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ENVIRONMENT AND HEALTH

**Science
Reporter**



MK Yadav Sir

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Forest (Conservation) Amendment Act 2023: States, UTs must act as per definition in TN Godavarman judgement, says SC

Context: The states and Union territories (UT) must act according to the definition of 'forest' as laid down in the landmark **TN Godavarman Thirumalpad v. Union of India judgement issued in 1996**, the Supreme Court said in an interim order.

Forest Conservation Amendment Act 2023

- **Exempted Categories of Land:** The Act exempts some types of land from the Act, including forest land along a railway line or a public road maintained by the government.
- **Assignment/Leasing of Foreign Land:** The Act extends the prior approval requirement for assigning forest land to all entities, including government-owned ones. The approval must be subject to terms and conditions prescribed by the central government.
- **Land Under the Purview of the Act:** It defines forest land as either land that is notified as a forest under the IFA, 1927 or any other law, or land that is notified as a forest on or after Oct 25, 1980, in a government record.
- **Permitted Activities in Forest Land:** The Act restricts de-reservation of forests or use of forest land for non-forest purposes, **but the central government may approve such use with conditions.**

Interpretation of "Deemed Forest" in TN Godavarman Thirumalpad v. Union of India judgement (1996)

- **Expansive Definition:** The court in its 1996 judgment expanded the definition of a "deemed forest" beyond the traditional notion of a forest as a large area with significant tree cover.
- **Inclusion Criteria:** It encompassed areas recorded as forests in government records, regardless of the presence of significant tree cover or ownership status.
- **Protection under Forest Conservation Act, 1980:** The judgment extended protection to vast tracts of eco-sensitive and Adivasi lands, irrespective of their formal classification as "forests" in revenue records.

THE FOREST (CONSERVATION) ACT, 1980

- **The Act empowers:** The central government to demand proper compensation (compensatory afforestation) for any forest land diverted for non-forestry purposes.
 - It also extends its jurisdiction to land that is not officially designated as "forest" in government records at the state or central level.
- **Penalties:** This Act provides penalties for the infringement of the provisions of this Act.
- **Advisory committee:** It may be formed for advising the Central government in matters related to forest conservation.

ODYSSEUS SPACECRAFT

A US-based private company recently launched a lunar lander, named after the hero of Homer's epic *Odyssey*

A ROBOTIC lunar lander launched into space early Thursday morning. If all goes well, on February 22, it will become the first American spacecraft to gently set down on the Moon's surface since the Apollo 17 moon landing in 1972.

It would also become the first private effort to reach the surface of the Moon in one piece. Three earlier attempts, by an American company, a Japanese company and an Israeli nonprofit, failed.



The Odysseus lander in Houston on February 1, 2023. *The NYT*

Why is it called Odysseus?

This particular spacecraft was named Odysseus after a contest among employees of Intuitive Machines of Houston — the company in charge of the mission. Mario Romero, the engineer who proposed the name, said the travels of the hero of *Odyssey*, the ancient Greek epic poem, provided an apt analogy for the lunar mission. "This journey takes much longer due to the many challenges, setbacks and delays," Romero said in Intuitive Machine's press kit for the mission. "Travelling the daunting, wine-dark sea repeatedly tests his mettle, yet ultimately, Odysseus proves worthy and sticks the landing back home after 10 years."

What is its significance?

If private companies can pull off this feat, at a cost much lower than a traditional NASA mission, it will open the door to wider exploration of the Moon by NASA and commercial endeavours.

NASA is the primary customer for this mission, paying Intuitive Machines \$118 million to take its payloads, which include a stereo camera to observe the plume of dust kicked up during landing and a radio receiver to measure the effects of charged particles on radio signals.

But if these private efforts continue to

crash, NASA won't get its money's worth. The launch of the Intuitive Machines mission comes just one month after another US company, Astrobotic Technology of Pittsburgh, attempted to send Peregrine, its lander, to the moon. But a malfunction with its propulsion system shortly after launch prevented any possibility of landing.

Both Odysseus and Peregrine are part of NASA's Commercial Lunar Payload Services program, or CLPS. The object of the programme is to use commercial companies to send experiments to the Moon rather than NASA building and operating its own moon landers.

Thomas Zurbuchen, the former associate administrator for science at NASA who started the CLPS program in 2018, said the space agency expected half of the CLPS missions to fail and he repeatedly told Congress, scientists and the companies to expect that. But even if half of the commercial missions fail, NASA would still come out ahead, because a traditional mission costs \$500 million to \$1 billion, Zurbuchen said, while on a CLPS mission, NASA is paying a company about \$100 million to fly its payloads. **THE NYT**

ODYSSEUS SPACECRAFT Syllabus GS Paper 3 – Sci and Tech)

Context: A robotic lunar lander recently launched into space; if all goes well, on February 22, it will mark the first time an American spacecraft has gently landed on the Moon's surface since the Apollo 17 moon landing in 1972.

- It would also become the **first private effort** to reach the surface of the Moon in one piece. Three earlier attempts, by an American company, a Japanese company and an Israeli nonprofit, failed.

Odysseus Spacecraft

- **About:** The spacecraft launched by SpaceX was named Odysseus after a contest among employees of Intuitive Machines of Houston.
- **Inspiration Source:** The engineer who proposed the name, drew inspiration from the travels of the hero of *Odyssey*, the ancient Greek epic poem.
- **Apt Analogy:** Engineer highlighted that the journey of Odysseus in the epic poem parallels the challenges, setbacks, and delays of the lunar mission.
- **Journey Comparison:** It emphasized that like Odysseus, the spacecraft faces numerous challenges akin to traversing the daunting, wine-dark sea.
- **Endurance and Success:** Despite the trials, Odysseus in the epic poem proves worthy and successfully completes his journey, which parallels the mission's goal of "sticking the landing" after 10 years of development and challenges.

Significance

- **Cost-Effective:** Private companies achieve lunar exploration at a fraction of NASA's costs.
- **Odysseus Lander:** Odysseus lander arrives in Houston on February 1, 2023.
 - Risk of financial loss for NASA in case of mission failure due to a crash.
- **Challenges in Commercial Lunar Missions:** Astrobotic Technology's Peregrine mission faced technical malfunction. CLPS program includes missions by private companies Odysseus and Peregrine.
- **Expectations and Cost Savings in CLPS Program:** Thomas Zurbuchen initiates the CLPS program at NASA in 2018.
 - Anticipates a 50% failure rate in CLPS missions.
 - Despite failures, CLPS missions offer significant cost savings compared to traditional NASA missions.

Financial assistance for rubber sector raised by 23% to Rs 708.69 crore for FY24-25 and FY25-26

Context: The financial assistance for the Rubber sector under the ‘Sustainable & Inclusive Development of Natural Rubber Sector’ has been increased by 23% from Rs 576.41 crore to Rs 708.69 crore for the next 2 financial years (2024-25 and 2025-26).

Rubber Producing Regions in India

- **Cultivation Statistics:** In India, 8.5 lakh hectares are under rubber cultivation.
- **Regional Breakdown:** Kerala and Kanyakumari district of Tamil Nadu contribute almost 5 lakh hectares, with 1 lakh hectares in Tripura.
 - Northeastern states, especially Tripura and Assam, account for over 16% of total production.
- **Global Distribution:** Thailand, Indonesia, Malaysia, Vietnam, Nigeria, and Brazil.
- **Three Zones of Rubber Cultivation**
 - **Traditional region:** Kerala state and Kanyakumari District of Tamil Nadu.
 - **Non-traditional region:** All states other than Kerala and Kanyakumari District and North East region.
 - **Northeastern region:** Assam, Tripura, Meghalaya, Nagaland, Manipur, Mizoram, and Arunachal Pradesh.

Climate requirements

- **Soil and climate:** It requires **deep and lateritic fertile** soil with an acidic pH of 4.5 to 6.0 and highly deficient in available phosphorous.
 - Tropical climate **with annual rainfall of 2000 – 4500 mm** is suited for cultivation.
 - Minimum and maximum temperature should be **ranged from 25 to 34°C** with 80 % relative humidity is ideal for cultivation.
 - Regions **prone to heavy winds** should be avoided.
- **Season:** June – July is optimum for cultivation.
- **Method of propagation:** Propagated by **green budding, brown budding and crown budding**.

Rubber

- **About: Rubber**, also called **latex**, as initially produced, consists of **polymers of the organic compound isoprene**, with minor impurities of other organic compounds.
- India is the **third largest producer, fourth largest consumer of natural rubber and fifth largest consumer of natural rubber and synthetic rubber together** in the world.
- The share of synthetic rubber in total rubber consumption in India is **around 30%** while the world average is 65%.

Scientists shocked to discover new species of green anaconda, the world's biggest snake

Context: The green anaconda has long been considered one of the Amazon's most formidable and mysterious animals. New research upends scientific understanding of this magnificent creature, revealing it is actually two genetically different species.

Green Anaconda

- **Historical Recognition of Anaconda Species:** Historically, four anaconda species have been recognized, including green anacondas, also known as giant anacondas.
- **Behemoths of the Reptile World:** Green anacondas are true behemoths, with the largest females growing to over seven meters long and weighing more than 250 kilograms.
 - Adapted to aquatic life, their nostrils and eyes are located on top of their head, allowing them to see and breathe while submerged. Their olive-colored bodies with large black spots help them blend into their surroundings.
- **Inhabiting South America's Waterways:** It inhabit the lush waterways of South America's Amazon and Orinoco basins, known for their stealth, patience, and surprising agility.
- **Non-venomous Predators:** Green anacondas are not venomous; they rely on their large, flexible jaws and strong bodies to take down prey before swallowing them whole.

Conservation Strategies and Importance

- **Maintaining Ecosystem Balance:** As apex predators, green anacondas play a vital role in maintaining ecosystem balance by influencing the behavior of other species in their habitats.
- Their presence alters the foraging, breeding, and migration patterns of various species, highlighting their ecological importance.
- **Sensitivity to Environmental Change:** Green anacondas are highly sensitive to environmental changes; healthy anaconda populations indicate vibrant ecosystems with ample food resources and clean water.



National Council for Transgender Persons (NCTP) to hold a meeting today at DAIC, New Delhi

Context: A significant third meeting of the National Council for Transgender Persons (NCTP) is recently scheduled to take place in New Delhi.

National Council for Transgender Persons (NCTP)

- **About:** It is a statutory body constituted under the **Transgender Persons (Protection of Rights) Act 2019** to safeguard the rights of transgender persons in India.
- **Aim:** To focus on livelihood issues and raise awareness about the trans community to achieve the goal of social justice, ensuring acceptance within families and in the larger society.
- **Responsibilities of the NCTP:** Monitoring and evaluating the implementation of the provisions of the Transgender Persons (Protection of Rights) Act, 2019 and making recommendations to the government on measures to promote and protect the rights of transgender persons.
- **Composition:** Chairperson: Union Minister of the Ministry of Social Justice and Empowerment.
 - One representative each from five states or union territories, from east, west, north, south, and northeast zones. They will be appointed on a rotational basis.

Functions of the National Council for Transgender Persons

- **Advisory Role:** The committee's primary function is to offer the Central Government guidance on formulating policies, programs, laws, and initiatives affecting transgender individuals.
- **Monitoring and Evaluation:** It monitors and evaluates the outcomes of laws and programs designed to achieve full equality and inclusion for transgender individuals.
- **Coordination and Assessment:** It coordinates and assesses the endeavors of various government agencies, alongside non-government organizations, in tackling transgender issues.
- **Issue Resolution:** The committee focuses on resolving problems specifically concerning transgender individuals.

Can the Public Examinations Act stop question paper leaks?

The government has brought in the Public Examinations (Prevention of Unfair Means) Act, 2024, to curb increasing instances of question paper leaks and other malpractices in recruitment examinations.

Banasree Purkayastha looks at whether the stiffer penalties can be an effective deterrent



₹1 crore
minimum fine
for those involved in
organised crimes
of cheating

5-10 years
jail sentence
in cases of organised
paper leaks by a
group of people

5
central public
examination authorities
— UPSC, SSC, NTA, RRB,
IBPS — listed under the Act

● Objective of the Public Examinations Act

THE NEWLY ENACTED Public Examinations (Prevention of Unfair Means) Act, 2024, aims to prevent use of "unfair means" in public examinations and bring greater transparency, fairness and credibility to government recruitment exams. Examinations conducted by the Union Public Service Commission (UPSC), Staff Selection Commission (SSC), Railway Recruitment Boards (RRB), Institute of Banking Personnel Selection (IBPS), ministries or departments of the

central government and their attached and subordinate offices for recruitment of staff, National Testing Agency or any other authority as may be notified by the central government are covered under this anti-cheating law. The Act seeks to check practices such as leakage of question paper or answer key, directly or indirectly assisting the candidate and tampering with the computer network through imposition of stiff fines and jail sentences.

● Punishments under the new law

THE PUBLIC EXAMINATIONS (Prevention of Unfair Means) Act aims to curb examination malpractices by deterring individuals, organised groups or institutions that indulge in various unfair means and adversely impact the public examination systems for monetary or wrongful gains. It does not impose penalties directly on candidates who resort to unfair means; they will be punished on the basis of the rules set forth by their respective examination authorities. The Act mandates a minimum three to

five years of imprisonment for cases of paper leaks. In case of organised crimes, the accused can be sentenced to 5-10 years in jail, and a minimum fine of ₹1 crore imposed. For service provider firms which conduct examinations, a fine of up to ₹3 crore, and recovery of proportionate cost of examination have been proposed as punishment. Such firms will also be barred from conducting a public examination for four years. All the offences will be cognisable, non-bailable and non-compoundable.

● Paper leaks rampant in public exams

THE ENACTMENT OF the anti-cheating law may be interpreted as a response to the increasing number of exam cancellations due to question paper leaks. Question paper leaks in government recruitment examinations are rampant across India, especially in states such as Bihar, Uttar Pradesh, Rajasthan and Jharkhand. According to a report in *The Indian Express*,

question paper leaks in recruitment exams across 15 states affected 1.4 crore job applicants applying for over 1.04 lakh posts in the last five years. Over 4.1 instances of paper leaks in exams for government jobs have been documented during this period. Of these, the maximum number of candidates affected was from Rajasthan, followed by Bihar.

● State laws fail to curb malpractices

IN RECENT YEARS several states have enacted laws to curb cheating in examinations, especially those for recruitment in public service commissions. In 2023, Uttarakhand, Jharkhand and Gujarat passed laws to penalise cheating in public examinations. Rajasthan (Act passed in 2022), Uttar Pradesh (Act passed in 1998) and Andhra Pradesh (Act passed in 1997) also have similar laws.

However, the repeated scams indicate that existing laws have not been able to prevent examination malpractices with not just coaching centres or private individuals indulging in them, but senior government officials also hand-in-glove with them. For instance, only this month, Ranchi Police arrested an undersecretary of the Jharkhand assembly, in connection with the paper leak case of the Jharkhand Staff Selection Commission (JSSC)

Combined Graduate Level (CGL) examination held in January. Offenders remain one step ahead using inventive means to circumvent the system - from Bluetooth devices to taking the help of ChatGPT to answer questions in the examination hall as in the Telangana State Public Service Commission (TSPSC) exam paper leak case in March 2023. The decision to establish a national technical committee on public examinations to enhance the security of computerised examination processes, under this new law, is, therefore, a welcome step. This committee will also develop protocols to safeguard digital platforms, devising foolproof IT security systems, ensuring electronic surveillance of examination centres, and formulating national standards for physical and IT infrastructure utilised in such examinations.

Context: The government has brought in the Public Examinations (Prevention of Unfair Means) Act, 2024, to curb increasing instances of question paper leaks and other malpractices in recruitment examinations.

Public Examinations (Prevention of Unfair Means) Act, 2024

• **About:** The Bill seeks to prevent use of unfair means in public examinations. Public examinations refer to examinations conducted by authorities specified under the Schedule to the Bill, or notified by the central government.

Punishments under the new law

- Persons committing an organised crime will be punished with imprisonment between five years and 10 years, and a fine of at least one crore rupees.
- If an institution is held guilty of committing an organised crime, its property will be attached and forfeited, and a proportionate cost of the examination will also be recovered from it.
- **Nature of Offences:** All offences under the Act are cognisable, non-bailable, and non-compoundable.

Objective of Act

- **Prevention of Unfair Means:** The newly enacted Public Examinations (Prevention of Unfair Means) Act, 2024, targets the prevention of the use of "unfair means" in public examinations.
 - It aims to eliminate cheating practices and ensure fairness, transparency, and credibility in government recruitment exams.
- **Coverage of Examinations:** Union Public Service Commission (UPSC), Staff Selection Commission (SSC), Railway Recruitment Boards (RRB), Institute of Banking Personnel Selection (BPS), and ministries or departments of the central government are covered under this act.
- **Measures Against Unfair Practices:** The Act targets specific unfair practices such as the leakage of question papers or answer keys.
 - It also addresses issues like direct or indirect assistance to candidates and tampering with computer networks during examinations.
- **Responsibilities of service providers:** In the event of violation of provisions of the Bill, service providers must report to the police and the concerned examination authority. A service provider is an organisation that provides computer resources or any other support to a public examination authority.

India hosts Milan naval exercise



The exercise began with arrival of 15 warships and one maritime patrol aircraft. PTI

India on Monday kick-started a nine-day mega naval exercise in Visakhapatnam with participation of around 50 navies that came amid the fractious geopolitical environment including growing global concerns over deteriorating security situation in the Red Sea.

Navies from the US, Japan, Australia, France, Bangladesh, South Korea, Vietnam, Indonesia and Malaysia, among others, are participating in the 12th edition of the 'Milan' exercise that is aiming to bolster maritime cooperation among like-minded nations.

The exercise commenced with the arrival of 15 warships and one maritime patrol aircraft from friendly foreign countries.

From the Indian Navy, nearly 20 ships including aircraft carriers Vikrant and Vikramaditya and nearly 50 aircraft including MiG 29K, Light Combat Aircraft Tejas and P-8I long-range maritime reconnaissance and anti-submarine warfare aircraft are participating in the exercise. Milan is a biennial multinational naval exercise which started in 1995 with the participation of Indonesia, Singapore, Sri Lanka and Thailand in consonance with India's 'Look East' policy. PTI

Visakhapatnam

- **About:** The city is situated **between the Eastern Ghats and the Bay of Bengal**.
- **Situated:** In Coastal Andhra Region.
- **Boundaries by:**
 - Simhachalam Hill Range to the west
 - Yarada Hills to the southeast

Context: Recently, India commenced a nine-day mega naval exercise in Visakhapatnam, featuring the participation of approximately 50 navies, amidst the fractious geopolitical landscape, which includes mounting global apprehensions regarding the deteriorating security situation in the Red Sea.

Exercise MILAN

- **About:** The Flagship event, MILAN, is a **biennial multilateral** naval exercise.
 - **Initiated by:** The Indian Navy in 1995.
 - Originally aligned with India's 'Look East Policy,' MILAN has expanded over the years to include participation from **Friendly Foreign Countries (FFCs)** due to the 'Act East policy' and PM of India **Security and Growth for All in the Region (SAGAR) initiative**.
 - **Participants:** Navies from the US, Japan, Australia, France, Bangladesh, South Korea, Vietnam, Indonesia and Malaysia, among others.
 - **Aim:** To strengthen regional cooperation and maritime security, foster interoperability and understanding between participating navies and provide a platform for sharing best practices and expertise.
- ### Other Naval Exercise
- **CORPAT** - India and Thailand
 - **JIMEX** - India and Japan
 - **Konkan Shakti** - India and UK
 - **Samudra Shakti** - India and Indonesia
 - **SIMBEX** - India and Singapore

Forest department's sporting gesture aims at saving tigers and preventing forest fires

Context: The ongoing Kula Mama Volleyball Tournament-2024 in Melghat Tiger Reserve's (MTR) Semadoh sends a strong message to save tigers and the pristine forest with involvement of local youths.

Melghat Tiger Reserve

- **Location:** It is located on the southern offshoot of the Satpura Hill Range in Central India, called Gavilgarh Hill.
- **Established as a wildlife sanctuary in:** 1967 and was declared a tiger reserve in 1974.
 - It was the **first tiger reserve in Maharashtra**.
 - It was among the **first nine tiger reserves notified in 1973-74 under Project Tiger**.
 - The name 'Melghat' means the confluence of various 'ghats' or valleys, as is typical from the landscape of this tiger Reserve.
- **Vegetation:** Tropical dry deciduous in nature, dominated by teak.
- **Rivers:** The Khandu, Khapra, Sipna, Gadga, and Dolar, all of which are tributaries of the river Tapti.
 - The Tapti River and the Gawilgadhi ridge of the Satpura Range form the boundaries of the reserve.
- **Tribes:** The Korkus are the largest tribal community in Melghat. Other communities include the Gawli community, the Gond tribe, and several other smaller tribal communities.
- **Flora:** Teak, Lagerstroemia Parviflora, Terminalia Tomentosa, Ougeinia Oojeinensis, Emblica Officinalis, Bamboo, etc.
- **Fauna:** Apart from Tigers, the other prominent animals are Sloth Bear, Indian Gaur, Sambar deer, Leopard, Nilgais, dhole, hyena, jungle cat, langur, etc.
 - It is considered a stronghold of the critically endangered forest owl.

AMITABH SINHA
NEW DELHI, FEBRUARY 19

MONSOON RAINFALL over India is known to be strongly influenced by El Niño and La Niña events, the alternating warming and cooling of the eastern Pacific Ocean that impacts weather across the world. A new study by Indian researchers has now suggested that even air quality in the country could be influenced by the two events.

The study, by researchers at the Bengaluru-based National Institute of Advanced Studies and Pune-based Indian Institute of Tropical Meteorology, has argued that the unusual air quality in some Indian cities in the winter of 2022 could be attributed to the record-breaking spell of La Nina prevailing at that time. This is the first time that air quality in Indian cities has been linked to a La Nina event – and indirectly to climate change, which is making El Nino and La Nina more severe.

What happened

During October to January, northern Indian cities, particularly Delhi, experience very high concentrations of PM_{2.5}. A variety of meteorological factors – temperature, moisture, heaviness in air, wind speed and direction – play a role in trapping pollutants in the lower levels of the atmosphere.

These factors are also responsible for transporting pollutants from other regions, particularly those generated by agriculture waste burning in Punjab and Haryana, to Delhi and adjoining areas.

The western and southern parts of the country have always had relatively lower levels of pollution, because of their proximity to oceans.

The winter of 2022, however, showed a significant deviation from this normal. Northern Indian cities, including Delhi, were cleaner than usual, while cities in the west and the south, like Mumbai, Bengaluru and Chennai, experienced worse-than-usual air quality.

The study said PM2.5 concentrations in Ghaziabad that winter saw a reduction of about 33 per cent from normal, while in Noida, the concentration was 28 per cent below normal. Delhi saw a reduction of about 10 per cent. Simultaneously, the concentrations in Mumbai rose by 30 per cent, while Bengaluru registered a 20 per cent rise.

It was this anomalous behaviour that the researchers had set out to study when they

South Mumbai engulfed in smog and haze on December 16, 2022. Mumbai saw unusually poor air quality that winter. *Express Archive*

found themselves led to the possible effects of La Niña. Delhi and further into the Gangetic plain. This is one of the main reasons why arid

Wind direction

The most crucial factor in explaining the anomaly of winter 2022 was a change in the normal wind direction. During this time,

wind usually blows in the northwesterly direction: for example, from Punjab towards

southern regions (see map)

"There was no change in the local sources of emissions in Delhi and Mumbai. But the additional pollutant load from the northern states, which usually lands in Delhi and surrounding areas, moved in a different trajectory and reached peninsular India, some landing in Mumbai as well," explained Gauran Beig, the lead researcher and one of the leading air pollution experts in the country.

The local circulation of wind near Mumbai also had an anomalous behaviour that year. Wind currents alternate between blowing from the land to the sea every few days. When blowing from the land towards the sea, the winds carry pollutants out of the city. In 2022, however, instead of changing direction every four to five days, the winds persisted in one direction for more than a week or 10 days, leading to greater accumulation of pollutants in Mumbai.

La Nina and climate change

Beig said the wind behaviour in both cases had something to do with the extended La Nina which, by the winter of 2022, had been persisting for an unusually long three years.

“Where used the global air circulation data as a result of La Nina in our computer models, we found the emergence of wind patterns over the Indian region that were very similar to the observed changes. When we ran the models with data from previous years, when a strong La Nina was not present, these anomalous wind patterns disappeared. It showed a strong sensitivity to La Nina conditions,” Beig said.

Beig said not only La Nina events might produce noticeable changes in wind circulation over the Indian Ocean, but also a particularly strong event. And the impact on air circulation became evident only in the third year of La Nina. So, there may be a cumulative effect,” he said.

He said it was not yet entirely clear whether El Nino would produce an opposite effect for air quality over India.

The study did add that changes in wind patterns were not the only reasons for the unusual trends in air quality that year. It mentioned local meteorological conditions, unrelated to La Niña, that could also have resulted in the reduction of pollutant concentrations over northern India.

LONGER VERSION ON
indianexpress.com/expained

- A new study by Indian researchers has now suggested that even air quality in the country could be influenced by the two weather events.

- **The study conducted by:** National Institute of Advanced Studies in Bengaluru and the Indian Institute of Tropical Meteorology in Pune

- **It suggests:** A correlation between the unusual air quality in select Indian cities during the winter of 2022 and the record-breaking La Nina event that occurred during that time.
- **First-Time Association with La Nina:** This marks the first instance where the air quality in Indian cities has been linked to a La Nina event, thereby indirectly implicating climate change, which exacerbates the severity of both El Nino and La Nina phenomena.
- **PM2.5 Concentration Variations:** According to the study, PM2.5 concentrations in Ghaziabad during that winter exhibited a reduction of approximately 33% from the norm, while Noida experienced a decrease of 28% below average.
- **Anomalous Behavior Prompting Study:** The anomalous behavior of air quality in various Indian cities during the specified period prompted the researchers to investigate further, eventually leading them to explore the potential impacts of the La Nina phenomenon.

- **Change in Wind Direction**: The most crucial factor in explaining the anomaly of winter 2022 was a change in the normal wind direction.
 - During typical winters, wind predominantly blows in the northwesterly direction, such as from Punjab towards Delhi and onward into the Gangetic plains.
- **North-South Wind Circulation in Winter 2022**: In the winter of 2022, the wind circulation deviated from its usual north-westerly pattern.
- **Altered Pollution Route**: Due to the north-south wind circulation pattern in winter 2022, pollutants from Punjab and Haryana took a different route.
 - They travelled over Rajasthan and Gujarat and extended into southern regions, altering the usual dispersion patterns of pollutants during the winter months.

Cambodia aims to import Indian tigers to up big-cat numbers

Cambodia hopes to import four tigers from India this year under an agreement signed with New Delhi aimed at reviving the population of big cats in the kingdom, an environmental official said on Monday. Cambodia's dry forests were once home to scores of Indochinese tigers but conservationists say intensive poaching of both tigers and their prey has devastated their numbers.

The last sighting of a tiger in the Southeast Asian kingdom was from a camera trap in 2007 and the cats were declared "functionally extinct" in Cambodia in 2016. One male and three female tigers "could arrive in Cambodia at the end of 2024", Khvay Atitya, spokesman for the environment ministry, told AFP.

The cats will be sent to a 90-hectare forest inside the Tatai Wildlife Sanctuary in western Koh Kong province to acclimatize before being released into the wild, he said. He did not give details about what type of tiger would be imported from India.



Cambodia hopes to import four tigers from India in 2024 under an agreement signed with New Delhi, an official said.

Context: Cambodia hopes to import four tigers from India this year under an agreement signed with New Delhi aimed at reviving the population of big cats in the kingdom.

- The last sighting of a tiger in the Southeast Asian kingdom was from a camera trap in 2007 and the cats were declared "functionally extinct" in Cambodia in 2016.

Cambodia

- **About:** It is a country on the Indochinese mainland of Southeast Asia.
- **Capital:** Phnom Penh
- **Location:** Cambodia lies entirely within the tropics, between latitudes 10° and 15°N, and longitudes 102° and 108°E.
- **Border:** It borders Thailand to the north and west, Laos to the northeast, and Vietnam to the east and southeast.
- **Coastline:** It has a 443-kilometer coastline along the Gulf of Thailand.
- **Geology:** Cambodia's landscape is characterized by a low-lying central plain that is surrounded by uplands and low mountains and includes the Tonle Sap (Great Lake) and the upper reaches of the Mekong River delta.
- **Geographical Features**
 - Cambodia's main geographical features are the low-lying Central Plain that includes the Tonlé Sap basin, the lower Mekong River floodplains and the Bassac River plain surrounded by mountain ranges to the north, east, in south-west and south.
 - The landmass is bisected by the Mekong River, which is the longest river in Cambodia.

How did tigers go extinct in Cambodia?

- **Habitat Destruction and Poaching:** As forests were cut down for development activities and as human habitats extended into forests, the tiger's habitat came under stress.
- **Illegal Wildlife Trade:** According to the World Wildlife Fund (WWF), "Every part of the tiger—from whisker to tail—has been found in illegal wildlife markets.
- **Thirteen countries make up the tiger range of the world:** Bangladesh, Bhutan, China, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam.

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