's participation.

**Have the Himalayan forests undergone a transformation?**

The Himalayan forests have been systematically transformed over the last two centuries. A crucial watershed moment in Indian forestry began with the construction of railways in the 1850s. Lord Dalhousie's understanding about railway construction was that the railways were to be constructed not just to market British goods but also to serve as an outlet for British capital seeking profitable avenues. Unfortunately, the profitability

of Himalayan forests continue to be a driving force. From 1853 to 1910, the construction of around 80,000 kms of railway track led to an assault on forests and the extinction of the customary rights of the people. Between 1869 and 1885, 6.5 million sleepers were made of Deodar, and the area for Chir pines was expanded for timber and resin. Total trees from which resin was tapped between 1910 and 1920 increased from 2,60,000 to 21,35,000. Resin was used for commercial and industrial applications, and its extraction continues to be a major source of production from pine forests. Verrier Elwin, an Oxford scholar and renegade priest, wrote in the early 20th century that State-managed forestry led to the gradual replacement of the Banj oak, a source of fuel, fodder, and leaf manure, with the Chir pine, which was more valued commercially as a source of timber and resin. Ecologically, Banj forests absorb a high content of rainwater, leading to better moisture retention and water springs in the mountains.

Currently, more than 17.8% of the total 37,033 square kilometers of forest area is covered with Chir pine trees in H.P. Chir forests are very vulnerable to forest fires.

**What needs to be done?**

Democratisation of forests is essential to ensure that people and communities who have lived in and around forests are made part of the forest management process. The rights of the local community have been periodically curtailed, and as a result, when forest fires start, first responders are nowhere to be found.

The traditional forest rights of Himalayan dwellers included the right to extract wood for fuel, timber, fodder, and other activities. H.P. is under Schedule V of the Indian Constitution, which requires community assent for development activities in the region. However, for large projects like hydro power generation, road widening, and four-lane highways, forests are being diverted with ease.

What the Himalayan States now need is to build mixed forestry and remove pine trees; ensure that both scientific and community knowledge converge and forest management is conducted in a participatory manner; implement check dams and other methods to revive water springs; create environmental services at the village level; and articulate their case with the ongoing 16th Finance Commission, seeking help apart from disaster mitigation funds.

*Author is former Deputy Mayor, Shimla, and Member, Kerala Urban Commission.*

## THE GIST

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- **The moisture conditions of the pre-monsoon season, characterised by rainstorms, play a critical role in determining the nature of forest fires.**
- **The less moisture there is, the greater the impact of the fires.**
- **Human activities such as unattended camp fires, discarded cigarettes etc., are also some of the common causes for forest fires.**

- **These fires are also a major source of pollutants, including black carbon, which significantly contribute to glacier melt in the Himalayas and negatively influences the regional climate.**
- **The primary causes of these forest fires are faulty forestry practices, and treating forests from a utilitarian perspective, excluding people's participation.**

## **Himalayan transformation**

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# Chinese forces seize two Philippines boats in disputed shoal

**Associated Press**

MANILA

Chinese forces seized two Philippine rubber boats that were delivering food and other supplies to a military outpost in a disputed South China Sea shoal in a tense confrontation in which some Filipino navy personnel were injured, Philippine security officials said on Tuesday.

The U.S. renewed a warning on Tuesday that it is obligated to defend the Philippines, a treaty ally, a day after the hours-long hostilities in Second Thomas Shoal. The shoal has been occupied by a small Philippine navy contingent aboard a long-grounded warship that has been closely monitored by China's coast guard and navy in a years-long stand-off.

There is fear that territorial disputes in the South China Sea could escalate and pit the United States and China in a larger conflict. China and the Philippines blamed each other for Monday's hostilities, the most serious in recent months, but provided few details.

A Philippine government task force overseeing the territorial disputes con-

demned what it said were "dangerous maneuvers, including ramming and towing" which disrupted an effort to transport food, water and other supplies to the Filipinos manning the territorial outpost on the grounded ship, the *BRP Sierra Madre*, at the shoal.

Two Philippine security officials, who had knowledge of the supply mission at the shoal, separately said that two rubber boats manned by Filipino navy personnel had approached the *BRP Sierra Madre* at the shoal to deliver fresh supplies when several Chinese coast guard personnel on speedboats arrived to disrupt the mission, sparking a scuffle and collisions.

At least eight of the Filipinos were injured, including one who lost a thumb, in the scuffle, said one of the two officials.

U.S. Deputy Secretary of State Kurt Campbell discussed China's actions with his Philippine counterpart, Maria Theresa Lazaro, in a telephone call. Both agreed that China's "dangerous actions threatened regional peace and stability," State Department spokesperson Matthew Miller said.



The U.S. renewed a warning that it is obligated to defend the Philippines, a day after the hostilities in Second Thomas Shoal. AP

## Second Thomas Shoal,

- Second Thomas Shoal, also known as Ayungin Shoal and Rén'ài Jiāo is a submerged reef in the Spratly Islands of the South China Sea, 105 nautical miles (194 km; 121 mi) west of Palawan, Philippines



# Maritime standoff

A new standoff is developing in the disputed waters of the South China Sea between Chinese and Philippine forces at the Second Thomas Reef.

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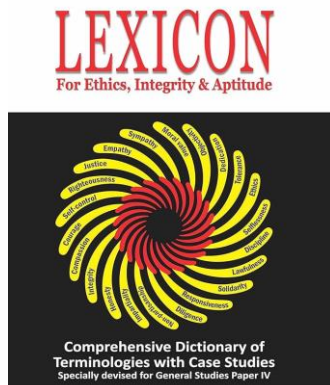
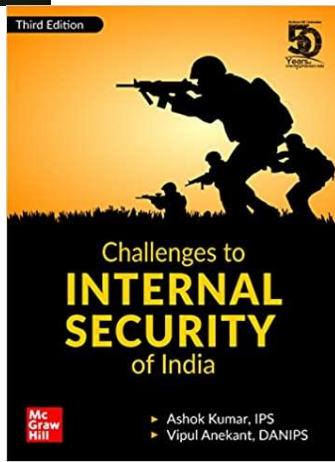
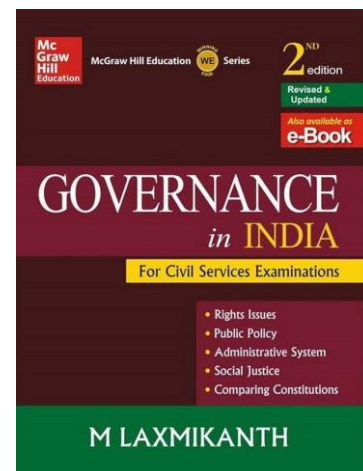
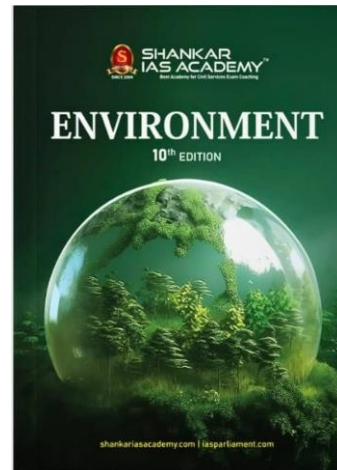
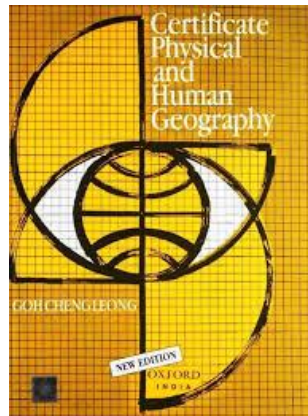
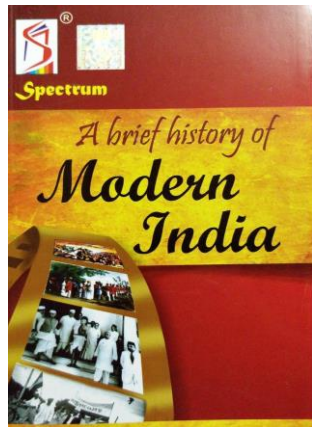
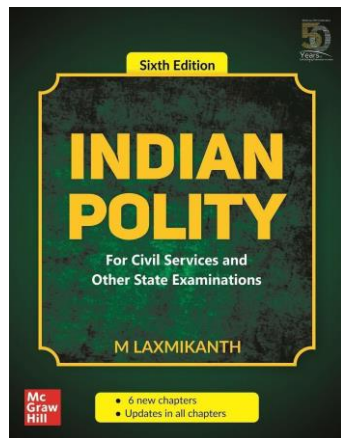
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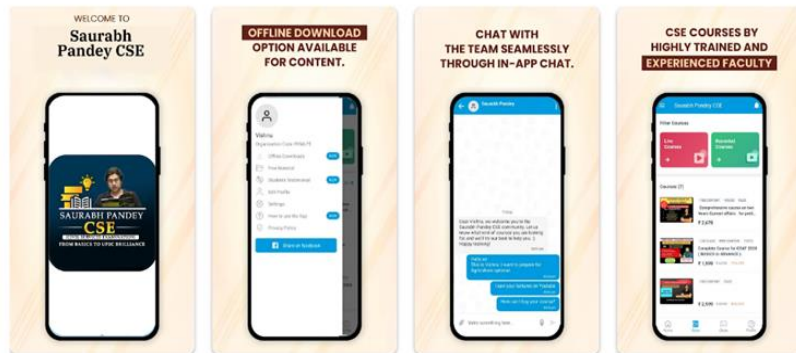
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### Periodical cicada emergence disrupts food webs

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual prey – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

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The cicadas are a superfamily, the Cicadoidea, of insects in the order

Hemiptera.



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States as per Article 244(2).

### What are Scheduled Areas?

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

### How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.



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### Garba dance of Gujarat makes it to UNESCO list

Sneeparna Chakrabarty  
NEW DELHI

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

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



**Climate change is making the world sick**

Climate change is making the world sick. The world is becoming warmer, and the weather is becoming more extreme. This is causing a lot of problems for people and the environment. We need to do something to stop climate change before it's too late.



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**WION** | WORLD CUP | VIDEOS | GRAVITAS | WORLD | INDIA | SHOWBIZ | LIFESTYLE | SPORTS | SCIENCE | P  
 Russia loads 'Avangard' missile into launch Silo, fears of nuclear warfare on rise | World DNA

Que-3 With reference to exercise 'Mitra Shakti', consider the following statements

- Between India and Nepal.
- The aim of the exercise is to jointly rehearse sub-conventional operations under Chapter VII of the United Nations Charter, which authorises the Security Council to take enforcement measures, including the use of military force, to address threats to international peace and security.
- "Exercise MITRA SHAKTI-2023" recently commenced in Goa.

How many of the above statements are correct?

- Only one
- Only two
- All three
- None

Ans 3- (a)

- "Exercise MITRA SHAKTI-2023" recently commenced in Aundh (Pune).
- Between India and Sri Lanka.

1:17

PRELIMS 18th N...

- The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

#### Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warrant — to show by what warrant is a person holding public office;

- Prohibition — directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and
- Certiorari — re-examination of an order given by judicial, quasi-judicial or administrative authorities.
- In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.
- When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.
- Article 226, however, is not a fundamental right like Article 32.

12th BRICS

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1:19

28th october 2...

US Pakistan South Asia UK Europe China Middle East Mad, Mad World Photos Vide  
 1023 Nobel Prize In Economic Sciences Awarded to Claudia Gold...  
 Simon Cipher Case He 3rd Missing Israel Hamas War  
 ... awarded to ... of women's  
 CURRENT AFFAIRS BY SAURABH PANDEY SIR  
 Que-2 Consider the following statements  
 1- Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.  
 2- Articles 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(3).  
 3- The Prime Minister of India notifies India's Scheduled Areas.  
 How many of the above statements are correct?  
 a) Only one b) Only two  
 c) All three d) None

Ans (b)  
 The President of India notifies India's Scheduled Areas.  
 Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh. In 2015, Kerala proposed to notify 2,133 habitations, five gram panchayats, and two wards in five districts. It awaits the Indian government's approval.  
 The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.  
 The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make regulations for a Scheduled Area, especially to prohibit or restrict the transfer of forest land by or among members of the STs, and regulate the allotment of land to STs and money-lending to STs.

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12:40

X polity 11th augu...

## Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

### Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

X 18th Septembe...

## Santiniketan finds its place on UNESCO's World Heritage List

Should body makes announcement on Sunday. Manu's says, named in Tagore, has been supported by Bengal Culture Ministry seek to bring in human values

By India Staff

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, has been named on UNESCO's World Heritage List. The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture, and its role in the development of modern Indian education.



The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture, and its role in the development of modern Indian education. The town is located in the Birbhum district of West Bengal, India.

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum district, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the foundations of Visva-Bharati University.

## EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

By Staff

Continues

European Commission President Ursula von der Leyen has promised to introduce a plan of action to address the growing number of migrants arriving in Italy. She said that the EU will work with Italy to find a sustainable solution to the migration crisis.



Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

The plan includes using the EU's external borders to identify and assist migrants, as well as providing them with legal channels for entry. She also mentioned the importance of working with the Italian government to manage the situation on the ground.

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-2 With reference to Parliaments special sessions, consider the following statements

- There is specific provision in the Constitution that deals with special sessions.
- Article 352, which deals with the proclamation of Emergency, refers to a "special sitting" of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.
- The Question Hour was suspended during the session.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.
- The Hoysala Temples, built in the 12th and 13th centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.
- The temples became targets of plundered and destruction by the Delhi Sultanate army of Ala-ud-din Khilji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughlaq in 1326 AD.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-4 Consider the following statements about SHREYAS scheme

- It comprises 4 central sector sub-schemes.
- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.
- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-5 Consider the following statements about Women's Reservation Bill

- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve 33% of seats in Lok Sabha and state Assemblies for women.

12:03

X prelims pointer...



- Que-5** With reference to Shumang Leela, consider the following statements
- Shumang Leela is a traditional form of theatre in Tripura.
  - In this the roles of women are all played by men, called Nupi Shabis.
  - It is performed in an open courtyard surrounded by spectators on all four sides.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- Shumang Leela is a traditional form of theatre in Manipur.
  - In the case of women's theatre groups, the roles of men are played by women.
  - Shumang Leela translates to "courtyard performance".
  - Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.
- Que-6** Consider the following statements about Red Sanders also called Red Sandalwood
- It is a species found in the southern tropical dry deciduous forest of Telangana.
  - The tree reaches an average height of 10 to 15 metres.
  - The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.
- Which of the following given above is/are correct
- a) 1 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
  - CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
  - In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
  - The heartwood of Red Sanders is in demand in the domestic and international markets for making

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CURRENT AFFAIRS FEB 2<sup>nd</sup> by SAURABH PANDEY SIR

furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

**Que-7** Consider the following statements about Compressed Biogas (CBG) and compressed natural gas (CNG)

- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.
- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.
- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

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

**Que-8** Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARDHAN) in the Union Budget 2023. Consider the following statements about this

- The new GOBARDHAN scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.
- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.
- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

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

12:05

X prelims pointer...



- Que-7** Lamu Archipelago, recently in News, belongs to which country
- a) Somalia  
b) Malaysia  
c) Indonesia  
d) Kenya
- Ans: (d)
- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.
- Que-8** Consider the following statements about "Operation Sadbhavana", recently in News
- Launched by an Indian Army.
  - For development of Jammu and Kashmir.
  - Some of the objectives achieved through Operation Sadbhavana are national integration, tourism, women's empowerment, employment generation, education, and
- development activities geared towards nation-building.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 only
- Ans: (b)
- For development of Ladakh.
  - The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

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**Que-1** Consider the following statements

- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.
- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.
- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

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

Ans: (c)

- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

of what we call persistence, allowing satellites to capture images continuously.

**Que-2** With reference to Paris Club, consider the following statements

- The Paris Club is a group of mostly western creditor countries.
  - It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
  - Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.
- Which of the following given above is/are correct
- a) 2 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (b)

- It grew from a 1956 meeting in which Brazil agreed to meet its public

12:35

X may 2024 impo...



## Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.

- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

## Pros and Cons of Exchange-Traded Funds



## BIMSTEC

WHAT YOU SHOULD KNOW





11:29



X 12th august 2023



## DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission

- In India, such Delimitation Commissions have been constituted 4 times - in 1952 under the Delimitation Commission Act, 1952, in 1962 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.

- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.



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defends use of  
Saurabh Kutumbak

11:37



X Mock Series 17t...



productivity, uphold good health and prevent poverty.

- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 5 With reference to Doppler radar network, consider the following statements

- It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.
- It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.
- The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

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

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- (c)
  - It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?

- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?

- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?

- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 6 Consider the following statements about Army Day

- India celebrates Army Day on January 15 every year.
- The Army Day is celebrated every year to honour Cariappa and the defence forces.
- 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

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

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5- (d)

- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004, with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)

- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)

- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)

- The Chief of Defence Staff is principally responsible for getting the armed forces better integrated rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, and Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Minister only on tri-services matters. The three service chiefs will continue to advise the Defence Minister exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance of the three services.



# Target Mains -2024/25 -

**Q “Operations in cyberspace need to be dovetailed into the national security fabric, to evolve the ‘ends,’ ‘ways’ and ‘means’ to create advantage and influence events in all other operational environments and across all instruments of power” Examine**

प्रश्न "साइबरस्पेस में संचालन को राष्ट्रीय सुरक्षा ढांचे में शामिल करने की आवश्यकता है, ताकि लाभ पैदा करने और अन्य सभी परिचालन वातावरणों और शक्ति के सभी उपकरणों में घटनाओं को प्रभावित करने के लिए 'साध्य', 'तरीके' और 'साधन' विकसित किए जा सकें।"

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upsc telegram channel**



# Topics

- What is iCET??
- How did the submersible (Titan) implode?
- Constitutional morality
- Laws on mercenaries in war zones
- (ukraine peace conference )
- EU's Carbon Border Adjustment Mechanism (CBAM)
- Inuit
- Mains



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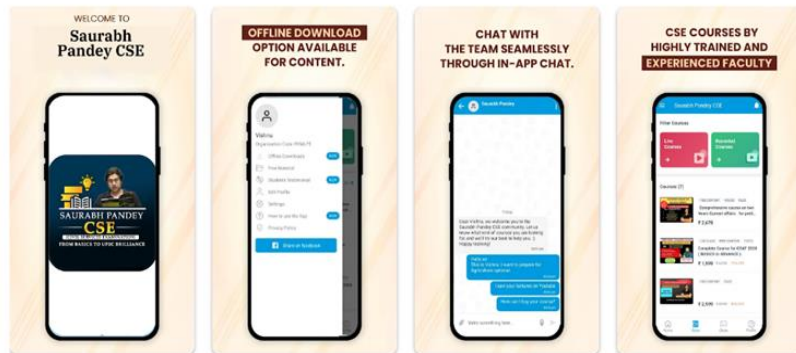
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# Target Mains -2024/25 -

**Q Constitutional morality to be 'situational based not just 'constitutional provision based'. Examine**

Q संवैधानिक नैतिकता केवल 'संवैधानिक प्रावधान आधारित' नहीं, बल्कि परिस्थितिजन्य आधारित है। परीक्षण करना

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# NSAs of India, U.S. review progress on iCET, silent on Pannun investigation

Ajit Doval and Jake Sullivan resolve to prevent the 'leakage' of sensitive technologies to countries of 'concern'; they welcome the discussions on India's planned acquisition of MQ-9B drones, announce launch of a new semiconductor partnership between General Atomics and Indian firm 3rdiTech

**Dinakar Peri**  
NEW DELHI

National Security Adviser (NSA) Ajit Doval and his U.S. counterpart, Jake Sullivan, who is on a two-day visit to India, on Monday resolved to prevent the "leakage" of sensitive and dual-use technologies to countries of "concern" as they chaired the second meeting of the initiative on Critical and Emerging Technology (iCET).

Mr. Sullivan arrived just hours after reports confirmed that Indian national Nikhil Gupta was extradited to the U.S. for alleged links to a plot to assassinate Sikh separatist Gurbhag Singh Pannun. While neither side confirmed if the Pannun case was discussed, it was expected to be high on the agenda.

During the second iCET meeting, the two NSAs set the vision for the next chapter of the strategic technology partnership,

according to a joint fact sheet issued after the dialogue.

"They underscored their commitment to orienting our cooperation around breakthrough achievements in priority critical and emerging-technology areas, by focusing our efforts on co-production, co-development, and research and development opportunities to ensure we stay at the leading edge of innovation and enhancing coordination with like-minded nations to deliver secure, reliable, and cost-competitive technology solutions for the Indian and American people and our partners around the world," the fact sheet said.

Mr. Sullivan also held talks with External Affairs Minister S. Jaishankar and later called on Prime Minister Narendra Modi. "Met US NSA Jake Sullivan. India is committed to further strengthen the India-US Comprehensive Global Strategic Partnership for global good," Mr.



**Cementing ties:** U.S. National Security Advisor Jake Sullivan calls on Prime Minister Narendra Modi in New Delhi on Monday. ANI

Modi said on X.

On Tuesday, both the NSAs are scheduled to address the India-U.S. iCET roundtable with industry heads, organised by the Confederation of Indian Industry (CII).

Mr. Sullivan's India visit was cancelled twice earlier due to geopolitical developments.

India and the U.S. are currently in advanced stages of talks for the purchase of 31 MQ-9B unmanned aerial vehicles and licensed

manufacture of General Electric GE-414 jet engines as well as the Stryker infantry vehicles.

"We welcome the discussions on India's planned acquisition of the MQ-9B platforms, the possible co-production of land warfare systems, and progress on other co-production initiatives outlined in the India-U.S. Roadmap for Defense Industrial Cooperation," the fact sheet said in this regard.

On semiconductors, a

priority area for both countries, the fact sheet announced the launch of a new strategic semiconductor partnership between General Atomics and Indian firm 3rdiTech to co-develop semiconductor design and manufacture of "precision-guided ammunition and other national security-focused electronics platforms".

The fact sheet also outlined several steps both countries would take in new and emerging areas which in a large way would also address dependency on China.

For instance, on rare-earth minerals, it said, "Promoting India's vital role in the Mineral Security Partnership, including through co-investing in a lithium resource project in South America and a rare earths deposit in Africa, to responsibly and sustainably diversify critical mineral supply chains."

The ambitious iCET was announced by Mr. Modi and U.S. President Joseph

Biden on the sidelines of the Quad Summit in Tokyo in May 2022 and was launched by the NSAs in January 2023 comprising key technology sectors including space, semiconductors, advanced telecommunications, artificial intelligence, quantum science, biotechnology, and clean energy.

Subsequently, new areas were included including biotechnology, critical minerals and rare earths processing technologies, digital connectivity, digital public infrastructure and advanced materials.

## Pannun investigation

Indian national Mr. Gupta, 52, was arrested in the Czech Republic last year at the request of the U.S. government over the plot against Pannun.

India, which has come under intense pressure from the U.S. and other countries, has instituted a high-level investigation into the matter.



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# What is iCET??

## What is iCET?

- The Initiative on Critical and Emerging Technologies is a framework agreed upon by India and the U.S. for cooperation on critical and emerging technologies in areas including artificial intelligence, quantum computing, semiconductors and wireless telecommunication.
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- It was launched in January 2023 to strengthen their strategic partnership and drive technology and defence cooperation.
  - Mr. Modi and Mr. Biden first announced the framework on the sidelines of the Quad meeting in Tokyo in May 2022.
  - “The United States and India affirm that the ways in which technology is designed, developed, governed, and used should be shaped by our shared democratic values and respect for universal human rights
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**What are the focus areas of the initiative?**

- **Primarily, the iCET seeks to position New Delhi and Washington D.C. as “trusted technology partners” to build supply chains and support the coproduction and codevelopment of item**
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- Key takeaways include setting up a research agency partnership to drive collaboration in areas like AI; developing a new defence industrial cooperation roadmap to accelerate technological cooperation for joint development and production; developing common standards in AI;
  - developing a roadmap to accelerate defence technological cooperation and ‘innovation bridge’ to connect defence startups;
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- supporting the development of a semiconductor ecosystem; strengthening cooperation on human spaceflight; advancing cooperation on development in 5G and 6G; and adopting OpenRAN network technology in India.
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- , a new initiative to advance cutting edge technology cooperation, known as the India U.S. Defence Acceleration Ecosystem (INDUSX), is set to be launched during the visit.
  - India and the U.S. have also concluded a roadmap for 'Defence Industrial Cooperation' to guide the policy direction for the next few years.
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- The two countries have also established a Strategic Trade Dialogue to remove regulatory “barriers” and review existing export control norms to take forward strategic technology and trade collaborations envisaged under iCET
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The Titan submersible, operated by OceanGate Expeditions, imploded on its way to explore the wreck of the Titanic on June 18, 2023. AP

# One year after Titan's fatal dive, explorers vow to pursue ocean's secrets

Associated Press

The deadly implosion of an experimental submersible en route to the deep-sea grave of the Titanic last June has not dulled the desire for further ocean exploration, despite lingering questions about the disaster.

June 19 marks one year since the Titan vanished on its way to the historic wreckage site in the North Atlantic Ocean. After a five-day search that captured attention around the world, authorities said the vessel had been destroyed and all five people on board had died.

Concerns have been raised about whether the Titan was destined for disaster because of its unconventional design and its creator's refusal to submit to independent checks that are standard in the industry.

The US Coast Guard condemned a high-level investigation into what happened, but officials said the inquiry is taking longer than the initial 12-month time frame, and a planned public hearing to discuss their findings won't happen for at least another two months.

Meanwhile, deep-sea exploration continues undeterred. Numerous ocean explorers have said they are confident undersea exploration can continue safely in a post-Titan world.

"It's been a desire of the scientific community to get down into the ocean," said Greg Stone, a veteran ocean explorer and friend of Titan operator Stockton Rush, who died in the implosion. "I have not noticed any difference in the desire to

**Deep-sea exploration continues undeterred. Numerous ocean explorers have said they are confident undersea exploration can continue safely in a post-Titan world.**

go into the ocean, exploring," OceanGate, a company co-founded by Rush that owned the submersible, suspended operations in early July. A company spokesperson declined to comment.

David Concannon, a former adviser to OceanGate, said he will mark the anniversary privately with a group of people who were involved with the company or the submersible's expeditions over the years, including scientists, volunteers and mission specialists.

The Titan had been chronicling the Titanic's decay and the underwater ecosystem around the sunken ocean liner in yearly voyages since 2020.

The craft made its last dive on June 18, 2023, a Sunday morning, and lost contact with its support vessel about two hours later. When it was reported overdue that afternoon, rescuers rushed ships, planes and other equipment to the area.

All hope was extinguished on June 22, when the Coast Guard announced that debris had been found near the Titanic on the ocean floor. Authorities have since recovered the submersible's intact endcap, debris, and presumed human remains from the site.

In addition to Rush, the implosion killed two members of a prominent Palestinian family, Shakhada Dawood and her son Sukman Dawood, British adventurer Hamish Harding, and Titanic expert Paul Henri Nargeot.

The group's president Richard Garriot believes the world is in a new golden age of exploration thanks to technological advances that have opened frontiers and provided new tools to more thoroughly study already visited places. The Titanic

## How did the submersible (Titan) implode?

- There is no definitive proof of what happened, but experts assume the implosion happened on Sunday — the first day of the dive.
- The Titan was made of carbon fiber and titanium, materials thought to withstand the pressure at depths of up to 4,000 meters. The craft's hull was designed to protect the crew from the water pressure.
- The water pressure 3,800 meters down at the site of the Titanic wreck is roughly 400 atmospheres (6,000 PSI) — about the same as having 35 elephants on your shoulders.
- "Any deep divers know how unforgiving the abyssal plain is: going undersea is as, if not more, challenging than going into space from an engineering perspective,"



- **Experts have questioned the use of titanium and carbon fiber for deep diving, as they have different properties.**
- **Titanium is elastic and can adapt to ranges of stresses and pressures without permanent strain on the material. Carbon fiber on the other hand is stiffer and non-elastic, often prone to cracking.**
- **the differences in the materials could have created a defect in the hull, triggering “an instantaneous implosion due to the underwater pressure.”**

# Constitutional respect should not be reduced to optics

**P**rime Minister Narendra Modi never stops surprising the nation with optics. On June 7, 2024, at the Bharatiya Janata Party-led National Democratic Alliance meeting of newly elected Members of Parliament, Mr. Modi, upon his arrival, paid his respects to the Constitution of India by touching the book to his forehead. Interestingly, the setting of the meeting was the Samvidhan Sadan of the newly built Parliament.

But does Mr. Modi respect the Constitution of India in letter and spirit? His actions so far as the Prime Minister since 2014, or for that matter as the Chief Minister of Gujarat, show otherwise.

In a parliamentary democracy, the Prime Minister is only the head of the Council of Ministers. Article 74 of the Constitution mandates: "There shall be a Council of Ministers with the Prime Minister at the head to aid and advise the President who shall, in the exercise of his functions, act in accordance with such advice."

## Pitching for 'responsibility'

B.R. Ambedkar and his fellow framers wisely chose the parliamentary system over the presidential system because "Looking at it from the point of view of responsibility, a non-Parliamentary Executive being independent of Parliament tends to be less responsible to the Legislature, while a Parliamentary Executive being more dependent upon a majority in Parliament become more responsible." It was hoped that the assessment of responsibility of the executive is both daily and periodic; the daily assessment is done by Members of Parliament in the form of questions, resolutions, no-confidence motions, adjournment motions and debates on addresses. Periodic assessment is done by the electorate every five years. Thus, the framers preferred "more responsibility to more stability".

On June 9, 2024, the Prime Minister and the Cabinet Ministers were administered the oath of office and secrecy by the President of India. But it was only after the first cabinet meeting on the evening of June 10 that the portfolios of Ministers were announced. Yet, on the same day, the Prime Minister cleared the file that sanctioned the release of the seventeenth instalment of the Pradhan Mantri Kisan Samman Nidhi, the farmers' welfare scheme, for ₹20,000 crore. Could the Prime Minister at all have done so? And was it within his purview under the Rules of Business? Such a scheme will be under the Ministry of Agriculture with its working regulated by the Ministry of Finance, Department of



**Dushyant Dave**

is a Senior Advocate and a former President of the Supreme Court Bar Association

B.R. Ambedkar seems to have predicted today's complete political disregard for

pre-emptive and perhaps unauthorised action? It is optics.

The first cabinet, which met without the allocation of portfolios, also took the decision "to provide assistance to three crore additional rural and urban households for the Construction of houses under the Pradhan Mantri Awas Yojana". Could this at all have been done by a cabinet sans portfolios? Which was the Ministry that had initiated the proposal? Was the agenda circulated? Were Ministers aware of the details? Why this hurry? Optics.

Yet again, without reconstituting the Cabinet Committee after the formation of the new government, the Prime Minister extended the tenures of the National Security Adviser Ajit Doval, and P.K. Mishra as the Principal Secretary to the Prime Minister. This was done under the garb of the old "Appointments Committee of the Cabinet", which, incidentally, comprises the Prime Minister and the Home Minister.

## On constitutional morality

So, what happens to coalition dharma?

These events show a complete disregard for the Constitution by the Prime Minister. Regrettably, not one Minister or bureaucrat who is bound by constitutional details and controls raised any objections. Why?

B.R. Ambedkar was aware of these problems. On November 4, 1948, before the Constituent Assembly, he said that "Constitutional morality is not a natural sentiment. It has to be cultivated. We must realize that our people have yet to learn it. Democracy in India is only a top-dressing on an Indian soil, which is essentially undemocratic."

So how did this Great Son of India predict today's Modi? Because, to him, constitutional morality meant "a paramount reverence for the forms of the Constitution" and those forms of the Constitution must be sacred in the eyes of both those who are in power and his opponents. To ensure this, the framers provided administrative details in the Constitution of India.

Article 77, thereupon, provides that "The President shall make rules for the more convenient transaction of the business of the Government of India, and for the allocation among Ministers of the said business".

In recent times, the functioning of the Government of India shows a complete negation of the cabinet system and collective responsibility to the President and Parliament. There is an extraordinary amassing of power in the Prime Minister's Office (PMO) which is destroying the

(Allocation of Business) Rules, as they stand today, allocate only business to the PMO – "To provide Secretarial Assistance to the PM". On the contrary, they provide that "The business of the Government of India shall be transacted in the Ministries, Departments, Secretariats and Offices specified in the First Schedule to these Rules". Also, the distribution of subjects is provided in the Second Schedule. Even the Cabinet Secretariat is only to provide "Secretarial assistance to the Cabinet and Cabinet Committees" and enforce the "Rules of Business".

So, why is there a complete breakdown of the constitutional framework and ethos? Bhakti.

## The advent of constitutional dictatorship

B.R. Ambedkar did warn that Bhakti in life is good for the salvation of the soul. But in politics, it is the sure path to dictatorship. What we are witnessing is constitutional dictatorship, something that the framers were strongly against.

Manipur has been burning for over a year. Yet the Prime Minister has not found the time to visit the State much less resolve the existential threat to the State. Had there been an Opposition government in power in Manipur, President's Rule would have been foisted on the State under Article 356 long back. Does the Prime Minister show any urgency to solve serious challenges such as poverty, ever increasing unemployment, inflation (actual) or even resolving the Kashmir situation? No. Why? These are thorny issues and do not provide instant optics.

The Prime Minister's campaign in the recently concluded general election is living proof of a complete disregard for constitutional morality. While on the campaign trail, he repeatedly attacked the largest minority community in the country, forgetting that secularism runs through the foundation of the Constitution. He belittled the Opposition in every speech forgetting that under our democracy, the Opposition has a place of honour. Yet, not one institution or its guardian stood up to remind him, much less stop him. The Prime Minister, as election laws stand today, is liable to be disqualified from Parliament. But who has courage in a nation where there is fear stalking in every nook and corner? So much for democracy.

So, will the government's coalition partners and the newly rejuvenated Opposition remind the Prime Minister of the need to adhere to constitutional morality? So far, they have failed us: the people, for whom the Constitution created the government of the people, by the

# Constitutional morality

- **Constitutional morality entails the adherence to constitutional norms within a democratic system.**
- **It goes beyond the literal interpretation to encompass a commitment to values such as sovereignty, social justice, and equality in constitutional adjudication.**
- **The term was first coined by British historian George Grote in his twelve-volume work, *A History of Greece*. Grote discussed the reforms of the Athenian Constitution by Cleisthenes – a statesman regarded as the founder of Athenian democracy.**

- **defines constitutional morality as the norms and procedures guiding decision-making in cases where the constitution is silent or grants discretionary power.**
- **But constitutional morality is now commonly used to refer to the substance of a constitution itself. According to this perspective, being subject to constitutional morality means being subject to the substantial moral implications inherent in a constitution.**



**Though the term constitutional morality is not explicitly used in the Indian Constitution, it is deeply embedded in several of its sections:**

- 1. Preamble:** It outlines the principles that underpin our democracy, including justice, liberty, equality, and fraternity.
- 2. Fundamental Rights:** It safeguards individuals' rights against the arbitrary use of state power. Notably, the Supreme Court allows for the enforcement of these rights under Article 32.
- 3. Directive Principles:** They provide guidelines for the state to pursue the goals set by the constitution's framers, drawing from Gandhian, socialist, and liberal intellectual philosophies.
- 4. Fundamental Duties:** Alongside their rights, citizens also have responsibilities to the nation.

**5. Checks and Balances:** It includes judicial review of legislative and executive actions, legislative oversight of the executive, etc.

## **SC VIEW**

- 1. In the 2015 Krishnamoorthy case, the court emphasised that constitutional morality is essential for good governance.**
- 2. In the case of Union of India vs. Government of the NCT of Delhi, it was ruled that high-ranking officials must adhere to constitutional morality and uphold the ideals outlined in the Constitution to prevent the arbitrary use of authority.**
- 3. The Court, in the Government of NCT of Delhi case (2018), likened constitutional morality to a “second basic structure doctrine”, emphasising its role in curbing arbitrary authority.**

# The last continent must remain a pristine wilderness



**T**he 46th Antarctic Treaty Consultative Meeting (ATCM-46), that was held in Kochi, Kerala last month, highlighted the ongoing debate on Antarctic tourism. While the meeting sought to bring in a regulatory framework, it ultimately fell short of a definitive solution. This reflects the complex challenges of managing tourism in a region governed by international consensus and where the environment is rapidly changing.

Since the early 1990s, Antarctic tourism has witnessed a dramatic surge in tourist numbers, which have exploded from a few thousand to over 1,00,000 in the 2022-23 season. The International Association of Antarctica Tour Operators (IAATO) estimates a figure of 1,18,089 tourists in 2023-2024. The United States and China account for more than 40% of tourists to the Antarctic. This growth is attributed to increased global interest in adventure travel and a desire to experience Antarctica's unique landscapes and wildlife. Tourists typically embark on multi-day expeditions on small to medium-sized ships, with some opting for larger cruises or fly-sail operations. Activities range from wildlife observation and photography to mountain climbing and skiing.

Antarctic tourism offers educational and economic benefits but also raises significant environmental concerns. Increased human presence disrupts wildlife, damages fragile ecosystems, and risks introducing invasive species. Ship traffic pollutes pristine waters, and tourism adds to the global carbon footprint. Climate change exacerbates these issues by opening new areas for tourism while increasing ecosystem vulnerability. The balance between scientific research, responsible tourism, and environmental protection is under intense pressure.

## Gaps in the regulatory framework

The current governance framework for Antarctic tourism is fragmented and lacks clear regulations. The Antarctic Treaty, that came into force in 1961, prioritises peaceful use and scientific research. While the Madrid Protocol offers broad



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Prioritising science-based decision-making will enable a sustainable future for Antarctic tourism

environmental guidelines, it lacks specific tourism regulations. The responsibility for day-to-day management falls largely on the IAATO, a self-regulatory industry body. Many believe IAATO's guidelines are inadequate to address the growing environmental pressures.

The ATCM is the primary platform for international cooperation on Antarctic issues. Despite recognising the need for a comprehensive tourism regulatory framework, the ATCM-46 failed to reach a consensus. Unanimous agreement from all consultative parties is required for decisions, often slowing action and allowing national interests to impede progress. While some countries push for strong regulations, others prioritise economic benefits or interpret Antarctic principles differently. The current geopolitical climate further complicates international cooperation on Antarctic governance.

Despite the limitations, the ATCM-46 made some progress. The meeting focused on developing a "comprehensive, flexible, and dynamic" framework for regulating tourism and non-governmental activities. A newly established working group will lead this effort over the next year. This signifies a renewed commitment to address the challenges of the Antarctic. Antarctica needs stronger measures to mitigate tourism impacts, as there are gaps in the current governance frameworks. The Antarctic Treaty System and the Madrid Protocol offer broad guidelines, but daily management relies heavily on self-regulation by IAATO, which many believe is inadequate for protecting wildlife and ecosystems.

A historical perspective on the evolution of discussions around tourism regulation is also valuable. Discussions on tourism regulation have been a point of debate at ATCM meetings since the 1960s. A proposed tourism annex introduced in 1991 failed to gain consensus, leading to the current reliance on IAATO's self-regulation. Since a 2004 expert meeting on tourism, discussions have grown more frequent, with concerns encompassing environmental impacts, disruption of research programmes, and safety issues.

However, the ATCM's fragmented approach has led to non-binding guidelines rather than comprehensive regulation.

The limitations of the consensus rule are a recurring theme. The requirement for unanimous approval from all consultative parties has often hindered action. Proposals such as banning permanent tourism facilities have failed due to a lack of consensus, with objections emerging from conflicts with domestic laws, sovereignty issues, and differing views on Antarctic principles.

Understanding the true reasons for objections and finding flexible compromises are essential. The consensus rule's limitations mean activities are permitted if they comply with the Antarctic Treaty and Protocol, leading to "decision making by non-decision making". This essentially allows unregulated activities to continue in the absence of a clear framework.

## India's line

At the ATCM 44 (2022), concerns about tourism's impact on Antarctic research, conservation, and the environment were raised. The importance of monitoring the impacts of tourism was emphasised, and India was emphatic on addressing tourism issues. Resolution 5 (2022) advised against building tourism-related structures with significant environmental impacts. Calls for a comprehensive debate on Antarctic tourism continued between ATCM 44 and ATCM 45, with a 2023 workshop highlighting the need for governance action. Despite the lack of international consensus, India enacted its own Antarctic Law in 2022.

Finding a sustainable future for Antarctic tourism requires a multi-pronged approach. Strengthening environmental protection, implementing robust monitoring programmes, and fostering international cooperation are crucial. The recent efforts at ATCM-46 offer a glimmer of hope. By prioritising science-based decision-making and having engagement with all stakeholders, we can ensure that Antarctica remains a pristine wilderness for generations to come, while also recognising the potential benefits of responsible tourism.

## **The 46th Antarctic Treaty Consultative Meeting (ATCM-46)**

- **The 46th Antarctic Treaty Consultative Meeting (ATCM-46), that was held in Kochi, Kerala last month, highlighted the ongoing debate on Antarctic tourism.**
- **While the meeting sought to bring in a regulatory framework, it ultimately fell short of a definitive solution. This reflects the complex challenges of managing tourism in a region governed by international consensus and where the environment is rapidly changing**

- **Antarctic tourism offers educational and economic benefits but also raises significant environmental concerns.**
- **Increased human presence disrupts wildlife, damages fragile ecosystems, and risks introducing invasive species.**
- **Ship traffic pollutes pristine waters, and tourism adds to the global carbon footprint.**
- **Climate change exacerbates these issues by opening new areas for tourism while increasing ecosystem vulnerability**

## Gaps in the regulatory framework



- The current governance framework for Antarctic tourism is fragmented and lacks clear regulations.
- The Antarctic Treaty, that came into force in 1961, prioritises peaceful use and scientific research.
- While the Madrid Protocol offers broad environmental guidelines, it lacks specific tourism regulations.
- The responsibility for day-to-day management falls largely on the IAATO, (The International Association of Antarctica Tour Operators (IAATO) 'a self-regulatory industry body

- **The ATCM is the primary platform for international cooperation on Antarctic issues. Despite recognising the need for a comprehensive tourism regulatory framework, the ATCM-46 failed to reach a consensus.**
- **Despite the limitations, the ATCM-46 made some progress.**
- **The meeting focused on developing a “comprehensive, flexible, and dynamic” framework for regulating tourism and non-governmental activities.**
- **A newly established working group will lead this effort over the next year.**



- **This signifies a renewed commitment to address the challenges of the Antarctic. Antarctica needs stronger measures to mitigate tourism impacts, as there are gaps in the current governance frameworks.**
- **The Antarctic Treaty System and the Madrid Protocol offer broad guidelines, but daily management relies heavily on self-regulation by IAATO, which many believe is inadequate for protecting wildlife and ecosystems.**

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- **Resolution 5 (2022) advised against building tourism-related structures with significant environmental impacts.**

# Saws on mercenaries in war zones

Indian nationals tricked by the promise of lucrative jobs in Russia have died fighting on the frontlines. As states are increasingly hiring private military companies to operate in conflict zones — can they qualify as mercenaries under international law? How can India secure the interests of its overseas migrant workers?

## EXPLAINER

Aaratrika Bhaumik

The story so far:

**I**n June 11, the Ministry of External Affairs (MEA) acknowledged the tragic loss of two Indian nationals who were recruited by the Russian Army amidst the ongoing conflict between Russia and Ukraine. The MEA in a press statement said that the Indian Embassy in Moscow has strongly raised this issue with the Russian Ambassador in New Delhi and authorities in Moscow, seeking the swift release and return of all Indian nationals currently serving in the Russian Army.

In February, *The Hindu* reported for the first time that Indians were getting killed while fighting on behalf of Russia in the Ukraine war. Over the past year, nearly 100 Indians have been recruited by the Russian Army after being reportedly duped by agents with the lure of money and a Russian passport. Contracts signed by these recruits stipulate a "no leave or exit policy" before six months of service, with salaries amounting to ₹1.5 lakh to ₹2 lakh per month. In January, Russian President Vladimir Putin signed a decree simplifying the process of obtaining Russian citizenship for foreigners who sign a minimum of one-year contract with the Army.

At least 30 Indians have so far contacted the MEA and the Indian Embassy in Moscow, seeking help to return. The deaths of the two Indian nationals highlight a disturbing reality — Indians are increasingly falling prey to labour trafficking rackets after being unable to secure jobs domestically leading to their recruitment as mercenaries in international armed conflicts.

**What has been the MEA's response?**

The MEA has issued a press note advising Indians to exercise caution while seeking employment opportunities in Russia. In March, the Central Bureau of Investigation (CBI) said that it had filed a first information report (FIR) booking 15 individuals and four companies for their alleged role in the "trafficking of gullible Indian nationals to Russia and duping them for better employment and high-paying jobs". In May, the central agency divulged that it had made four arrests in the case.

**Who are mercenaries?**

The distinction between conventional combatants and mercenaries is a fundamental cornerstone of international humanitarian law (IHL). A combatant is typically a member of the armed forces of a party to the conflict, whereas a mercenary is recruited from a third-party state unrelated to the conflict. Mercenaries usually engage in hostilities motivated primarily by personal gain as opposed to virtues of patriotism associated with regular combatants.

Article 47 of Additional Protocol I to the Geneva Conventions (AP I) envisages its cumulative conditions for a person to qualify as a mercenary. The person should be specially recruited locally or abroad in order to fight in an armed conflict, it has taken a direct part in the hostilities essentially by the desire for private gain and, in fact, is promised, by or on behalf of a party to the conflict, material compensation substantially in excess of that promised or paid to combatants of similar ranks and functions



Mercenaries qualify for humane treatment in accordance with the fundamental guarantees of humanitarian law as outlined under Article 75 Article 47 of Additional Protocol I to the Geneva Conventions.

in the armed forces of that party, iv) is neither a national of a party to the conflict nor a resident of territory controlled by a party to the conflict, v) is not a member of the armed forces of a party to the conflict, vi) has not been sent by a state which is not a party to the conflict on official duty as a member of its armed forces.

Under customary IHL, being a mercenary itself does not constitute a specific crime. However, if captured, they are not entitled to prisoner-of-war status or any protected categories under the Geneva Conventions.

This allows for their prosecution for war crimes or other grave breaches of humanitarian law. They may also face charges under the domestic laws of the detaining nation. Nevertheless, mercenaries qualify for humane treatment in accordance with the fundamental guarantees of humanitarian law, as outlined under Article 75 of the AP I.

However, over time, African states began expressing reservations about this definition, as it only addressed international armed conflicts and overlooked civil wars, where mercenary activities were most prevalent. This led to the adoption of the Organization of African Unity Convention for the Elimination of Mercenarism in Africa in 1977 which included a more expansive definition of mercenaries.

Similarly, in 1989, the United Nations General Assembly (UNGA) adopted the International Convention against the Recruitment, Use, Financing and Training of Mercenaries that criminalised the recruitment, use, financing and training of mercenaries and also promoted inter-State cooperation in this regard.

The charter also widened the prevailing definition of mercenaries as provided under the Additional Protocol I to the Geneva Conventions to include "persons recruited for the purpose of participating in a concerted act of violence aimed at overthrowing a government or otherwise undermining the constitutional order of a State, or at

undermining the territorial integrity of a State.

**What are the limitations of the existing regime?**

One of the major challenges of the existing regulatory regime is the lack of a clear, unequivocal, and comprehensive legal definition of what constitutes a mercenary. This is compounded by the fact that the domestic laws of most states do not criminalise mercenary activity. Additionally, the definition outlined under Article 47 of the AP I does not include within its ambit foreign military personnel integrated into the armed forces of another state — such as the Gurkhas (soldiers from Nepal who have served in the British Army since the 1900s). It also fails to establish mechanisms for holding accountable foreigners employed as advisors and trainers.

Dr. Shubha Prasad, Assistant Professor of International Relations at the Hertie School, Berlin highlighted the emerging trend of private military and security companies (PMSCs) gradually taking over roles previously associated with mercenaries. "These for-profit companies provide a range of services from combat to food supplies for troops. The legal framework surrounding the operations of PMSCs is more loosely defined and relies heavily on a country's domestic legal capacity," she said.

For instance, the operations of the controversial Wagner Group in Russia have been increasingly subjected to international scrutiny. Despite being registered as a private entity, it reportedly includes Russian Army veterans among its ranks. While the direct participation of the Wagner Group has been evident in the Ukraine-Russia conflict, the Kremlin had never formally acknowledged its connections with it. This has posed challenges in calling for accountability and assessing whether the group qualifies as a mercenary organisation. However, reports of the military corporation's aborted attempt at a coup last year,

President Vladimir Putin acknowledged that it had received tens of billions of rubles in public money from the government.

Signatories to the Montreux Doctrine have committed to stronger state oversight of private military and security actors. States are obliged to check whether PMSCs comply with international humanitarian and human rights laws. However, neither India nor Russia is a signatory to this document. That does not preclude India from imposing tighter restrictions on the recruitment of Indian nationals for such enterprises. Furthermore, we need stronger international legal frameworks to safeguard individuals who are coerced or misled into contracting with PMSCs", Dr. Prasad added.

**What is the way forward**

According to Dr. Prasad, the Indian government should develop a robust policy framework to address distress migration and implement strict measures against human trafficking. "India should adopt a two-pronged approach," she suggested. "Long-term preventive measures should target the underlying economic factors that are driving people to leave the country, while immediate measures should prioritise educating the public and ensuring strong pre-travel vetting for Indians going to Russia or other conflict zones."

For instance, she pointed out that pre-travel approval from the MEA for travel to Russia could be another measure to check if there are suspicious cases of human trafficking. This will also enable the identification of companies that are exploiting Indians, she added.

In 2012, Bangladesh implemented the Dhaka Principles for Migration with Dignity for ethical overseas recruitment of migrants. The Nepal government in January banned its citizens from travelling to Russia or Ukraine for employment after 10 young men were killed and dozens following the military corporation's predominately in the Russian military.

## THE GIST

Over the past year, nearly 100 Indians have been recruited by the Russian Army after being reportedly duped by agents with the lure of money and a Russian passport.

The distinction between conventional combatants and mercenaries is a fundamental cornerstone of international humanitarian law (IHL). A combatant is typically a member of the armed forces of a party to the conflict, whereas a mercenary is recruited from a third-party state unrelated to the conflict. Mercenaries usually engage in hostilities motivated primarily by personal gain as opposed to virtues of patriotism associated with regular combatants.

One of the major challenges of the existing regulatory regime is the lack of a clear, unequivocal, and comprehensive legal definition of what constitutes a mercenary. This is compounded by the fact that the domestic laws of most states do not criminalise mercenary activity. The Indian government should develop a robust policy framework to address distress migration and implement strict measures against human trafficking.

# Laws on mercenaries in war zones

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- **One of the major challenges of the existing regulatory regime is the lack of a clear, unequivocal, and comprehensive legal definition of what constitutes a mercenary.**
- **This is compounded by the fact that the domestic laws of most states do not criminalise mercenary activity.**
- **The Indian government should develop a robust policy framework to address distress migration and implement strict measures against human trafficking.**

- **Article 47 of Additional Protocol I to the Geneva Conventions (API) envisages six cumulative conditions for a person to qualify as a mercenary.**
- **The person i) should be specially recruited locally or abroad in order to fight in an armed conflict,**
- **ii) has taken a direct part in the hostilities, iii) is motivated to take part in the hostilities essentially by the desire for private gain and, in fact, is promised, by or on behalf of a party to the conflict, material compensation substantially in excess of that promised or paid to combatants of similar ranks and functions in the armed forces of that party,**

- iv) is neither a national of a party to the conflict nor a resident of territory controlled by a party to the conflict,**
- v) is not a member of the armed forces of a party to the conflict,**
- vi) has not been sent by a state which is not a party to the conflict on official duty as a member of its armed forces.**

**Under customary IHL, being a mercenary itself does not constitute a specific crime.**

**However, if captured, they are not entitled to prisoner-of-war status or any protected categories under the Geneva Conventions.**

**This allows for their prosecution for war crimes or other grave breaches of humanitarian law.**



- **They may also face charges under the domestic laws of the detaining nation.**
- **Nevertheless, mercenaries qualify for humane treatment in accordance with the fundamental guarantees of humanitarian law, as outlined under Article 75 of the API.**
- **However, over time, African states began expressing reservations about this definition, as it only addressed international armed conflicts and overlooked civil wars, where mercenary activities were most prevalent.**
- **This led to the adoption of the Organization of African Unity Convention for the Elimination of Mercenarism in Africa in 1977**

- **Similarly, in 1989, the United Nations General Assembly (UNGA) adopted the International Convention against the Recruitment, Use, Financing and Training of Mercenaries that criminalised the recruitment, use, financing and training of mercenaries and also promoted inter-State cooperation in this regard.**

- **The charter also widened the prevailing definition of mercenaries as provided under the Additional Protocol I to the Geneva Conventions to include “persons recruited for the purpose of participating in a concerted act of violence aimed at overthrowing a government or otherwise undermining the constitutional order of a State, or at undermining the territorial integrity of a State**

# Negotiating for peace

India's decision to attend but not vote at the Swiss conference was right

**T**he two-day "Summit on Peace", that ended on Sunday in Burgenstock, met with mixed outcomes. Switzerland was able to bring together more than 90 countries, at least 56 were represented by leaders, and the final joint communiqué was signed by about 82 countries and organisations, with the exception of a few including India. The document made a strong call for an end to the "ongoing war of the Russian Federation against Ukraine" and a pitch for sovereignty, territorial integrity and adherence to international law. It cited three areas of broad understanding: nuclear safety, food security and the exchange of all prisoners of war, displaced and detained Ukrainians. The statement was not very ambitious in its scope, as the organisers were keen to bring as many countries, particularly from the 'Global South' on board – which they managed to do to some extent. However, despite all these areas where Ukrainian President Zelenskyy hailed a "historic victory", there were shortcomings. Switzerland's decision not to invite Russia, and to build their negotiations on the basis of the Ukraine Peace Formula along with UN resolutions, made the event appear one-sided. The failure in convincing China, which arguably holds the most sway over Moscow, to even send a delegation was another blow. That no BRICS member, current and future, signed on to the statement indicates that it was a non-starter among the emerging economies.

Switzerland, Ukraine and other western countries had made a special attempt to win India's favour for the conference, including a last minute appeal by Mr. Zelenskyy when he met PM Modi at the G-7 outreach summit in Italy. As a close partner of Russia, a key Global South player, and a country that has kept a balance in the conflict, India's presence would have been a major win for the organisers. However, while New Delhi sent the NSA and Deputy NSA to two preparatory conferences in Jeddah and Davos, the Indian delegation here was led by the Secretary (West) in the External Affairs Ministry. India has consistently abstained from every resolution at the UN, Security Council, IAEA, Human Rights Council and other multilateral fora that seeks to criticise Russia for its invasion of Ukraine. While India may share concerns over much of the text released at the conference, it could not have gone ahead with its overtly anti-Russian slant. In its presence, however, New Delhi showed that it is willing to be part of the process, especially if it leads to a more inclusive future conference, with Russia and Ukraine at the table. As a result, India's decision to attend the conference, but not endorse its outcome, was probably a foregone conclusion.



# Swiss conference (ukraine peace conference )

- **two-day “Summit on Peace”, that ended on in Burgenstock, (Switzerland) met with mixed outcomes.**
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# 'EU carbon border tax will penalise British green energy'

## NEWS ANALYSIS

Reuters

LONDON/BRUSSELS

British wind and solar farms exporting power to continental Europe could face CO2 fees from 2026—even though they don't produce any emissions—unless the United Kingdom (UK) and European Union (EU) can agree to changes around the EU's carbon border tax.

The charges, set out in a little-noticed clause of the CO2 levy law, could hit revenues of renewable energy projects in the UK, add to already-high EU power prices and even lead to higher emissions, industry sources and analysts told *Reuters*.

"It's a problem on both sides," said Adam Berman, deputy director of industry group Energy UK.

"(It) disincentivises clean power in the UK at the moment in which we're trying to ramp up provision of clean power, and it's going to increase (power) prices in northern Europe."

The Carbon Border Adjustment Mechanism (CBAM) will impose a CO2 emissions fee on imports to the EU of steel, cement, aluminium, fertilisers, electricity and hydrogen, unless the exporting nation has equal CO2 pricing policies.

Under its current design, the CO2 fee for power would be calculated using a default value based on average and historic power



**Green penalty:** EU charges can make it uneconomical to export excess clean power to Europe. REUTERS

generation emissions. The British energy industry says that will unfairly penalise renewables.

"It is an issue that we are conscious of and one that we have raised, that the UK

has raised, with the EU," Catherine Stewart, the UK Treasury's deputy director for trade policy, told an event in Brussels last month.

A European Commis-

sion spokesperson said it would continue talks with all countries, including the UK, on the design of the carbon levy before finalising its application from 2026.

The extra cost could make it uneconomical to export excess clean power from Britain to Europe at certain times when demand is weaker, renewables generation is high, and power prices are low, analysts said.

Analysis from Aurora Energy Research, shared with *Reuters*, showed as much as 3 gigawatt hours (GWh) of renewable power generation, enough to power up to 2,000 homes a year, could be curtailed by 2030 if the fee proves a disincentive to exporters.

"You are adding a tax on exporting, so this essentially reduces the profit margin every time you want to export," said Pranav Menon, GB Power & Renewables Lead at Aurora.

In 2030, the carbon bor-

der fee could knock 5% off the price British renewable projects can earn for their power, Aurora said.

### Higher prices

Reduced access to cheap British electricity could increase wholesale power prices by up to 4% in markets like Ireland and Northern Ireland's Integrated Electricity Market which import a lot of power from the UK, the Aurora analysis showed.

If European countries boost coal and gas power generation to make up the shortfall, CO2 emissions could even rise—by as much as 13 million tonnes a year, equivalent to emissions of 8 million cars, an earlier analysis by AFRY suggested.

A European Commis-

sion spokesperson said renewable power exports will be able to avoid the CO2 fee if they can comply with certain criteria and prove their origin.

But industry figures say that could be tough.

"Most of the electricity (across interconnectors) is traded anonymously ... so it's almost impossible to demonstrate what that carbon content is," said Pieter-Jan Marsboom, products and services manager at UK-Belgian power interconnector Nemo Link.

British and EU diplomats have quietly begun discussing the issue, but the highly political nature of any post-Brexit deals between the two means no progress is expected before the UK general election on July 4.

## **EU's Carbon Border Adjustment Mechanism (CBAM)**

- **The EU's Carbon Border Adjustment Mechanism (CBAM) is the EU's tool to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries.**
- **By confirming that a price has been paid for the embedded carbon emissions generated in the production of certain goods imported into the EU, the CBAM will ensure the carbon price of imports is equivalent to the carbon price of domestic production, and that the EU's climate objectives are not undermined. The CBAM is designed to be compatible with WTO-rules.**
- **CBAM will apply in its definitive regime from 2026, while the current transitional phase lasts between 2023 and 2025.**



# Carbon border adjustment mechanism (CBAM) own resource



## Why in news ??

- **British wind and solar farms exporting power to continental Europe could face CO<sub>2</sub> fees from 2026— even though they don't produce any emissions— unless the United Kingdom (UK) and European Union (EU) can agree to changes around the EU's carbon border tax**



Inuit hunters look for seals in Ittoqqortoormiit on the frozen Scoresbysund Fjord on April 25. AFP

## Greenland's Inuit polar bear hunters live on very thin ice

**Agence France-Presse**

ITTOQQORTOORMIIT (DENMARK)

Inuit hunter Hjelmer Hammeken, 66, spotted a ringed seal near its breathing hole on the Greenland ice. In his white camouflage, he slowly crept towards it then lay down in the snow and waited.

When the right moment came, he tapped his feet together. The seal lifted its head to look where the noise was coming from and the hunter fired. He butchered the animal there and then, eating some of its liver while it was still warm, as his ancestors have done for centuries – the hunter's reward. Such scenes are common around the hugely isolated Inuit community of Ittoqqortoormiit, the world's biggest fjord on the frozen east coast of Greenland.

But for the last two decades climate change and hunting quotas have been threatening the livelihood on which Inuit families have long survived.

Mr. Hammeken made his reputation in the 1980s. He would go out alone for several weeks at a time, to bring back up to three polar bears.

That ended in 2005 when quotas were put in place to slow the fall in polar bear numbers. Climate change has also turned the lives of the Inuit upside down – with the Arctic warming four times faster than the global average.

"Before we could hunt all year," said Mr. Hammeken. "In winter the ice was harder... and the fjord never melted."

"In August, all the ice sheet will have melted. There will be just the sea, a rough sea," which will make hunting difficult, he said. With little ice on which to hunt seals, he wondered how the polar bears, stuck on land and starving now in the summers, would survive.

# Inuit

- Inuit are a group of culturally and historically similar Indigenous peoples traditionally inhabiting the Arctic and subarctic regions of North America, including Greenland, Labrador, Quebec, Nunavut, the Northwest Territories, Yukon, Alaska, and Chukotsky District of Chukotka Autonomous Okrug, Russia



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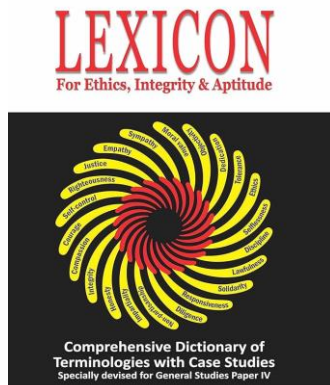
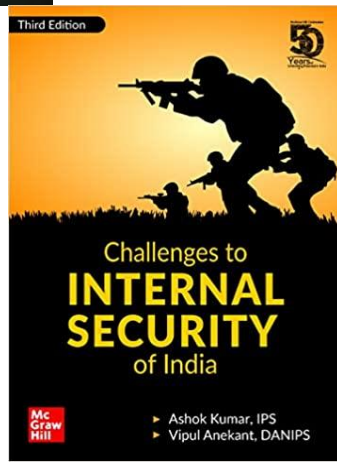
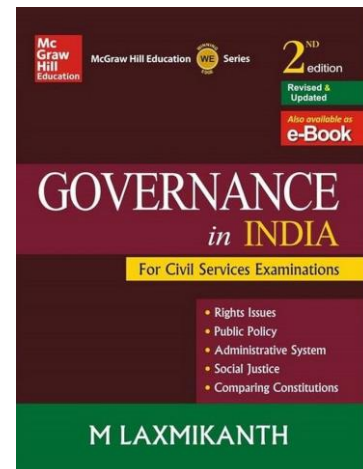
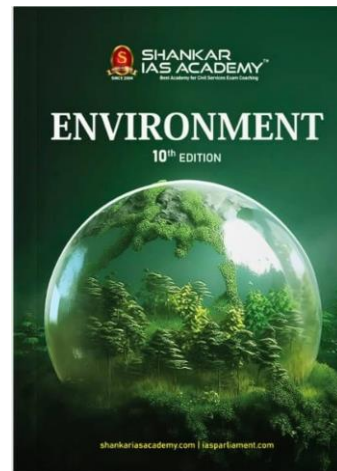
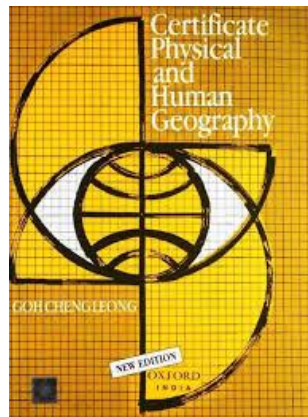
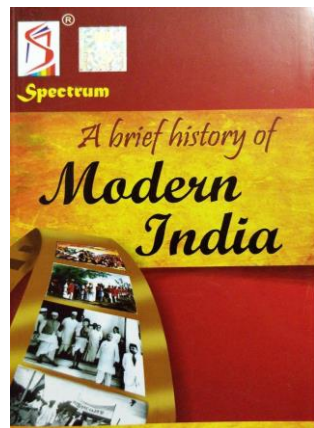
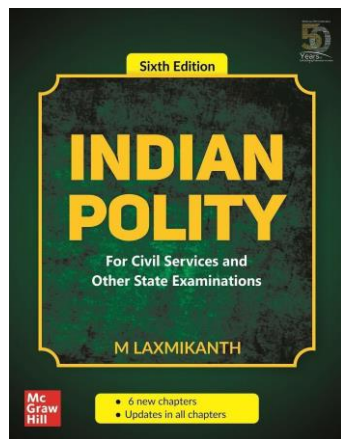
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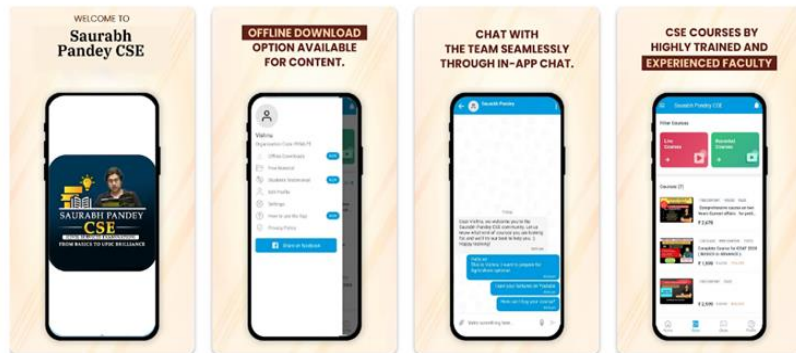
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# Saurabh pandey upsc performance - UPSC PRELIMS 2024 ( Detailed pdf to be shared )



X 22nd october 2...



### Periodical cicada emergence disrupts food webs

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual prey – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

- The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence.

The cicadas are a superfamily, the Cicadoidea, of insects in the order

Hemiptera.



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X 10th october 2...



States as per Article 244(2).

### What are Scheduled Areas?

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

### How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.



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X 7TH DECEMBE...



### Garba dance of Gujarat makes it to UNESCO list

Sneeparna Chakrabarty  
NEW DELHI

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

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



Garba dance performance in Gujarat.

**Climate change is making the world sick**  
A new report from the World Health Organization (WHO) says that climate change is making the world sick. The report says that climate change is causing a rise in the number of people who are sick and dying from heat, drought, and other weather-related events. It also says that climate change is causing a rise in the number of people who are sick and dying from diseases that are spread by insects, such as mosquitoes and ticks. The report says that climate change is causing a rise in the number of people who are sick and dying from diseases that are spread by insects, such as mosquitoes and ticks. The report says that climate change is causing a rise in the number of people who are sick and dying from diseases that are spread by insects, such as mosquitoes and ticks.



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 Russia loads 'Avangard' missile into launch Silo, fears of nuclear warfare on rise | World DNA

Que-3 With reference to exercise 'Mitra Shakti', consider the following statements

- Between India and Nepal.
- The aim of the exercise is to jointly rehearse sub-conventional operations under Chapter VII of the United Nations Charter, which authorises the Security Council to take enforcement measures, including the use of military force, to address threats to international peace and security.
- "Exercise MITRA SHAKTI-2023" recently commenced in Goa.

How many of the above statements are correct?

- Only one
- Only two
- All three
- None

Ans 3- (a)

- "Exercise MITRA SHAKTI-2023" recently commenced in Aundh (Pune).
- Between India and Sri Lanka.

1:17

PRELIMS 18th N...

- The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

#### Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warrant — to show by what warrant is a person holding public office;

- Prohibition — directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and
- Certiorari — re-examination of an order given by judicial, quasi-judicial or administrative authorities.
- In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.
- When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.
- Article 226, however, is not a fundamental right like Article 32.

12th BRICS

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1:19

28th october 2...

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 1023 Nobel Prize In Economic Sciences Awarded to Claudia Gold...  
 Simon Cipher Case He 3rd Missing Israel Hamas War  
 ... awarded to ... of women's  
 CURRENT AFFAIRS BY SAURABH PANDEY SIR  
 Que-2 Consider the following statements  
 1- Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.  
 2- Articles 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(3).  
 3- The Prime Minister of India notifies India's Scheduled Areas.  
 How many of the above statements are correct?  
 a) Only one b) Only two  
 c) All three d) None

Ans- (b)  
 The President of India notifies India's Scheduled Areas.  
 Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh. In 2015, Kerala proposed to notify 2,133 habitations, five gram panchayats, and two wards in five districts. It awaits the Indian government's approval.  
 The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.  
 The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make regulations for a Scheduled Area, especially to prohibit or restrict the transfer of forest land by or among members of the STs, and regulate the allotment of land to STs and money-lending to STs.

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12:40

X polity 11th augu...

## Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

### Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

X 18th Septembe...

## Santiniketan finds its place on UNESCO's World Heritage List

Should body makes announcement on Sunday. Mantra says new, named in Tagore, has been supported by Bengal Culture Ministry seek to bring in human values

By India Staff

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, has been added to the UNESCO's World Heritage List. The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture and its rich cultural heritage.



The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture and its rich cultural heritage. It is a place where Tagore laid the foundations of Visva-Bharati University.

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum district, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the foundations of Visva-Bharati University.

## EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Lab migration have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

By Staff

Continues

European Commission President Ursula von der Leyen has promised to take action to address the humanitarian crisis on the Italian island of Lampedusa, where thousands of migrants are stranded.



Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Lab migration have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

The EU chief has promised to take action to address the humanitarian crisis on the Italian island of Lampedusa, where thousands of migrants are stranded. She said that the EU will provide financial and technical support to the Italian government to manage the crisis.

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-2 With reference to Parliaments special sessions, consider the following statements

- There is specific provision in the Constitution that deals with special sessions.
- Article 352, which deals with the proclamation of Emergency, refers to a "special sitting" of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.

3- The Question Hour was suspended during the session.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.
- The Hoysala Temples, built in the 12th and 13th centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.
- The temples became targets of plundered and destruction by the Delhi Sultanate army of Ala-ud-din Khilji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughlaq in 1326 AD.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-4 Consider the following statements about SHREYAS scheme

- It comprises 4 central sector sub-schemes.
- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.
- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-5 Consider the following statements about Women's Reservation Bill

- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve 33% of seats in Lok Sabha and state Assemblies for women.



12:03

X prelims pointer...



- Que-5** With reference to Shumang Leela, consider the following statements
- Shumang Leela is a traditional form of theatre in Tripura.
  - In this the roles of women are all played by men, called Nupi Shabis.
  - It is performed in an open courtyard surrounded by spectators on all four sides.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- Shumang Leela is a traditional form of theatre in Manipur.
  - In the case of women's theatre groups, the roles of men are played by women.
  - Shumang Leela translates to "courtyard performance".
  - Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.
- Que-6** Consider the following statements about Red Sanders also called Red Sandalwood
- It is a species found in the southern tropical dry deciduous forest of Telangana.
  - The tree reaches an average height of 10 to 15 metres.
  - The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.
- Which of the following given above is/are correct
- a) 1 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
  - CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
  - In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
  - The heartwood of Red Sanders is in demand in the domestic and international markets for making

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furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

**Que-7** Consider the following statements about Compressed Biogas (CBG) and compressed natural gas (CNG)

- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.
- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.
- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

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

**Que-8** Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARDHAN) in the Union Budget 2023. Consider the following statements about this

- The new GOBARDHAN scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.
- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.
- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

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

12:05

X prelims pointer...



- Que-7** Lamu Archipelago, recently in News, belongs to which country
- a) Somalia  
b) Malaysia  
c) Indonesia  
d) Kenya
- Ans: (d)
- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.
- Que-8** Consider the following statements about "Operation Sadbhavana", recently in News
- Launched by an Indian Army.
  - For development of Jammu and Kashmir.
  - Some of the objectives achieved through Operation Sadbhavana are national integration, tourism, women's empowerment, employment generation, education, and
- development activities geared towards nation-building.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 only
- Ans: (b)
- For development of Ladakh.
  - The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

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**Que-1** Consider the following statements

- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.
- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.
- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

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

- Ans: (c)
- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.

of what we call persistence, allowing satellites to capture images continuously.

**Que-2** With reference to Paris Club, consider the following statements

- The Paris Club is a group of mostly western creditor countries.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

Which of the following given above is/are correct

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

- Ans: (b)
- It grew from a 1956 meeting in which

12:35

X may 2024 impo...



## Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.
- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

## Pros and Cons of Exchange-Traded Funds



## BIMSTEC

WHAT YOU SHOULD KNOW



11:29



X 12th august 2023



## DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission

- In India, such Delimitation Commissions have been constituted 4 times - in 1952 under the Delimitation Commission Act, 1952, in 1962 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.

- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.



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defends use of  
Saurabh Kutumbak

11:37



X Mock Series 17t...



productivity, uphold good health and prevent poverty.

- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

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Question 5 With reference to Doppler radar network, consider the following statements

- 1 It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.
- 2 It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.

The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

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

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- 5- (c)
  - It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?

- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?

- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?

- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

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Question 6 Consider the following statements about Army Day

- 1 India celebrates Army Day on January 15 every year.
- 2 The Army Day is celebrated every year to honour Cariappa and the defence forces.
- 3 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

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

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5- (d)

- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004, with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)

- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)

- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)

- The Chief of Defence Staff is principally responsible for getting the armed forces better integrated rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, and Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Minister only on tri-services matters. The three service chiefs will continue to advise the Defence Minister exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance of the three services.



# Target Mains -2024/25 -

**Q Constitutional morality to b 'situational based not just 'constitutional provision based'. Examine**

Q संवैधानिक नैतिकता केवल 'संवैधानिक प्रावधान आधारित' नहीं, बल्कि परिस्थितिजन्य आधारित है।  
परीक्षण करना

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# Topics

- caecilian (Ichthyophis spp)
- What is the alcohol in liquor?
- Changes in china's fiscal revenue system.
- Strategic Alliance Agreement (SAA)
- Russia and north korea
- Mains



By saurabh Pandey







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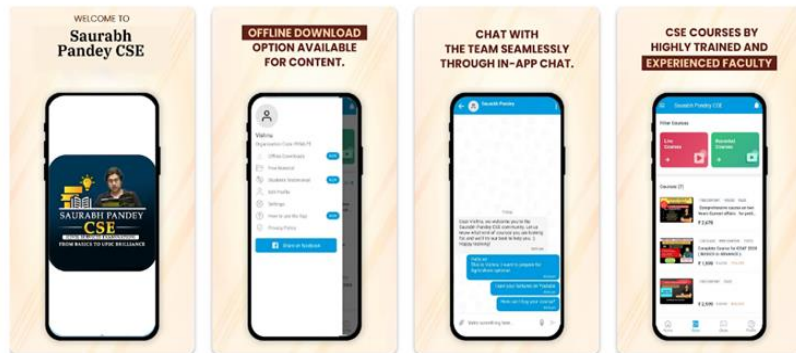
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# Target Mains -2024/25 -

**Q "India's interest in west asia has moved beyond energy security " Discuss**

प्रश्न "पश्चिम एशिया में भारत की रुचि ऊर्जा सुरक्षा से आगे बढ़ गई है" चर्चा करें

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# Limbless amphibian found in Kaziranga for first time

**The Hindu Bureau**  
GUWAHATI

A limbless amphibian has been added to the fauna in the 1,307.49 sq. km Kaziranga National Park and Tiger Reserve.

Assam's wildlife officials said a team of herpetologists recorded the striped caecilian (*Ichthyophis spp*) in the tiger reserve for the first time during a rapid herpetofauna survey conducted from June 14-17.

The survey was conducted with support from Saibal Sengupta of Assam Don Bosco University; Abhijit Das of the Wildlife Institute of India; Rajeev Basumatary and Samrat Sengupta of D.R. College in eastern Assam's Golaghat; Jaydev Mandal of Madhab Choudhury College in western Assam's Barpeta; Jayaditya Purkayastha of Guwahati-based Help Earth; Jayanta Kumar Roy of Aaranyak; and Sushmita Kar of the Turtle Survival Alliance.

Reptiles and amphibians, collectively called



The striped caecilian. SPECIAL ARRANGEMENT

herpetofauna, are the least studied but most vulnerable to climate change. "Caecilians are limbless amphibians that spend most of their lives burrowed under soil. They are, therefore, the least studied of the amphibian species. As they are an ancient species, their presence holds critical linkages to evolution and intercontinental speciation," a statement issued by the Kaziranga authorities said.

The diverse ecosystem of Kaziranga, comprising flood plains, wetlands,

grasslands, and hill tracts on the periphery, provides an ideal habitat for herpetofauna. The tiger reserve houses 24 species of amphibians and 74 species of reptiles. It is also home to 21 of the 29 species of tortoises and freshwater turtles found in India.

Kaziranga's Director, Sonali Ghosh, said, "a training and sensitisation programme was held to enhance the skills of forest personnel in herpetofauna identification and conservation for ensuring better management and protection of these vital species."

## **caecilian (*Ichthyophis* spp)**

- **A limbless amphibian has been added to the fauna in the 1,307.49 sq. km Kaziranga National Park and Tiger Reserve.**
- **Assam's wildlife officials said a team of herpetologists recorded the striped caecilian (*Ichthyophis* spp) in the tiger reserve for the first time during a rapid herpetofauna survey**



The striped caecilian SPECIAL ARRANGEMENT

- **Reptiles and amphibians, collectively called herpetofauna, are the least studied but most vulnerable to climate change.**
- **“Caecilians are limbless amphibians that spend most of their lives burrowed under soil.**



# Why is dangerous is methanol poisoning?

What happened in the Kallakurichi district of Tamil Nadu? How is spurious liquor made and why does it have deadly effects? Why is methanol added to liquor and how is it processed by the body if ingested? Is treatment effective?

## EXPLAINER

Yasudevan Mukundh

The story so far:

**A**s of 9.30 p.m. on June 20, at least 38 people had died after consuming spurious liquor in the Kallakurichi district of Tamil Nadu while as many as 82 others were receiving treatment in hospitals. Immediately after news of the deaths broke, Chief Minister M.K. Stalin had the Collector transferred and the district superintendent of police suspended. The State has also deployed 2,000 police personnel around the district. The tragedy echoes a similar incident a year ago in the State's Chengalpattu and Villupuram districts, in which more than 20 people died after consuming spurious liquor. Liquor sales in Tamil Nadu are controlled by the State, through around 5,000 outlets.

**What is the alcohol in liquor?**

Liquor is differentiated by its alcohol content - from the 5% or so of beer to the 12% or so of wine to the 40% or so of distilled spirits (all by volume). In the beverages consumed for recreational purposes, the alcohol in question is almost always ethanol. In this context, ethanol is technically a psychoactive drug that, in low doses, reduces the level of neurotransmission in the body, leading to its typical intoxicating effects.

Contrary to popular belief, the World Health Organisation has found "no level of [its] consumption is safe for our health". Long-term use leads to dependence, heightens the risk of some cancers and heart disease, and may eventually cause death.

Ethanol ( $C_2H_5OH$ ) is one carbon atom bonded to three hydrogen atoms and one more carbon atom; the second carbon atom is also bonded to two hydrogen atoms and the hydroxyl group, also known as the  $OH^-$ . Inside the body, ethanol is metabolised in the liver and the stomach by alcohol dehydrogenase (ADH) enzymes to acetaldehyde. Then, acetaldehyde is transformed into acetate by aldehyde dehydrogenase (ALDH) enzymes. The adverse effects of alcohol consumption, from the hangover to a cancer, are due to acetaldehyde.

**What is spurious liquor?**

Spurious liquor is characterised by the liquid mixture containing methanol as well. The police were able to determine last year that the spurious liquor in both the Chengalpattu and Villupuram incidents arose from the same source, and that attack sellers had purchased methanol from factories and sold it to the victims (Arrack is distilled from the fermented sap of the palm tree). Following the Kallakurichi incident, Mr. Stalin constituted a one-man commission headed by former High Court judge B. Gokuldas to inquire into the tragedy.

In many other cases, spurious liquor has typically been a homemade liquor to which methanol was added to strengthen the intoxicating effects in colloquial parlance, to 'kick' and/or to increase its bulk volume. The Food Safety and Standards (Alcoholic Beverages) Regulations 2018 stipulate the maximum permissible quantity of methanol in different liquors. These values span a wide range, including "absent" in coconut fenny, 50 grams per 100 litres of country liquor, and 300 grams per 100 litres of pot-distilled spirits.

**What is methanol?**

The chemical molecule ( $CH_3OH$ ) consists



**Tragic event:** The bodies of victims who died after consuming spurious liquor being cremated at Kanunapuram in Kallakurichi on June 20, KUNAR S.S.

of one carbon atom bonded with three hydrogen atoms and one hydroxyl group. Schedule 1 of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 includes methanol. The Indian Standard IS 817 applies to how the quality of methanol is to be ascertained and, together with the Tamil Nadu Denatured Spirit, Methyl Alcohol, and Vernish (French Polish) Rules 1959, what signage methanol packaging should carry.

The most common way to produce methanol is to combine carbon monoxide and hydrogen in the presence of copper and zinc oxides as catalysts at 50-60 atm of pressure and 250 °C. In the pre-industrial era, going back to ancient Egypt, people made methanol together with several other byproducts by heating wood to a very high temperature.

Methanol has several industrial applications, including as a precursor to acetic acid, formaldehyde, and aromatic hydrocarbons. It is also used as a solvent and as antifreeze. In Tamil Nadu, the manufacture, trade, storage, and sale of methanol requires licences under the 1959 Rules.

**How does spurious liquor kill?**

The deadliness of spurious liquor arises from methanol. James Manor, emeritus professor of Commonwealth Studies at the University of London, wrote in December 2022, "in every hoosh tragedy in the history of India - and of the world since 1945 - the poison has been methanol". The human body contains infinitesimal quantities of methanol (4.5 ppm in the breath of healthy individuals, per a 2006 study) as a result of eating some fruits. But even for an adult, more than 0.1 ml of pure methanol per kilogram of body weight can be devastating.

Once ingested, ADH enzymes metabolise methanol in the liver to form formaldehyde ( $H_2CHO$ ). Then ALDH enzymes convert formaldehyde to formic acid ( $HCOOH$ ). The accumulation of formic acid over time leads to a condition called metabolic acidosis, which can lead to acidemia: when the blood's pH drops below its normal value of 7.35, becoming increasingly acidic. The blood's pH is normally maintained by a balance between an acid, like carbon dioxide ( $CO_2$ ), and a base, like the bicarbonate ion ( $HCO_3^-$ ). The 'metabolic' in 'metabolic acidosis' means the concentration of the bicarbonate ion is dropping, leading to the acid gaining the upper hand. Formic acid also interferes with an enzyme called cytochrome oxidase, disrupting cells' ability to use oxygen and leading to the build-up of lactic acid and contributing to acidosis.

According to a paper published by the journal *Archives of Toxicology* in January 2022, consuming methanol also leads to "methanol-induced optic neuropathy" - a serious condition that may result in long-term or irreversible visual impairment or even blindness (due to damage and loss of function of the optic nerve and retina). This consequence "shows a tendency to occur as mass poisonings around the world with a clear predilection for poor societies in developing countries", it added.

Methanol poisoning can also cause cerebral edema, haemorrhage, and death.

**How can methanol-poisoning be treated?**

Once methanol is ingested, the body takes some time to completely eliminate it. One estimate suggests as much as 33% is still left behind after 48 hours. It is completely absorbed via the gastrointestinal tract.

And blood methanol level can reach its maximum value within 90 minutes.

There are two immediate ways to treat methanol poisoning. One is to administer pharmaceutical-grade ethanol. This may sound counter-intuitive but ethanol competes very well with methanol for the ADH enzymes, which metabolise ethanol around 10x faster. As a result, the methanol is kept from being metabolised to formaldehyde.

The other option is to administer an antidote called fomepizole, which has a similar mechanism: it slows the action of the ADH enzymes, causing the body to produce formaldehyde at a rate the body can quickly excrete, preventing the deadlier effects from kicking in.

Both courses of action are limited by availability: fomepizole is expensive whereas pharmaceutical-grade ethanol needs to be administered under expert supervision. Healthcare workers may also have the individual undergo a dialysis to remove methanol and formic acid salts from the blood, and mitigate damage to the kidneys and the retina.

They may also administer folic acid, which encourages the formic acid to break up into carbon dioxide and water. Both fomepizole and folic acid are in the WHO's list of essential medicines.

The formic acid would have begun accumulating in dangerous amounts around 8-24 hours after ingestion, affecting the optic nerve, kidneys, the heart, and the brain. Ophthalmic effects have been observed even in those who have consumed methanol, and they become apparent within 24 hours.

If the individual consumed ethanol along with the methanol, the damage may not be evident until after a few days, further delaying treatment and increasing mortality.

## THE GIST

At least 38 people had died after consuming spurious liquor in the Kallakurichi district of Tamil Nadu.

The deadliness of spurious liquor arises from methanol. James Manor, emeritus professor of Commonwealth Studies at the University of London, wrote in December 2022, "in every hoosh tragedy in the history of India - and of the world since 1945 - the poison has been methanol."

More than 0.1 ml of pure methanol per kilogram of body weight can be devastating.

Methanol-poisoning can also cause cerebral edema, haemorrhage, and death.



SAIBASH PANDEY  
CSE  
EDITOR OF THE WIRE



## What is the alcohol in liquor?

- **Liquor is differentiated by its alcohol content — from the 5% or so of beer to the 12% or so of wine to the 40% or so of distilled spirits (all by volume).**
- **In the beverages consumed for recreational purposes, the alcohol in question is almost always ethanol.**
- **In this context, ethanol is technically a psychoactive drug that, in low doses, reduces the level of neurotransmission in the body, leading to its typical intoxicating effects.**

- **Ethanol ( $C_2H_5OH$ ) is one carbon atom bonded to three hydrogen atoms and one more carbon atom;**
- **the second carbon atom is also bonded to two hydrogen atoms and the hydroxyl group, also known as the ion  $OH^-$ .**
- **Inside the body, ethanol is metabolised in the liver and the stomach by alcohol dehydrogenase (ADH) enzymes to acetaldehyde.**
- **Then, acetaldehyde is transformed into acetate by aldehyde dehydrogenase (ALDH) enzymes**

**Spurious liquor is characterised by the liquid mixture containing methanol as well.**

## **What is methanol?**

- **The methanol molecule ( $\text{CH}_3\text{OH}$ ) consists of one carbon atom bonded with three hydrogen atoms and one hydroxyl group.**
- **The most common way to produce methanol is to combine carbon monoxide and hydrogen in the presence of copper and zinc oxides as catalysts at 50-100 atm of pressure and  $250^\circ \text{C}$ .**

- **In the pre-industrial era, going back to ancient Egypt, people made methanol (together with several other byproducts) by heating wood to a very high temperature.**
- **Methanol has several industrial applications, including as a precursor to acetic acid, formaldehyde, and aromatic hydrocarbons.**

- **There are two immediate ways to treat methanol poisoning.**
- **One is to administer pharmaceutical-grade ethanol.**
- **This may sound counter-intuitive but ethanol competes very well with methanol for the ADH enzymes, which metabolise ethanol around 10x faster.**
- **As a result, the methanol is kept from being metabolised to formaldehyde.**
- **The other option is to administer an antidote called fomepizole, which has a similar mechanism: it slows the action of the ADH enzymes, causing the body to produce formaldehyde at a rate the body can quickly excrete, preventing the deadlier effects from kicking in**

- **also administer folinic acid, which encourages the formic acid to break up into carbon dioxide and water.**
- **Both fomepizole and folinic acid are in the WHO's list of essential medicines.**

# China's key plenum aims to fix decades-old tax revenue imbalance

The plenum is set to discuss the biggest changes to China's fiscal system in three decades, hoping to ease concerns over a \$13 trn. local government debt pile; in 2023, local governments' own fiscal revenues accounted for 54% of the nation's total, but their expenditures accounted for 86%

## NEWS ANALYSIS

Reuters  
BEIJING

**L**ong-touted changes to China's tax system will focus on allowing local governments to retain more fiscal revenues, say policy advisers, widely seen by markets as an important step towards removing an immediate threat to financial stability.

Measures that redistribute income from central authorities to municipalities, curbing an addiction to land sales laid bare by China's property crisis, will top the agenda of a leadership gathering in July, known as the third plenum, they said.

"Pressure is high to push reforms to bolster local government revenue after the end of the land finance phase," said one of four policy advisers who spoke to Reuters.

### Big changes

The plenum is set to discuss the biggest changes to China's fiscal system in three decades, with policymakers hoping to ease concerns over a \$13 trillion-and-growing local government debt pile that poses risks to financial institutions and growth.

In 2023, local governments' own fiscal revenues accounted for 54% of the nation's total, but their ex-



**Tough choice:** Taxing household income is difficult as top earners are already taxed at 45%

penditures accounted for 86%, data from the finance ministry showed.

This imbalance stems from the fiscal reforms of 1994, when China aimed to limit localities' capacity to independently raise money, following a surge in local spending and inflation in the late 1980s.

But local governments got around those limitations by creating off-budget financing vehicles and by auctioning land for residential development, fuelling a giant housing bubble.

Land sales' contribution to local budgets rose from a fifth to almost a third in the decade leading up to 2021, when China entered a severe property market downturn. It is no longer a reliable cash cow: such in-



Local governments' spending should be based on their fiscal capacity. A mature society no longer needs to find special ways to build more infrastructure

- A Chinese policy advisor

comes shrank to 5.8 trillion yuan in 2023 from a 2021 peak of 8.7 trillion.

Chinese leaders flagged plans for fiscal reforms at an annual meeting in December, without offering details. Policy advisers said the main changes are likely to revolve around how much revenue local governments retain, rather

than adding or hiking taxes. Municipalities currently get half of value-added tax revenue and 40% of personal income tax, while the central government gets most corporate income tax and all of what China calls a consumption tax, currently levied on producers and importers.

The advisers did not give figures on the future division of tax income between central and local governments.

But they said local governments may be allowed to keep most of the consumption tax - which accounts for almost a tenth of China's total tax revenues - and more of the value-added tax - which accounts for more than a third.

Proposals also include

Beijing taking over growing commitments on pensions and healthcare as the population ages. The aim is to stop municipal debt accumulation by balancing revenues with expenditure, the advisers said.

"Local governments' spending should be based on their fiscal capacity," said a second adviser. "A mature society no longer needs to find special ways to build more infrastructure."

### Still imbalanced

The fiscal overhaul will likely stop short of addressing other structural imbalances, such as an over-reliance on investment and exports and weak household consumption, analysts say.

China taxes capital gains at 20%. While subject to many exemptions, it is also lower than the 30% in India and 37% in the U.S.

But investment yields dwindling returns, as evidenced by debt significantly outgrowing China's GDP for the past 15 years.

Therefore, tax revenue is also low. The IMF calculates China's tax-to-GDP ratio at 14%, versus a 23% average for G7 economies.

This makes social spending difficult to fund without raising taxes on capital or businesses. Taxing households more is a difficult proposition as China's upper personal income tax band is among

the world's steepest, at 45%. The difference between how capital and labour are taxed encourages low wages and high investment.

But reversing that runs counter to Beijing's strategic goals of global industrial and technological leadership, which channel resources to factories and science laboratories, rather than consumers.

"Tax reforms should support industrial development," said policy adviser Jia Kang, founding president of the China Academy of New Supply-Side Economics. China still needed to "grow the pie," he added.

Still, one seed for a longer-term tilt towards consumption may yet be planted at the plenum.

Chinese media said policymakers may shift the point of charging the consumption tax to wholesalers and retailers.

This tax currently only applies to 15 types of goods. Domestic demand for these items has limited impact on China's productivity.

Goldman Sachs analysts say charging consumers shifts incentives for local officials from growing their manufacturing base to growing their consumer base. But that would require a broader application of the tax at a time when consumption remains weak.



# Changes in china's fiscal revenue system.

- Long-touted changes to China's tax system will focus on allowing local governments to retain more fiscal revenues.
- widely seen by markets as an important step towards removing an immediate threat to financial stability.
- Measures that redistribute income from central authorities to municipalities, curbing an addiction to land sales laid bare by China's property crisis.

- **The plenum is set to discuss the biggest changes to China's fiscal system in three decades, with policymakers hoping to ease concerns over a \$13 trillion and-growing local government debt pile that poses risks to financial institutions and growth.**

# The U.S.-Saudi agreement, from fist-bump to embrace



Over eight decades of eventful ties between the United States and the Kingdom of Saudi Arabia have had their ups and downs – from the oil embargo of 1973 to the Jamal Khashoggi assassination in 2018. However, two images of this relationship remain iconic: the first is of the meeting between the U.S. President Franklin D. Roosevelt and the King of Saudi Arabia, Abdul Aziz Al-Saud on Valentine's Day 1945 aboard a U.S. cruiser beginning seven decades of an unbroken bilateral bromance. It was underpinned by an understated but seminal “oil-for-security” symbiosis. The second iconic frame is the fist-bump of July 15, 2022 in Riyadh between U.S. President Joe Biden and Saudi Crown Prince Mohammed bin Salman (MbS), symbolising a more equal and largely transactional partnership.

If the buzz around is to be believed, Riyadh and Washington are on the verge of a new and enhanced relationship, tentatively titled Strategic Alliance Agreement (SAA). This “Grand Bargain” between them being negotiated for the past year is designed to match the domestic and regional ambitions of Al-Saud under MbS with the keenness of the White House to score a diplomatic success big enough to ensure Mr. Biden's re-election.

## The layers to the agreement

Reading between the lines of the U.S. media's episodic coverage, the SAA could have three interlinked components: bilateral, regional and global. At a bilateral level, it would codify the current implicit bilateral alliance into a strategic defence pact modelled on the U.S.-Japan treaty committing the Pentagon to come to the Kingdom's rescue in case of an attack. The U.S. would also equip Riyadh with means to defend itself which would include the state-of-art F-35 stealth fighters. More surprisingly, Washington, a non-proliferation hawk, seems to be agreeable to providing Saudi Arabia with nuclear technology for peaceful use. At a regional level, Riyadh wants a ceasefire in Gaza and some movement towards a two-state solution to the Israel-Palestine problem. As a *quid pro quo* for Riyadh's maximalist demands, Washington reportedly has put forth a daunting wish list of its own. It wants Riyadh to recognise Israel and have full normal diplomatic relations. It also wants the Kingdom to ring-fence its foreign policy to avoid getting too close to Washington's rivals, specifically, Beijing and Moscow.

While the precise economic underpinnings of the incipient SAA are not known, they are likely to be quite substantive. Although the U.S. is no longer dependent on Saudi oil supplies, the two sides are unlikely to abandon their long-standing coordination to balance the global market between the U.S. need for cheaper energy with a Saudi quest for higher oil revenue. The SAA is



**Mahesh Sachdev**

a former Indian  
Ambassador

likely to ensure that the lion's share of the projects under MbS's Vision 2030 goes to American companies.

It was apparently China's President Xi Jinping's epochal State visit to Riyadh in December 2022, with triple summits, which forced Washington to revamp its ties with Saudi Arabia. Slowly, a U.S. diplomatic counter-offensive to forestall “losing Saudi Arabia” began to take shape. To U.S. strategists, a decline in the oil-for-security paradigm notwithstanding, Saudi Arabia retains much of its importance. As the custodian of Islam's two holy shrines, the Kingdom has been the most important determinant of the Ummah, the 1.4 billion Muslims all over the world. So, if Saudi Arabia agrees to become the fifth Abraham Accord Arab state to recognise Israel's right to exist, this could geopolitically reconfigure not only West Asia but also push much of the Islamic world to follow Riyadh's lead. Second, Saudi Arabia remains the largest economy in both the Arab and Islamic world and an ambitious Vision 2030 offered very lucrative pickings. Last but not least, during his decade at the helm, MbS has not only consolidated power but also taken bold and often controversial reforms. If any Grand Bargain is to be implemented, young and dynamic MbS would be the right person to carry it through.

## The hurdles

The SAA project faces two formidable odds on its way to realisation. First, the past decade has seen a rise in the bilateral trust deficit. In 1990-91, the U.S. deployed troops to evict Saddam Hussein's forces from Kuwait poised to threaten Saudi Arabia. However, when Saudi Arabia's largest oil processing facility at Abqaiq and Khurais was attacked in 2019, the U.S. did practically nothing. Moreover, the U.S. banned the supply of some weapons during the Yemeni war, citing their possible misuse. The U.S. perceived ambivalence towards Iran in general and the signing of the nuclear agreement (the Joint Comprehensive Plan of Action) in particular, was also seen as a sign of U.S. unreliability. On the other hand, the decline of the bilateral oil underpinning emboldened many U.S. politicians and opinion makers to criticise Saudi Arabia, which in turn, drifted closer to China and Russia over the last decade and even reconciled with Iran. Beijing became Riyadh's top trading partner and Mr. Xi visited Riyadh. Saudi Arabia has been collaborating with Russia under the Organization of the Petroleum Exporting Countries Plus (OPEC+) rubric to steer the global crude market.

The second major obstacle that the SAA faces is the ongoing Gaza conflict which has made it politically inopportune for Riyadh to agree to any reconciliation with Israel. This is also important from the Biden administration's perspective as the SAA would require the U.S. Senate approval by two-thirds which can only follow a Riyadh-Tel Aviv détente. But if any progress is to be made in

this direction, the wanton bloodletting of Palestinian Arabs and destruction in Gaza need to be stopped, and a two-state solution to the Israel-Palestine problem put back on the table. However, persistent U.S. efforts to end this conflict and move towards a semblance of normalcy in the region have been hitherto unsuccessful. Meanwhile, the clock ticks away towards the U.S. Presidential elections in November when ascendant Donald Trump faces Mr. Biden.

Incidentally, many of the recent regional events can be explained by looking through the SAA prism: Some analysts even believe that the October 7 surprise attack on Israel by Hamas was to forestall the SAA. Other signs include Saudi demurral in joining BRICS, MbS not going to the China-Arab Forum last month despite a prior commitment, the Saudi Foreign Minister participating in Ukraine Peace Conference, Mr. Biden personally unveiling a Gaza Peace Plan and his administration's piloting the UN Security Council resolution, increasingly strident American disapproval of Israeli attack on Rafah, fissures in Israeli war cabinet, a Republican-inspired invitation to Israeli Prime Minister Benjamin Netanyahu, a hardliner, to address a joint session of the U.S. Congress, looming Israel-Hezbollah conflict and Israeli national security adviser's statement that the Gaza war could last till the end of 2024.

The quest for the SAA has become a time-bound contest between an irresistible force and an immovable object. We can only speculate on the likely impact of the likely scenarios. In case a fully formatted SAA is signed, it would reimpose unipolarity (Pax Americana) onto the Gulf and much of West Asia. Pro-West regimes will gain more confidence and the Palestinian cause would be given a facile burial. If the quest for the SAA fails, the region will stay in turmoil and the non-state actors promoted by Iran will keep disrupting the regional equilibrium. The region would remain a chessboard for outside powers. There is also a possibility that if Gaza peace remains elusive, having come this far, Riyadh and Washington may reluctantly agree to a truncated piecemeal agreement, bringing in other friendly countries to fill it up.

## India's stakes

India, a large neighbour of the region with well-known stakes in the region, needs to watch the emerging Grand Bargain carefully. An SAA would be in India's overall interest as it would hopefully enhance regional stability, create economic opportunities, promote the India-Middle East-Europe Economic Corridor and free the U.S. to follow its Indo-Pacific Strategy more vigorously. At the same time, India needs to pursue its own “Act West” policy without waiting for a third iconic image of Israeli and Saudi leaders shaking hands at Camp David.

The proposed  
Strategic  
Alliance  
Agreement may  
have been  
forced by  
Washington's  
fear of  
losing Riyadh



## **Strategic Alliance Agreement (SAA)**

- **, Riyadh and Washington are on the verge of a new and enhanced relationship, tentatively titled Strategic Alliance Agreement (SAA).**
- **components: bilateral, regional and global.**
- **At a bilateral level, it would codify the current implicit bilateral alliance into a strategic defence pact modelled on the U.S.-Japan treaty committing the Pentagon to come to the Kingdom's rescue in case of an attack.**
- **The U.S. would also equip Riyadh with means to defend itself**

- **More surprisingly, Washington, a non-proliferation hawk, seems to be agreeable to providing Saudi Arabia with nuclear technology for peaceful use.**
- **At a regional level, Riyadh wants a ceasefire in Gaza and some movement towards a two-state solution to the Israel-Palestine problem.**
- **As a quid pro quo for Riyadh's maximalist demands, Washington reportedly has put forth a daunting wish list of its own.**
- **It wants Riyadh to recognise Israel and have full normal diplomatic relations.**
- **It also wants the Kingdom to ring-fence its foreign policy to avoid getting too close to Washington's rivals, specifically, Beijing and Moscow.**

- **To U.S. strategists, a decline in the oil-for-security paradigm notwithstanding, Saudi Arabia retains much of its importance.**
- **As the custodian of Islam's two holy shrines, the Kingdom has been the most important determinant of the Ummah, the 1.4 billion Muslims all over the world.**
- **So, if Saudi Arabia agrees to become the fifth Abraham Accord Arab state to recognise Israel's right to exist, this could geopolitically reconfigure not only West Asia but also push much of the Islamic world to follow Riyadh's lead.**



- **Second, Saudi Arabia remains the largest economy in both the Arab and Islamic world and an ambitious Vision 2030 offered very lucrative pickings.**
- **Last but not least, during his decade at the helm, MbS has not only consolidated power but also taken bold and often controversial reforms**

## Hurdles

- **First, the past decade has seen a rise in the bilateral trust deficit. In 1990-91, the U.S. deployed troops to evict Saddam Hussein's forces from Kuwait poised to threaten Saudi Arabia.**
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- **An SAA would be in India's overall interest as it would hopefully enhance regional stability, create economic opportunities, promote the India-Middle East-Europe Economic Corridor and free the U.S. to follow its Indo-Pacific Strategy more vigorously.**
- **At the same time, India needs to pursue its own “Act West” policy without waiting for a third iconic image of Israeli and Saudi leaders shaking hands at Camp David.**

# In security pact, Russia, N. Korea seek to expand partnership, challenge West

The agreement requires both countries to use all means to provide immediate military assistance in the event of war, according to North Korean state media; Kim claimed that deal elevated bilateral ties to the level of an alliance, while Putin was more understated and did not call it an alliance

**Associated Press**  
SEOUL

**B**oth Russian President Vladimir Putin and North Korean leader Kim Jong-un say a new strategic partnership is a “break-through”, but what it means for their relationship is still uncertain.

The pact requires both countries to use all available means to provide immediate military assistance in the event of war, according to North Korean state media. While the agreement, inked on Wednesday at a summit in Pyongyang, could represent the countries’ strongest deal signed after the Cold War, there are differing opinions on how strong the security commitment is.

Mr. Kim claimed that the deal elevated bilateral relations to the level of an alliance, while Mr. Putin was more understated and did not call it an alliance.

North Korean state media released the text of the agreement, which also includes broader cooperation in military, foreign policy and trade. Russia has not published its version of the text.

Relations between sprawling Russia and small, isolated North Korea – both of them nuclear powers – have warmed significantly in recent years amid Russia’s growing acrimony with the West over



**Strengthening ties:** North Korea’s leader Kim Jong-un (right) with Russian President Vladimir Putin after a signing ceremony at the Kumsusan State guest house in Pyongyang, AP.

the invasion of Ukraine and suppression of all domestic opposition.

One of the first knock-on effects of the agreement came on Thursday, when South Korea’s government said it would reconsider its policy of limiting its support to Ukraine to non-lethal supplies. South Korea, a growing arms exporter, has provided humanitarian aid to Ukraine, but it has not directly provided weapons to Kyiv.

## **Mutual aid**

Most of the debate over the partnership agreement revolves around the article that pledges mutual aid.

But it also says that such actions must be in accordance with the laws of both countries and Article 51 of the UN Charter, which recognises a UN member state’s right to self-defence.

Cheong Seong Chang, an analyst at South Korea’s Sejong Institute, said the agreement echoes the language of the 1961 treaty, as well as provisions of the U.S.-South Korea mutual defence treaty about activ-

ating channels to coordinate if either of faces the threat of invasion.

Other experts were more cautious, saying the section is carefully worded to avoid implying automatic interventions and strictly limits the circumstances in which either country would be obligated to step in.

And the language of the agreement is much less important than what each nation is actually capable of and willing to do, Du Hyeon Cha, an analyst at Seoul’s Asan Institute for Policy Studies, said.

While it’s rare for any defence treaty to spell out specifically that a country is required to automatical-

ly intervene to defend a partner under attack, the strength of the commitment can be signalled in other ways, such as how the U.S. stations thousands of troops in South Korea and closely coordinates with its ally over training and weapons systems, Cha said. But Russia, for instance, doesn’t have a troop presence in North Korea and the countries have no established track record in joint military activities and coordination, aside from the North’s alleged munitions transfers to Russia.

The fact that the article invokes the countries’ domestic laws and the U.N. Charter could reflect that Russia tried to limit its defence obligation to very narrow conditions: when it’s clear North Korea did not instigate the aggression, the attack on the North is legally recognised in Russia as war, and Russia’s defence of the North is justified by the U.N., Cha said.

## **Biggest concern**

“The agreement is a symbolic statement vowing the expansion of cooperation, but it leaves a lot of room for interpretation when we get into practice,” Cha said. “The biggest concern about the summit isn’t whether [Russia] committed to an automatic military intervention or not, but the possible expansion

of North Korean weapons transfers to Russia and the transfers of Russian military technologies to the North.”

Mr. Putin said he would not “exclude the development of military-technical cooperation with the Democratic People’s Republic of Korea in accordance with the document signed today.”

That statement in effect formalises something Western countries claim is already happening.

The U.S. and other allies allege that Russia has received ballistic missiles and ammunition from North Korea as the Ukraine war depletes Moscow’s inventory, and that Russia has made technology transfers to Pyongyang that could enhance the threat posed by Kim’s nuclear weapons and missile program.

The agreement also calls for the countries to actively cooperate in efforts to establish a “just and multipolar new world order,” the North’s Korean Central News Agency said, underscoring how the countries are aligning as they face separate, escalating confrontations with the United States and its allies.

The partnership also calls for developing economic ties, an especially important issue for North Korea as it suffers under an array of international sanctions.

# Russia and north korea

- **Both Russian President Vladimir Putin and North Korean leader Kim Jong-un say a new strategic partnership is a “breakthrough”, but what it means for their relationship is still uncertain.**
- **The pact requires both countries to use all available means to provide immediate military assistance in the event of war, according to North Korean state media.**
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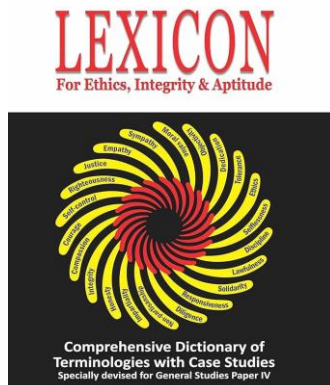
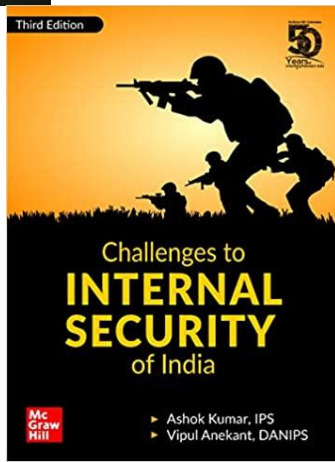
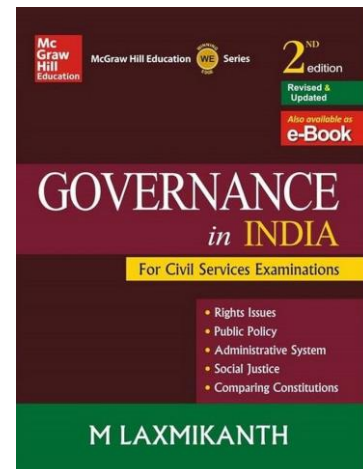
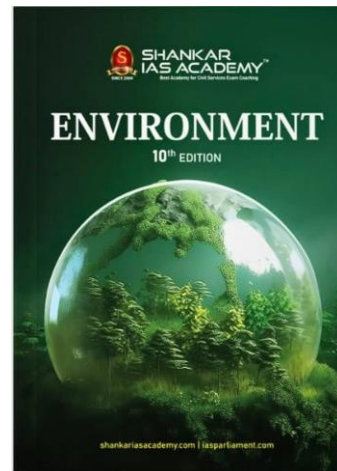
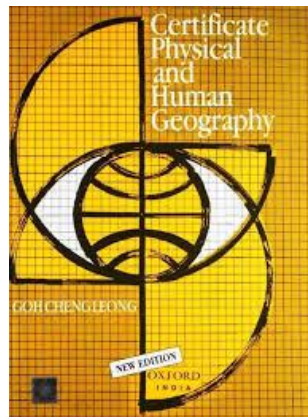
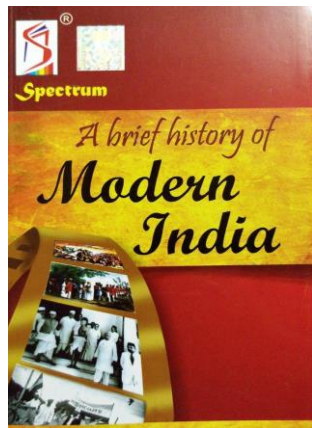
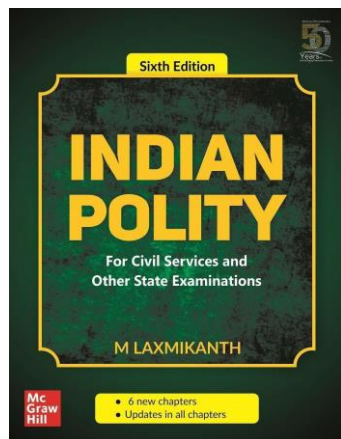
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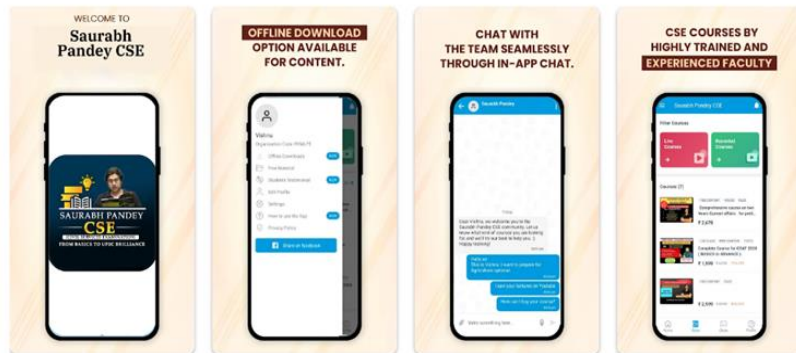
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The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2023 Brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual repeat – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

- The periodical mass emergence of cicadas in eastern North American forests can “rewire” forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence.

The cicadas are a superfamily, the Cicadoidea, of insects in the order

Hemiptera



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states as per ARTICLE 244(2).

### What are Scheduled Areas?

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

### How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.



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### Garba dance of Gujarat makes it to UNESCO list

**Sreeparna Chakrabarty**  
NEW DELHI

Gujarat's traditional dance form 'Garba' was on Wednesday included in the list of Intangible Cultural Heritage by the United Nations Educational, Scientific and Cultural Organization (UNESCO).

The popular dance form is the 15<sup>th</sup> cultural item from India to make it to the UNESCO list. 'Kolkata's Durga Puja' was the last one added two years ago.

The inclusion has been made under the provisions of the 2003 Convention for the Safeguarding of Intangible Cultural Heritage. The international cultural body described the 'Garba' as a ritualistic and devotional dance performed in India.

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



**Climate change is making the world sick**

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Russia loads 'Avangard' missile into launch Silo, fears of nuclear warfare on rise | World DNA

Que-3 With reference to exercise 'Mitra Shakti', consider the following statements

- 1- Between India and Nepal.
- 2- The aim of the exercise is to jointly rehearse sub-conventional operations under Chapter VII of the United Nations Charter, which authorises the Security Council to take enforcement measures, including the use of military force, to address threats to international peace and security.
- 3- "Exercise MITRA SHAKTI-2023" recently commenced in Goa.

How many of the above statements are correct?

- a) Only one
- b) Only two
- c) All three
- d) None

Ans 3- (a)

- "Exercise MITRA SHAKTI - 2023" recently commenced in Aundh (Pune).
- Between India and Sri Lanka.

X PRELIMS 18th N...

- The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

### Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warrant — to show by what warrant is a person holding public office;

- **Prohibition** – directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and
- **Certiorari** – re-examination of an order given by judicial, quasi-judicial or administrative authorities.
- In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.
- When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.
- Article 226, however, is not a fundamental right like Article 32.

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Que-2 Consider the following statements

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

2- Articles 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(2).

The Prime Minister of India notifies India's Scheduled Areas.

How many of the above statements are correct?

a) Only one b) Only two  
c) All three d) None

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12:40

X polity 11th augu...

## Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

### Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

X 18th Septembe...

## Santiniketan finds its place on UNESCO's World Heritage List

Should body makes announcement on Sunday. Mantra says new, named in Tagore, has been supported by Bengal Culture Ministry seek to bring in human values

By India Staff

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, has been added to the UNESCO's World Heritage List. The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture, and its role in the development of modern Indian education.



Students at Santiniketan, a town established by Nobel laureate Rabindranath Tagore, have been added to the UNESCO's World Heritage List.

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum district, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the foundations of Visva-Bharati University.

## EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

EUROPEAN COMMISSION

Ursula von der Leyen, President of the European Commission, has promised to present a plan of action to address the migrant crisis in Italy. She said that the Commission will work closely with the Italian government to find a sustainable solution to the problem.



Ursula von der Leyen, President of the European Commission, has promised to present a plan of action to address the migrant crisis in Italy.

The plan includes using the EU's external borders to prevent migrants from entering the country. It also includes providing support to the Italian government to help it manage the crisis. The plan is expected to be presented to the European Council in the coming weeks.

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None

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Que-2 With reference to Parliaments special sessions, consider the following statements

- There is specific provision in the Constitution that deals with special sessions.
- Article 352, which deals with the proclamation of Emergency, refers to a 'special sitting' of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.
- The Question Hour was suspended during the session.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.
- The Hoysala Temples, built in the 12th and 13th centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.
- The temples became targets of plundered and destruction by the Delhi Sultanate army of Ala-ud-din Khilji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughlaq in 1326 AD.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None



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Que-4 Consider the following statements about SHREYAS scheme

- It comprises 4 central sector sub-schemes.
- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.
- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

- a) Only one      b) Only two  
c) All three      d) None

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Que-5 Consider the following statements about Women's Reservation Bill

- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve 33% of seats in Lok Sabha and state Assemblies for women.



12:03



prelims pointer...



**Que-5** With reference to Shumang Leela, consider the following statements

- Shumang Leela is a traditional form of theatre in Tripura.
- In this the roles of women are all played by men, called Nupi Shabis.
- It is performed in an open courtyard surrounded by spectators on all four sides.

Which of the following given above is/are correct

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

Ans: (d)

- Shumang Leela is a traditional form of theatre in Manipur.
- In the case of women's theatre groups, the roles of men are played by women.
- Shumang Leela translates to "courtyard performance".
- Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.

**Que-6** Consider the following statements about Red Sanders also called Red Sandalwood

- It is a species found in the southern tropical dry deciduous forest of Telangana.
- The tree reaches an average height of 10 to 15 metres.
- The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.

Which of the following given above is/are correct

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

Ans: (d)

- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
- CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
- In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
- The heartwood of Red Sanders is in demand in the domestic and international markets for making

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furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

**Que-7** Consider the following statements about Compressed Biogas (CBG) and compressed natural gas (CNG)

- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.
- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.
- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

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

**Que-8** Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARDHAN) in the Union Budget 2023. Consider the following statements about this

- The new GOBARDHAN scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.
- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.
- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

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

12:05



prelims pointer...



**Que-7** Lamu Archipelago, recently in News, belongs to which country

a) Somalia  
b) Malaysia  
c) Indonesia  
d) Kenya

Ans: (d)

- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.

**Que-8** Consider the following statements about "Operation Sadbhavana", recently in News

- Launched by an Indian Army.
- For development of Jammu and Kashmir.
- Some of the objectives achieved through Operation Sadbhavana are national integration, tourism, women's empowerment, employment generation, education, and

development activities geared towards nation-building.

Which of the following given above is/are correct

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

Ans: (b)

- For development of Ladakh.
- The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

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**Que-1** Consider the following statements

- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.
- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.
- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

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

Ans: (c)

- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.

of what we call persistence, allowing satellites to capture images continuously.

**Que-2** With reference to Paris Club, consider the following statements

- The Paris Club is a group of mostly western creditor countries.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

Which of the following given above is/are correct

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

Ans: (b)

- It grew from a 1956 meeting in which Brazil agreed to meet its public

12:35



may 2024 impo...



## Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.

- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

## Pros and Cons of Exchange-Traded Funds



## BIMSTEC

WHAT YOU SHOULD KNOW





11:29



X 12th august 2023



## DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission

- In India, such Delimitation Commissions have been constituted 4 times - in 1952 under the Delimitation Commission Act, 1952, in 1963 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.

- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.



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defends use of  
Saurabh Kutumbak

11:37



X Mock Series 17t...



productivity, uphold good health and prevent poverty.

- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

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Question 5 With reference to Doppler radar network, consider the following statements

- 1 It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.
- 2 It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.
- 3 The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

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

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- 5- (c)
  - It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?

- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?

- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?

- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

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Question 6 Consider the following statements about Army Day

- 1 India celebrates Army Day on January 15 every year.
- 2 The Army Day is celebrated every year to honour Cariappa and the defence forces.
- 3 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

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



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5- (d)

- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004, with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)

- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)

- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)

- The Chief of Defence Staff is principally responsible for getting the armed forces better integrated rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, and Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Minister only on tri-services matters. The three service chiefs will continue to advise the Defence Minister exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance of the three services.



# Target Mains -2024/25 -

**Q "India's interest in west asia has moved beyond energy security " Discuss**

प्रश्न "पश्चिम एशिया में भारत की रुचि ऊर्जा सुरक्षा से आगे बढ़ गई है" चर्चा करें

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# Topics



- Ele - fence
- Russia - North korea and china
- India and myanmar
- **The Insolvency and Bankruptcy Board of India**
- Mains



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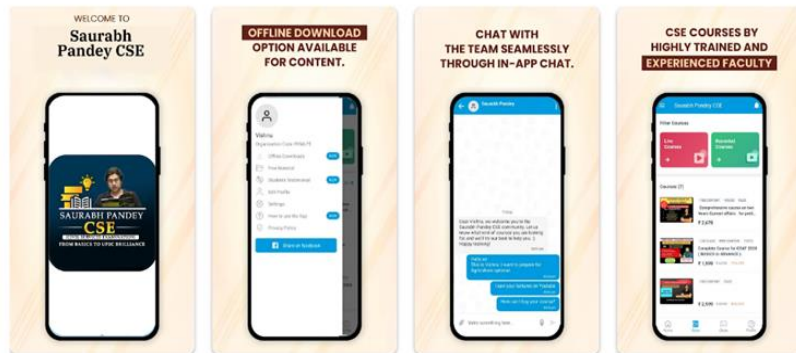
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# Target Mains -2024/25 -

## Essay topic

"The greater the difficulty, the more glory in surmounting it"

"कठिनाई जितनी बड़ी होगी, उससे पार पाने में उतनी ही अधिक महिमा होगी"

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# 'Ele-fence' in Kerala seeks to end man-animal conflict

**E.M. Manoj**  
KALPETTA

The installation of country's first artificial intelligence-based smart fence, 'Ele-fence', is under way in Kerala's Wayanad to mitigate the burgeoning cases of human-wildlife conflict in the region.

The pilot project is being implemented by White Elephant Technologies, a Kochi-based R&D firm, with support from the Kerala Forest Department at Chelakkolly, near Pambra, in the Chethalth forest range of the south Wayanad forest division.

The proposed 70-metre Ele-fence incorporates an effective blend of surveillance, real-time monitoring, and control as well as preventive and protective features, says Parrakkal Mohan Menon, CEO, White Elephant Technologies.

The design elements also involved a deep dive and study of elephant behaviour in typical conflict-prone situations. The fence has been installed with six-inch-wide steel girders, each 17 feet high.

The girders are concreted at four feet depth and welded with steel bars under the ground level for strength, he says.



Kerala Forest Minister A.K. Saseendran visiting the installation works of 'Ele-fence' at Chelakkolly in Wayanad. SPECIAL ARRANGEMENT

The fence is duly equipped with AI-based logical trip wires, which enable early warning of intrusive elephant movements. There are 4K cameras for real-time video and audio dissemination to control rooms and the Rapid Response Teams of the Forest Department.

The fence has sound and alarm lights installed to keep the elephants from approaching the regions around the barrier.

It also has built-in features that will send light and sound alerts to pedestrians and motorists to warn them of elephants' presence in the area. Apart from the loaded AI features, Ele-fence also uses lasher belt technology, which would prevent ele-

phants from physically breaching the fence, Mr. Menon adds.

When the animal reaches within 50 to 60 metres range of the fence, multiple cameras would capture the live visuals and trigger alarm bells, warning local people of the elephant's presence. The system would alert the nearest Rapid Response Team (RRT), forest office and the central forest control room with real-time video of the fenced area. The fence is likely to be commissioned by the end of July, Mr. Menon adds. "We expect the latest project to protect human habitats from wildlife incursion and if it is found effective, it will be expanded to other parts of the State," he adds.

# Ele - fence

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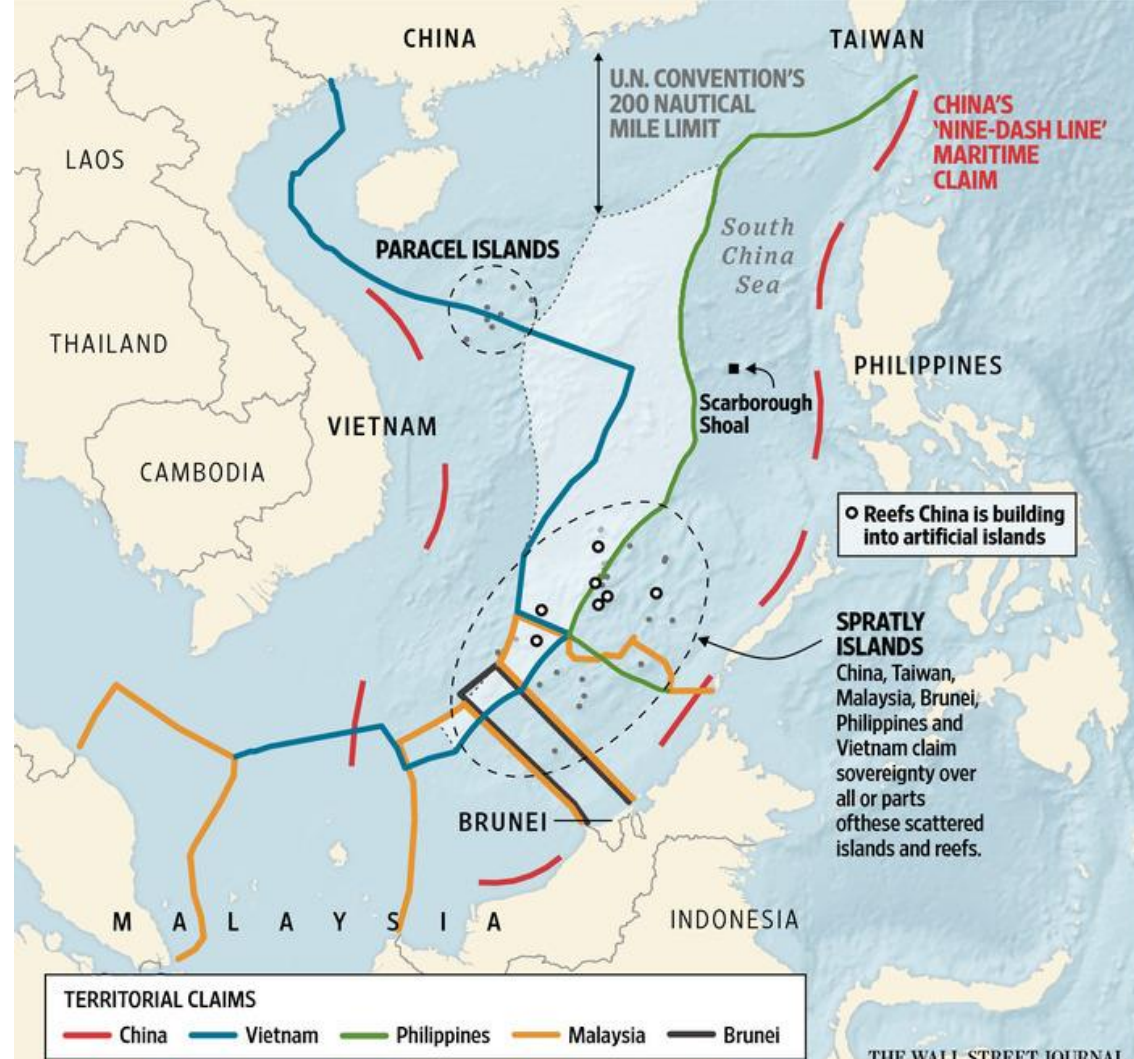
# New Cold War

## Russia's pact with North Korea will deepen U.S. ties in East Asia

**T**he security pact reached between Russian President Vladimir Putin and North Korean leader Kim Jong-un in Pyongyang, in which both countries promised mutual assistance “in the event of aggression”, has echoes from the Cold War era. Russia and North Korea, erstwhile allies, are facing biting sanctions, but for different reasons. And, both are at odds with the West. Now, they seem determined to revive the alliance so that they can stand up to the western-led global order together. Mr. Putin's visit to Pyongyang, his first in 24 years, itself marked a new beginning. The Russian leader has supported multilateral efforts to curb the North's nuclear programme in the past. Moscow has also voted for sanctions at the UN Security Council against Pyongyang over its nuclear arsenals. But the Ukraine war appears to have altered Kremlin's geopolitical arithmetic and provided an opportunity for Pyongyang to make itself useful as an ally. When the Ukraine war dragged on and Russia came under western sanctions, Mr. Putin turned to Mr. Kim for ammunition and ballistic missiles. After Mr. Kim's visit to Russia in September 2023, North Korea reportedly supplied ammunition to Russia. Moscow stepped up supplies of food and fuel, and there was speculation that it could help the North's defence sector with critical technologies. While both have rejected reports of weapons trade, the security pact clearly elevates ties to the level of a de facto alliance.

Ever since the Ukraine war, Mr. Putin has steadily expanded Russia's cooperation with countries that are at odds with the U.S. He reportedly bought kamikaze drones from Iran. China has also emerged as a key economic, technological and energy partner. And, by promising to help North Korea, an isolated, one-family-ruled totalitarian state that is still technically at war with South Korea, in the event of an attack, Russia has signalled its readiness to play a larger role in northeast Asia. Mr. Putin, essentially a cold warrior, wants to build an axis of the 'others' opposed by the West to expedite the churn in the global order. China remains cautious but seems fine with the idea of its closest partners challenging the western order. This will have far-reaching geopolitical consequences. North Korea will now have little incentive to discuss denuclearisation. Russia, which already has tenuous ties with Japan, could see its relationship with South Korea deteriorating. The agreement is also likely to strengthen the emerging tripartite partnership in East Asia among Japan, South Korea and the U.S., further solidifying the new cold war between great powers, which is still in its early stages.







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- **The Russian leader has supported multilateral efforts to curb the North's nuclear programme in the past.**
- **Moscow has also voted for sanctions at the UN Security Council against Pyongyang over its nuclear arsenals.**
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- **China remains cautious but seems in line with the idea of its closest partners challenging the western order.**
- **This will have far-reaching geopolitical consequences**

- **The agreement is also likely to strengthen the emerging tripartite partnership in East Asia among Japan, South Korea and the U.S., further solidifying the new cold war between great powers, which is still in its early stages.**

# Case of china



- **China appears to be keeping its distance as Russia and North Korea move closer to each other with a new defence pact that could tilt the balance of power among the three authoritarian states.**
- **Experts say China's leaders are likely fretting over the potential loss of influence over North Korea after its leader Kim Jong-un and Russian President Vladimir Putin signed the deal this week, and how that could increase instability in the Korean Peninsula.**
- **But Beijing may also be struggling to come up with a response because of its conflicting goals: keeping peace in the Koreas while countering the U.S. and its Western allies on the global stage.**

# A progressive Indian policy on Myanmar outlined



**T**hree years on, the military in Myanmar, which overthrew the elected civilian government in February 2021, continues to kill, maim and displace its own people. India has steadfastly maintained formal relations with this regime, which has so far murdered more than 5,000 people and displaced some 2.5 million people. In its second tenure, the Narendra Modi government did very little to engage with the pro-democracy resistance, which now has both political and military wings. Indian foreign policy scholars and practitioners have doggedly defended this policy by arguing that India needs to work with the junta if it has to protect its “interests” in Myanmar and not get swayed by an idealistic preoccupation with “values”.

## How India can step out of China's shadow

But, in foreign policy, there is no clear line between “values” and “interests” simply because neither has a standard definition. It all depends on how a country defines these terms. This is also the case with India's Myanmar policy. New Delhi has long defined its “interests” in the Southeast Asian country in narrow strategic terms. But now, it needs to leverage a unique set of “values” to better defend its interests. It is possible for India to put in place a more progressive, values-driven Myanmar policy that works in favour, and not against, its national interests.

This new policy should have two key pivots, namely, democracy and human security. The new National Democratic Alliance (NDA) government, therefore, needs to take four interlocking steps immediately.

First, India needs to use its credentials as the largest federal democracy in the region to sharpen its influence in Myanmar. For long, Myanmar's pro-democracy political elites and civil society have looked up to India as a model of a federal democratic union with a well-oiled power-sharing arrangement between the centre and various subnational units. This is even more relevant today as the democratic resistance in Myanmar, which is led by the National Unity Government (NUG), dozens of ethnic revolutionary organisations, civil society organisations, and trade unions, strives to replace the military-drafted 2008 constitution with a



**Angshuman Choudhury**

New Delhi-based researcher and writer from Assam, and formerly an Associate Fellow at the Centre for Policy Research

New Delhi's stance of defining its 'interests' in the Southeast Asian country in narrow strategic terms needs to change

federal constitution. By helping this vibrant opposition achieve its aim through capacity-building and knowledge exchange programmes, India can distinguish itself from China, its primary regional competitor in Myanmar. Both Beijing and New Delhi can sell military hardware to Myanmar, but only India can sell the spirit of federal cooperation. Here is a chance for the new Indian government to outmanoeuvre the Chinese in their own 'backyard'.

## Weapons sales and humanitarian outreach

Second, India needs to immediately halt all weapon sales to the Myanmar military. According to the advocacy group, Justice For Myanmar (JFM), Indian state-owned military hardware manufacturers have sold a range of non-lethal and semi-lethal equipment to the junta since the 2021 coup. In its most recent report, published on March 27, the group claimed that on January 2, the Indian Air Force transferred a package which had 52 items, including navigation and communication parts, to its Myanmar counterpart. Another recent investigation by Frontier Myanmar claims that India sold more than \$1.5 million worth of navy-grade diesel to junta-linked entities since the coup. New Delhi needs to immediately put a stop to these, as the Myanmar military continues to use all its three services – the army, air force, and navy – to attack non-combatant civilians using imprecise lethal tactics.

Third, India needs to immediately open cross-border humanitarian corridors to help civilians affected by the conflict along three border provinces – Sagaing Region, Chin State and northern Rakhine State. According to United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) data, Sagaing Region has seen the largest quantum of internal displacement in all of Myanmar since the coup (as of March 25, 2024). Rakhine comes next, while Chin State sits tenth in the list. Continuing air strikes by the junta and clashes between armed groups in these areas have only pushed more civilians across the borders. New Delhi needs to first revoke its plans to fence the India-Myanmar border and reinstate the Free Movement Regime,

or the FMR, which the Union Home Ministry suspended in February 2024. Then, it should engage existing humanitarian aid networks along the India-Myanmar border to send emergency relief assistance including medicines, food and tarpaulin to the other side. Mizoram, where a multi-layered asylum and aid ecosystem is already operational, is a good starting point. India should also collaborate with local and international non-governmental organisations with experience in the field. Best practices from Thailand, which recently started cross-border aid deliveries into Myanmar, should also be adopted. New Delhi should use its clout to ensure that the aid is not distributed by the junta, which not only has a disastrous track record in this field, but is also not even in control of large areas along the India-Myanmar border. It is also possible to run cross-border aid corridors without allowing contraband to pass through, with stringent checks and pre-delivery vetting.

## Detention of asylum seekers

Fourth, the Narendra Modi government should immediately halt the detention and deportation of asylum seekers from Myanmar. This is especially so in the case of Manipur, where the BJP-led government has so far deported 115 asylum seekers to Myanmar – the latest round was on June 11. These are people who entered India not because they wanted to or with mal-intent, but because they were forced to. Regardless of the fact that India has not ratified the 1951 Refugee Convention, it is incumbent upon the government to treat them as refugees in need of humanitarian assistance and protection rather than as “illegal immigrants”. Both the Indian Constitution and international law allow the Indian state to do so. In fact, the customary international legal principle of non-refoulement discourages India from deporting refugees back to a home country where they face a threat of persecution or death. The Centre should also urge the BJP-led Assam government to release the 27 Chin refugees detained in the State and house them in a humane refugee shelter.

India, the “Vishwabandhu”, routinely claims to stand with the people of Myanmar. It should now walk the talk.

# Myanmar coup

Seizure of power on February 1 follows weeks of tensions and the military's allegations of "huge irregularities" in November parliamentary polls



## What we know so far:

- ▶ The army has declared a **one-year state of emergency**
- ▶ Myint Swe, a former general and the current vice president, to become acting president
- ▶ As well as Suu Kyi, **President Win Myint** and other civilian leaders taken into custody hours before parliament due to reconvene after elections
- ▶ Internet and mobile phone communications severely restricted across the country
- ▶ Army pledges it will hold fresh elections
- ▶ All banks closed nationwide



Aung San Suu Kyi

Age 75

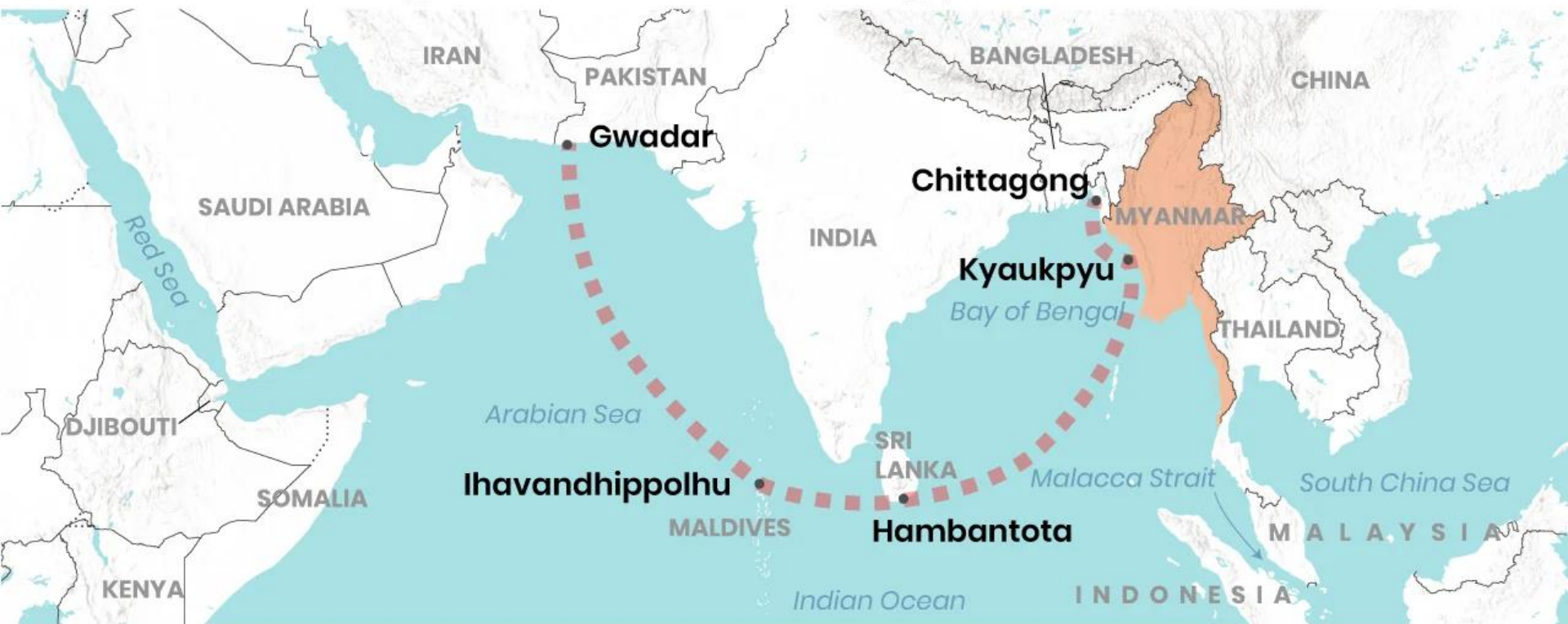
- **2010**  
Released from house arrest after **15 year detention** by the junta
- **2016**  
Assumes **de facto national leadership** in the role of state counsellor
- **2015**  
Leads **NLD\*** to landslide **election** victory in the country's **first democratic elections**
- **2020**  
Leads NLD to **second landslide** victory
- **Feb 1, 2021**  
**Arrested** hours before new parliament due to convene

\*National League for Democracy





# China's String of Pearls Strategy



Sources: Center for International Maritime Security, Eurasian Times, indiatimes.com

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# Major ethnic groups in Myanmar

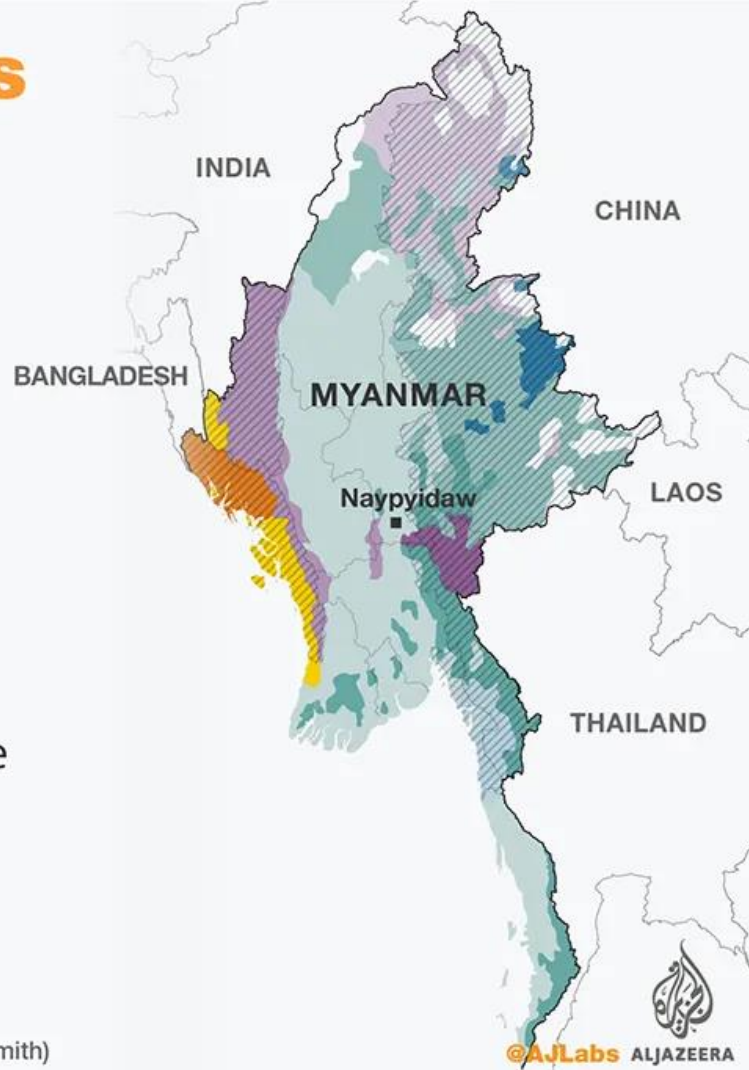
Myanmar officially recognises 135 ethnic groups but Rohingya have been rendered stateless and stripped of their citizenship.

## Ethnic Groups

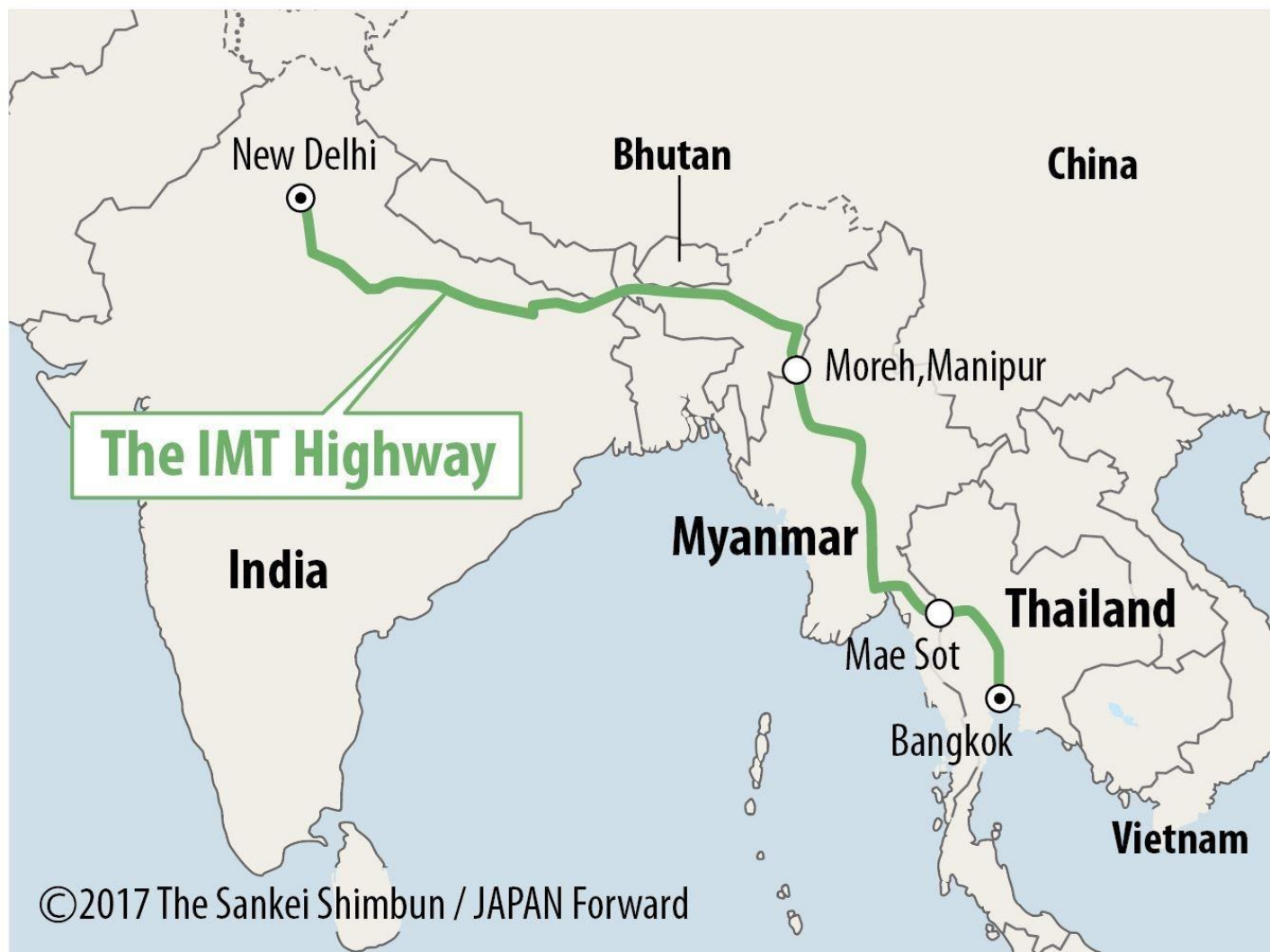
	Bamar		Kachin
	Shan		Chin
	Karen		Karenni
	Rakhine*		Mon
	Rohingya		Wa
			Kokang Chinese

 Ethnic minority states

\* Includes other Rakhine Muslim minorities



Sources: Al Jazeera, agencies, Free Burma Rangers, Burma - Insurgency and the Politics of Ethnicity (Martin Smith)



- , in foreign policy, there is no clear line between “values” and “interests” simply because neither has a standard definition. It all depends on how a country defines these terms.
- This is also the case with India’s Myanmar policy. New Delhi has long defined its “interests” in the Southeast Asian country in narrow strategic terms.
- But now, it needs to leverage a unique set of “values” to better defend its interests.
- It is possible for India to put in place a more progressive, values-driven Myanmar policy that works in favour, and not against, its national interests

- **First, India needs to use its credentials as the largest federal democracy in the region to sharpen its influence in Myanmar.**
- **Second, India needs to immediately halt all weapon sales to the Myanmar military.**

# IBBI to strengthen creditors' rights on personal guarantors

**K.R. Srivats**  
NEW DELHI

The Insolvency and Bankruptcy Board of India proposes to make it unequivocally clear that the submission or approval of a resolution plan for a corporate debtor under the IBC does not automatically release guarantors from their liability to repay the debt.

The IBBI now seeks to amend its CIRP regulations to ensure that submitting a resolution plan does not prevent creditors from enforcing their rights against the personal guarantor. Insolvency law experts said the IBBI's plan is likely to provide legislative clarity, strengthen creditors' position, and boost recoveries from personal guarantors.

The IBBI has released a discussion paper addressing, among other things, the "release of guarantees in a resolution plan." The last date for public comments through electronic mode is July 10, IBBI has said.

## SC's approach

To clarify that approving a resolution plan does not automatically discharge a personal guarantor's liabilities from an independent contract, the IBBI has followed the Supreme Court's approach in *Lalit Kumar Jain vs Union of India*.

In the *Lalit Kumar Jain vs Union of India* judgment, the Supreme Court upheld the November 15, 2019, MCA notification enforcing the IBC's provisions on personal guarantors' insolvency.



**Bringing clarity:** The regulator has issued a discussion paper and sought public comments by July 10. GETTY IMAGES/ISTOCK

The court also ruled that approving a resolution plan does not absolve personal guarantors from their obligations or extinguish their liability.

## Experts' take

Sushmita Gandhi, Partner, INDUSLAW, said the case of Lalit Kumar is one of the many instances where judicial interpretation bridged the lacuna in the IBC, which is still a nascent law.

"The proposal indicates that the IBBI is cognisant of such gaps and is attempting to bridge the same to avoid ambiguity relating to the position of release of guarantees," she added.

## 'Raises concerns'

Misha, Partner, Shardul Amarchand Mangaldas & Co., said the language of the proposed amendment raises concerns.

"On a plain reading, it suggests that a resolution plan cannot prevent creditors from enforcing their rights against the guarantors of the corporate debtor. This should not be the case where the creditors have agreed to discharge the guarantor along with

the corporate debtor," she observed.

Hari Hara Mishra, CEO of the Association of ARCs in India, said the IBBI proposal, if implemented, will be a shot in the arm for creditors and a boost to improve recovery from the enforcement of guarantees.

## 'Sanctity of contracts'

"This will reinforce the sanctity of contractual obligations, the backbone of a robust framework of credit culture," he said.

Sumit Khanna, Partner, Deloitte India, said, "By prohibiting resolution applicants from extinguishing guarantees, this change strengthens creditors' positions, promising a more efficient recovery process. With creditors recovering close to 2 per cent of claims from PGs, this amendment is crucial for bolstering recovery."

Vishwas Panjiar, Partner, Nangia Andersen in India, said personal guarantors remain liable for the guarantees they have provided.

*(The writer is with The Hindu businessline)*



# The Insolvency and Bankruptcy Board of India

- The Insolvency and Bankruptcy Board of India was established on 1st October, 2016 under the Insolvency and Bankruptcy Code, 2016 (Code).
- It is a key pillar of the ecosystem responsible for implementation of the Code that consolidates and amends the laws relating to reorganization and insolvency resolution of corporate persons, partnership firms and individuals in a time bound manner for maximization of the value of assets of such persons, to promote entrepreneurship, availability of credit and balance the interests of all the stakeholders.



- It is a unique regulator: regulates a profession as well as processes.
- It has regulatory oversight over the Insolvency Professionals, Insolvency Professional Agencies, Insolvency Professional Entities and Information Utilities.

- It writes and enforces rules for processes, namely, corporate insolvency resolution, corporate liquidation, individual insolvency resolution and individual bankruptcy under the Code.
- It has recently been tasked to promote the development of, and regulate, the working and practices of, insolvency professionals, insolvency professional agencies and information utilities and other institutions, in furtherance of the purposes of the Code.
- It has also been designated as the 'Authority' under the Companies (Registered Valuers and Valuation Rules), 2017 for regulation and development of the profession of valuers in the country.

# IR IN NEWS

**Armenia becomes the latest nation to recognise Palestine**

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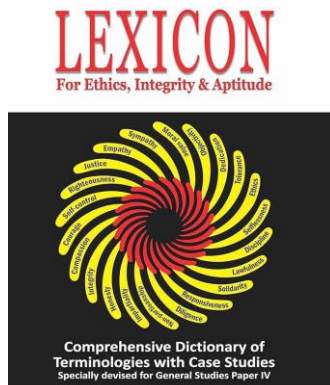
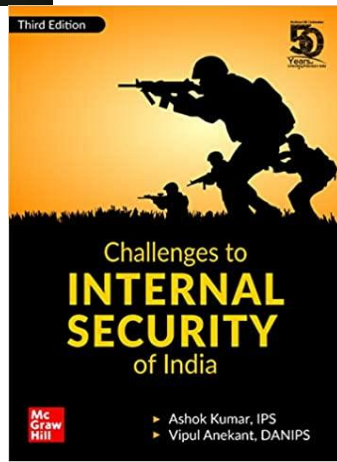
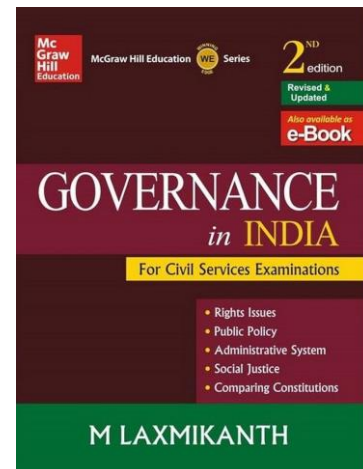
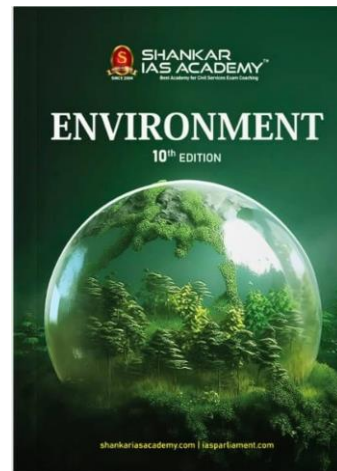
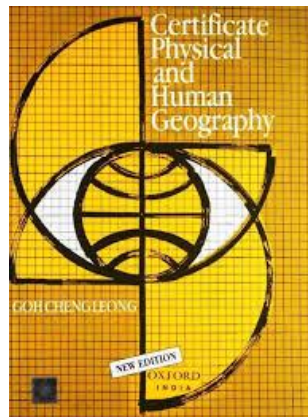
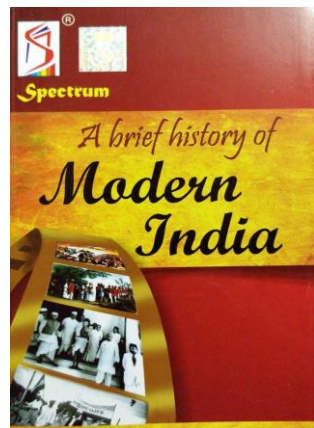
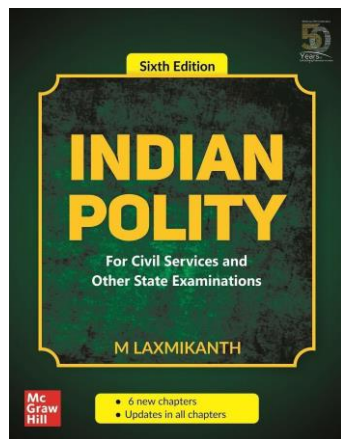
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X 22nd october 2...



### Periodical cicada emergence disrupts food webs

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual prey – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

- The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence.

The cicadas are a superfamily, the Cicadoidea, of insects in the order

Hemiptera.



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X 10th october 2...



States as per Article 244(2).

### What are Scheduled Areas?

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

### How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.



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X 7TH DECEMBE...



### Garba dance of Gujarat makes it to UNESCO list

Sneeparna Chakrabarty  
NEW DELHI

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

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- The inclusion has been made under the provisions of the 2003 Convention for the Safeguarding of Intangible Cultural Heritage.
- The international cultural body described the 'Garba' as a **ritualistic and devotional dance performed in India**.



© Jyoti Chavhan/Alamy

**Climate change is making the world sick**  
A new report from the World Health Organization (WHO) says that climate change is making the world sick. The report says that climate change is causing a rise in the number of people who are sick and dying from heat, drought, and flooding. It also says that climate change is causing a rise in the number of people who are sick and dying from air pollution. The report says that climate change is causing a rise in the number of people who are sick and dying from all of these things.



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11:17

PRELIMS 18th N...

• The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warrant — to show by what warrant is a person holding public office;

Prohibition — directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and

Certiorari — re-examination of an order given by judicial, quasi-judicial or administrative authorities.

In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.

When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.

Article 226, however, is not a fundamental right like Article 32.

12th BRICS...

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11:19

28th october 2...

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1023 Nobel Prize In Economic Sciences Awarded to Claudia Gold...

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awarded to  
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Que-2 Consider the following statements

- Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.
- Articles 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(3).
- The Prime Minister of India notifies India's Scheduled Areas.

How many of the above statements are correct?

- Only one
- Only two
- All three
- None

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Ans- (b)  
The President of India notifies India's Scheduled Areas.

Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh. In 2015, Kerala proposed to notify 2,133 habitations, five gram panchayats, and two wards in five districts. It awaits the Indian government's approval.

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.
- The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make regulations for a Scheduled Area, especially to prohibit or restrict the transfer of forest land by or among members of the STs, and regulate the allotment of land to STs and money-lending to STs.

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Article 226, however, is not a fundamental right like Article 32.

12th BRICS...

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12:40

X polity 11th augu...

## Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

### Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

X 18th Septembe...

## Santiniketan finds its place on UNESCO's World Heritage List

Should body makes announcement on Sunday. Mantra says new, named in Tagore, has been supported by Bengal Culture Ministry seek to bring in human values

By India Staff

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, has been added to the UNESCO's World Heritage List. The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture and its role in the development of modern Indian education.



The town, which was founded by Tagore in 1901, is known for its unique blend of Indian and Western architecture and its role in the development of modern Indian education. The town is located in the Birbhum district of West Bengal, India.

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum district, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the foundations of Visva-Bharati University.

## EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

By Staff

Continues

European Commission President Ursula von der Leyen has promised to take action to address the humanitarian crisis on the Italian island of Lampedusa, where thousands of migrants are stranded.



Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Labia program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

The EU chief has promised to take action to address the humanitarian crisis on the Italian island of Lampedusa, where thousands of migrants are stranded. She has also promised to take action to address the humanitarian crisis on the Italian island of Lampedusa, where thousands of migrants are stranded.

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

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Que-2 With reference to Parliaments special sessions, consider the following statements

- There is specific provision in the Constitution that deals with special sessions.
- Article 352, which deals with the proclamation of Emergency, refers to a "special sitting" of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.

3- The Question Hour was suspended during the session.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



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Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.
- The Hoysala Temples, built in the 12th and 13th centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.
- The temples became targets of plundered and destruction by the Delhi Sultanate army of Ala-ud-din Khilji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughlaq in 1326 AD.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-4 Consider the following statements about SHREYAS scheme

- It comprises 4 central sector sub-schemes.
- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.
- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-5 Consider the following statements about Women's Reservation Bill

- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve 33% of seats in Lok Sabha and state Assemblies for women.



12:03

X prelims pointer...



- Que-5** With reference to Shumang Leela, consider the following statements
- Shumang Leela is a traditional form of theatre in Tripura.
  - In this the roles of women are all played by men, called Nupi Shabis.
  - It is performed in an open courtyard surrounded by spectators on all four sides.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- Shumang Leela is a traditional form of theatre in Manipur.
  - In the case of women's theatre groups, the roles of men are played by women.
  - Shumang Leela translates to "courtyard performance".
  - Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.
- Que-6** Consider the following statements about Red Sanders also called Red Sandalwood
- It is a species found in the southern tropical dry deciduous forest of Telangana.
  - The tree reaches an average height of 10 to 15 metres.
  - The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.
- Which of the following given above is/are correct
- a) 1 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
  - CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
  - In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
  - The heartwood of Red Sanders is in demand in the domestic and international markets for making

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furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

**Que-7** Consider the following statements about Compressed Biogas (CBG) and compressed natural gas (CNG)

- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.
- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.
- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

a) 1 and 2 only    b) 3 only

**Que-8** Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARDHAN) in the Union Budget 2023. Consider the following statements about this

- The new GOBARDHAN scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.
- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.
- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

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

12:05

X prelims pointer...



- Que-7** Lamu Archipelago, recently in News, belongs to which country
- a) Somalia  
b) Malaysia  
c) Indonesia  
d) Kenya
- Ans: (d)
- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.
- Que-8** Consider the following statements about "Operation Sadbhavana", recently in News
- Launched by an Indian Army.
  - For development of Jammu and Kashmir.
- Some of the objectives achieved through Operation Sadbhavana are national integration, tourism, women's empowerment, employment generation, education, and
- development activities geared towards nation-building.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 only
- Ans: (b)
- For development of Ladakh.
  - The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

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**Que-1** Consider the following statements

- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.
- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.
- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

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

- Ans: (c)
- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.

of what we call persistence, allowing satellites to capture images continuously.

**Que-2** With reference to Paris Club, consider the following statements

- The Paris Club is a group of mostly western creditor countries.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

Which of the following given above is/are correct

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

- Ans: (b)
- It grew from a 1956 meeting in which

12:35

X may 2024 impo...



## Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.
- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

## Pros and Cons of Exchange-Traded Funds



## BIMSTEC

WHAT YOU SHOULD KNOW



11:29



X 12th august 2023



## DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission

- In India, such Delimitation Commissions have been constituted 4 times - in 1952 under the Delimitation Commission Act, 1952, in 1963 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.

- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.



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defends use of  
Saurabh Kutumbak

11:37



X Mock Series 17t...



productivity, uphold good health and prevent poverty.

- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 5 With reference to Doppler radar network, consider the following statements

- 1 It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.
- 2 It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.

The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

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

CURRENT AFFAIRS BY SAURABH PANDEY SIR

- 5- (c)
  - It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?

- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?

- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?

- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 6 Consider the following statements about Army Day

- 1 India celebrates Army Day on January 15 every year.
- 2 The Army Day is celebrated every year to honour Cariappa and the defence forces.
- 3 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

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

CURRENT AFFAIRS BY SAURABH PANDEY SIR

5- (d)

- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004, with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)

- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)

- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)

- The Chief of Defence Staff is principally responsible for getting the armed forces better integrated rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, and Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Minister only on tri-services matters. The three service chiefs will continue to advise the Defence Minister exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance of the three services.



# Target Mains -2024/25 -

## Essay topic

"The greater the difficulty, the more glory in surmounting it"

"कठिनाई जितनी बड़ी होगी, उससे पार पाने में उतनी ही अधिक महिमा होगी"

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# Topics



- Killing of wild animals
- eSakshya
- iDEX
- The Pradhan Mantri Awas Yojana (Urban)
- Potassium cyanide
- National Security Strategy (NSS)
- What Is a K-Shaped Recovery?
- Cocoa Producer
- Melting of Antarctica
- Mains



By saurabh Pandey



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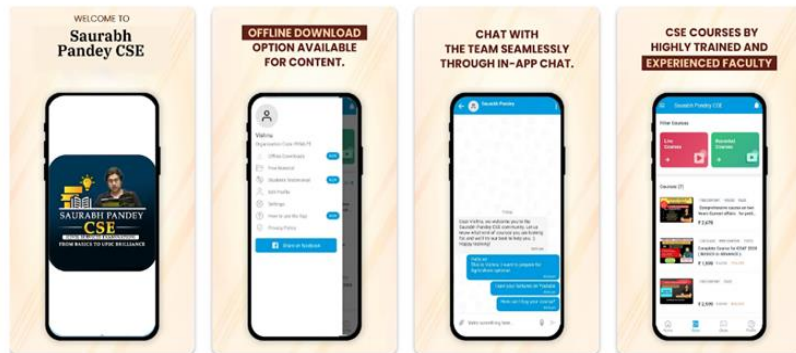
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## Target Mains -2024/25 -

**Q What role technology can play in criminal justice system ??**

प्र. आपराधिक न्याय प्रणाली में प्रौद्योगिकी क्या भूमिका निभा सकती है??

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# T.N. to allow regulated culling of wild boars in fields close to forest

**The Hindu Bureau**  
CHENNAI

The Tamil Nadu government has decided to allow culling of wild boars that cause distress to farmers in farmland close to forest areas.

Minister for Forests M. Mathiventhan said in the Assembly on Friday that the decision was taken based on a report by the Farmers' Conflict Resolution Committee, which was constituted to study the impact of raids by elephants and wild pigs on agricultural crops. The committee comprises representatives from the Departments of Forest, Revenue, Agriculture, and Horticulture, scientific experts, and wildlife enthusiasts.

During the debate on the demand for grants for his department, the Minister said that the areas adjacent to reserve forests would be divided into three zones – Zone A (within one kilometre from forest limits); Zone B (one to five kilometres); and



Shooting of wild boars will not be allowed within 5 km from the reserve forest, says Minister

Zone C (beyond five kilometres). Shooting of wild pigs will not be allowed within five kilometres from the reserve forest, he added.

While farmers have been requesting the State government to allow culling of wild boars, experts have expressed concerns about indiscriminate killing.

Mr. Mathiventhan said the shooting must adhere to a scientific approach and take into account the intensity of conflict and the frequency of incidents on farmland, located outside Zone C.



# Killing of wild boar

**The Tamil Nadu government has decided to allow culling of wild boars that cause distress to farmers in farmland close to forest areas.**

## **Rule**

**Section 11 of wildlife protection act 1972 regulate killing of wild animals**

**As per clause (1)(A) of the section, the Chief Wildlife Warden (CWLW) of a state may if satisfied that a wild animal specified in Schedule I (mammals) has become dangerous to human life or disabled or diseased beyond recovery permit hunting or killing of such animal**

# Ahead of roll-out of the new criminal laws, Union Home Ministry tests eSakhsya App



**Vijaita Singh**

NEW DELHI

Days ahead of the implementation of the three criminal laws, the Union Ministry of Home Affairs (MHA) is testing eSakhsya (e-evidence), a mobile-phone application to help police record scene of crime, search and seizure in a criminal case and upload the file on the cloud-based platform. The police official will have to upload a selfie after the procedure is complete. Each recording could be maximum four minutes long and several such files could be uploaded for each First Information Report (FIR), according to the details shared with State police departments.

The Bharatiya Nyaya Sanhita (BNS) that replaces the Indian Penal Code, 1860; the Bharatiya Sakshya (BS) which replaces the Indian Evidence Act, 1872; and the Bharatiya Nagarik Suraksha Sanhita (BNSS) that replaces the Code of Criminal Procedure, 1898

**The mobile application will be available to all police stations to download and register**

are all set to come into force from July 1.

**Conviction rate**

The BNSS mandates compulsory audiovisual recording of search and seizure in each criminal case and mandatory forensic examination in all cases where an offence attracts punishment of seven years or more. Procuring hardware and cloud space is an expensive affair and many States do not have enough resources, said an official, adding that it will also help uniformity in investigations, thereby increasing the conviction rate.

The mobile application developed by the National Informatics Centre (NIC) will be available to all police stations which register and download the app.

A senior government of-

ficial said the app was under final stages of trial and the police were given two options. "If there is connectivity issue, the police can record the crime scene on their own device such as personal mobile phones and generate a hash value, come back to the police station and upload the file. The other method is they can directly upload through eSakhsya for which good Internet speed is required," explained the official.

Another police officer cautioned that the sanctity of the chain of evidence submission will have to be adhered to, else, it could benefit an accused.

"Many accused escape the clutches of law due to procedural infirmities. The new laws make everything digital; if there is slightest of issue in procuring digital evidence, it could lead to criminals walking free. Forensic evidence is not always challenged on the grounds of quality but on the chain of command," said the officer.

# eSakshya

- the Union Ministry of Home Affairs (MHA) is testing eSakshya (e-evidence), a mobile phone application to help police record scene of crime, search and seizure in a criminal case and upload the file on the cloud-based platform.
- The police official will have to upload a selfie after the procedure is complete.
- Each recording could be maximum four minutes long and several such files could be uploaded for each First Information Report (FIR)

# Urban Affairs Ministry to revamp affordable housing scheme



**The Hindu Bureau**

NEW DELHI

The Pradhan Mantri Awas Yojana (Urban), a scheme to enable affordable housing for urban poor, would be revamped with new features based on learning from the past nine years since when it has been operational, the Ministry of Housing and Urban Affairs said on Tuesday.

The PMAY (Urban), launched in 2015, has been given an extension till December 2024. The mission aims to address urban housing shortage among the poor and middle income groups, including the slum dwellers, by ensuring a *pucca* house to all eligible urban households.

## **No delays**

A senior official of the Housing and Urban Affairs Ministry said that the revamp would focus on ensuring that there are no delays on reaching out to beneficiaries who have signed up for the scheme.

The Ministry had also announced a scheme for

Special Assistance to States for Capital Investment 2023-24 and 2022-23 and for improving and speeding up basic urban planning ecosystem in cities by incentivising the States.

Both the schemes among other things also incentivised States for creating an enabling ecosystem for affordable housing for built up area up to 66 sq m through favourable by-laws and adoption of enabling policy by the States.

Under the scheme, the States have reported that through the enabling provisions under their affordable housing policy, approximately 5,00,000 dwelling units have been constructed in last four to five years in States like Gujarat, Haryana, Odisha, Chhattisgarh, Maharashtra, Rajasthan, Tamil Nadu, Assam and Uttar Pradesh, the official said.

During 2023-2024, as reported by the States, approximately 44,000 dwelling units have been constructed in Assam, Gujarat, Maharashtra, Haryana and Rajasthan.



## **The Pradhan Mantri Awas Yojana (Urban)**

- **The Pradhan Mantri Awas Yojana (Urban), a scheme to enable affordable housing for urban poor, would be revamped with new features based on learning from the past nine years since when it has been operational.**
- **The PMAY (Urban), launched in 2015, has been given an extension till December 2024.**
- **The mission aims to address urban housing shortage among the poor and middle income groups, including the slum dwellers, by ensuring a pucca house to all eligible urban households.**

- **PM Modi had started the Pradhan Mantri Awas Yojana.**
- **Under the Pradhan Mantri Awas Yojana, all homeless citizens of India are given housing by the central government.**
- **Prime Minister Narendra Modi inaugurated the Pradhan Mantri Awas Yojana (PMAY) on 25 June 2015.**
- **Then the main goal of the Pradhan Mantri Awas Yojana was that every family living below the poverty line should have their own house by the year 2023 so that they do not have to take a house on rent.**
- **The government claims that this goal has almost been achieved.**

## Who can apply under PM Awas Yojana?

- Eligibility criteria have been set by the Government of India to apply under the Pradhan Mantri Awas Yojana (PM Awas Yojana Apply Online 2024).
- According to this, the age of the applicant should be less than 70 years.
- There should not be any house or flat in the name of the applicant or any member of his family.
- The applicant should not have taken any kind of government exemption to buy a house, the ownership of the house should be either in the name of a woman, or there should be only men in that family.

Apart from this, the maximum annual income of the applicant's family should not exceed Rs 18 lakh

- For this, the applicant has been divided into four different parts economically.
- These include Economically Weaker Section (EWS) - those with annual total income less than three lakh rupees.
- Low Income Group (LIG) - those with Rs 3 lakh to 6 lakh annually, Middle Income Group-1 (MIG-I) - those with Rs 6 lakh to 12 lakh annually and Middle Income Group-2 (MIG-II) - those with Rs 12 lakh to 18 lakh annually.
- However, government assistance for repair or improvement of house is available only to EWS or LIG category.

# Defence Ministry signs 350th contract under iDEX for 'miniaturised satellite'



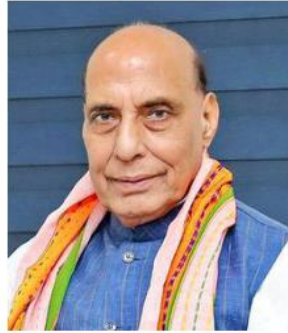
**The Hindu Bureau**  
NEW DELHI

The 350th contract under the Innovations for Defence Excellence (iDEX), the flagship initiative of the Defence Ministry, was signed with SpacePixxel Technologies for the design and development of a "miniaturised satellite capable of carrying electro-optical, infrared, synthetic aperture radar, and hyperspectral payloads up to 150 kg", the Defence Ministry announced on Tuesday.

This challenge is being led by the Indian Air Force.

## **Pros of the satellite**

"This 350th iDEX contract enables innovation in space electronics, wherein many payloads earlier deployed on dedicated large satellites are now being mi-



Rajnath Singh

niaturised," the Ministry said.

The modular small satellite will integrate multiple miniaturised payloads as per requirement, providing advantages such as faster and economical deployment, ease of manufacturing, scalability, and less environmental impact, it stated.

The contract was ex-

changed between Anurag Bajpai, Additional Secretary (Defence Production) & CEO, Defence Innovation Organisation (DIO), and Awais Ahmed Nadeem Alduri, founder and CEO of the SpacePixxel Technologies.

SpacePixxel has been actively working to build and launch high-resolution hyperspectral imaging satellites to provide detailed earth observation data, the statement said.

Established by the DIO under the Department of Defence Production, iDEX has launched 11 editions of the Defence India Start-up Challenge and recently unveiled the Acing Development of Innovative Technologies with iDEX (ADITI) scheme to promote innovations in critical and strategic defence technologies.

The iDEX initiative was launched by the Hon'ble PM in April 2018. iDEX aims to achieve self - reliance and foster innovation and technology development in Defence and Aerospace by engaging Industries including MSMEs, start-ups, individual innovators, R&D institutes and academia.

iDEX has partnered with leading incubators in the country to provide handholding, technical support and guidance to the winners of iDEX challenges.

Defence India Start-up Challenge (DISC) are launched with Problem Statements (PS) from Armed Forces and OFB/DPSUs for resolution by innovators.

# Death by oxygen deprivation

**The Hindu Bureau**



**Q. How does potassium cyanide cause sudden death?**

**A:** Potassium cyanide when consumed causes death by gradually arresting the

supply of oxygen to our body's cells by forming complexes with haemoglobin and cytochrome (a protein which helps in the respiration of cells), depriving them of their capacity to transport or exchange oxygen.

Normally, oxygen is carried to different parts of the body from the lungs by the blood using haemoglobin — the iron-containing, oxygen-carrying molecule of the red blood cells. Haemoglobin is made up of a globular protein and four heme groups. The iron (in ferrous state) present in these heme complexes can bond to either an oxygen molecule or a water molecule or exchange one for the other without much difficulty. It is because of this ability that haemoglobin is able to pick up oxygen from the lungs, carry it to the cells, and bring water in return.

Cells respire oxygen with the help of myoglobin (haemoglobin-like proteins present in the cells) and cytochrome, which carries electrons. Specific forms of cytochrome and haemoglobin also cause sudden death when poisoned by cyanide.

When potassium cyanide is consumed, it splits into a potassium



A small but deadly mass of potassium cyanide crystals next to a one-eurocent coin. MORIENUS (CC BY-SA 3.0)

ion and a cyanide ion. The cyanide ion has a greater affinity for the ferrous iron than. As a result it occupies the site meant for oxygen in haemoglobin. This process is irreversible and prevents the transfer of oxygen.

One form of cytochrome, designated cytochrome-a, also binds with the cyanide ion and stabilises the iron to such an extent that it does not take part in the electron transfer to the cell. This prevents oxygen intake by the cell.

The symptoms of cyanide poisoning are giddiness, headache, and bluish tinge of the skin. If not treated immediately, unconsciousness and death will follow.

(A. Karthikeyani, Udumalpet; C. Ravi Chandra, Secunderabad; and R. Ramaa, Chennai)

## For feedback and suggestions

for 'Science', please write to [science@thehindu.co.in](mailto:science@thehindu.co.in) with the subject 'Daily page'



## Potassium cyanide

- Potassium cyanide when consumed causes death by gradually arresting the supply of oxygen to our body's cells by forming complexes with haemoglobin and cytochrome (a protein which helps in the respiration of cells), depriving them of their capacity to transport or exchange oxygen.
- Normally, oxygen is carried to different parts of the body from the lungs by the blood using haemoglobin — the iron-containing, oxygen-carrying molecule of the red blood cells. Haemoglobin is made up of a globular protein and four heme groups.

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- **Specific forms of cytochrome and haemoglobin also cause sudden death when poisoned by cyanide.**
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- **One form of cytochrome, designated cytochrome-a, also binds with the cyanide ion and stabilises the iron to such an extent that it does not take part in the electron transfer to the cell.**
- **This prevents oxygen intake by the cell**

# India needs the anchor of a national security strategy



**T**he new National Democratic Alliance government faces some thorny old problems in national security. It will have to make decisions – or else continue to defer them – on everything from whether to build another aircraft carrier, to the process of implementing theaterisation, to managing strategic relations with the United States and competition with China. How will the coalition government, with competing demands on its resources and attention, make those decisions?

Its best option is to step back and consider national security holistically, from first principles. It should not consider this reform or that relationship in a piecemeal, haphazard way; that would risk wasting scarce resources and undermining national goals. It should, instead, commit to a new rubric for making these decisions – it should commit to writing a National Security Strategy (NSS).

Most powerful states publish some form of national security strategy. India does not. Consequently, its capability investment decisions are made by haggling between the military services. Plans and priorities get stuck in well-worn grooves, and are never systematically re-evaluated. Grand strategic vision becomes concentrated in the hands of a few individuals at the apex of government, where it gets hidden behind closed doors, or crowded out by other political whims.

## Many strategic risks

India cannot afford to be so reactive. The world is throwing up a slew of strategic risks, from climate change to pandemics, which require decades of coordinated policy effort to address. China alone represents an unprecedented array of interconnected challenges, from an explosive naval build-up, to geo-economic clout in South Asia, to leverage in global supply chains. And even distant conflicts, from Ukraine to Gaza, are revealing new technologies and tactics of war that will invariably spread to India's neighbourhood.



## Arzan Tarapore

a research scholar at the Center for International Security and Cooperation at Stanford University, U.S., and a senior non-resident fellow at the Australian Strategic Policy Institute

The country must have a regular process to make sense of growing global tumult and plan for it

India needs a regular process to make sense of this tumult and plan for it.

## A blueprint for expanding power

A regular and well-crafted NSS would give India five critical benefits that it currently lacks. First and logically foremost, it would force the government to undertake a comprehensive strategic assessment – a review of the country's threats and opportunities, and a stocktake of global security trends. Such a periodic review would force New Delhi to spotlight evolving challenges, such as the growth of the Chinese navy, even though it does not pose an urgent and lethal threat today. In the absence of an NSS, long-term threats will be neglected until they pose an immediate and grave threat – when they will be much harder to manage.

Second, an NSS would provide a coherent framework for long-term planning. Strategic competition requires intense work in peacetime, to conceptualise how best to secure India's expanding interests and deter its adversaries, and then to develop the requisite military capabilities and international partnerships. An NSS, done rigorously, would give the government an overarching strategic blueprint to adjudicate, for example, between the Indian Navy demanding a new aircraft carrier, or the Indian Army seeking to raise a new infantry division. In the absence of such a process, scarce resources may get wasted on vanity projects with comparatively little strategic value, and the military services left scrambling to fill capability gaps with emergency procurements.

Third, an NSS would provide an instrument for signalling to friend and foe alike. It would help to clarify India's strategic intent – declaring that, for example, India takes seriously its role as a net security provider in the Indian Ocean, so that it will counter armed coercion against other, smaller countries.

Equally valuable, an NSS would also clarify India's policy for its partners, highlighting areas

of converging interests, or explaining the limits on cooperation – to help mitigate instances of mismatched expectations.

Fourth, an NSS would create a mechanism to force various arms of the government to synchronise their efforts. Within the military, an NSS would give the Integrated Defence Staff and future joint organisations a clearer top-down mandate to better align the work of the Indian Army, Indian Air Force, and Indian Navy. Beyond the military, an NSS would provide common goals and plans so that various national security agencies, including the Ministries of Defence, External Affairs, and Home Affairs, and the intelligence agencies, could better coordinate daily at the working level, rather than episodically at the Cabinet level.

## Issue of accountability

Finally, an NSS would introduce a novel accountability tool, to ensure that the bureaucracy adheres to the political leadership's intent, and that the government's policies are as transparent as possible to Parliament and the people. The citizens of India have a legitimate need to know how their government is planning to safeguard their national security, and how well it is performing.

Some national security strategies are better than others. A fully effective strategy should be a public document issued with the imprimatur of the Prime Minister, because its purpose is to synchronise efforts widely across government, and credibly signal the government's political intent throughout the country and the world. A strong NSS would not automatically resolve conflicts between various arms of the government, but it should at least identify trade-offs and opportunity costs, so that political leaders can make rational decisions for long-term growth. In that way, an NSS would offer the intellectual scaffolding that is absolutely necessary for India to become one of the world's leading powers.

# National Security Strategy (NSS)

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- First and logically foremost, it would force the government to undertake a comprehensive strategic assessment — a review of the country's threats and opportunities, and a stocktake of global security trends.
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# K-shaped recovery fuelling similar trend in inflation: HSBC



**The Hindu Bureau**

NEW DELHI

An uneven K-shaped recovery in economic growth is also fuelling a similar trajectory for inflation dynamics, with food and rural price rise outpacing the inflation in other goods and services, and that faced by urban consumers, respectively, HSBC researchers said on Tuesday.

There has been much debate over India's post-pandemic recovery being driven by demand for higher-end goods and services. Apart from the dichotomy

between rural and urban inflation, and food prices compared with other goods, HSBC pointed to goods inflation being higher than that for services.

"Perhaps inflation and growth dynamics were never meant to differ," HSBC's chief economist for India and Indonesia Pranjul Bhandari wrote. "The same shocks that are driving the variance in growth, like the pandemic and climate change, hurting some groups more than others, are also likely driving the variance in prices," Ms. Bhandari added.

# What Is a K-Shaped Recovery?



- A K-shaped recovery occurs when, following a recession, different parts of the economy recover at different rates, times, or magnitudes.
- This is in contrast to an even, uniform recovery across sectors, industries, or groups of people.
- A K-shaped recovery leads to changes in the structure of the economy or the broader society as economic outcomes and relations are fundamentally changed before and after the recession.
- This type of recovery is called K-shaped because the path of different parts of the economy when charted together may diverge, resembling the two arms of the Roman letter "K."

## K-Shaped Recovery





## Trouble in cocoa land



**Harvesting woes:** Recently extracted cocoa beans at a farm in Asikasu. Despite government efforts to stabilise the sector and recent soaring global cocoa prices, many Ghana farmers say they feel abandoned and have turned to illicit trade to survive in the world's number two producer. Ghana is emerging from one of its worst economic crisis in years after securing a \$3 billion credit from the International Monetary Fund and restructuring most of its debt. AFP



# Cocoa Producer

- Cocoa beans are grown on cacao trees and have been consumed for thousands of years.
- Today, dried and fermented seeds can be used to create chocolate, while the fat of the beans – or cocoa butter – can also be extracted and used for a variety of purposes, from moisturizing the skin and hair to cooking. Cocoa was first harvested in what is today **Central America**.
- Soon, though, it became popular around the world, and it is now produced in many regions worldwide

- While many nations produce cocoa beans, there are a few that stand out from the pack. One of those is Cote d'Ivoire. This nation is responsible for 30% of the world's cocoa.
- Familiar brands like Cadbury and Nestle mostly source their cocoa from this country. Ghana is another top producer of cocoa. The production of cocoa contributes significantly to the nation's GDP.

- Unfortunately, operational costs have become a problem in recent years, leading to cocoa smuggling to the **Ivory Coast**.
- **Indonesia** is relatively new to the cocoa industry, only ramping up producing during the 1980s. Today, the nation is one of the top producers in the world.
- Other nations that are top producers of cocoa include **Brazil, Cameroon, Dominican Republic, Ecuador, Mexico, Nigeria, and Peru**.



Studies have shown that warm seawater is seeping into the 'grounding zone', where land and ice meet. FILE PHOTO

## New 'tipping point' of runaway melting found in Antarctica

**Agence France-Presse**

PARIS

Scientists have discovered a new tipping point toward "runaway melting" of Antarctic ice sheets, caused by warm ocean water intruding between the ice and the land it sits on, according to a study published on Tuesday.

While this type of melting has been previously studied, models used by the UN's Intergovernmental Panel on Climate Change to project the impact of global warming on the Antarctic have yet to factor in this phenomenon.

They have also systematically underestimated ice loss seen thus far, said the study, published in the journal *Nature Geoscience*. As temperatures rise due to human-caused global warming, Antarctic ice sheets are melting, threatening a rise in global sea levels and putting coastal communities at risk. "Increases in ocean temperature can lead to a tipping point being passed, beyond which ocean water intrudes in an unbounded manner beneath the ice sheet, via a process of runaway melting," the study said. Antarctic ice sheets sit atop the bedrock and extend beyond the coast to float on the sea.

Previous studies have shown that warm seawater is seeping into the "grounding zone" – where land and ice meet – and further inland. As the water warms, even by a fraction, the intrusion accelerates from short distances of 100 metres to tens of kilometres, melting ice along the way by heating it from below, explained the study's lead author Alexander Bradley. "Every 10th of a degree (of warming) makes these kind of processes closer, these tipping points closer," said Mr. Bradley, a researcher with the British Antarctic Survey.

# Melting of Antarctica



- **Scientists have discovered a new tipping point toward “runaway melting” of Antarctic ice sheets, caused by warm ocean water intruding between the ice and the land it sits on.**
- **As temperatures rise due to human-caused global warming, Antarctic ice sheets are melting, threatening a rise in global sea levels and putting coastal communities at risk.**
- **“Increases in ocean temperature can lead to a tipping point being passed, beyond which ocean water intrudes in an unbounded manner beneath the ice sheet, via a process of runaway melting,”**

- **Antarctic ice sheets sit atop the bedrock and extend beyond the coast to float on the sea.**
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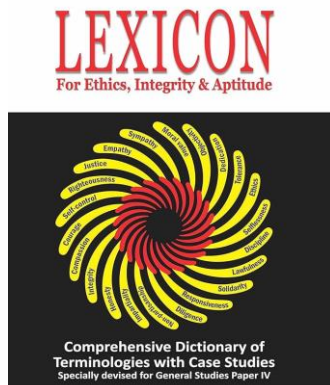
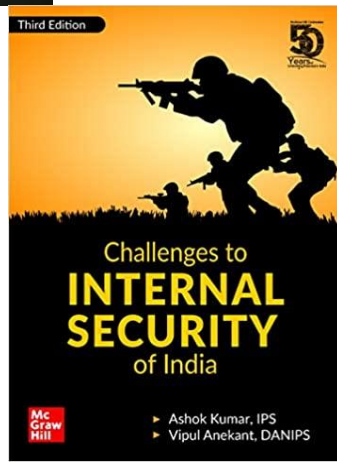
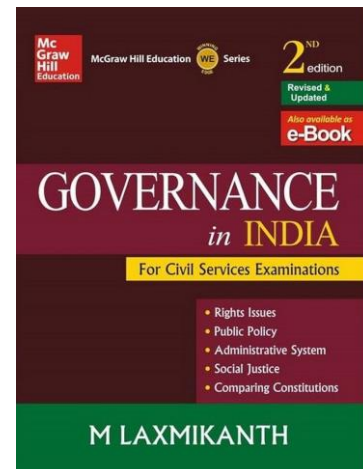
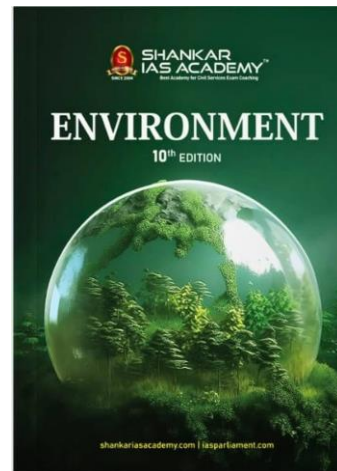
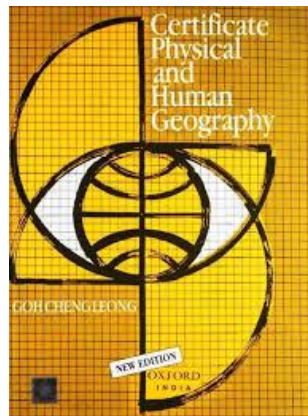
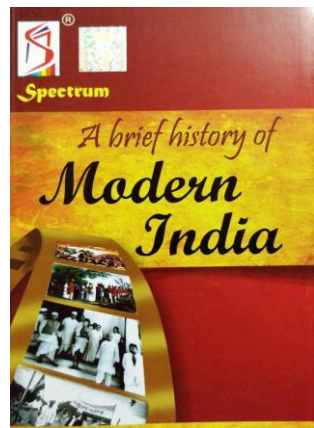
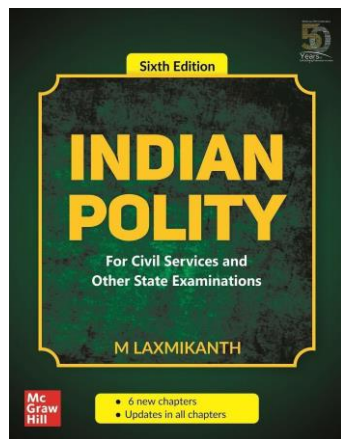
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### Periodical cicada emergence disrupts food webs

The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 brood X cicada emergence. The study found that when insect-eating birds have prey in the form of cicadas and thus shift their focus away from their usual prey – leaf-eating caterpillars – the caterpillars feast more heavily upon the leaves of oak saplings, doubling insect leaf damage.

- The periodical mass emergence of cicadas in eastern North American forests can "rewire" forest food webs and initiate a cascade of impacts that propagates throughout the food chain, as per a study that quantified effects of the 2021 Brood X cicada emergence.

The cicadas are a superfamily, the Cicadoidea, of insects in the order

Hemiptera.



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States as per Article 244(2).

### What are Scheduled Areas?

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

### How are Scheduled Areas governed?

- The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members.
- They will advise the Governor on matters referred to them regarding ST welfare.
- The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.

- The national government can give directions to the State regarding the administration of Scheduled Areas.
- The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State.



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### Garba dance of Gujarat makes it to UNESCO list

Sneeparna Chakrabarty  
NEW DELHI

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

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- The popular dance form is the 15th cultural item from India to make it to the UNESCO list. Kolkata's Durga Puja was the last one added two years ago.
- The inclusion has been made under the provisions of the 2003 Convention for the Safeguarding of Intangible Cultural Heritage.
- The international cultural body described the 'Garba' as a **ritualistic and devotional dance performed in India**.



**Climate change is making the world sick**

Climate change is making the world sick. The world is becoming warmer, and the weather is becoming more extreme. This is causing a lot of problems for people and the environment. We need to do something to stop climate change before it's too late.



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 Russia loads 'Avangard' missile into launch Silo, fears of nuclear warfare on rise | World DNA

Que-3 With reference to exercise 'Mitra Shakti', consider the following statements

- Between India and Nepal.
- The aim of the exercise is to jointly rehearse sub-conventional operations under Chapter VII of the United Nations Charter, which authorises the Security Council to take enforcement measures, including the use of military force, to address threats to international peace and security.
- "Exercise MITRA SHAKTI-2023" recently commenced in Goa.

How many of the above statements are correct?

- Only one
- Only two
- All three
- None

Ans 3- (a)

- "Exercise MITRA SHAKTI-2023" recently commenced in Aundh (Pune).
- Between India and Sri Lanka.

1:17

PRELIMS 18th N...

- The Constituent Assembly debated whether fundamental rights including this one could be suspended or limited during an Emergency. The Article cannot be suspended except during the period of Emergency.

#### Can High Courts be approached in cases of violation of fundamental rights?

- Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs:
- Habeas corpus (related to personal liberty in cases of illegal detentions and wrongful arrests)
- Mandamus — directing public officials, governments, courts to perform a statutory duty;
- Quo warrant — to show by what warrant is a person holding public office;

- Prohibition — directing judicial or quasi-judicial authorities to stop proceedings which it has no jurisdiction for; and
- Certiorari — re-examination of an order given by judicial, quasi-judicial or administrative authorities.
- In civil or criminal matters, the first remedy available to an aggrieved person is that of trial courts, followed by an appeal in the High Court and then the Supreme Court.
- When it comes to violation of fundamental rights, an individual can approach the High Court under Article 226 or the Supreme Court directly under Article 32.
- Article 226, however, is not a fundamental right like Article 32.

12th BRICS

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28th october 2...

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 1023 Nobel Prize In Economic Sciences Awarded to Claudia Gold...  
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 CURRENT AFFAIRS BY SAURABH PANDEY SIR  
 Que-2 Consider the following statements  
 1- Article 244, pertaining to the administration of Scheduled and Tribal Areas, is the single most important constitutional provision for STs.  
 2- Articles 244(1) provides for the application of Fifth Schedule provisions to Scheduled Areas notified in any State other than Assam, Meghalaya, Tripura, and Mizoram, the Sixth Schedule applies to these states as per Article 244(3).  
 3- The Prime Minister of India notifies India's Scheduled Areas.  
 How many of the above statements are correct?  
 a) Only one b) Only two  
 c) All three d) None

Ans- (b)  
 The President of India notifies India's Scheduled Areas.  
 Scheduled Areas cover 11.3% of India's land area, and have been notified in 10 States: Andhra Pradesh, Telangana, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, and Himachal Pradesh. In 2015, Kerala proposed to notify 2,133 habitations, five gram panchayats, and two wards in five districts. It awaits the Indian government's approval.  
 The President of India notifies India's Scheduled Areas. States with Scheduled Areas need to constitute a Tribal Advisory Council with up to 20 ST members. They will advise the Governor on matters referred to them regarding ST welfare. The Governor will then submit a report every year to the President regarding the administration of Scheduled Areas.  
 The national government can give directions to the State regarding the administration of Scheduled Areas. The Governor can repeal or amend any law enacted by Parliament and the State Legislative Assembly in its application to the Scheduled Area of that State. The Governor can also make regulations for a Scheduled Area, especially to prohibit or restrict the transfer of forest land by or among members of the STs, and regulate the allotment of land to STs and money-lending to STs.

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12:40

X polity 11th augu...

## Ethics vs privilege committee

- Objective: It oversees the moral and ethical conduct of members and examines cases of misconduct referred to it.
- Appointment of members in Lok Sabha: The members of the Ethics Committee are appointed by the Speaker for a period of one year.

### Procedure for complaints

- Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct, and an affidavit stating that the complaint is not "false, frivolous, or vexatious".
- If the Member himself complains, the affidavit is not needed.
- The Speaker can refer to the Committee any complaint against an MP.
- The Committee does not entertain complaints based only on media reports or on matters that are sub-judice.
- The Committee makes a prima facie inquiry before deciding to examine a complaint. It makes its recommendations after evaluating the complaint.

- The Rules (for example, the Rules of Procedure and Conduct of Business in the Lok Sabha) applicable to the Committee of Privileges also apply to the ethics panel.
- An allegation of corruption against an MP can be sent to either body, but usually more serious accusations go to the Privileges Committee.
- The mandate of the Privileges Committee is to safeguard the "freedom, authority, and dignity of Parliament".
- These privileges are enjoyed by individual Members as well as the

House as a whole.

- An MP can be examined for breach of privilege; a non-MP too can be accused of breach of privilege for actions that attack the authority and

12:55

X 18th Septembe...

## Santiniketan finds its place on UNESCO's World Heritage List

Should body makes announcement on Sunday. Manu's says news, named in Tagore, has been supported by Bengal Culture Ministry seek to bring in human values

By India Staff

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, today is the UNESCO's World Heritage site. The town, which was founded by Tagore in 1901, is a place of peace and beauty. It is a place where Tagore laid the foundations of Visva Bharati University.



Students and teachers of Santiniketan University in the foreground. The building in the background is the main building of the university.

Santiniketan, a town established by Nobel laureate Rabindranath Tagore, made it to the UNESCO's World Heritage List on Sunday.

Located in West Bengal's Birbhum district, Santiniketan, which means "abode of peace", started taking shape in 1901 and is the place where Tagore laid the foundations of Visva Bharati University.

## EU chief promises a plan of action as migrants flock to Italian island

Ursula von der Leyen, along with Italian PM Giorgia Meloni, visits Lampedusa where more than 2000 people have arrived this week. EU-Lab's program have arrived in Italy this year, almost double the figure by the corresponding period in 2022.

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ceramics and glasses, greases, metallurgical powders, polymers and other uses.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

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Que-2 With reference to Parliaments special sessions, consider the following statements

- There is specific provision in the Constitution that deals with special sessions.
- Article 352, which deals with the proclamation of Emergency, refers to a 'special sitting' of the House, this clause was added through the 44th Amendment Act in 1978, which included safeguards against the Emergency.

3- The Question Hour was suspended during the session.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-3 Consider the following statements about Sacred Ensembles of the Hoysala

- This includes five temples in Karnataka, has been recently inscribed on the UNESCO's World Heritage List.
- The Hoysala Temples, built in the 12th and 13th centuries by the Hoysala kings, are dedicated to Shiva and Vishnu.
- The temples became targets of plundered and destruction by the Delhi Sultanate army of Ala-ud-din Khilji in the early 14th century and another Delhi Sultanate army of Sultan Muhammad bin Tughlaq in 1326 AD.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None



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Que-4 Consider the following statements about SHREYAS scheme

- It comprises 4 central sector sub-schemes.
- The objective of the Scheme is to provide coaching of good quality for economically disadvantaged Scheduled Castes (SCs) and Other Backward Classes (OBCs) candidates to enable them appear in competitive and entrance examinations.
- The ceiling of the total family income under the scheme is 2 lakhs per annum and 3500 slots are allotted per annum.

How many of the above statements are correct?

- a) Only one b) Only two  
c) All three d) None

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Que-5 Consider the following statements about Women's Reservation Bill

- The Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, seeking to reserve



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CSE  
MENTOR & COACH  
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12:03

X prelims pointer...



- Que-5** With reference to Shumang Leela, consider the following statements
- Shumang Leela is a traditional form of theatre in Tripura.
  - In this the roles of women are all played by men, called Nupi Shabis.
  - It is performed in an open courtyard surrounded by spectators on all four sides.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- Shumang Leela is a traditional form of theatre in Manipur.
  - In the case of women's theatre groups, the roles of men are played by women.
  - Shumang Leela translates to "courtyard performance".
  - Today, Shumang Leela is of two types: Nupa Shumang Leela, performed only by men, and Nupi Shumang Leela, performed only by women.
- Que-6** Consider the following statements about Red Sanders also called Red Sandalwood
- It is a species found in the southern tropical dry deciduous forest of Telangana.
  - The tree reaches an average height of 10 to 15 metres.
  - The species is listed as 'Endangered' in the International Union for Conservation of Nature and falls in Appendix II of CITES.
- Which of the following given above is/are correct
- a) 1 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 and 3 only
- Ans: (d)
- It is a species found in the southern tropical dry deciduous forest of Andhra Pradesh (AP).
  - CITES (shorter name for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention).
  - In India, it has been enlisted under Schedule IV of the Wildlife (Protection) Act, 1972.
  - The heartwood of Red Sanders is in demand in the domestic and international markets for making

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furniture, handicrafts and musical instruments in China and Japan. The red dye obtained from the wood is used as a colouring agent in the textiles, medicine and food industries.

**Que-7** Consider the following statements about Compressed Biogas (CBG) and compressed natural gas (CNG)

- Chemically, CBG is the same as CNG — both are compressed methane — and has the same calorific value.
- CNG is a by-product of petroleum, CBG can be produced from any biomass, be it crop residue, cattle dung, sugarcane press mud, municipal wet waste or effluents from a sewage treatment plant.
- CBG cannot be transported through cylinders or pipelines to retail outlets.

Which of the following given above is/are correct

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

**Que-8** Finance Minister announced 500 new 'waste to wealth' plants under Galvanizing Organic Bio-Agro Resources Dhan scheme (GOBARDHAN) in the Union Budget 2023. Consider the following statements about this

- The new GOBARDHAN scheme is an upgrade and an expansion of the old one of the same name, launched in 2018 by the Department of Drinking Water and Sanitation.
- This scheme limited itself to cluster or community-level biogas plants, for instance, for Anganwadis or farms.
- Compressed biogas (CBG) was never a part of the initial scheme launched in 2018 because it is very different from biogas in terms of utilisation and constituents.

Which of the following given above is/are correct

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

12:05

X prelims pointer...



- Que-7** Lamu Archipelago, recently in News, belongs to which country
- a) Somalia  
b) Malaysia  
c) Indonesia  
d) Kenya
- Ans: (d)
- The Lamu Archipelago is located in the Indian Ocean close to the northern coast of Kenya, to which it belongs. The islands lie between the towns of Lamu and Kiunga, near the Coast Province. It is a part of Lamu District.
- Que-8** Consider the following statements about "Operation Sadbhavana", recently in News
- Launched by an Indian Army.
  - For development of Jammu and Kashmir.
  - Some of the objectives achieved through Operation Sadbhavana are national integration, tourism, women's empowerment, employment generation, education, and
- development activities geared towards nation-building.
- Which of the following given above is/are correct
- a) 1 and 2 only    b) 1 and 3 only  
c) 1, 2 and 3    d) 2 only
- Ans: (b)
- For development of Ladakh.
  - The Indian Army is organising multiple welfare activities, such as running schools and infrastructure development projects, as part of "Operation Sadbhavana" in the Union Territory of Ladakh.

<http://www.gesreporter.com/>

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CURRENT AFFAIRS FEB 6<sup>th</sup> by SAURABH PANDEY SIR

**Que-1** Consider the following statements

- A spy balloon is literally a gas-filled balloon that is flying quite high in the sky, more or less where we fly commercial airplanes.
- Disadvantage that low Earth orbit satellites have is that they are continually moving around the Earth.
- Geosynchronous orbit satellite has the disadvantage that it's harder to see things clearly when you're very, very far away.

Which of the following given above is/are correct

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

Ans: (c)

- The disadvantage these low Earth orbit satellites have is that they are continually moving around the Earth.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.

of what we call persistence, allowing satellites to capture images continuously.

**Que-2** With reference to Paris Club, consider the following statements

- The Paris Club is a group of mostly western creditor countries.
- It grew from a 1956 meeting in which Brazil agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.

Which of the following given above is/are correct

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

Ans: (b)

- It grew from a 1956 meeting in which Brazil agreed to meet its public

12:35

X may 2024 impo...



## Exchange traded fund

- An exchange-traded fund (ETF) is a pooled investment security that can be bought and sold like an individual stock.
- ETFs can be structured to track anything from the price of a commodity to a large and diverse collection of securities.
- ETFs can even be designed to track specific investment strategies.

- ETF share prices fluctuate all day as the ETF is bought and sold; this is different from mutual funds, which only trade once a day after the market closes.
- ETFs offer low expense ratios and fewer broker commissions than buying the stocks individually.
- An ETF must be registered with the Securities and Exchange Commission.

## Pros and Cons of Exchange-Traded Funds



## BIMSTEC

WHAT YOU SHOULD KNOW





11:29



X 12th august 2023



## DELIMITATION COMMISSION

- Delimitation literally means the act or process of fixing limits or boundaries of territorial constituencies in a country or a province having a legislative body. The job of delimitation is assigned to a high power body. Such a body is known as Delimitation Commission or a Boundary Commission

- In India, such Delimitation Commissions have been constituted 4 times - in 1952 under the Delimitation Commission Act, 1952, in 1963 under Delimitation Commission Act, 1962, in 1973 under Delimitation Act, 1972 and in 2002 under Delimitation Act, 2002.

- The Delimitation Commission in India is a high power body whose orders have the force of law and cannot be called in question before any court. These orders come into force on a date to be specified by the President of India in this behalf.

- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.



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defends use of  
Saurabh Kutumbak

11:37



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productivity, uphold good health and prevent poverty.

- The second set consists of policies to reduce inequality and promote economic security at older ages in a fiscally sustainable manner, considering pensions and health care.
- While many older persons are in excellent health or economically active stages, others live with ailments or are in poverty. Public spending in most countries has not been sufficient to cover the growing demand for long-term care, the analysis pointed out.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 5 With reference to Doppler radar network, consider the following statements

- It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect.
- It is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area.
- The entire stretch of India will be covered under the Doppler Weather Radar Network to better predict extreme weather events more accurately.

Which of the following given above is/are correct

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

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- (c)
  - It is named after Christian Doppler, the physicist who first proposed the concept of the Doppler effect. The Doppler effect is the change in frequency or wavelength of a wave (such as sound or light) as it approaches or moves away from an observer.

What is a Doppler radar network?

- A Doppler radar network is a system of multiple radar stations that work together to provide comprehensive coverage of a specific area. The system uses the Doppler effect to detect and track moving objects, such as weather systems, aircraft, and vehicles.

How does a Doppler radar network work?

- Each station in the network includes a radar transmitter, which sends out a microwave signal, and a radar receiver, which detects the reflected signal. The transmitter and receiver are typically located at the same site, but they can also be separated by a significant distance. The radar signal reflects off any moving objects in its path and the change in frequency of the signal due to the Doppler effect is used to determine the speed and direction of the moving object.

What are the uses of a Doppler radar network?

- Doppler radar networks are widely used for weather forecasting and severe weather warning, tracking of aircraft and vehicles, and also used in meteorology and atmospheric sciences. These radar networks provide detailed information about storm systems, including the location, size, and movement of thunderstorms, tornadoes, and other severe weather events.

CURRENT AFFAIRS BY SAURABH PANDEY SIR

Question 6 Consider the following statements about Army Day

- India celebrates Army Day on January 15 every year.
- The Army Day is celebrated every year to honour Cariappa and the defence forces.
- 75th Army Day was held in Hyderabad this year.

Which of the following given above is/are correct

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

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5- (d)

- In 1997 Bangkok Declaration launched a modest grouping (of Bangladesh, India, Sri Lanka and Thailand), with the acronym, BIST-EC.
- Originally formed as BIST-EC (Bangladesh, India, Sri Lanka and Thailand Economic Cooperation) in 1997, it became BIMST-EC after Myanmar joined, and BIMSTEC in 2004, with the inclusion of Nepal and Bhutan. This unique set of five countries from South Asia and two from Southeast Asia are parents to an institution with an unwieldy name but lofty ambitions.

6- (a)

- The portal ensures end-to-end coverage of all the linked schemes.
- Anyone can apply for a loan.

7- (b)

- Any serving or retired three-star officer from either of the three services, below 62 years on the date of projected appointment, would be eligible to be elevated as the CDS and will superannuate at the age of 65. Earlier, the post was only open for four-star generals.

8- (c)

- The Chief of Defence Staff is principally responsible for getting the armed forces better integrated rather than operating in silos as has been the case for decades.
- The job includes the creation of new military commands which integrate the Army, Air Force, and Navy to fight together.
- According to the government, the CDS acts as the Principal Military Adviser to the Defence Minister only on tri-services matters. The three service chiefs will continue to advise the Defence Minister exclusively on the matters concerning their respective services.
- The CDS will not hold any military command, including over the three service chiefs.
- As the Permanent Chairman of the Chief of Staff Committee, the CDS brings about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance of the three services.



## Target Mains -2024/25 -

**Q What role technology can play in criminal justice system ??**

प्र. आपराधिक न्याय प्रणाली में प्रौद्योगिकी क्या भूमिका निभा सकती है??

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# Topics

- Indigen
- (PRaGeD)
- **What is NGS?**
- **What is multiomics?**
- **Rhisotope'**
- **The Resolve Tibet Act**
- **What is the RTS (rooftop solar) programme?**
- **Mains**



By saurabh Pandey



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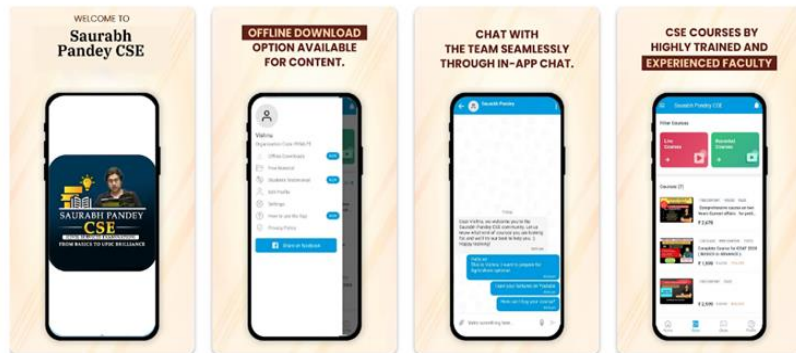
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## Target Mains -2024/25 -

Q Suggest steps to increase solar energy adoption in india .

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# U.P.S.C.

1. अपराध = जो व्यक्ति को शुद्ध बना देने का कारण बनने वाला कारण है।

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उत्तर :-

उपनायक - यम प्रजापति के अद्वय

1) ब्रह्मात्मिका का कुलीन  
काला का लोभ

2) ब्रह्मात्मिका  
विष्णु का प्रेम

3) जीवित का प्रेम  
रामायन का प्रेम

समान में बने हुए लोगों की संख्या  
 व. शोभाषिणी का पैसा है जो  
 समान में बने हुए लोगों की संख्या  
 व. शोभाषिणी का पैसा है जो  
 समान में बने हुए लोगों की संख्या  
 व. शोभाषिणी का पैसा है जो

अपराधिक - आम शाली में प्रौद्योगिकी की सुविधा है।

मजदूरों को काम से हटाना

(2) निजामीन को मालीदारों से प्रजापिता की भाँति माना जाता है।  
एक काल व ठगाना, नाश के नीति का आगमन है।  
वर्तमान में कई तरीकों से हमें भय का है।  
• गेहूँ की नष्ट-बाँट में कुछ सौकरकम होल  
• सैफ़ मारना फ़ौरन ही ख़तरा है।  
• वादना हल व फ़ैजाना का  
आवश्यकता को सामा कला है।  
• निजामीन की भाँति

2) पूर्वमुम्मीनत मुम्मीनियों के बीच में प्रियापिमा की मुम्मीन  
वर्तमान में बड़ा मात्रा में इस दुष्प्रकार का बड़ा विना  
जमा, बालवा में इस की उत्तर मुम्मीन प्रमुख मुम्मीन

**U.P.S.C.**

डेरा तक पहुँचा गरीब लकड़ें, नाचतों, मंगियों में झुगड़ा विदाया  
 करीब है। फुल-गुल-गुलियाँ हैं ये तो बालक-  
 कों के गाने, बालों के लाल झूलने की लीला है गंगा-गंगा के ल -  
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 कों के गाने, बालों के लाल झूलने की लीला है गंगा-गंगा के ल -  
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 करीब है। फुल-गुल-गुलियाँ हैं ये तो बालक-  
 कों के गाने, बालों के लाल झूलने की लीला है गंगा-गंगा के ल -

[illegible][illegible]

महावक्ता हूँ।  
 वही किता मे निकार स्वास मैं मानूँ 'ए' में 'मैं' किता मे  
 है जो कि प्रेमि की आँखें मैं हिस का देला टबि मे  
 न सब मैं किता मे मरन कीला!

नामालि, जल व नदीका अपवादात्मक प्रणाली  
मे महापान्थु गोखरु व अठ कुबू  
नैतिक नियाम के प्रधान कर्मा के  
इरा मास्य मीडिय गिरावली व्यक्त के  
आसा व अभिव्यक्ति



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Genomics and metagenomics are coming in handy to analyse antimicrobial resistance. Representative illustration. GETTY IMAGES

# ‘Multi-omics’ is transforming how India spots and treats TB, cancers

Researchers are building datasets to address health problems at the individual level. They have extracted more value from these data using AI and machine learning, and combining their output with proteomic, transcriptomic, and epigenomic information to develop ‘multi-omics’ approaches

T.V. Padma

In the last decade, India’s use of genomics has undergone a significant transformation, so much so that the diagnoses, management, and treatment of many diseases – including tuberculosis, cancers, and those caused by antimicrobial resistance – stand on the cusp of a revolution.

Most recently, in January 2024, the department of Biotechnology said it had completed sequencing 10,000 genomes from 99 ethnic groups under its ‘Genome India’ project. This national initiative aims at developing a reference genome for Indian people, which will help design genome-wide and disease-specific ‘genetic chips’ for low-cost diagnostics and research.

Earlier, in October 2020, the Council for Scientific and Industrial Research (CSIR) had reportedly sequenced the entire genomes of 1,008 individuals in India representing diverse ethnic groups in six months. This effort was part of a mission called ‘IndiGen’ – to create a pilot dataset with which researchers could analyse the epidemiology of genetic diseases and help develop affordable screening approaches, optimise treatment, and minimise adverse events for them.

Other, more disease-specific consortia have also sprung up around the country and efforts are underway to create new datasets to address individual health problems, ranging from the age-old scourge of tuberculosis to cancers, rare genetic disorders in children, and even antimicrobial resistance. These efforts have also been able to extract more value from these using artificial intelligence and machine learning, and by combining their contents with other extensive datasets on proteins (proteomics), gene expression in cells (transcriptomics), and chemical changes that regulate gene expression (epigenomics) to develop a ‘multi-omics’ approach to tackle diseases.

## Tuberculosis

A recent consortium concerns tuberculosis, a disease that continues to pose significant challenges to its eradication, in India and around the world. The Indian Tuberculosis Genomic Surveillance Consortium (ITGSC) comprises to Report India states covering eight States for tuberculosis, with the goal of sequencing around 32,000 tuberculosis clinical strains from active patients, and develop a centralised biological repository of clinical *Mycobacterium tuberculosis* strains in India.

Other major objectives vis-à-vis tuberculosis include mapping the genetic diversity of pulmonary and extra-pulmonary isolates of the

tuberculosis bacterium from newly reported active cases in India, the associated treatment outcomes, and correlating mutations with drug resistance patterns, according to Vinay Nandimammi, director of the CSIR Centre for Cellular and Molecular Biology (CCMB), Hyderabad. The project’s ultimate goal is to validate identified mutations to develop a sequence-based method to determine drug resistance.

It also aims to confirm the epidemiological data with results from whole-genome sequencing to develop working solutions.

Scientists from a mix of leading research institutes have divided the various parts of the project thus. In the first stage, scientists from the Jawahar Institute of Postgraduate Medical Education and Research, Puducherry; the National Institute for Research in Tuberculosis, Bangalore; Medical College, Hyderabad; the Thyagaraj Government Medical College, Chennai; and the P.D. Hinduja Hospital, Mumbai, will collect the clinical samples, including the patients’ metadata. Next, scientists at the International Centre for Genetic Engineering and Biotechnology, New Delhi, will isolate the genetic material from the samples and set up a strain repository. In the third stage, scientists at CCMB and the National Institute of Biomedical Genomics, Kolkata, will conduct whole genome sequencing. In the fourth and final stage, a team at the National Institute of Immunology, New Delhi, will conduct RNA sequencing data analysis, and develop artificial intelligence (AI) and machine learning (ML) models to predict drug resistance and take cognisance of the metadata to detect resistance patterns, according to Dr. Nandimammi.

“This is a huge, huge, huge project,” he added. The starting point is to generate baseline data – a relatively ignored task in India compared to several other countries.

## Rare genetic disorders

India has also launched a pan-country mission for Paediatric Rare Genetic Disorders (PRAGeD), which, despite their rarity, have become a common public health concern. Mission PRAGeD is planning to create awareness, perform genetic diagnosis, discover and characterise new genes or variants, provide counselling, and develop new therapies for rare genetic diseases that afflict India’s children.

The mission will incorporate IndiGen data in its in-house bioinformatic pipelines. It will also analyse the parts of a genome that code for proteins (exome). The CSIR Centre for DNA Fingerprinting and Diagnostics (CCFD), Hyderabad, in collaboration with IISc across India, plans to recruit patients and their families with rare genetic disorders.



In January, the Department of Biotechnology said it had completed sequencing 10,000 genomes from 99 ethnic groups under its ‘Genome India’ project. The aim is to develop a reference genome for Indian people

“The study aims to identify novel genes for various known as well as unexplained inherited phenotypes (observable traits) but also help the patient and family with management of disease and prenatal diagnosis,” Ashwin Dalal group leader for diagnostics and a scientist at CCRF said. The team will also characterise novel genes or variants thereof to determine their function or role in the disorder, using cell lines and/or model organisms such as mice, fruit flies, and zebrafish.

Also on the anvil in the mission is the use of next generation sequencing, one of the latest tools to manage rare diseases and to assess the probability of developing several chronic ailments, especially when conventional tests give negative results. “Implementing next-gen genetic testing at a national level can contribute to the management of rare genetic conditions through faster and more accurate diagnostics,” Dr. Dalal said.

## Cancers

The Indian Cancer Genome Consortium (ICGC-India), part of the larger International Cancer Genome Consortium (ICGC) and supported by the Department of Biotechnology, plans to characterise genomic abnormalities in different types of cancers in Indian patients and identify population-specific genetic variations that are linked to cancer risk and treatment response. Such population-based genome sequencing projects can facilitate the discovery of novel biomarkers, potential new treatment targets, and personalised treatment strategies, according to Dinesh Gupta, group leader of translational bioinformatics at the International Centre for Genetic Engineering and Biotechnology, New Delhi.

Several Indian institutions have established ICGC genomic data repositories to facilitate cancer research and prevent medical disparities. The ICGC also aims to create a genetic map of Indian people, Dr. Gupta said. Another example is the Indian Cancer Atlas project, a not-for-profit public-private cancer genomics initiative that is trying to create a comprehensive catalogue of genomic alterations across various cancer types prevalent in India. This could help researchers identify novel biomarkers and treatment targets. The Atlas collects and generates detailed genomic data with linked clinical data. Clinical trials in cancer are also

beginning to incorporate genomics in the country, Dr. Gupta added. Indian cancer centres classify patients using genomic profiling for clinical trials that are based on their molecular subtypes, and match potential responders with targeted therapies.

## Antimicrobial resistance

Genomics and metagenomics are coming in handy to analyse antimicrobial resistance and understand the possibility of rapid spread of any antibiotic resistance functions between bacterial species. Some of the microbes, such as the bacteria that cause tuberculosis, grow very slowly, even in laboratory conditions, Bhaskar Das, associate professor at the Translational Health Science and Technology Institute, Faridabad, explained. “So clinicians prescribe antibiotics without knowing the actual resistance profile of the infectious agents.”

In such cases, genome sequencing is very helpful because it can provide information about the resistance profile of microbes without researchers having to grow them in the lab, he said. “Such information helps clinicians make judicious use of antibiotics.” In tuberculosis, pathogen-specific resistance signatures “should add immense value to antimicrobial resistance diagnostics and the selection of appropriate drug combinations for successful antimicrobial therapy.”

## AI, ML, and multi-omics

Meanwhile, AI and ML algorithms are lending a helping hand to genomics in analysing the extensive datasets. These genomic abnormalities can help predict an individual’s risk of developing cancer, Dr. Dalal explained. “So, we can detect some cancers early, classify them, and develop treatment strategies,” Dr. Gupta said.

Researchers have also started using AI and ML to help with analysing genome-sequencing data in cases of rare genetic disorders. A single instance of sequencing the entire exome of an individual can yield a GB of data and whole-genome sequencing can yield 90 GB. Dr. Dalal explained, “Analysis of such massive sequencing is impossible without the help of computers and algorithms. Techniques are using AI- and ML-based approaches in the in-house bioinformatic pipelines as well as part of commercial tools for analysis of the sequencing data to identify disease-causing variants.

With the rapid expansion of AI, it is now easy to access and analyse big data products rapidly, even with only modest computational facilities, according to Dr. Das, adding that multi-omics is today an emerging technology in the field of clinical science

(T.V. Padma is a science journalist in New Delhi.)

# Indigen

- in October 2020, the Council for Scientific and Industrial Research (CSIR) had reportedly sequenced the entire genomes of 1,008 individuals in India representing diverse ethnic groups in six months.
- This effort was part of a mission called ‘IndiGen’ — to create a pilot dataset with which researchers could analyse the epidemiology of genetic diseases and help develop affordable screening approaches, optimise treatment, and minimise adverse events for them.



## **(PRaGeD)**

- **India has also launched a pan-country mission for Paediatric Rare Genetic Disorders (PRaGeD), which, despite their rarity, have become a common public health concern.**
- **Mission PRaGeD is planning to create awareness, perform genetic diagnosis, discover and characterise new genes or variants, provide counselling, and develop new therapies for rare genetic diseases that afflict India's children.**

- **The mission will incorporate IndiGen data in its in-house bioinformatic pipelines it will use to analyse the parts of a genome that code for proteins (exome).**
- **The CSIR-Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad, in collaboration with 15 centres across India, plans to recruit patients and their families with rare genetic disorders.**

## What is NGS?

- **Next-generation sequencing (NGS) is a massively parallel sequencing technology that offers ultra-high throughput, scalability, and speed.**
- **The technology is used to determine the order of nucleotides in entire genomes or targeted regions of DNA or RNA.**
- **NGS has revolutionized the biological sciences, allowing labs to perform a wide variety of applications and study biological systems at a level never before possible.**
- **Today's complex genomics questions demand a depth of information beyond the capacity of traditional DNA sequencing technologies. NGS has filled that gap and become an everyday tool to address these questions.**

# What is multiomics?

- Multiomics (multiple omics) provides an integrated approach to power discovery across multiple levels of biology.
- By combining data from genomics, transcriptomics, epigenetics, and proteomics, researchers can achieve a more comprehensive understanding of molecular changes contributing to normal development, cellular response, and disease.
- Multiomics can also combine separate omic data from past experiments, known as in-silico multiomics, to efficiently analyze novel biological relationships



James Larkin (left) from the University of the Witwatersrand implants radioisotopes into a captured rhinoceros' horns, along with other Rhinopage Project members in the Waterbury UNESCO Biosphere in Mozambique, on Tuesday. AP

## Radioactive implant for rhino horns to curb poaching

Agence France Presse

South African scientists on Tuesday injected radioactive material into live rhinoceros horns to make them easier to detect at border posts in a pioneering project aimed at curbing poaching.

The country is home to a large majority of the world's rhinoceroses and, as a hotspot for poaching driven by demand from Asia, where horns are used in traditional medicine for their supposed therapeutic effect.

At the Limpopo rhinoceros orphanage in the Waterberg area, in the country's northeast, a few of the thick-skinned herbivores graze in the low savannah.

James Larkin, director of the University of the Witwatersrand's radiation and health physics unit who spearheaded the initiative, said he had put "two tiny little radioactive chips in the horn" as he administered the radioisotopes on one of the large animals' horns.

The radioactive material would "render the horn useless... essentially poisonous for human consumption," added Nithya Chetty, professor and dean of science at the same university.

The dusty rhinoceros, put to sleep and cradled on the ground, wouldn't feel any pain, Mr. Larkin said. The radioactive material's dose was so low that it wouldn't affect the animal's health or the environment in any way, he added.

In February, the environment ministry said that despite government efforts to tackle the illicit trade, 699 of the giant mammals were killed in 2023, mostly in state-run parks, an 18% increase over 2022 figures.

**The radioactive material would render the horn poisonous for human consumption and trigger alarms at international borders**

Twenty live rhinos in total are part of the pilot 'Rhinopage' project, whereby they will be administered a dose "strong enough to set off detectors installed globally" at international border posts, originally "to prevent nuclear terrorism," Mr. Larkin said.

Rhinoceros horns are highly sought after on black markets, where their price by weight rivals that of gold and cocaine.

According to Arrie Van Deventer, the orphanage's founder, deboning the rhinoceros and poisoning the horns have failed to deter poachers.

"Maybe this is the thing that will stop poaching," the conservationist said. "This is the best idea I've ever heard."

Wildbeest, warthogs, and giraffe roamed the vast conservation area a more than a dozen team members performed the delicate process on another rhinoceros.

Mr. Larkin drilled a small hole into the horn, hammered in the radioisotope, and finished off by spraying 11,000 microbes over the horn.

About 12,000 rhinoceroses live in the southern African nation, according to an estimate by the International Foundation.

The last phase of the project will be the animal's aftercare following "proper scientific protocol and ethical protocol," project COO Jessica Lubich said.

The team will then take follow-up blood samples to ensure the rhinoceroses are effectively protected. The material itself will last two years on the horn, resulting in a cost lower than deboning every 18 months, Mr. Larkin said.



# Rhisotope'

- **South African scientists on injected radioactive material into live rhinoceros horns to make them easier to detect at border posts in a pioneering project aimed at curbing poaching.**
- **Twenty live rhinos in total are part of the pilot 'Rhisotope' project, whereby they will be administered a dose "strong enough to set off detectors installed globally" at international border posts, originally "to prevent nuclear terrorism**

# It's time for India to reclaim its voice on Tibet



**T**he timing of the visit by a delegation of U.S. lawmakers to Dharamshala made it clear what it would be about. The delegation arrived just days after the passage of the 'Promoting a Resolution to the Tibet-China Dispute Act' in both Houses of U.S. Congress, which now awaits U.S. President Joe Biden's signature. Both Democrat and Republican co-authors of the Bill were part of the delegation, invited by the Central Tibetan Administration that manages affairs of the Tibetan diaspora-in-exile worldwide, for a special facilitation. Given the circumstances, New Delhi would have been more than aware of the content of the speeches they would make, slamming China for its repression of the Tibetan people, calling for talks between the Dalai Lama's representatives and Beijing that were suspended in 2010 to be restarted, and for a Free Tibet. "This bill is a message to the Chinese government that we have clarity in our thinking on this issue, for the freedom of Tibet," said former House Speaker Nancy Pelosi. "[The Dalai Lama's] legacy will live forever, but you, the President of China, will be gone, and no one will give you credit for anything."

## Weakness, not strength

While the sharp tone of these comments and even the presence of U.S. officials and lawmakers in Dharamshala is not new, this is the first time in recent years that a public rally of this kind has been held in India. India's External Affairs Minister hosted the delegation for a late dinner the same evening as the rally, and the Prime Minister met them the next day, indicating that this was a more considered decision by New Delhi. Some people have even interpreted it as a strong message from New Delhi to Beijing amidst continuing tensions between the two countries, as a resolution to the Line of Actual Control military stand-off eludes them since the deadly 2020 Galwan clash.

However, New Delhi's decision



Suhasini Haidar

to allow American politicians to take centre stage amongst the Tibetan refugee population in India in order to promote a U.S. law and pitch U.S. policy is not a show of strength, but could convey weakness. It also denotes the danger of letting a carefully calibrated foreign policy narrative on Tibet spin out of its control.

To begin with, India has not joined the U.S. in publicly articulating its concerns on the treatment of Tibetans simply because its actions since 1959, of offering the Dalai Lama refuge and allowing Tibetan refugees to settle in India, speak much louder. To this day, people from Tibet trek across the Himalayas to seek refuge in India. Often, parents send just their children over, fearing for their future as Tibetan curriculum gets more standardised to the mainland's system, rigorously enforced by the Chinese Communist Party.

Given India's own sensitivities on sovereignty and territorial integrity, New Delhi has worked out its own formulation on the Tibet issue and ties with China. It has "recognised" the Tibet Autonomous Region (TAR) as part of the territory of the People's Republic of China since 1954. Since 2010, however, given China's refusal to respect India's territorial integrity, its renaming of places in Arunachal Pradesh, and its issuance of stapled visas to residents of Jammu and Kashmir, India stopped articulating a 'One China' policy or making references to Tibet in official statements. It contends that the Dalai Lama is a revered spiritual leader, despite China's protests that he is a "separatist" or "splittist".

India also does not officially recognise the Tibetan Government in Exile or Parliament in Exile as more than organising mechanisms for the Tibetan people based here and abroad. Even though Prime Minister Narendra Modi invited the Tibetan Sikyong (elected leader) to his swearing-in ceremony in 2014, he did not do so in 2019 or this month. In 2018, a government circular reminded

officials of India's policy, asking them not to attend events commemorating the 60th year since the Dalai Lama's flight to India. New Delhi has become more sensitive on such issues, as is evident from its objections to U.S. Ambassadors visiting Pakistan-occupied Kashmir, or to the space given for political or extremist Khalistani separatist rallies and referendums in the U.S., U.K., Canada, and Australia.

## Moving out of the picture

If the government wishes to change its line to mirror the more strident position on Tibet adopted by the U.S., then Indian officials and leaders should have made the statements that were addressed instead by U.S. lawmakers to Tibetans in Dharamshala, who were all waving U.S. flags (Indian flags were far fewer). The superfluousness of allowing the U.S. delegation to do so is underlined by the fact that the Dalai Lama travelled to the U.S. for medical treatment just days after their visit, and all the U.S. lawmakers could have met him in Washington DC instead.

Above all, the problem with allowing U.S. leaders to aim messages at Beijing from a pulpit in India, and then have Beijing respond to those directly, is that India is getting cut out of a picture where it has been the most important external figure. This is not unlike its predicament in other parts of South Asia, including the Maldives, Sri Lanka, Nepal, and the Indian Ocean islands where its space is being diminished by growing U.S.-China contestations. With the U.S. giving the Karmapa a home and accepting more Tibetan refugees on the one hand, and China's ever-tightening control of Tibetan Buddhist monasteries in the TAR on the other, India must consider the future of its own policy, especially with regard to the question of the Dalai Lama's succession. New Delhi must move more decidedly to reclaim its own voice and the pace of its own policy narrative without being "bigfooted" by others.

India must avoid ceding the centre stage in its own region on foreign policy and on Tibet issues



# The Resolve Tibet Act

- The Resolve Tibet Act enhances U.S. support for Tibet— empowering State Department officials to actively and directly counter disinformation about Tibet from the Chinese government, rejecting false claims that Tibet has been part of China since “ancient times,” pushing for negotiations without preconditions between the Chinese government and the Dalai Lama or his representatives or the democratically elected leaders of the Tibetan community, and affirming the State Department’s responsibility to coordinate with other governments in multilateral efforts toward the goal of a negotiated agreement on Tibet.

- **No formal dialogue between Tibetan and Chinese authorities has happened since 2010, and Chinese officials continue to make unreasonable demands of the Dalai Lama as a condition for further dialogue.**

# How well is India tapping its rooftop solar potential?

Which are the States with the highest RTS capacities? How can more awareness be spread?

**Shantanu Roy**

## The story so far:

India's installed rooftop solar (RTS) capacity increased by 2.99 GW in 2023-2024, the highest growth in a year. As of March 31, the total installed RTS capacity in India was 11.87 GW, according to the Ministry of New and Renewable Energy. To meet rising energy demand, India needs to double down on its efforts to expand its RTS potential.

## What is the RTS programme?

India launched the Jawaharlal Nehru National Solar Mission in January 2010. Its main objective was to produce 20 GW of solar energy (including RTS) in three phases: 2010-2013, 2013-2017, and 2017-2022. In 2015, the government revised this target to 100 GW by 2022, including a 40-GW RTS component, with yearly targets for each State and Union Territory. In December 2022, India had an installed RTS capacity of 7.5 GW and extended the deadline for the 40-GW

target to 2026. While financial incentives, technological advances, awareness, and training have improved RTS installation numbers, there is a long way to go. India's overall RTS potential is approximately 796 GW. To meet India's target of installing 500 GW of renewable energy capacity, with a solar component of 280 GW, by 2030, RTS alone needs to contribute about 100 GW by 2030.

## How are States faring?

As of March 31, 2024, the RTS capacities of Gujarat, Maharashtra, and Rajasthan had taken big strides while some others were behind the curve. An installed RTS capacity of 3,456 MW in Gujarat is the result of its government's quick approval process, a large number of RTS installers, and high consumer awareness. Similarly, Maharashtra, with an RTS capacity of 2,072 MW, is one of the top-performing States owing to its robust solar policies and conducive regulatory environment.

Thanks to its land area and high solar irradiance, Rajasthan boasts of the

highest RTS potential in the country: 1,154 MW. Its efforts to streamline approvals, provide financial incentives, and promote RTS through public-private partnerships have spurred this growth.

Kerala, Tamil Nadu, and Karnataka, with respective installed capacities of 675, 599, and 594 MW, have also performed reasonably well. However, Uttar Pradesh, Bihar, and Jharkhand, among others, are yet to fully explore their RTS potential. Their challenges include bureaucratic hurdles, inadequate infrastructure, and lack of public awareness.

The 'Pradhan Mantri Surya Ghar Muft Bijli Yojana' is a flagship initiative to fit one crore households with RTS systems and help them get up to 300 units of free electricity every month. An average system size of 2 kW for targeted households will result in a total RTS capacity addition of 20 GW. The scheme has a financial outlay of ₹75,021 crore, which includes financial assistance for consumers (₹65,700 crore), incentives for distribution companies (₹4,950 crore),

incentives for local bodies and model solar villages in each district, payment security mechanisms, capacity building (₹657 crore), and awareness and outreach (₹657 crore). The scheme also encourages the adoption of advanced solar technologies, energy storage solutions, and smart grid infrastructure.

## How can we ensure RTS growth?

Creating awareness is key to getting consumers on board. In addition, RTS needs to be economically viable for households. While government subsidies are helping, multiple low-cost financing options are required. The number of banks and non-bank financial companies providing RTS loans has increased of late. Access to low-cost RTS loans should be as easy as getting a bike or car loan.

Promoting R&D in solar technology, energy storage solutions, and smart-grid infrastructure can lower costs, improve performance, and enhance the reliability of RTS systems. Investments in training programmes, (like the 'Suryamitra' solar PV technician programme initiated in 2015), vocational courses, and skill development initiatives will help build a skilled workforce.

As the scheme's implementation enters full swing, net-metering regulations, grid-integration standards, and building codes should be reviewed and updated to help address emerging challenges and facilitate smooth implementation.

*Shantanu Roy works with the Center for Study of Science, Technology and Policy.*

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- In December 2022, India had an installed RTS capacity of 7.5 GW and extended the deadline for the 40-GW target to 2026.
- While financial incentives, technological advances, awareness, and training have improved RTS installation numbers, there is a long way to go.
- India's overall RTS potential is approximately 796 GW.
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# Topics

- Stryker
- MQ-9 Reaper
- GE-414 jet
- The mainland serow
- Currency swap arrangement
- **EU ON CRITICAL RARE EARTH**
- Mains



By Saurabh Pandey



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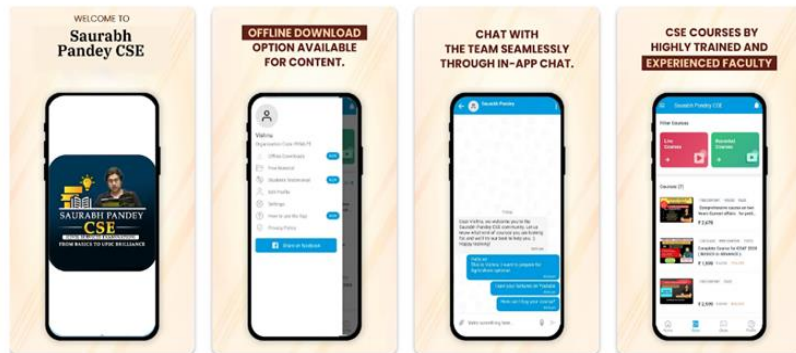
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# India and U.S. in talks for Stryker infantry vehicles

Deals for MQ-9B unmanned aerial vehicles and GE-414 jet engines are making progress along with defence industrial collaborations under the initiative on Critical and Emerging Technology

**Dinakar Peri**

NEW DELHI

India has expressed interest in co-producing the Stryker infantry vehicles and it is in “relatively” early stages of talks with the U.S. on the Stryker and the Javelin anti-tank guided missiles (ATGM), says the U.S. Deputy Secretary of State Kurt M. Campbell.

At the same time, deals for MQ-9B unmanned aerial vehicles and GE-414 jet engines are making progress along with defence industrial collaborations under the initiative on Critical and Emerging Technology (iCET) framework.

Discussions on Stryker have been going on for several months now, and officials said the deal could potentially see local manufacture of several hundred variants of the vehicle under licence with some customisations for the Indian Army, including one with Javelin mounted on them.

However, several defence officials expressed



The deal on Stryker could potentially see local manufacture of variants under licence with some customisations for the Army. AP

reservations on going for Stryker given that several such vehicles have been developed and demonstrated by Indian companies in recent years.

## Early stages

“India has expressed an interest in the co-production of Stryker, and I think we’re still in relatively early stages and the U.S. Army plans to demonstrate the capabilities of the Stryker to the Indian Army at an early opportunity,” Mr. Campbell stated.

“We’ve had some discussions around the co-production of Javelin and Stryker. We’re exploring a number of avenues for both co-production and engagement around technological areas where we could collaborate together on development more generally in R&D.”

Mr. Campbell was speaking in a virtual briefing on Wednesday on the second India-U.S. iCET dialogue that was chaired by the two National Security Advisers last week.

The U.S. has in the past demonstrated both Stryker as well as Javelin for the Indian Army during bilateral exercises. Javelin was extensively evaluated by the Indian Army, though the deal did not go through.

On the MQ-9B deal, Mr. Campbell noted that the letter of offer and acceptance was delivered to India in early March, and they are awaiting signature to move forward.

“General Atomics is negotiating details of the sale with the Ministry of Defence and we are prepared, obviously, to work with them in addressing any outstanding questions,” he stated.

The deal is in advanced stages and expected to go for approval by the Cabinet Committee on Security (CCS) in the next few months. Similarly, the deal for licence manufacture of the GE-414 engines by Hindustan Aeronautics Ltd. (HAL) to power the Light Combat Aircraft (LCA)-MkIA is also in advanced stages.

# Stryker

- The Stryker is a family of eight-wheeled armored fighting vehicles derived from the Canadian LAV III, itself derived from the Swiss Mowag Piranha.



- **The General Atomics MQ-9 Reaper** (sometimes called Predator E) is an unmanned aerial vehicle (UAV, one component of an unmanned aircraft system (UAS)) capable of remotely controlled or autonomous flight operations, developed by General Atomics Aeronautical Systems (GA-ASI) primarily for the United States Air Force (USAF).
- The MQ-9 and other UAVs are referred to as Remotely Piloted Vehicles/Aircraft (RPV/RPA) by the USAF to indicate ground control by humans.
- The MQ-9 is a larger, heavier, more capable aircraft



# MQ-9B

Predator Drones



Max Gross Takeoff Weight: **5,670 kg**

Fuel Capacity: **2,721 kg**

Payload Capacity: **2,177 kg across 9 hardpoints (8 wing, 1 centerline)**



## Crew:

**Two pilots in ground control stations**



## Weapons

**Laser guided missiles  
Anti-tank missiles  
Anti-ship missiles**



## Missions

- **Humanitarian Assistance/Disaster Relief**
- **Search and Rescue**
- **Law Enforcement**
- **Border Enforcement**
- **Defensive Counter Air**
- **Airborne Early Warning**

## Missions



- **Electronic Warfare**
- **Anti-Surface Warfare**
- **Anti-Submarine Warfare**
- **Airborne Mine Counter Measures**
- **Long-Range Strategic ISR**
- **Over-the-Horizon Targeting**



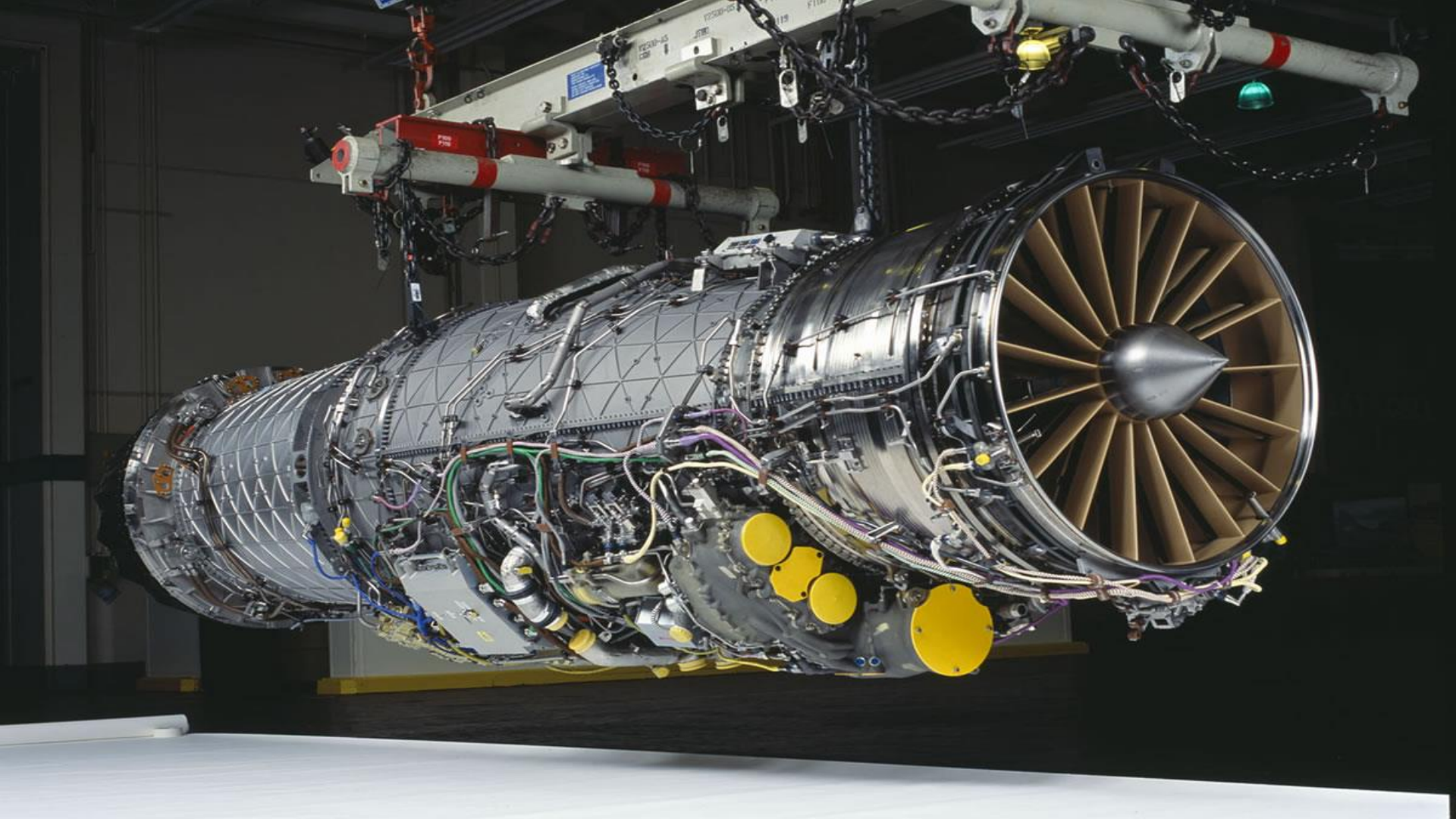
# GE-414 jet



**General Electric (GE) Aerospace announced on that it has signed a Memorandum of Understanding (MOU) with Hindustan Aeronautics Limited (HAL) to co-produce “F414 engines” in India,**

- **The General Electric F414 is an American afterburning turbofan engine in the 22,000-pound thrust class produced by GE Aerospace. The F414 originated from GE's widely used F404 turbofan, enlarged and improved for use in the Boeing F/A-18E/F Super Hornet**
- **GE's F414 engines utilise advanced technologies to enhance engine performance, durability, and reduce Life Cycle Cost (LCC) for next-generation combat aircraft.**
- **The F414 provides unrestricted engine performance with rapid throttle response and no throttle restrictions, ensuring power is readily available when needed.**





# INSIDE THE F414 MILITARY AIRCRAFT ENGINE

## FAN

- New high-flow design
- Stage 2/3 blisk

## COMBUSTOR

- New annular combustor with multi-hole cooling design

## HIGH PRESSURE TURBINE (HPT)

- Single crystal HPT blades
- Boltless retainers
- Thermally matched rotor/stator

## LOW PRESSURE TURBINE (LPT)

- Single crystal HPT blades
- Boltless retainers
- Thermally matched rotor/stator

## ENGINE SPECIFICATIONS

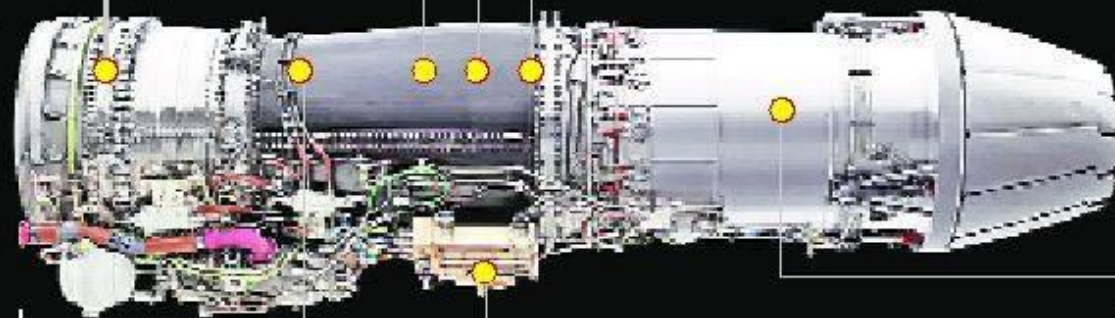
Maximum diameter  
**35 in**

Length **154 in**

Thrust Class **22,000 lb**

Airflow **170 lb/sec**

Pressure Ratio **30:1**



## AFTERBURNER & NOZZLE

- Air-cooled flame holder system
- Ceramic Matrix Composite (CMC) seals

## HIGH PRESSURE COMPRESSOR (HPC)

- Stage 1/2 blisk
- Stage 3 blisk

## ADVANCED CONTROLS

- Dual channel. Full Authority Digital Engine Control (FADEC)
- Advanced engine analytics capability

- **The engine offers good afterburner light and stability, enabling additional thrust to be quickly accessed when required.**
- **The F414 is designed to maximize time-on-wing, simplify maintenance, and keep Life Cycle Costs low.**
- **The engine's six-module design makes it reliable, easy to maintain, and allows for interchangeability and with no scheduled overhauls and on-condition maintenance, the F414 maximizes engine availability**



# Antelope-like mammal from Bhutan recorded at lowest elevation in western Assam



**The Hindu Bureau**  
GUWAHATI

The mainland serow, a mammal that looks like a cross between a goat and an antelope, has been recorded at the lowest elevation beyond Bhutan, its natural home, in Assam.

A team of scientists recorded a lone mainland serow (*Capricornis sumatraensis thar*) at 96 metres above the mean sea level at the Raimona National Park in western Assam. Also, the elusive animal has been found for the first time within a radius of 1 km from a human habitation.

The finding with photographic proof was published as a scientific paper in the latest issue of the *Journal of Threatened Taxa*. The paper was authored by M. Firoz Ahmed,



**Lone ranger:** A mainland serow at the Raimona National Park in western Assam. SPECIAL ARRANGEMENT

senior scientist at biodiversity conservation group Aaranyak; senior conservation biologist Dipankar Lahkar; Nibir Medhi; Nitul Kalita; Bhanu Sinha, Divisional Forest Officer, Kachugaon; forest officials Pranjal Talukdar, Biswajit Basumatary, and Tunu Basumatary; Ramie H. Begum, Associate Professor, Assam University; and

Abhishek Harihar, the director of Tiger programme, Panthera.

According to the International Union for Conservation of Nature, the mainland serow inhabits areas at altitudes of 200 metres to 3,000 metres. Its habitat is across the border in the Phibsoo Wildlife Sanctuary and the Royal Manas National Park in Bhutan.

# The mainland serow



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- **Its habitat is across the border in the Phibsoo Wildlife Sanctuary and the Royal Manas National Park in Bhutan**



# RBI rejigs SAARC currency swap plan



**The Hindu Bureau**

MUMBAI

The Reserve Bank of India (RBI) has decided to put in place a revised framework for currency swap arrangement for SAARC countries for 2024 to 2027.

“Under the Framework, a separate INR swap window has been introduced with various concessions for swap support in Indian rupee,” the RBI said. “The total corpus of the rupee support is ₹250 billion.” The RBI will continue to offer swap arrangement in U.S. dollar and euro under a separate U.S. Dollar/ Euro Swap Window with an overall corpus of \$2 billion.”

# Currency swap arrangement



- **The Reserve Bank of India has put in place a revised framework on currency swap arrangements for countries within the South Asian Association of Regional Cooperation (SAARC) grouping for the time period 2024 to 2027.**
- **Under the Framework for 2024-27, a separate INR Swap Window has been introduced with various concessions for swap support in Indian Rupee.**
- **The total corpus of the Rupee support is ₹250 billion (Rs 25,000 crore),” the RBI Said**
- **The central bank will continue offering swap arrangements in US dollars and euros under a separate dollar/euro swap window with an overall corpus of \$2 billion.**

- **Under the currency swap framework, the RBI would strike bilateral swap agreements with central banks of SAARC countries.**
- **The SAARC currency swap facility, which was first operationalised in November 2012, is intended to provide a backstop line of funding for short-term foreign exchange liquidity requirements or balance of payments crises suffered by SAARC countries till longer-term arrangements are made**

# Recycling to kick in as long-term solution to EU rare-earths challenge



**Reuters**

LONDON

EU firms are gearing up to take advantage of the huge potential for recycling to supply critical rare earths for the bloc's green transition, but it will take time before there is enough supply of old EVs and wind turbines to process.

The EU will struggle to meet ambitious goals for rare earths in a new legislation designed to boost domestic output of critical minerals and reduce dependence on China.

Under the Critical Raw Materials Act that entered into force last month, the bloc has set a target that recycling should meet 25% of EU demand for critical



**Boosting supply:** A rare earth processing plant owned by Belgian chemicals group Solvay in France. SOLVAY/HANDOUT VIA REUTERS.

minerals by 2030, including rare earths. Today, less than 1% of rare earths consumed in EU are recycled.

The 25% target is not due to be met according to a Reuters analysis, but in the longer term, the out-

look is strong for the bloc to furnish a large portion of the rare earths needed for electric vehicles and wind turbines from salvaging and re-processing them.

"Today you have magnets leaving Europe every

day because there is no possibility to recycle them here," said Frederic Caren-cotte, the founder of French start-up Carester.

The firm is collecting old magnets to be ready when its plant is due to go into production in 2026. Initially, it plans to process 2,000 tonne a year of old, permanent magnets and make rare earth oxides. It will also process mine concentrate until enough old EVs and wind turbines are scrapped to boost supply of old magnets.

Another key input will be 'swarfs', leftovers when blocks of new permanent magnets are cut into specific shapes, which can total up to a fifth of magnet production.

# EU ON CRITICAL RARE EARTHS

- EU firms are gearing up to take advantage of the huge potential for recycling to supply critical rare earths for the bloc's green transition, but it will take time before there is enough supply of old EVs and wind turbines to process.
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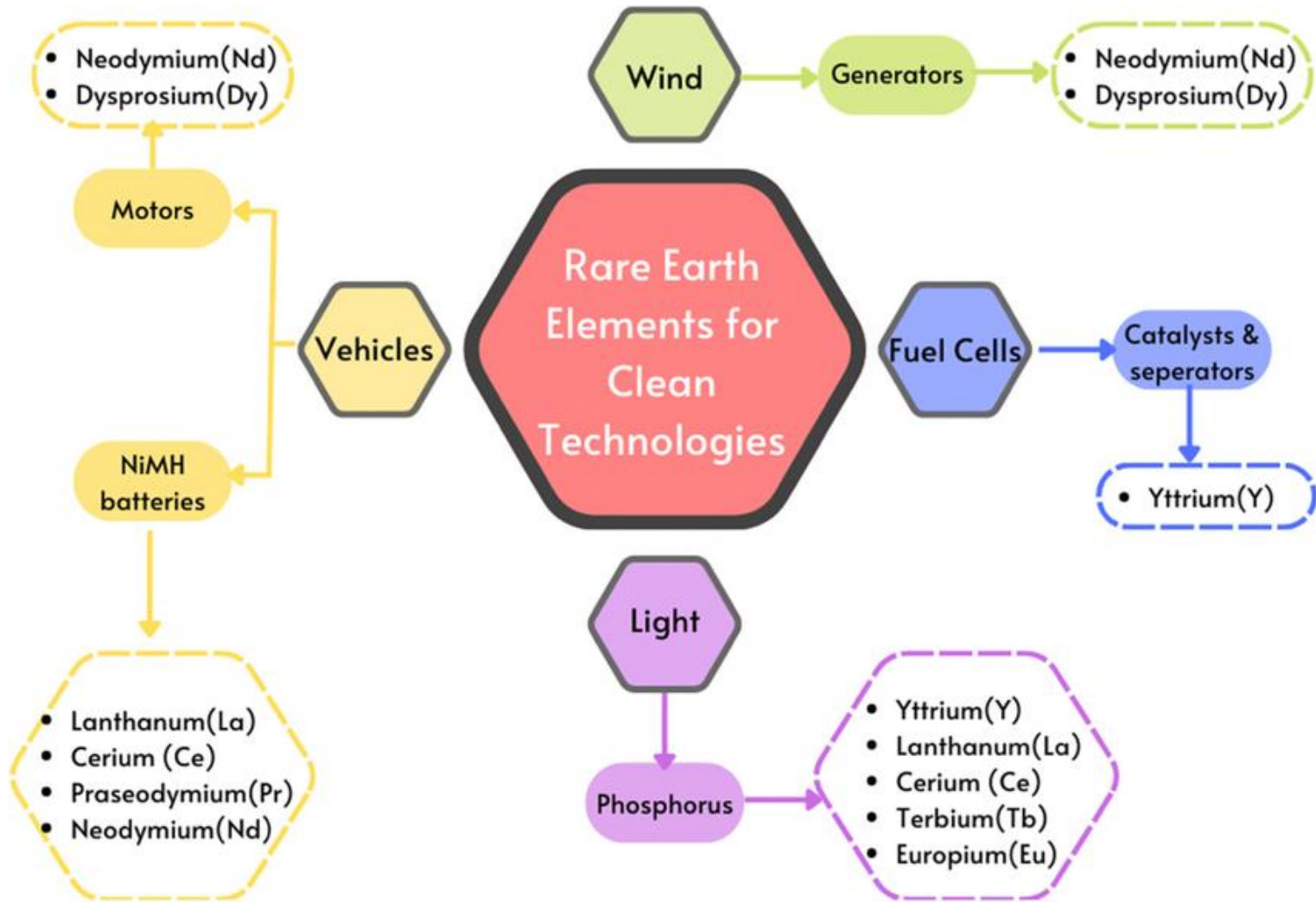
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- Another key input will be **'swarfs', leftovers when blocks of new permanent magnets are cut into specific shapes,** which can total up to a Fifth of magnet production.

# SWARF

- **Swarf, also known as chips or by other process-specific names, are pieces of metal, wood, or plastic that are the debris or waste resulting from machining, woodworking, or similar subtractive manufacturing processes.**
- **Swarf can be small particles; long, stringy tendrils; slag-like waste; or stone fragments and dust**



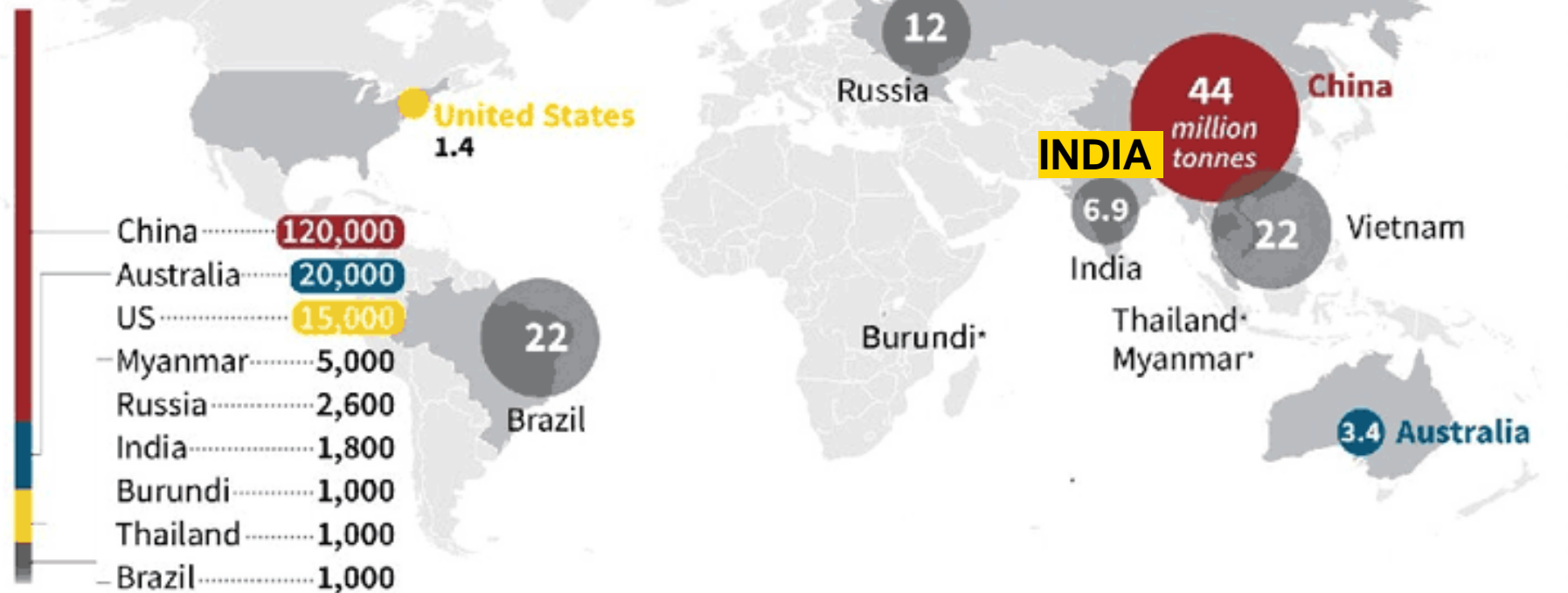
- **Critical minerals**
- Critical minerals such as copper, lithium, nickel, cobalt and rare earth elements are essential components in many of today's rapidly growing clean energy technologies – from wind turbines and electricity networks to electric vehicles.



# Rare earth metals production and reserves

**2018 PRODUCTION**  
Tonnes

**RESERVES**  
Million tonnes



Source: USGS

\*Data not available

© AFP

# Multiple-warhead missile test success, says N. Korea



**Agence France-Presse**

SEOUL

North Korea successfully tested its multiple-warhead missile capability, state media said on Thursday, while dozens more trash-laden balloons sent by Pyongyang landed in the South.

Relations between the two Koreas are at one of their lowest points in years, with Pyongyang ramping up weapons testing while bombarding the South with balloons full of trash it says are in retaliation to similar missives sent northwards by activists in the South.

North Korea claimed it had “successfully conducted the separation and guidance control test of individual mobile warheads”, the state-run Korean Cen-



A missile takes off during an individual mobile combat separation and guidance control test in North Korea on Wednesday. REUTERS

tral News Agency (KCNA) said.

The “separated mobile warheads were guided correctly to the three coordinate targets” during the test carried out on Wednesday, it said.

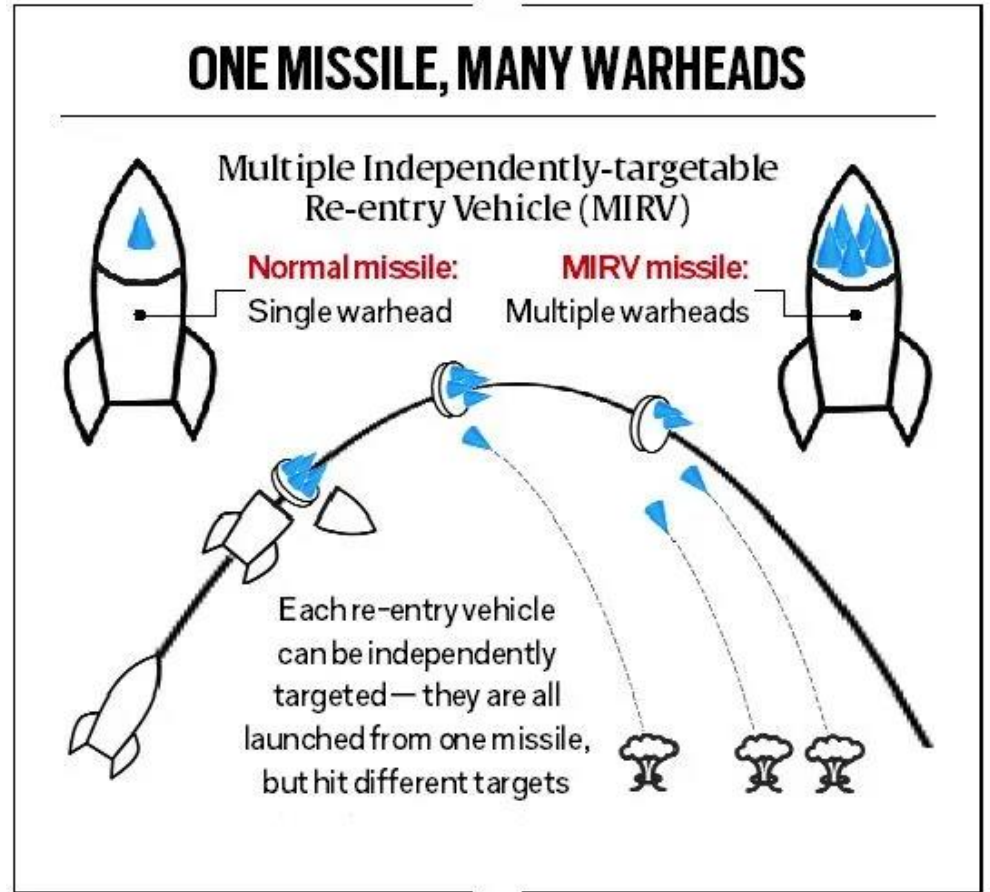
“The test is aimed at securing the MIRV capability,” KCNA added, referring to multiple independently targetable reentry vehicle technology – the ability to

fire multiple warheads on a single ballistic missile.

South Korea’s military had said the North’s test on Wednesday appeared to be of a hypersonic missile, but that the launch ended in a mid-air explosion.

More smoke than usual appeared to emanate from the missile, raising the possibility of combustion issues, a South Korean military official said.

# MIRV CAPABILITIES





# India's MIRV punch

India has joined select group of nations that have Multiple Independently Targeted Re-entry Vehicle (MIRV) technology

**Agni-5** missile  
uses a three-stage  
solid fuelled engine

**5,000km**  
range

## USING MULTIPLE WARHEADS

- MIRVs can cause more destruction than missiles that carry single warhead.
- It will allow Agni-V to deliver multiple nuclear warheads against different targets across hundreds of kilometres

India completed its nuclear trial in 2018 when nuclear-powered ballistic missile submarine, INS Arihant, completed its first deterrence patrol

India's nuclear doctrine, promulgated in 2003, commits to a 'no first use' posture, with weapons to be used only in retaliation against a nuclear attack

Proud of our DRDO scientists for Mission Divyastra, the first flight test of indigenously developed Agni-5 missile with Multiple Independently Targetable Re-entry Vehicle (MIRV) technology."  
—NARENDRA MODI, Prime Minister



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- **UNESCO SITE IN KARNATAKA**
- **FATF**
- **IR IN NES**
- **Core sector**
- **Mount Bromo**
- **Asteroid Belt**
- **Maurya and Davana (Dayana) species**
- **Mains**



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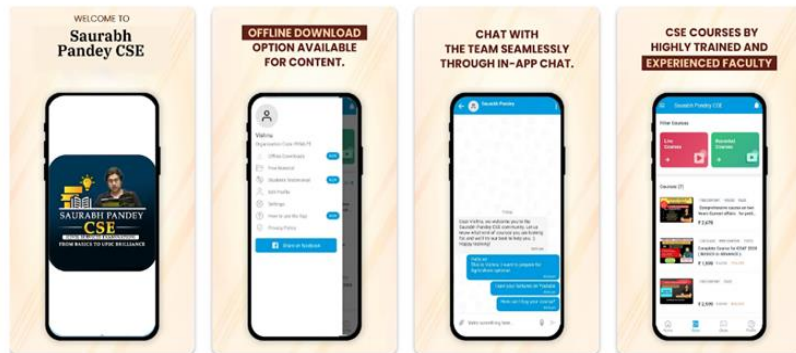
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**Smart move:** The Tourism Department in Karnataka is planning to promote the UNESCO World Heritage Site of Somanathapur as part of Mysuru tourism circuit before Dasara this year. This will be through cross-promotion of the 13th-century heritage site at popular places of tourist interest such as the Mysuru Palace, zoo and the Chamundi Hills so that visitors can plan a visit. M.A. SRIRAM

# UNESCO SITE IN KARNATAKA



- **The Hoysala temples at Belur, Halebid, and Somanathapur in Karnataka were declared as UNESCO World Heritage Sites in a move that will bring global recognition with prospects of increase in international tourism to these places.**
- **The Chennakeshava temple at Belur and the Hoysaleshwara temple at Halebidu both in Hassan district have been on the UNESCO's tentative list since 2014.**

- **The Keshava temple at Somanathapur in Mysuru district was appended to the other two monuments under the tentative list and all three were officially nominated by the Centre as India's entry for 2022-23 in February 2022.**

# India achieves 'outstanding outcome' in FATF evaluation



**Devesh K. Pandey**  
NEW DELHI

India has achieved an outstanding outcome in the mutual evaluation conducted during 2023-24 by the Financial Action Task Force (FATF), the government said on Friday.

The Mutual Evaluation Report of India, which was adopted at the FATF plenary held in Singapore from June 26 to 28, places India in the "regular follow-up" category, a distinction shared by only four other G-20 countries.

"This marks a significant milestone in the nation's efforts to combat money laundering (ML) and terrorist financing (TF)," read a Press Information Bureau release.

In a statement, the FATF said the plenary concluded that India had reached a high level of technical compliance with its requirements. The country's anti-



The report was adopted at the FATF plenary held in Singapore.

countering the financing of terrorism (CFT), and counter-proliferation financing (CPF) regime was achieving good results, including international cooperation, access to basic and beneficial ownership information, use of financial intelligence, and depriving criminals of their assets.

However, the FATF observed that improvements were needed to strengthen the supervision and implementation of preventive measures in some non-fi-

needs to address delays relating to concluding ML and TF prosecutions, and to ensure that CFT measures aimed at preventing the non-profit sector from being abused for TF are implemented in line with the risk-based approach, including by conducting outreach to NPOs [Non-Profit Organisations] on their TF risks," it said.

Among other things, the FATF has recognised the efforts made by India on the issue of mitigating the risks arising from ML/TF, including the laundering of proceeds from corruption, fraud, and organised crime, and the effective measures implemented by India to transition from a cash-based to a digital economy to reduce ML/TF risks. "This recognition is a testament to the rigorous measures implemented over the last 10 years to safeguard the financial system from ML/TF threats," the

# FATF

- India has achieved an outstanding outcome in the mutual evaluation conducted during 2023-24 by the Financial Action Task Force (FATF), the government.
- The Mutual Evaluation Report of India, which was adopted at the FATF plenary held in Singapore from June 26 to 28, places India in the “regular follow-up” category, a distinction shared by only four other G-20 countries



- **The country's antimoney laundering (AML), countering the financing of terrorism (CFT), and counter-proliferation financing (CPF) regime was achieving good results, including international cooperation, access to basic and beneficial ownership information, use of nancial intelligence, and depriving criminals of their assets**

## What is the FATF?

- The Financial Action Task Force is an international watchdog for financial crimes such as money laundering and terror financing.
- As per the official definition, it is an inter-governmental body that sets international standards that aim to prevent these illegal activities and the harm they cause to society.
- The FATF was established at the G7 Summit of 1989 in Paris, over concerns of the member countries about growing money laundering activities.
- The heads of G7 countries and the president of the European Commission brought together a Task Force after addressing loopholes in the global financial system.
- Later, in the aftermath of the 9/11 terror attack on the United States, FATF also added terror financing as a main focus area.

- This was broadened In 2012, to include restricting the funding of weapons of mass destruction. ●
- The FATF currently has 39 members.
- The decision making body of the FATF is known as its plenary, which meets thrice a year.
- Its meetings are attended by 206 countries of the global network, including members, and observer organisations, such as the World Bank, some offices of the United Nations and regional development banks.

## How does the FATF do its work?

---

- The FATF conducts regular peer-reviewed evaluations called Mutual Evaluations (ME) of countries, starting with member countries, to check their performance on standards prescribed by it.
- The reviews are carried out by FATF and FATF-Style Regional Bodies (FSRBs), which then release Mutual Evaluation Reports (MERs).
- For the countries that don't perform well on certain standards, the FATF and FSRBs draw up time-bound action plans to fight financial crimes.
- The FATF recommendations for countries range from assessing risks of crimes to setting up legislative, investigative and judicial mechanisms to pursue cases of money laundering and terror funding

## **What are FATF's 'grey' and 'black' lists?**

- **Grey countries are those that are “actively working” with the FATF to counter criminal financial activities.**
- **In their cases , the watchdog does not tell other members to carry out due-diligence measures vis-a-vis the listed country but does tell them to take into account the risks such countries possess.**
- **Currently, there are 23 countries on the grey list, with one new addition and one removal.**
- **The United Arab Emirates was added to the list at the end of this plenary meet while Zimbabwe was taken off it.**
- **Besides, some of the other countries on the list are Pakistan, Myanmar, Morocco, Philippines, Panama, Senegal, Albania, Jamaica and Turkey.**

- **As for the black list, it means countries designated by the FATF as 'high-risk jurisdictions subject to call for action'.**
- **In this case the countries have considerable deficiencies in their AML/CFT regimens.**
- **For such countries, the body calls on members and non-members to apply enhanced due-diligence and in the most serious cases, apply counter-measures such as sanctions.**
- **Currently, two countries- North Korea and Iran are on the black list.**
- **Being listed under the FATF's two lists makes it difficult for countries to get aid from organisations like the International Monetary Fund (IMF), Asian Development Bank (ADB) and the European Union.**

# IR IN NEWS

- **Kenya - economic crisis/ tak hike protest**
- **Bolivia - coup attempt**
- **the crisis is reverberating in Kenya, Bolivia and other middle-income nations bearing the brunt of a surge in inflation and the rapid global interest rate rises that followed the pandemic. Borrowing costs soared and Russia's war in Ukraine exacerbated a rise in prices of fuel and food.**



# Coal, electricity buoy core output

May's heatwave likely spurred output at the two energy sectors, Index of Core Industries (ICI) data show; production of cement contracted for the second consecutive month to hit the lowest level since November; ICI growth eased to 6.3%

**Vikas Dhoot**

NEW DELHI

Output growth in India's eight core infrastructure sectors eased to 6.3% in May, from April's 6.7%, with a double-digit rise in coal and electricity production offsetting contractions in three sectors, including cement and fertilisers.

Sequentially, the Index of Core Industries (ICI) rose 3.7% from April.

Electricity generation rose year-on-year at a seven-month high pace of 12.8%, while coal production grew 10.2%, both like-

## Heatwave spurred

Coal production, electricity generation rose in double digits in May, helping prop up overall core sector output growth to 6.3%



■ Electricity generation rose YoY at a seven-month high pace of 12.8%, while coal production grew 10.2%

■ Index of Core Industries (ICI) growth eased from an upwardly revised 6.7% pace in April

■ Sequentially, the ICI rose 3.7% from April

ly triggered by higher demand amid the heatwave in most parts of the country through May.

Natural gas output rose 7.5% while steel produc-

tion increased 7.6%.

However, refinery products saw a mere 0.5% uptick in May, the slowest rise in four months.

Cement output con-

tracted for the second successive month, dipping 0.8% following a 0.5% fall in April. However, in absolute terms, cement production levels were the lowest since November.

### 'Upward revision'

The Commerce and Industry Ministry revised April's ICI, reflecting a 6.7% rise, higher than 6.2% estimated earlier.

The revision was driven by upgrades to electricity and steel, which are now reckoned to have grown 10.2% and 8.8%, respectively, compared with 9.4% and 7.1% estimated earlier.

The eight core sectors constitute just over 40% of the Index of Industrial Production (IIP). IIP growth had slowed to a three-month low of 5% in April, and ICRA chief economist Aditi Nayar said she expects May's IIP to rise in the range of 4% to 5%.

"A combination of factors including the heatwave over parts of the country and the phased Parliamentary elections could have curtailed activity and execution in some sectors, even as the heatwave boosted demand for coal and electricity," noted Ms. Nayar.

## Core sector

The core sector in India comprises eight key industries: coal, crude oil, natural gas, refinery products, fertilizers, steel, cement, and electricity.

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

# *Spiritual climb*



Tenggerese Hindu worshippers and villagers climb Mount Bromo and gather at its top during the Yadnya Kasada festival in Probolinggo, East Java, Indonesia. The festival is held to express their devotion and gratitude to their ancestors and gods. REUTERS



# Mount Bromo



- **The Bromo, or Mount Bromo is an active somma volcano and part of the Tengger mountains, in East Java, Indonesia.**
- **At 2,329 meters it is not the highest peak of the massif, but is the most active and famous.**
- **The name Bromo comes from the Javanese pronunciation of Brahma, the Hindu god of creation.**
- **At the mouth of the crater, there is an idol of Ganesha, the Hindu god of wisdom which is being worshipped by the Javanese Hindus.**
- **Mount Bromo is located in the middle of a plain called "Sea of Sand", a nature reserve that has been protected since 1919.**



NASA's Ingenuity Mars Helicopter captured by Mars Perseverance rover. FILE PHOTO

## Meteorites strike Mars far more often than thought: probe

**Agence France-Presse**  
PARIS

Mars is bombarded with basketball-sized meteorites on a nearly daily basis, five times more often than previously estimated, seismic recordings from a NASA spacecraft have revealed.

Before the new study was published on Friday, the best guess for how many meteorites strike Mars was made by looking at images taken by orbiting spacecrafts or models based on craters on the Moon. But NASA's InSight probe, which landed on a Martian plain called Elysium Planitia in 2018, has allowed scientists to listen to the internal rumblings of the red planet for the first time.

Mars is roughly twice as big as the Moon and is much closer to our solar system's main asteroid belt, making it a prime target for large rocks hurtling through space. Most meteorites taking a shot at Earth break apart in our atmosphere. But the Martian atmosphere is 100 times thinner than Earth's, giving it little protection.

Rather than scouring through images taken from far away, the international team of researchers behind the new study in Nature Astronomy were able to listen in on meteorites smashing into Mars. "Listening for impacts seems to be more effective than looking for them if we want to understand how often they occur," study co-author Gareth Collins of Imperial College London said in a statement.

The researchers used the data from InSight's seismometer to estimate that every year Mars is hit by between 280 to 360 meteorites, which all blast craters bigger than eight metres (26 feet) wide.

# Asteroid Belt

- Mars is bombarded with basketball-sized meteorites on a nearly daily basis, five times more often than previously estimated, seismic recordings from a NASA spacecraft have revealed
- Mars is roughly twice as big as the Moon and is much closer to our solar system's main asteroid belt, making it a prime target for large rocks hurtling through space.
- Most meteorites taking a shot at Earth break apart in our atmosphere.
- But the Martian atmosphere is 100 times thinner than Earth's,

## Insight mission

- The Interior Exploration using Seismic Investigations, Geodesy and Heat Transport (InSight) was a NASA Discovery Program mission that placed a single geophysical lander on Mars to study its deep interior.
- But InSight was more than a Mars mission. It addressed one of the most fundamental issues of planetary science: understanding the processes that shaped the rocky planets of the inner solar system (including Earth) more than four billion years ago.
- The mission ended in December 2022 after more than four years of collecting unique science on Mars.





**Launched: May 5, 2018 (4:05 a.m. PT/7:05 a.m. ET)**

**Launch Vehicle: Atlas V-401**

**Launch Location: Vandenberg Air Force Base, California**

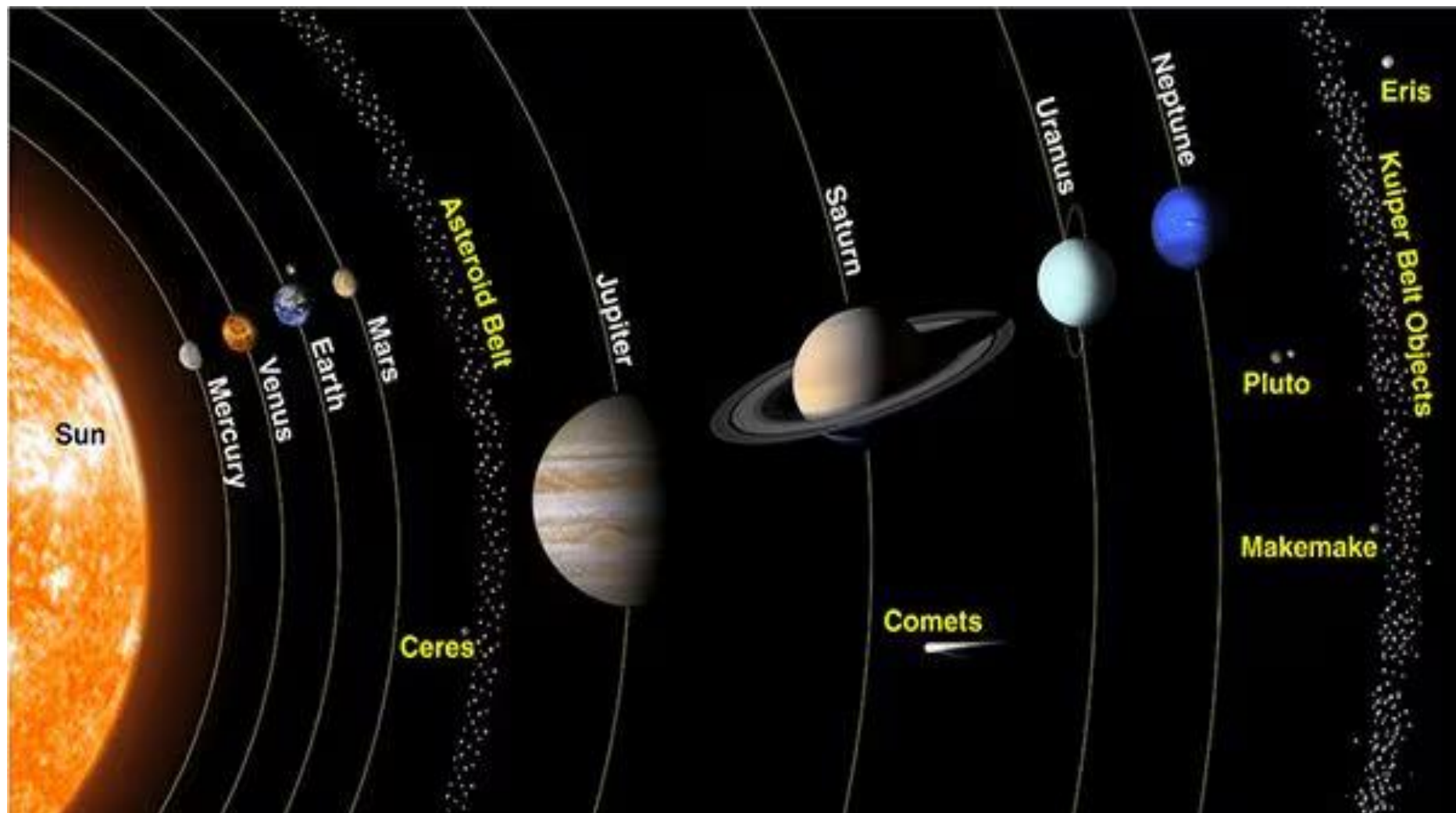
**Landed: Nov. 26, 2018, at 11:52:59 a.m. PT (2:52:59 p.m. ET)**

**Landing Site: Elysium Planitia, Mars**

**End of Mission: Dec. 15, 2022**

# Asteroid Belt

- The majority of known asteroids orbit within the asteroid belt **between Mars and Jupiter**, generally with not very elongated orbits.
- The belt is estimated to contain between 1.1 and 1.9 million asteroids larger than 1 kilometer (0.6 miles) in diameter, and millions of smaller ones.



## Trojans:

- These asteroids share an orbit with a larger planet, but do not collide with it because they gather around two special places in the orbit (called the L4 and L5 Lagrangian points).
- There, the gravitational pull from the Sun and the planet are balanced by a trojan's tendency to otherwise fly out of orbit.
- The Jupiter trojans form the most significant population of trojan asteroids. It is thought that they are as numerous as the asteroids in the asteroid belt.
- There are Mars and Neptune trojans, and NASA announced the discovery of an [Earth trojan in 2011](#).



**Near-Earth Asteroids: These objects have orbits that pass close by that of Earth. Asteroids that actually cross Earth's orbital path are known as Earth-crossers.**

# Botanical institute sets out to revive rare flowers used in Jagannath Temple

**Satyasundar Barik**

BHUBANESWAR

Lucknow-based National Botanical Research Institute (NBRI), a Council of Scientific and Industrial Research (CSIR) institution, has set out to revive endangered flower species used in the 12th century Shree Jagannath Temple in Puri, Odisha.

A year after NBRI signed a Memorandum of Understanding with Shree Jagannath Temple Administration (SJTA), to cater to the needs of flowers, the country's premier botanical research institute (NBRI) has supplied *Maurya* and *Davana* (Dayana) species flowers for the temple.

"We are studying various scriptures that detail the practices of the Shree



The National Botanical Research Institute has already supplied rare *maurya* and *davana* flowers to the temple. SPECIAL ARRANGEMENT

Jagannath Temple. The temple's rich traditions involve the extensive use of flowers and leaves, each selected for specific rituals performed in the temple. However, many of these plant species are rare and difficult to procure," said Ajit Kumar Shasany, Director, CSIR-NBRI, Lucknow.

Dr. Shasany said, "We have undertaken a mission

to ensure the availability of these sacred flowers. Through this endeavour, we also aim to revive endangered floral species, preserving both the temple's traditions and the biodiversity of these plants."

As per the demand, quality planting materials of marigold, tuberose, tulsi, jasmine, davana (Dayana) were supplied and in-

troduced in the Matitota garden of the temple for raising these plants for their use for worshipping purposes.

"The gardeners are periodically trained about the agro-practices for raising these plants. A polyhouse has been raised in this garden for continuously raising the plants throughout the year," NBRI said.

## Lotus variety

"Besides, Namoh 108 variety of lotus, released by CSIR-NBRI, was also introduced in the Koili Baikuntha garden of the temple. All these aromatic flower and foliage plants are in much demand in the temple as these plants are in use in daily rituals," the institute said.

- **Lucknow-based National Botanical Research Institute (NBRI), a Council of Scientific and Industrial Research (CSIR) institution, has set out to revive endangered flower species used in the 12th century Shree Jagannath Temple in Puri, Odisha.**
- **A year after NBRI signed a Memorandum of Understanding with Shree Jagannath Temple Administration (SJTA), to cater to the needs of flowers, the country's premier botanical research institute (NBRI) has supplied Maurya and Davana (Dayana) species flowers for the temple.**



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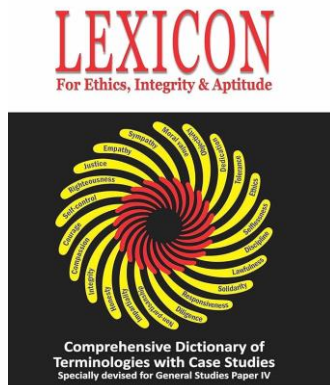
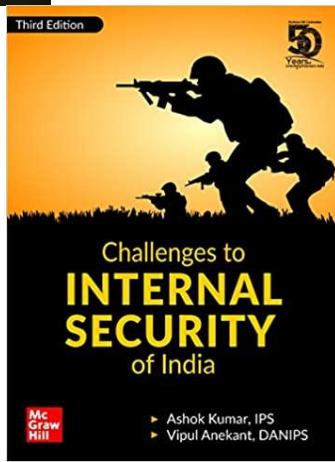
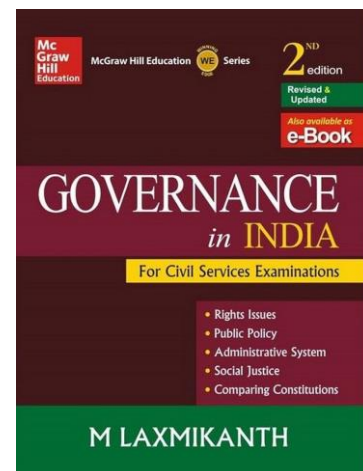
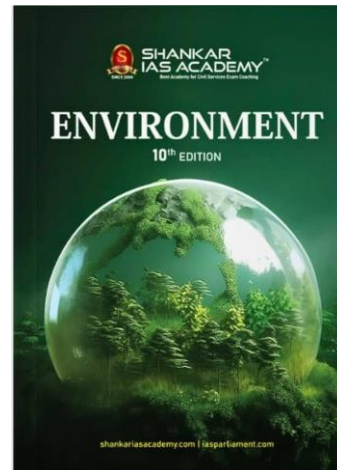
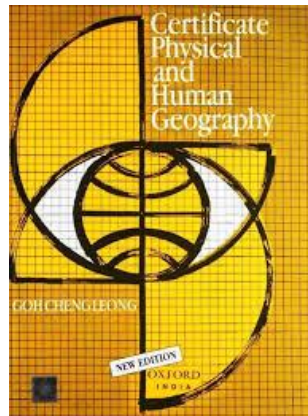
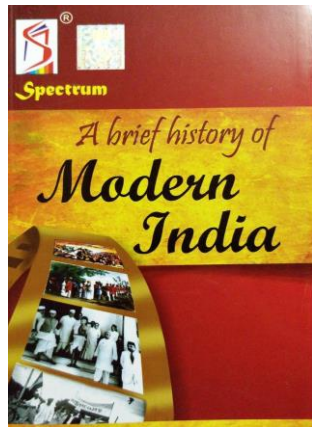
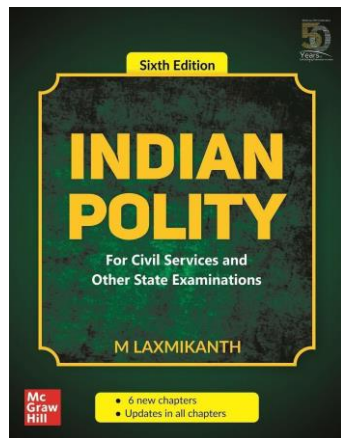
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- Seine River
- M.K. Ranjitsinh and Ors. vs Union of India

- Should education be brought back to the State list?



THE HINDU

# Topics-2



- Safeguard duty
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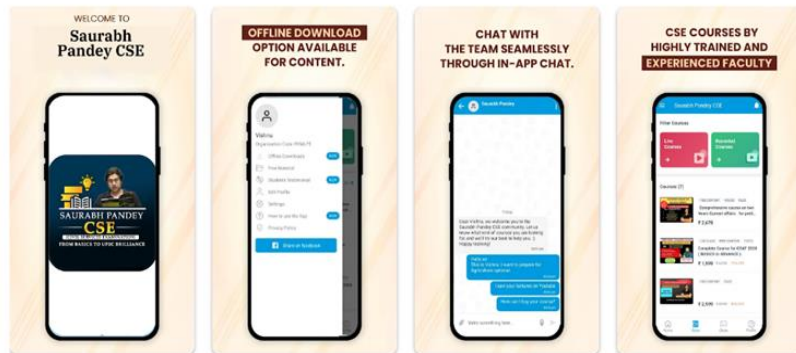
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Q "Cooperative federalism " is not the only solution in managing competitive exam in india . Examine

Q "सहकारी संघवाद" भारत में प्रतियोगी परीक्षा के प्रबंधन का एकमात्र समाधान नहीं है। परीक्षण करना

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# Meningoencephalitis due to amoebic infection claims two lives in Kerala

**A.S. Jayanth**  
KOZHIKODE

Unhygienic and stagnant water resources and high temperatures could be the factors contributing to the recent unusual rise in the rare, but fatal primary amoebic meningoencephalitis cases in the State.

Three cases of the infection, including two deaths, have been reported in the last two months alone. While a five-year-old girl from Malappuram district died in May, a 13-year-old girl from Kannur district lost her life in June. Another 12-year-old boy from Kozhikode district is right now undergoing medical treatment at a private hos-

**Unhygienic and stagnant water resources and high temperatures may be worsening situation**

pital. First detected in Alappuzha municipality in 2016, the infection was reported in Malappuram in 2019 and 2020, Kozhikode in 2020, Thrissur in 2022, and in Alappuzha in 2023.

“There has been a rise in such cases the world over. Warming of the atmosphere and stagnant and unhygienic water resources could be some of the conditions leading to it. This type of amoeba is found to be more active in

warm water,” M.P. Jayakrishnan, Additional Professor, Paediatrics, Government Medical College Hospital, Kozhikode, told *The Hindu* on Sunday.

Dr. Jayakrishnan was among those who treated the five-year-old girl from Malappuram and also suspected the possibility of the infection.

“Earlier, we used to have cases of bacterial meningitis among children. But, its instances have come down of late due to vaccination. The five-year-old girl had symptoms similar to that of bacterial meningitis. That was when we thought if it could be amoebic meningoencephalitis,” he pointed out.

# meningoencephalitis

- **Unhygienic and stagnant water resources and high temperatures could be the factors contributing to the recent unusual rise in the rare, but fatal primary amoebic meningoencephalitis cases in the State.**
- **The meninges are the layers of thin tissue that cover your brain. Meningitis is when these tissues become inflamed or infected.**
- **The problem is called encephalitis when your brain becomes inflamed or infected.**
- **If both the meninges and the brain are infected, the condition is called meningoencephalitis**

## Causes

- **Infectious diseases, like viruses, bacteria, fungi and the amoeba *Naegleria fowleri*, are the main causes of meningoencephalitis.**
- **These infections can spread through air, water, food or close contact with somebody else who has them.**
- **Not everyone who gets these infections develops meningoencephalitis**

# Carbon derived from coconut husks can power supercapacitors, find researchers

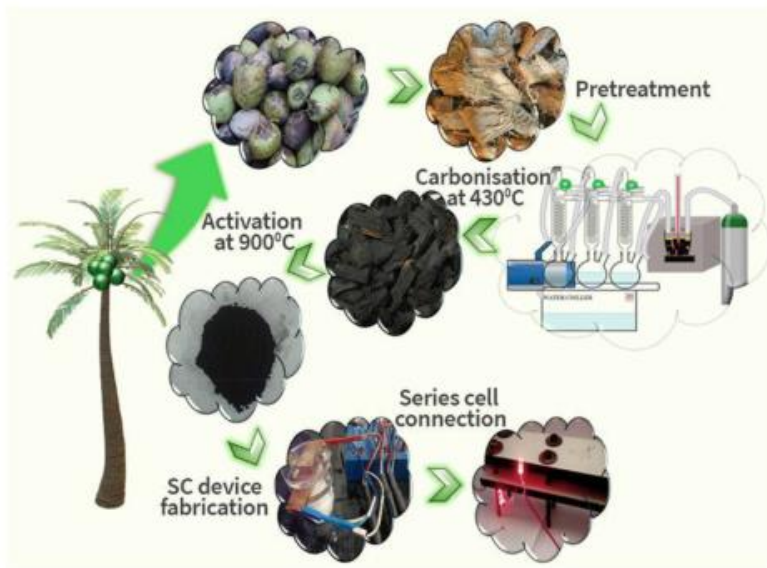


**Sarath Babu George**  
THIRUVANANTHAPURAM

Researchers at the Government College for Women, Thiruvananthapuram, have devised a method to produce activated carbon, suitable for supercapacitor fabrication, from coconut husks, which are a major agricultural residue in Kerala.

The coconut husk bio-waste-derived activated carbon holds immense promise for sustainable and efficient green solutions for high-performance supercapacitors owing to its availability, low cost, and eco-friendly nature.

Supercapacitors, with



Schematic illustration of the synthesis of activated carbon.

significantly higher capacitance and energy storage capacity than conventional capacitors, have emerged as a vital component in the

quest for sustainable energy storage solutions. But, the search for an ideal supercapacitor electrode material has been a challenge.

The research team, led by Xavier T.S., Assistant Professor, Department of Physics, and including Merin Tomy, Ganesh S.G., Anu M.A., and Sreelakshmi S.R., found the prototype supercapacitors made of coconut husk-derived activated carbon to be four-times more efficient than the existing supercapacitors. The findings have been published in the American *Sustainable Resource Management Journal*.

The team had leveraged the innovative microwave-assisted method designed at the Centralised Common Instrumentation Facility (CCIF) at the college.

# Coconut husk for supercapacitor

- Researchers at the Government College for Women, Thiruvananthapuram, have devised a method to produce activated carbon, suitable for supercapacitor fabrication, from coconut husks, which are a major agricultural residue in Kerala.
- The coconut husk biowaste-derived activated carbon holds immense promise for sustainable and efficient green solutions for high-performance supercapacitors owing to its availability, low cost, and eco-friendly nature.

- **Supercapacitors, with significantly higher capacitance and energy storage capacity than conventional capacitors, have emerged as a vital component in the quest for sustainable energy storage solutions.**
- **But, the search for an ideal supercapacitor electrode material has been a challenge.**



# What is Capacitor ?

**Capacitors** are energy-storing devices available in many sizes and shapes. They consist of two plates of conducting material sandwiched between an insulator made of ceramic, film, glass or other materials, even air. The insulator is also known as a **dielectric**, and it boosts a capacitor's charging capacity. Capacitors are sometimes called **condensers** in the automotive, marine and aviation industries.

The internal plates are wired to two external terminals, which sometimes are long and thin and can resemble tiny metallic antennae or legs. These terminals can be plugged into a circuit.

**Capacitors** and batteries both **store energy**. While batteries release energy gradually, **capacitors discharge it quickly**.

## Super capacitor

- Supercapacitors are electrochemical devices with following features:

- High energy density.
- High power density.
- High capacitance.
- Longer life.



- A supercapacitor or ultra capacitor is an electrochemical capacitor that has an unusually high energy density when compared to common capacitors. They are of particular interest in automotive applications for hybrid vehicles and as supplementary storage for battery electric vehicles.



# Study finds gene mutation that turns familiar faces into strangers

Individuals with the misfortune of carrying the mutant gene took much longer than is socially acceptable to recognise people with whom they were expected to be familiar – such as spouses, siblings, and children – while they confused strangers with familiar people

D.P. Kasbekar

A simple joy, often taken for granted, is to unexpectedly run into a friend or a relative at a train station or market. Recognising a familiar face in an unfamiliar context or crowded place gives most of us unalloyed pleasure.

We should give thanks to our MCTP2 gene for this ability. According to research published in this month's issue of the journal *Genetics*, by researchers led by Ye Rao of Capital Medical University, Beijing, when this gene is mutated the ability to recognise faces is severely impaired.

Individuals with the misfortune of carrying the mutant gene took much longer than is socially acceptable to recognise people with whom they were expected to be familiar – such as spouses, siblings, and children – while they confused strangers with familiar people. This disorder is called prosopagnosia, or face blindness. Its prevalence worldwide is estimated to be 1.8-2.9% in the general population. Prosopagnosia is one form of visual agnosia, or inability to identify everyday items just by looking at them.

The MCTP2 gene is thus the first found to be required for a higher form of visual social cognition in humans.

**Face recognition and a gene**

The researchers identified a family of 35 individuals spread across three generations. The members of its eldest generation were all older than 60 years. Nine members of the family had daily problems with recognising faces. They also performed very poorly on a standardised face recognition test. Another nine performed normally in the tests, yet they too had difficulty recognising faces.

The remaining 17 – including nine who married into the family – performed normally in the tests and had no difficulty recognising faces.

By charting the family tree, the researchers inferred that a great-grandparent of the eldest generation must have carried the mutation. The eldest members then passed on the mutation to their affected children and grandchildren.

Examining the genome of the affected family members revealed they had all inherited the same genome segment in one copy of their chromosome no. 15. Recall that we inherit two copies of each chromosome, one from each parent, and in this way each one of us possesses 23 pairs of chromosomes.

By sequencing the genomic DNA, the



Examining the genome of the affected family members revealed they had all inherited the same genome segment in one copy of their chromosome no. 15. STEWART MACLEAN/UNSPLASH

researchers found that the MCTP2 gene, located in this segment, had been altered by a mutation. As a result, one amino acid in the protein encoded by the MCTP2 gene had been replaced by another. The researchers didn't find this mutation in any of the hundreds of thousands of human genome sequences stored on different databases.

That is, the mutation was novel and private to this family.

**Validation from population studies**

But how did the researchers conclude that face blindness was caused by precisely this mutation, and not by some other mutation in the candidate genome segment?

They came to their conclusion on the basis of a population screen. The researchers recruited a cohort of 2,904 individuals (743 male and 2161 female, all around 19 years of age) to answer an online questionnaire. The questionnaire incorporated elements of the face recognition test. Seventy-eight individuals scored very poorly: that is, their scores deviated by two standard deviations or more from the average score.

The researchers sequenced the genome of 75 of the poor scorers and found seven of them carried one of five other sequence alterations in the MCTP2 gene. This demonstrated that unrelated individuals who performed very poorly in face recognition tests were more likely to carry independent mutations in the



The MCTP2 gene is the first found to be required for a higher form of visual social cognition in humans

MCTP2 gene compared to the general population.

Additionally, the team found that the individuals' first-degree relatives, such as a parent, a child or a sibling, who shared their mutation also shared the facial recognition impairment.

These findings implicated the MCTP2 gene in face recognition.

As for the 68 others who did poorly on the test but had non-mutated MCTP2 genes: some of them might have had mutations in yet other genes for face recognition. Others might have suffered face recognition problems because of infection or injury. And still others might indeed have been false positives.

A questionnaire-based screen is unlikely to have been 100% specific for identifying individuals with face recognition deficits; for extraneous reasons, even 'normal' face recognisers might perform poorly on a questionnaire.

In the brain, the right middle fusiform gyrus, a.k.a. the fusiform face area (FFA), is activated during facial recognition. When the researchers used functional magnetic resonance imaging to study

individuals carrying the different MCTP2 mutations, they found abnormal responses in the rFFA.

**When a glove becomes a puzzle**

It is perplexing for most of us to imagine what it is to live with a visual agnosia. In his bestselling 1985 book *The Man Who Mistook His Wife for a Hat*, the gifted neurologist and writer Oliver Sacks (1933-2015) recounted case histories of some of his patients. Dr P. was a distinguished musician and teacher, and had a visual agnosia caused by a tumour in the brain.

When Dr P. was offered a glove and asked what it was, he described it as "a continuous surface infolded on itself, (with) five outpouchings..." He imagined it to be a change purse for coins. When asked to put on his shoe, he was unable to tell his foot from his shoe. He mistook water hydrants and parking metres on the street for children and patted them on the head. And he mistook his wife for a hat.

Baffled, Dr. Sacks wondered how a man such as this could function as a teacher at the Music School. Yet Dr. P. taught music until the last days of his life.

With the discovery of MCTP2's role, our helpless bewilderment regarding visual agnosia should give way to our first molecular glimpse of what actually might be happening in the troubled brain. Both Dr. Sacks and Dr. P. would have been pleased with this progress.

(D.P. Kasbekar is a retired scientist.)

## THE GIST

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# Prosopagnosia

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## WHAT IS IT?

# Perpetual motion: cheating nature's laws

### Karthik Vinod

Nothing lasts forever. This is good life advice, and it also happens to be an important feature of our physical universe.

Natural philosophers considered and discarded the idea of “perpetual motion” a long time ago. The basic premise of perpetual motion is that it should be possible to operate a system without supplying power to it. We know from daily experience that this can't be true: for example, your phone's battery will drop to zero if you use it without charging.

In physicists' parlance, perpetual motion violates the law of conservation of energy. The first and second laws of thermodynamics also stipulate that anything that offers power must also liberate heat. If there was an infinite power supply, there would also have to be an infinite heat liberator. There isn't.

But this simple explanation hasn't stopped some people from wondering whether perpetual motion machines might exist. A simple example is the dunking bird toy. It uses a temperature differential between the bird's top and bottom to move back and forth. Very simply speaking, when it moves forth, its beak dips into a glass of water that flows to the



A dunking bird toy uses a temperature differential between the top and bottom to move back and forth. ROBINLEICESTER (CC BY-SA 3.0)

bird's bottom, and the weight causes the bird to move back.

The dunking bird toy can work like this for a long time, but it can't move perpetually: it will stop when the temperature differential between the bird's top and bottom vanishes. (Karthik Vinod is an intern with The Hindu.)

#### **For feedback and suggestions**

for 'Science', please write to [science@thehindu.co.in](mailto:science@thehindu.co.in) with the subject 'Daily page'

# Perpetual motion: cheating nature's laws

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## BIG SHOT



Water pollution levels in Paris's Seine river remain much higher than the level allowed for swimming, data showed on Friday. The numbers arrived just one month before the start of the Olympics, in which the capital's landmark waterway is meant to be one of the swimming venues. REUTERS



# Seine River

- **Seine River, ancient Sequana, Second longest river in France.**
- **It rises on the Langres plateau, 18 mi (30 km) northwest of Dijon, and flows through Paris before emptying into the English Channel at Le Havre after a course of 485 mi (780 km). Its tributaries include the Marne and Oise rivers.**





# Court on climate right and how India can enforce it



Through its recent judgment in *M.K. Ranjitsinh and Ors. vs Union of India & Ors.*, the Supreme Court of India has dropped a large rock into the relatively placid waters of India's nascent climate change jurisprudence. It has read into the Constitution of India the right to 'be free from the adverse effects of climate change', identifying both the right to life and the right to equality as its sources. As a new government considers its imperatives and agenda, *Ranjitsinh* provides an intriguing opportunity to think through and possibly enact much more systematic governance around climate change.

## A new right around climate

Scholars and legal practitioners are still unpacking the judgment. The issue before the Court was whether and how electricity transmission lines can be built through the habitat of the critically endangered Great Indian Bustard. The government claimed that a previous court order protecting the bird's habitat had affected the country's renewable energy potential. Modifying this order, the Court prioritised transmission infrastructure to enable accelerated development of renewable energy to address climate change. But the more seismic aspect of the judgment was the newly minted 'climate right' rooted in the constitutionally guaranteed right to life (Article 21) and right to equality (Article 14). Reading this right into the Constitution potentially opens the door to climate litigation, empowering citizens to demand from the government that this right be protected.

But the judgment also leaves unresolved questions. Does the Court overstate the large-scale clean energy agenda as the main pathway to avoiding climate harms and, correspondingly, understate climate adaptation and local environmental resilience? Just how will this right against the adverse effects of climate change be protected? And what might it mean for the agenda of the newly formed government? One way forward is the slow accretion of judicial decisions around this right. But another is new legislation to actively realise a right against the adverse effects of climate change.

The former approach, the proliferation of court-based action through enhanced litigation around climate claims, will likely lead, slowly and over time, to an incomplete patchwork of (judiciary-led) protections. As with many other well-meaning judicial orders directing the protection of fundamental rights, realising climate rights could become contingent on the passage of several subsequent policy actions. Moreover, a patchwork approach is less likely to chart an overarching framework to guide future policy.

## Navroz K. Dubash

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## Aditya Valiathan Pillai

Fellow at the Sustainable Futures Collaborative

Is the latter approach, climate legislation, then a preferred approach to protect climate rights? The judgment itself states that there is no 'umbrella legislation' in India that relates to climate change. And in so doing, seems to implicitly recognise the merits of an overarching, framework legislation. Drawing from the experience of other countries, framework legislation can bring several advantages. It can set the vision for engaging with climate change across sectors and regions, create necessary institutions and endow them with powers, and put in place processes for structured and deliberative governance in anticipation of and reaction to climate change.

## Indian context is important

These are important advantages, and good reasons for India to consider climate legislation. But at the same time, it is essential that Indian climate legislation not blindly copy other countries, and is tailored to the Indian context.

Undoubtedly, India needs to transition to a low-carbon energy future, an imperative that is highlighted in the *Ranjitsinh* judgment. But this, by itself, is not nearly enough to enforce a right against the adverse effects of climate change. Climate legislation should also create a supportive regulatory environment for more sustainable cities, buildings, and transport networks. It should enable adaptation measures such as heat action plans sensitive to local context. It should provide mechanisms for shifting to more climate-resilient crops. It should protect key ecosystems such as mangroves that act as a buffer against extreme weather events. And, it should actively consider questions of social equity in how it achieves these tasks. In brief, it should provide a way of mainstreaming and internalising climate change considerations into how India develops. Nothing less is required to make progress toward avoiding the adverse effects of climate change.

But having a single, omnibus law that covers all these areas is not feasible, particularly in the face of an existing legal framework that legislates on most of these issues. It is impossible to anticipate upfront all the ways in which society can and should prepare for climate change. So, what is the way forward?

Here, there is scope to learn from international experience both what not to do and what directions to follow. Climate laws in many countries, often following the example of the United Kingdom, focus narrowly on regulating carbon emissions, for example, by setting regular five yearly national carbon budgets and then putting in place mechanisms to meet them. This sort of approach, which has unfortunately become somewhat of a template for countries to

follow, is ill-suited to India.

Instead, because India is still developing, is highly vulnerable, and yet to build much of its infrastructure, what the country needs is a law that enables progress toward both low-carbon and climate resilient development. The distinction between a regulatory law, such as the U.K.'s, and an enabling one, like, for example in Kenya, is important to understand. A regulatory law focuses, in a narrow way, on emissions and how they can be limited. An enabling law can be written to stimulate development-focused decisions in a range of sectors across the economy – urban, agriculture, water, energy and so on – by systematically asking whether each decision moves the country closer to or further from low-carbon growth and climate resilience. Importantly, this approach emphasises adaptation as much as mitigation.

An enabling law is likely to be a more procedurally-oriented law, one that systematically creates the institutions, processes and standards for mainstreaming climate change across diverse ministries and different parts of society. For example, such a law would build in procedures to support knowledge-sharing, ensuring transparency and avenues for public participation and expert consultation, prompting meaningful setting (and revision) of targets and timelines and reporting against these.

## The factor of federalism

There is another dimension essential for a climate law tailored to India: ensuring that the law works effectively within Indian federalism. Many areas relevant to climate action, from urban policy to agriculture and water fall under the authority of sub-national governments – States or local levels, and electricity also is a concurrent subject. An Indian climate law must simultaneously set a framework for coherent national action while decentralising sufficiently to empower States and local governments, and enable them with information and finance to take effective action.

Finally, the enabling role should ideally also extend beyond government. Business, civil society and communities, particularly those on the frontlines of climate impacts, have essential knowledge to bring to energy transition and resilience. Finding ways of enabling participation in decision making would enable all these sections of society to bring their knowledge to the table in addressing climate change. An effective Indian climate law based on enabling procedures would also provide opportunities for voice to diverse segments of society.

These broad ideas provide a set of principles for a climate law tailored to India, one that provides a basis for taking forward and fulfilling the promise of the *Ranjitsinh* judgment.

Because India is still developing, what the country needs is a law that enables progress toward low-carbon and climate-resilient development

## **M.K. Ranjitsinh and Ors. vs Union of India**

- **Through its recent judgment in M.K. Ranjitsinh and Ors. vs Union of India & Ors., the Supreme Court of India defines new climate change jurisprudence.**
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- **As a new government considers its imperatives and agenda, Ranjitsinh provides an intriguing opportunity to think through and possibly enact much more systematic governance around climate change**



# Should education be brought back to the State list?

When was the subject added to the concurrent list? How do other countries govern education?

**Rangarajan. R**

**The story so far:**

**T**he NEET-UG exam has been embroiled in controversies over the award of grace marks, allegation of paper leaks and other irregularities. The government also cancelled the UGC-NET exam after it was held, while the CSIR-NET and NEET-PG exams have been postponed.

**What is the historical background?**

The Government of India Act, 1935 during the British rule created a federal structure for the first time in our polity. The legislative subjects were distributed between the federal legislature (present day Union) and provinces (present day States). Education which is an important public good was kept under the provincial list. After independence, this continued and education was part of the 'State list' under the distribution of powers.

However, during the Emergency, the Congress party constituted the Swaran

Singh Committee to provide recommendations for amendments to the Constitution. One of the recommendations of this committee was to place 'education' in the concurrent list in order to evolve all-India policies on the subject. This was implemented through the 42nd constitutional amendment (1976) by shifting 'education' from the State list to the concurrent list. There was no detailed rationale that was provided for this switch and the amendment was ratified by various States without adequate debate.

The Janata Party government led by Morarji Desai that came to power after Emergency passed the 44th constitutional amendment (1978) to reverse many of the controversial changes made through the 42nd amendment. One of these amendments that was passed in the Lok Sabha but not in the Rajya Sabha was to bring back 'education' to the State list.

**What are international practices?**

In the U.S., State and local governments

set the overall educational standards, mandate standardised tests and supervise colleges and universities. The federal education department's functions primarily include policies for financial aid, focussing on key educational issues and ensuring equal access. In Canada, education is completely managed by the provinces. In Germany, the constitution vests legislative powers for education with landers (equivalent of States). In South Africa, on the other hand, education is governed by two national departments for school and higher education. The provinces of the country have their own education departments for implementing policies of the national departments and dealing with local issues.

**What can be the way forward?**

The arguments in favour of 'education' in the concurrent list include a uniform education policy, improvement in standards and synergy between Centre and States. However, considering the vast diversity of the country, a 'one size fits all'

approach is neither feasible nor desirable. Further, as per the report on 'Analysis of Budgeted expenditure on Education' prepared by the Ministry of Education in 2022, out of the total revenue expenditure by education departments in our country estimated at ₹6.25 lakh crore (2020-21), 15% is spent by the Centre while 85% is spent by the States. Even if expenditure by all other departments on education and training are considered, the share works out to 24% and 76% respectively.

The arguments against restoring 'education' to State list include corruption coupled with lack of professionalism. The recent issues surrounding the NEET and NTA have however displayed that centralisation does not necessarily mean that these issues would vanish.

Considering the need for autonomy in view of the lion's share of the expenditure being borne by the States, there needs to be a productive discussion towards moving 'education' back to the State list. This would enable them to frame tailor-made policies for syllabus, testing and admissions for higher education including professional courses like medicine and engineering. Regulatory mechanisms for higher education can continue to be governed by central institutions like the National Medical Commission, University Grants Commission and All India Council for Technical Education.

*Rangarajan. R is a former IAS officer and author of 'Polity Simplified'. Views expressed are personal.*

**THE GIST**

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# Indonesia to levy safeguard duties of 100% to 200%: Hasan



**Protectionist move:** The duties are aimed at protecting local industry, says Trade Minister Zulkifli Hasan. REUTERS

**Reuters**  
JAKARTA

Indonesia will impose safeguard duties of 100% to 200% on imports ranging from footwear to ceramics, reviving a plan to protect domestic industries, the Trade Minister said.

The planned import duties average more than 100%, Trade Minister Zulkifli Hasan told reporters on Friday. "If we are flooded with (imported goods), our micro, small and medium enterprises could collapse."

Southeast Asia's biggest economy issued a regulation late last year to tighten monitoring for more than 3,000 imported goods, from food ingredients to electronics to chemicals.

## **Reverses regulation**

However, the regulation was reversed after domestic industry said it hindered the flow of imported materials needed by domestic industry.

Duties will be imposed soon and could affect imports of footwear, clothing, textiles, cosmetics and ceramics, Mr. Zulkifli said.

The Indonesian Trade Safeguards Committee is investigating to determine duty rates, senior Trade Ministry official Budi Santoso said on Saturday.

Indonesia mainly imports apparel and clothing accessories from China, Vietnam and Bangladesh, data from the statistics bureau show.

# Safeguard duty

- A safeguard duty is a type of customs duty imposed by emergency action under the WTO Agreement on Safeguards.
- It is designed to prevent harm and injury to a domestic industry that would face intense competitive pressure from the continued importation of a particular good



**SEOUL**

## N. Korea condemns drills by U.S., Japan, South Korea as 'Asian NATO'



AP

North Korea denounced joint military drills by South Korea, Japan and the U.S., calling them an “Asian version of NATO” and warning of “fatal consequences”. It comes a day after the allies wrapped up the exercises, dubbed “Freedom Edge”, in missile and air defences, anti-submarine warfare and defensive cyber training. AFP

# Freedom Edge.'



- joint military exercise by South Korea, Japan, and the United States held this month.
- In a statement, its state media said such drills show that the relationship among the three countries has developed into the Asian version of NATO. Earlier on Thursday, the three countries began large-scale joint military drills called 'Freedom Edge.'
- The exercise involving navy destroyers, fighter jets, and the nuclear-powered U.S. aircraft carrier Theodore Roosevelt aimed at boosting defences against missiles, submarines, and air attacks.



## Anti-measles antibody prevents viral fusion: study

Cryo-electron microscopy (cryo-EM) structures of an anti-measles antibody reveal its therapeutic potential by blocking the virus's fusion process, a new study reports. The work paves the way for the next generation of measles virus therapeutics and illuminates a mechanism that may be shared by antibodies against other viral pathogens. The structures generated by the researchers also revealed an important epitope that may provide a new druggable target for MeV as well as other paramyxoviruses like mumps.

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- **Cryo-EM is a version of electron microscopy that freezes many copies of a delicate sample into a glassy state and hits them with an electron beam. Electrons pass through the copies to create images into a high-res 3D model of the sample.**
- **Microscopy is the technical field of using microscopes to view samples & objects that cannot be seen with the unaided eye (objects that are not within the resolution range of the normal eye)**



## Antibody shields hamsters from SARS-CoV-2 variants

Scientists show that a new antibody therapy for COVID-19 can neutralise the Omicron strain of SARS-CoV-2 in hamsters and is safe in humans, according to their research. The antibody (AZD3152) could provide an additional layer of protection to vulnerable groups at risk of severe COVID-19. The antibody binds to the back “left shoulder” of the receptor binding domain on the SARS-CoV-2 spike protein, and is designed to be more potent against emerging variants.

## **(AZD3152)**

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# inStem's fabric offers protection from pesticides

**R. Prasad**

Researchers at the Institute for Stem Cell Science and Regenerative Medicine (inStem), in Bengaluru have developed an anti-insecticide fabric that effectively neutralises organophosphate-based pesticides. In an earlier work published about six years ago, the team had developed a gel for topical dermal application to deactivate the pesticides. But considering that compliance might be poor, the researchers looked at another alternative that is as effective in deactivating the insecticide but at the same time does not reduce compliance.

When esters present in organophosphate-based pesticides enter the body they bind and inhibit an enzyme (acetylcholinesterase or AChE) critical for neuromuscular function from working. Therefore, inhibition of this important

enzyme is implicated in learning deficits, suffocation, paralysis, muscle weakness among others.

In a paper published recently in *Nature Communications*, the team led by Dr. Praveen Kumar Vemula from inStem coated the cotton fabric with small molecules, rendering the final product the ability to deactivate the insecticide. "The small molecules are covalently bonded with the cellulose of the fabric making the cloth not only breathable but also durable," says Dr. Vemula. The small molecules that are covalently bonded with the fabric are nucleophile in nature, and can detoxify the pesticides upon contact through nucleophile-mediated hydrolysis, says Dr. Vemula. "The fabric attacks the pesticide molecule and breaks it into non-toxic products. The pesticide is deactivated even before it reaches the skin



**Right way:** The fabric deactivates the pesticide and breaks it down into non-toxic products. AP

surface," he says. The fabric with covalently-bonded small molecules was developed in collaboration with Sepio Health Pvt Ltd, a spin-off company from inStem.

"The fabric retains the anti-insecticide property even after washing 150 times." Though the reusability after 50 cycles was reported in the paper, the researchers continued the reusability testing and found the effectiveness to last up to 150 cycles of

washing. "Unlike the gel, the reusability will make the fabric an affordable solution to prevent insecticide-induced toxicity to farmers. It will also increase compliance," he says.

According to Dr. Vemula, the small molecule-coated fabric does not act as a physical barrier to organophosphate-based insecticide. Instead, the fabric hydrolytically deactivates the insecticides, causing the preven-

tion of insecticide-induced AChE inhibition.

To investigate the efficiency of the fabric containing the small molecules, the active AChE in the blood before and three days after exposure to the insecticide was measured in rats. While direct exposure or when normal cloth did little to halt the drop in active AChE in blood, no reduction in blood active AChE level was observed in the presence of the fabric coated with small molecules. Several organs from the exposed and unexposed rats were studied and compared, and the researchers found that the active AChE levels in the organs did not drop in the case of rats that were exposed to the insecticide in the presence of the fabric coated with small molecules. Also, while rats that were repeatedly and directly exposed to ethyl paraoxon (an activated orga-

nophosphate insecticide) or through the normal fabric died within four days, none of the rats exposed to the insecticide in the presence of the special fabric died.

Farmers get repeatedly exposed to the insecticide due to frequent usage, and this can cause chronic toxicity and severe adverse health effects. The animal study results show promise that the fabric containing the small molecules can prevent chronic toxicity in farmers, he says.

"The design of one nucleophile that can deactivate a wide range of organophosphates and carbamates was challenging. Subsequently, optimising the industry-friendly chemistry to covalently attach on the fabric was the key in developing anti-pesticide fabric," says Dr. Ketan Thorat, a former research student at inStem and coauthor of the paper.

# Pesticide protection

- When esters present in organophosphate-based pesticides enter the body they bind and inhibit an enzyme (acetylcholinesterase or AChE) critical for neuromuscular function from working.
- Therefore, inhibition of this important enzyme is implicated in learning deficits, suffocation, paralysis, muscle weakness among others.

- **researchers looked at another alternative that is as effective in deactivating the insecticide**
- **small molecule coated fabric does not act as a physical barrier to organophosphate-based insecticide. Instead, the fabric hydrolytically deactivates the insecticides, causing the prevention of insecticide-induced AChE inhibition.**
- **inStem's fabric offers protection from pesticides**

# Why has the NTA failed to deliver?

How many examinations are under the charge of the National Testing Agency? Is it equipped to handle the large number of students and centres? What are the challenges? What are the loopholes in the system that can be manipulated by unscrupulous players?

**Priscilla Jebaraj**

**The story so far:**

**T**he National Testing Agency (NTA) has come under intense fire over the past few weeks, with widespread allegations of cheating, paper leaks and other irregularities impacting flagship examinations such as the NEET (National Eligibility cum Entrance Test) for undergraduate medical college admissions and the UGC-NET for Ph.D and assistant professor appointments. The agency's director general, Subodh Kumar Singh, has been removed, the CBI is probing irregularities, and a high-level panel has been set up to create a roadmap for a systemic overhaul.

**What is the NTA?**

The NTA was set up in 2017 as a specialist, self-sustaining and autonomous organisation under the aegis of the Union Education Ministry. Its director general and governing body are appointed by the Union government. However, it is registered as a society and is a separate legal entity, which raises questions about the government's legal liability for the NTA's actions. Its main mandate is to conduct efficient, transparent and international standard tests to assess the competency of candidates for admission, and recruitment purposes. Soon after it was established, the NTA took over the conduct of major all-India examinations, such as the JEE for engineering college admissions, NEET-UG, and UGC-NET (both of which had previously been conducted by the Central Board for Secondary Education or CBSE), as well as the entrance tests for Jawaharlal Nehru University and Delhi University. The National Education Policy of 2020 envisaged a broader role,

Educationalists propose broader pathways like equipping NTA better or dismantling the centralisation process

recommending that the NTA conduct an entrance or aptitude test for all universities across the country. In all, the NTA now has charge for more than 20 examinations.

**Why have there been so many problems?**

One of the main problems is that the NTA was originally intended to conduct computer-based tests only. "This will ensure that high volume can be processed in a short period of time," says the agency's website, claiming that such online testing will "eliminate the possibility of leakage of questions and question papers, post-test malpractice of filling in the OMR sheets, late entry of students to cheat in the test, subjectivity errors on descriptive testing, etc...In a short period of three years, all the tests administered by NTA will be computer adaptive. This will completely eliminate the problem of cheating," it declares. Thus, when the NTA took over conduct of the UGC-NET examination from the CBSE six years ago, it was converted from a pen-and-paper examination to a computer-adaptive test. This year, however, for reasons that are unclear, UGC-NET shifted back to the pen-and-paper mode. The day after it was conducted for over 11 lakh aspirants, the government cancelled the examination, citing inputs from the cyber crime unit.

"Pen-and-paper is a heaven for scammers," said one former official, noting that the printing process is particularly vulnerable to leaks. It is interesting that when the government announced fresh dates for UGC-NET 2024 to be held again, it also stipulated that it would be a computer-adaptive test this time.

However, when the conduct of NEET-UG was taken over by the NTA, the Health Ministry flatly refused to allow it to shift to a computer-based exam, citing concerns about students in rural areas who would not be prepared for an online exam, as well as Supreme Court rulings on how the examination should be conducted. Hence, the NTA has been forced to run a major examination in a mode that it was never intended to implement by design.

Officials and educationalists note that the agency is severely understaffed for the role it is currently being asked to undertake. According to a senior official, the agency was set up with only about 25 permanent staff positions. A number of its functions have also been outsourced to technical partners from the very beginning. Given that NEET-UG alone had more than 23 lakh candidates writing the examination in almost 5,000 centres across the country and abroad, this has left the agency stretched thin, according to some officials. "The NTA was set up to be a lean, professional organisation. The

more people, the higher risks. The NIC [National Informatics Centre] simply does not have the capacity or IT infrastructure needed, so it was always meant to engage third-party technical partners which have the robust cyber security expertise needed to run large-scale computer based examinations," said R. Subrahmanyam, former Higher Education Secretary who was in charge at the time the NTA was set up. However, some educationalists have complained that engaging third-party players takes accountability out of the government's hands and leaves loopholes in the system which can be exploited by unscrupulous players.

Officials say the NTA has also failed to develop robust mechanisms needed to handle a large-scale pen-and-paper examination, including the setting of the question paper and its encryption, selection of external printing presses and exam centres, transportation to printing presses, storage and distribution to examinees at examination centres and then the collection and transportation of answer sheets to evaluation centres. Each of these is a stage where malpractice can occur without robust security mechanisms.

**What is the way ahead?**

The high-level panel headed by former ISRO chief K. Radhakrishnan has been given two months to recommend reforms in the examination process, improve data security protocols, and overhaul the NTA's functioning.

Educationalists, however, propose starkly different pathways for the future. One option is to add manpower and infrastructure to the NTA to equip it to take on large-scale pen-and-paper examinations in an improvement to the CBSE system that preceded it. Those recommending this return to the past point out that pen-and-paper examinations are more equitable, especially for students in rural and remote areas with little access to technology.

Another option is to dismantle the centralisation process that seeks to move all testing in the country under the NTA. Some State governments, and professors from individual universities, notably JNU, have called for entrance tests for their institutions to be removed from the NTA and handed back to the institutions themselves, arguing that more decentralised structures are needed to meet the vastly differing needs of institutions.

However, others seek a more radical reform of the assessment system. They suggest systemic changes to remove the single, high-stakes entrance examination which results in extreme pressure on students, encourages an inequitable coaching industry, and incentivises malpractice. Instead, periodic assessments of knowledge, concept-based understanding, and aptitude can be conducted in the final years of school education as the precursor to the admission process, using online testing, and AI-based proctoring which can be overseen by the NTA.



**Outrage and uproar:** Members of the Students' Federation of India staging a protest in Vijayawada on June 22. G.N. RAO



# What is the NTA?



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- **Its director general and governing body are appointed by the Union government. However, it is registered as a society and is a separate legal entity, which raises questions about the government's legal liability for the NTA's actions.**
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# What is holding up the Teesta treaty?



What has the Indian government told Bangladesh? What is the technical team going to look into? Why is Bengal Chief Minister protesting this development? What about the Ganga water sharing agreement? When does it come up for renewal? What is the state of both the rivers?

**Shiv Sahay Singh**

**The story so far:**

**D**uring the recent state visit of Sheikh Hasina, Prime Minister of Bangladesh, to India, Prime Minister Narendra Modi on June 22 said: “A technical team will soon visit Bangladesh to discuss conservation and management of the Teesta river in Bangladesh.” The remark triggered fresh speculation about the Teesta water sharing treaty with Bangladesh, a key bilateral agreement that has been pending between the two countries for over a decade.

**What is India's stand?**

After Mr. Modi's comment, Foreign Secretary Vinay Kwatra told the media that the discussion “between the two leaders was less about water sharing per se, and more about the management of the water flows within Teesta”. West Bengal Chief Minister Mamata Banerjee took issue with the Centre's stand. On June 24, she wrote a letter to Mr. Modi conveying her strong reservation that no discussion on the sharing of Teesta waters should be taken up with Bangladesh without the involvement of the State.

**Why is Bengal upset?**

Ms. Banerjee pointed out that if Teesta's water is

Bengal claims if Teesta water is shared with Bangladesh, lakhs of people in north Bengal will get severely impacted

shared with Bangladesh, lakhs of people in north Bengal will get severely impacted. This is not the first time she has voiced her opposition to the proposed water sharing agreement of India with Bangladesh. In July 2019, the Trinamool Congress chairperson admitted that Bangladesh is hurt because the Teesta waters could not be shared and added, “If I had the ability, I would have definitely shared Teesta waters with them.” In 2017, the Chief Minister had also referred to an alternative proposal of sharing waters of the Torsa, Manshai, Sankosh and Dhanai rivers but not Teesta.

In all, 54 rivers flow between India and Bangladesh and sharing of river waters has been a key bilateral issue. India and Bangladesh agreed on the sharing of waters of the Ganga in 1996 after the construction of the Farakka Barrage and by the 2010s the issue of sharing of the Teesta came up for negotiation. In 2011, during the United Progressive Alliance-II government, India and Bangladesh were close to signing an agreement on the Teesta but Ms. Banerjee walked out of the deal, and since then, the agreement has been pending.

**What is the proposal?**

In 2011, when the proposal for sharing Teesta water was drawn up, it was said India would get 42.5% and Bangladesh 37.5% of the river water from December to March.

A tributary of the Brahmaputra, the Teesta river originates from the Tso Lhamo Lake at an elevation of about 5,280 metres in north Sikkim. The river travels for about 150 km in Sikkim and 123 km in West Bengal, before entering Bangladesh from Mekhliganj in Cooch Behar district; it flows another 140 km in Bangladesh and joins the Bay of Bengal. Teesta is Bangladesh's fourth largest trans-boundary river and its floodplain covers an area of 2,750 square kilometres in Bangladesh. But 83% of the river's catchment area lies in India and the remaining 17% is in Bangladesh, supporting 8.5% of its population and 14% of its crop production.

**What are the political considerations?**

While the Awami League government in Bangladesh is facing questions from the

Opposition about the delay in inking an agreement on the Teesta, the dams for hydro-electric power generation in Sikkim and the Teesta Barrage Project at Gazoldoba in West Bengal is making the flow of the river erratic in Bangladesh, leading to either floods or scarcity of water. The visit of a technical team from India to discuss conservation of the Teesta in Bangladesh also comes amid the backdrop of China proposing major dredging work on the river and building reservoirs and embankments in 2020. The Bangladesh government has put the proposal on hold for the past four years.

Soon after returning to Bangladesh, Prime Minister Hasina announced that her country would accept India's proposal to develop the Teesta River basin. Ms. Banerjee raised questions about the health of the Teesta river after the construction of a series of hydropower projects in Sikkim, deforestation in upper catchment areas and impact of climate change. She expressed surprise that no concrete steps have been taken by the Ministry of Jal Shakti to restore the river to its original form and health on the Indian side when a bilateral cooperation between India and Bangladesh for restoration of Teesta in Bangladesh is being proposed.

Environmental activists have also been raising questions on the ecological impact of hydro-electric projects on the river. In October 2023, a glacial lake outburst triggered floods in the Teesta basin that claimed hundred lives and destroyed the Teesta III hydroelectric dam.

Sharing of waters of transboundary rivers have been mandated by international laws including The Helsinki Rules on the Uses of the Waters of International Rivers in 1966. Article 253 of the Indian Constitution gives powers to the government to enter any transboundary river water-related treaty with a riparian state.

**Why is Bengal talking about Ganga treaty?**

The Ganga water sharing treaty with Bangladesh completes 30 years in 2026 and a renewal of the agreement is on the cards. The Trinamool Congress chairperson has pointed out that water sharing with Bangladesh has changed the Ganga's morphology and affected lakhs of people in West Bengal owing to river erosion.

“Lakhs of people have been displaced from their habitation rendering them homeless and also leading to their loss of livelihood. The reduced silt load in Hooghly has impeded the nourishment of the Sundarban delta,” she wrote in the letter to the Prime Minister.



**Extreme weather:** The flooded bank of the Teesta river following heavy downpour, in Siliguri, West Bengal, on June 14. PTI

## The Ganges-Brahmaputra Basin



## What is the Teesta proposal?

- In 2011, when the proposal for sharing Teesta water was drawn up, it was said India would get 42.5% and Bangladesh 37.5% of the river water from December to March.
- A tributary of the Brahmaputra, the Teesta river originates from the Tso Lhamo Lake at an elevation of about 5,280 metres in north Sikkim.
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- **But 83% of the river's catchment area lies in India and the remaining 17% is in Bangladesh, supporting 8.5% of its population and 14% of its crop production.**



## Why is Bengal upset?

- **Ms. Banerjee pointed out that if Teesta's water is shared with Bangladesh, lakhs of people in north Bengal will get severely impacted.**
- **This is not the first time she has voiced her opposition to the proposed water sharing agreement of India with Bangladesh**

- **In all, 54 rivers flow between India and Bangladesh and sharing of river waters has been a key bilateral issue. India and Bangladesh agreed on the sharing of waters of the Ganga in 1996 after the construction of the Farakka Barrage and by the 2010s the issue of sharing of the Teesta came up for negotiation.**



## **Why is Bengal talking about Ganga treaty?**

- **The Ganga water sharing treaty with Bangladesh completes 30 years in 2026 and a renewal of the agreement is on the cards.**
- **The Trinamool Congress chairperson has pointed out that water sharing with Bangladesh has changed the Ganga's morphology and affected lakhs of people in West Bengal owing to river erosion.**



# tussle over Covaxin IPR?

What are the rules for patenting the intellectual property rights of a vaccine?  
Why was the ICMR not included?

Incub Kenly

**The story so far:**  
**T**he maker of the indigenous coronavirus vaccine, Covaxin, Bharat Biotech International Limited (Bharat Biotech), has admitted to an "inadvertent error" in patent filings to protect the vaccine's intellectual Property Rights (IPR). One of India's leading biotechnology companies, it had failed to include scientists from the Indian Council of Medical Research (ICMR) as co-inventors in the Covaxin patent filings.

**What kind of rights govern vaccine patents?**  
India's patent law governs both product and process patents. Product patents grant an inventor a monopoly over a drug. Process patents bar competitors from making a similar drug using the same sequence of steps. In response to queries from *The Hindu*, Bharat Biotech said it had patented the process, namely of making a batch of vaccines from the virus strains that were provided by the ICMR-NIV (National Institute of Virology). This is the lab that has expertise in extracting viruses from blood samples, identifying its characteristics, conducting various tests to gauge its infectiousness and quality. It is competent to related strains. However, preparing a vaccine out of this at an industrial scale is beyond the capabilities of a lab and requires a different order of facilities.

Bharat Biotech International Limited had collaborated with the Indian Council of Medical Research-National Institute of Virology for all the steps in developing a vaccine that only established vaccine manufacturers have. Covaxin is an inactivated version of COVID-causing coronavirus, once injected into the body it causes it into producing antibodies that can potentially protect against severe disease from a coronavirus infection. To do this effectively, an 'adjuvant' is added which increases the vaccine's potency. Vaccine makers may have their own ways of bringing all of these steps together and, given the competitive nature of the field, strive to ward off competitors from imitating these processes to gain a temporary monopoly in the market and rule profits.

To be sure, while companies are free to file for a product or process patent in as many countries as they can afford, a patent is only granted after regulatory authorities grant them one or are convinced that this process is indeed novel or innovative. BIRL, as far as publicly known, hasn't yet been granted these patents.

**What were the roles of BIRL and ICMR?**  
BIRL had collaborated with the ICMR-NIV for all the steps in developing a vaccine. The two organisations had signed an agreement that spelled out each entity's responsibilities. As ICMR is a public entity and because of the scale of the COVID crisis, there were tighter To Information requests to make this agreement public. However, it was only in July 2020, that parts of the agreement were made public in Rajya Sabha. Beyond transferring the strains and making vaccines, the agreement said, ICMR would also test these vaccines on animals – rodents to monkeys – and then on people to establish that the vaccine worked as intended. The ICMR also funded these clinical trials – C31 core – and incurred costs in developing Covaxin. In return it was to get 5% of royalties that BIRL earned from the sale of Covaxin. Since the announcement of the BIRL and ICMR collaboration, it was generally accepted that both entities would contribute to the vaccine and would therefore hold "joint intellectual property rights", as was stated in Parliament.

However, BIRL, first said *The Hindu* that it made a distinction between the rights governing the making of the vaccine and the rights over the data generated from clinical trials. The ICMR hadn't invested in the actual making of the vaccine and so wasn't included in patent applications. However, a day after the matter became public, BIRL said it had made a mistake, and that it would be making amends by filing fresh applications that listed ICMR personnel as inventors. It is unclear what prompted this.

**Why does being cited as an inventor matter?**  
IPR is a vast, complex domain and spans the minutest parts of the product invention process. As the development of pharmaceutical products involves a wide range of expertise, it is hard for single firms or entities to develop everything in-house. Just like the BIRL-ICMR collaboration, companies may enter into several licensing agreements – BIRL, for instance had a technology licensing agreement with Vertex for the adjuvant – with other companies. If a single product thus involves multiple entities and collaborators, being listed as an inventor has a bearing on the sharing of intellectual property rights, royalties and even determining how a product can be used. There is no field of human activity that is untouched by dispute over IPR. In patent filings, not listing out all the inventors in the U.S especially – could even lead to patent applications being rejected.

- **The maker of the indigenous coronavirus vaccine, Covaxin, Bharat Biotech International Limited (BBIL), has admitted to an “inadvertent error” in patent filings to protect the vaccine’s Intellectual Property Rights (IPR).**
- **One of India’s leading biotechnology companies, it had failed to include scientists from the Indian Council of Medical Research (ICMR) as co-inventors in the Covaxin patent filings.**

## **What kind of rights govern vaccine patents?**

- **India's patent laws govern both product and process patents.**
- **Product patents grant an inventor a monopoly over, say, a drug. Process patents bar competitors from making a similar drug using the same sequence of steps. In response to queries from**

## **Adjuvant**

- **An adjuvant is a substance that enhances the immune system's response to the presence of an antigen.**
- **They are commonly used to improve the effectiveness of a vaccine.**  
**Generally, they are injected alongside an antigen to help the immune system generate antibodies that fight the antigen.**

- **The purpose of adding adjuvants into vaccines is to boost the immune system response and to allow for fewer doses or lesser quantities of the vaccine to be administered.**
- **Aluminum, one of the most commonly used adjuvants, was first discovered to have adjuvant properties back in 1926.**
- **Research has revealed that adjuvants are likely generating immuno-competent environments at the location of the vaccine injection through the activation of an innate immune response.**

# New criminal laws in effect; amendments soon

Till the BNS gets a new section on sexual crimes against men and transgender persons, police can invoke allied charges such as wrongful confinement and physical hurt if they receive such complaints; Union government officials say the States are free to bring in their own amendments to some provisions of the BNSS that replace the Cr.PC.

Vijaita Singh  
NEW DELHI

As three new criminal laws come into effect across the country from Monday despite objections from States ruled by non-BJP parties, Union government officials said here on Sunday that the States were free to bring in their own amendments to some provisions of the Bharatiya Nagrik Suraksha Sanhita (BNSS) that replaces the Code of Criminal Procedure (Cr.PC.). The BNSS prescribes the procedure and conditions for arrest, bail, and custody, among other things.

The Bharatiya Nyaya Sanhita (BNS), which replaces the Indian Penal Code, 1860, may also be amended soon to incorporate a section on sexual crimes against men and transgender persons. A senior government official said that police officers

## Crime and punishment

The new Bharatiya Nyaya Sanhita has 358 Sections against the 511 in the Indian Penal Code that it replaces. The Bharatiya Nagrik Suraksha Sanhita replaces the Code of Criminal Procedure, and the Bharatiya Sakshya Adhiniyam comes in place of the Indian Evidence Act



ISTOCKPHOTO

### What is new?

- Provision for **Zero FIR** allowing filing of a first information report at any police station, regardless of jurisdiction
- **Online registration** of police complaints and mandatory videography of crime

scenes for all heinous crimes

- A person can now report incidents by **electronic communication**, without the need to visit a police station
- Judgment in criminal cases has to come **within 45 days**

of completion of the trial

- Provisions against false promise of marriage, gang rape of minors and **mob lynching**
- Statement of a woman rape victim will be recorded by a woman police officer

in the presence of her guardian or relative

- Death sentence or life imprisonment for **gang rape of a minor**
- **Sedition** has been replaced with 'secession' or 'act against the country's sovereignty, unity and integrity'

were being asked to invoke other allied sections under the BNS, such as wrongful confinement and physical hurt, if they get such complaints, until an amendment is brought to correct this anomaly.

The Bharatiya Sakshya (BS), which replaces the Indian Evidence Act, 1872, is the third law which will come into force.

From 00:00 hours on

July 1, more than 650 district courts and 16,000 police stations across the country will have no option but to migrate to the new system. Cognisable offences will be registered under Section 173 of the BNSS, instead of Section 154 of the Cr.PC.

The IPC and Cr.PC will run concurrently along with the new laws as several cases are still pending in

courts and some crimes that took place before July 1 that are reported later will have to be registered under the IPC.

### 'Hand-holding done'

On June 21, West Bengal Chief Minister Mamata Banerjee wrote to Prime Minister Narendra Modi seeking deferment of the implementation of the laws passed by Parliament

in December 2023.

However, a senior government official told *The Hindu* that training and hand-holding has been done for all States to help them adapt to the new system.

First information reports (FIRs) are filed through the Crime and Criminal Tracking Network Systems (CCTNS), a programme that functions un-

der the National Crime Records Bureau. A significant upgrade to the CCTNS will help people file an e-FIR, without visiting a police station, and a zero FIR, which can be filed irrespective of the jurisdiction of the crime location.

The official said that changes have also been made to the CCTNS software to register FIRs in languages other than English and Hindi.

### Electronic evidence

The BNSS mandates compulsory audio-video recording of search and seizure in each criminal case and mandatory forensic examination in all cases where an offence attracts a punishment of seven years or more.

The recordings will have to be submitted before the court electronically "without delay."

Under Section 105 of the BNSS, the scope of audiovi-

visual recording during search and seizure includes the process of preparing a list of seized items and the signature of witnesses.

While the Home Ministry is testing eSakshya (e-evidence), a mobile based application to help police record scene of crime, search and seizure in a criminal case and upload the file on the cloud-based platform, several States depending on their capacities have devised their own systems.

For instance, the Delhi Police have developed an e-pramaan application which will help investigating officials record a scene of crime and generate a hash value along with a certificate under Section 62 of Bharatiya Sakshya.

Officials pointed out that the security of the cloud-based system where the data will be stored will be of prime concern.



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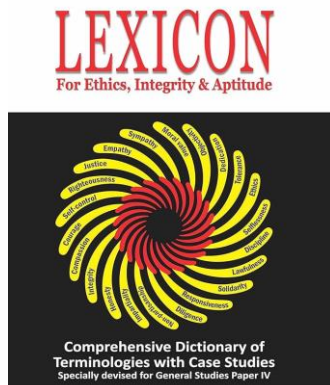
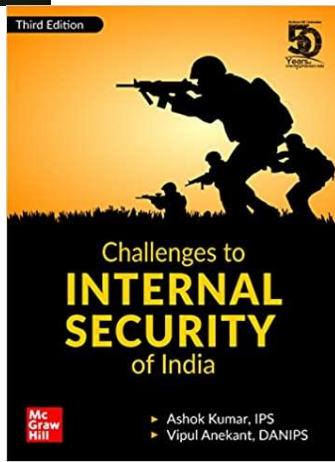
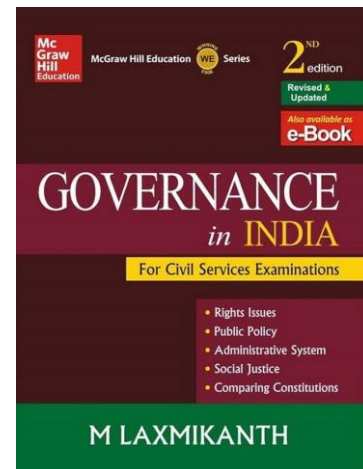
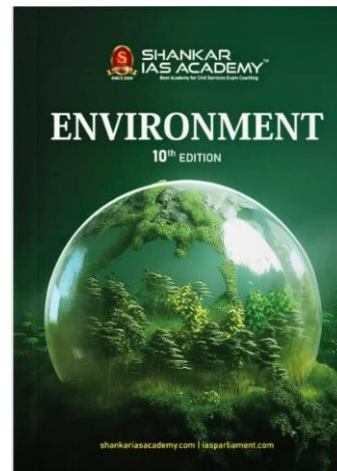
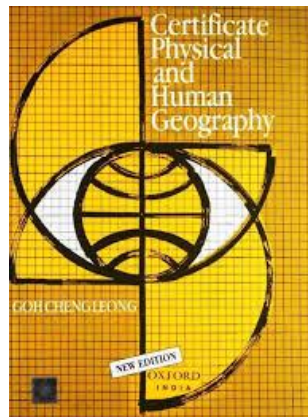
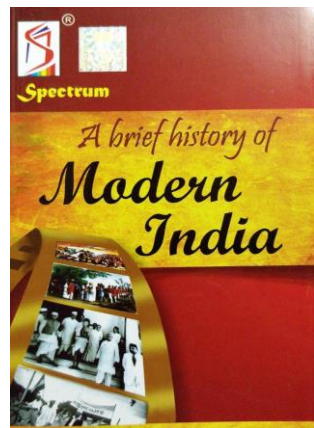
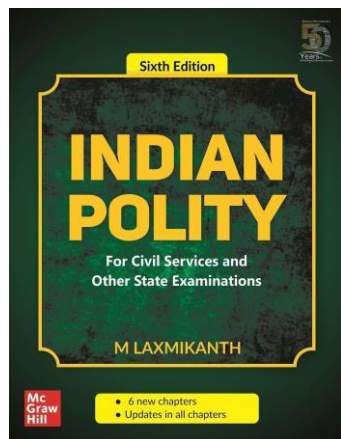
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