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The outgoing year is set to be the warmest ever recorded, capping a decade of unprecedented heat. AP

2024 experienced extreme effects of climate change: UN

Agence France-Presse

GENEVA

Climate change sparked a trail of extreme weather and record heat in 2024, the United Nations said on Monday, urging the world to pull back from the “road to ruin”.

The outgoing year is set to be the warmest ever recorded, the UN’s weather and climate agency said, capping a decade of unprecedented heat.

Meanwhile emissions of greenhouse gases grew to new record highs, locking in more heat for the future, the World Meteorological Organization (WMO) said.

“Climate change plays out before our eyes on an almost daily basis in the form of increased occurrence and impact of extreme weather events,” WMO secretary general Celeste Saulo said. “This year we saw record-breaking rainfall and flooding events and terrible loss of life in so many countries, causing heartbreak to communities on every continent”.

In November, the WMO said the January-September mean surface air temperature was 1.54C above the pre-industrial average measured between 1850 and 1900. That puts 2024 comfortably on course to surpass the record set in 2023.

The WMO is set to publish the consolidated global temperature figure for 2024 in January, with its full State of the Global Climate 2024 report to follow in March.

In his New Year message, UN Secretary-General Antonio Guterres reflected on the record temperatures witnessed over the past decade.

“This is climate breakdown in real time. We must exit this road to ruin – and we have no time to lose,” he said.



On India's obligations towards the Rohingya

What has a recent report by The Azadi Project and Refugees International said about India's refugee policy for the Rohingya people? How many Rohingya refugees reside in India? What does the 1951 Refugee Convention state? Does India have a domestic refugee law?

EXPLAINER

Aaratrika Bhaumik

The story so far:

A recent study examining the plight of Rohingya refugees detained in India, conducted jointly by The Azadi Project and Refugees International has highlighted "gross violations of constitutional and human rights" and criticised India's "failure to uphold its obligations under international human rights treaties." Based on interviews with detainees, their families, and legal representatives, the report reveals that "a significant number of Rohingya refugees continue to be incarcerated even after serving their prescribed sentences."

How are Rohingya refugees protected under international law?

The Rohingya people of Myanmar constitute the world's largest stateless population, estimated to number approximately 2.8 million. Denied citizenship and subjected to decades of persecution by Myanmar's authorities, majority of the Rohingya have been compelled to flee their homeland due to genocidal violence. At present, they are dispersed across multiple countries. According to the United Nations High Commissioner for Refugees (UNHCR), nearly 22,500 Rohingya refugees currently reside in India.

The 1951 Refugee Convention and its 1967 Protocol enshrine the principle of non-refoulement, which prohibits States from expelling individuals under their jurisdiction when substantial evidence suggests they would face persecution, torture, or other severe human rights violations upon return. This principle is a cornerstone of human rights, humanitarian, and refugee law. Moreover, its status as customary international law imposes binding obligations on states regardless of formal assent. The Office of the United Nations High Commissioner for Human Rights has reiterated that "the principle is characterised by its absolute nature without any exception". Additionally, in a 2007 advisory opinion, the UNHCR affirmed that non-refoulement constitutes customary law and is binding on all states, including those not parties to the Refugee Convention or the 1967 Protocol.

What is India's stand?

As India is neither a signatory to the Refugee Convention nor a party to key international instruments, such as the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment and the International Convention for the Protection of All Persons from Enforced Disappearance, it maintains that it bears no legal obligation to provide asylum or adhere to the principle of non-refoulement. India continues to detain Rohingya refugees under archaic domestic legal frameworks, notably the Foreigners Act, 1946, and the Passport Act, 1967. These legislations confer sweeping executive powers to regulate the presence of foreigners and enable authorities to categorise Rohingya refugees as "illegal migrants."

In response to a public interest litigation (PIL) in the Supreme Court seeking the release of detained Rohingya refugees, the Centre clarified in March that while they are entitled to the right to life under Article 21 of the Constitution, they do not possess the right to reside or settle in India. In 2021, the top court in *Mohammad Saifullah and Anr. versus Union of India*, rejected a plea to prevent



Substitute living: A general view of Rohingya camps area near Shaheen Bagh in New Delhi on December 12. SHASHI SHIKHAR KASHYAP

the deportation of 170 Rohingya refugees detained in Srinagar accepting the Centre's national security concerns.

In October 2024, the Delhi High Court dismissed a PIL seeking directions to the authorities to admit Rohingya refugee children in local schools. The court noted that the matter involved international implications and required a policy decision to be taken by the government.

What are India's international obligations?

The International Covenant on Civil and Political Rights, to which India is a party, implicitly obligates member states under Article 7 to refrain from refouling individuals to places where they may face torture or cruel, inhuman, or degrading treatment. The UN Human Rights Committee has unequivocally affirmed this interpretation. Similarly, the principle of non-refoulement is enshrined in other significant international instruments, including the International Convention on the Elimination of All Forms of Racial Discrimination and the Convention on the Rights of the Child, both of which India has ratified.

Further, the Convention Against Torture makes an express mention of non-refoulement under Article 3. While India's position as a signatory but not a ratifier renders its provisions non-binding, any deviation from the

convention's principles would compromise the commitment India demonstrated by signing the treaty.

Although India lacks a domestic refugee law, the Supreme Court in landmark rulings such as *Vishaka & Ors. versus State of Rajasthan* (1997) and *National Legal Services Authority versus Union of India* (2014), has affirmed that in the absence of domestic legislation on a matter, international conventions and norms must be applied by municipal courts to ensure the dignity of human life. Additionally, Article 51(c) of the Constitution mandates that the state must strive to promote respect for international law and treaty obligations.

Several High Courts in India have also interpreted the principle of non-refoulement as integral to Article 21 of the Constitution, which guarantees the right to life and personal liberty. Notable examples include the Gujarat High Court's decision in *Kaer Abbas Habib Al Qutabi versus Union of India* (1998) and the Delhi High Court's ruling in *Dough Lion Kham versus Union of India* (2015), both of which involved refugees from different countries seeking protection from deportation.

What are the existing concerns?

The absence of a standardised refugee policy has led to the disparate treatment of different refugee populations, driven

by India's shifting geopolitical and diplomatic interests. While groups such as the Tibetans, Sri Lankans, and Afghans are granted refugee certificates or long-term visas by the government, most Rohingya refugees – despite being registered with the UNHCR – often face arbitrary detention and criminal imprisonment. Further, the controversial Citizenship Amendment Act, 2019, excludes persecuted Muslim minorities, such as the Rohingya, from its ambit.

The lack of legal representation and aid for detained Rohingya refugees also poses a severe concern. The report by Azadi Project and Refugees International highlights that civil society organisations working on behalf of Rohingya refugees in India are starved of funding as most Foreign Contribution (Regulation) Act licences that allow for the receipt of foreign funding have been revoked. This has made lawyers reluctant to take on cases involving the Rohingya, fearing potential repercussions.

Moreover, detention centres housing Rohingya refugees, including pregnant women and children, are plagued by dehumanising living conditions. In light of the appalling conditions at the Mata Transit Camp, the Supreme Court in October, directed the Assam State Legal Services to conduct surprise visits and evaluate the conditions in which the refugees are living.

THE GIST

A recent study examining the plight of Rohingya refugees detained in India, conducted jointly by The Azadi Project and Refugees International has highlighted "gross violations of constitutional and human rights" and criticised India's "failure to uphold its obligations under international human rights treaties."

As India is neither a signatory to the Refugee Convention nor a party to key international instruments, it maintains that it bears no legal obligation to provide asylum or adhere to the principle of non-refoulement.

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Women electors turned out more than men in LS polls

Out-migration could possibly explain the anomaly of lower male turnout in States like Bihar in the 2024 polls

DATA POINT

Vignesh Radhakrishnan
Srinivasan Ramani

The Election Commission (EC) has released granular data for the 2024 Lok Sabha elections recently. As **Chart 1** shows, the gap between male and female turnouts was narrowing in recent elections, before female electors' turnout surpassed that of men in the 2019 and now, the 2024 elections. The difference between the turnout increased from 0.16 to 0.23 points from the 2019 to the 2024 elections.

Chart 2 shows that in 15 out of the 28 major States and U.T.s, female turnout surpassed that of men, while in the rest, it was the opposite. The gender difference in turnout was highest in Bihar, even as the overall turnout was relatively low. Bihar apart, Jharkhand and Uttarakhand also experienced higher female turnout relative to males. Among States with high turnout, Arunachal Pradesh, Meghalaya, Manipur, and West Bengal had higher female turnout compared to males. In States with moderate turnout, Odisha, Kerala, and Himachal Pradesh had a similar gender divide in turnout.

The situation was the opposite in Gujarat, Maharashtra, Jammu & Kashmir, and Rajasthan, where overall turnout was lower relative to the rest of the country, and male turnout surpassed that of females. In States with moderate turnout, Haryana, Madhya Pradesh, Telangana, Chhattisgarh, and Karnataka had higher turnout among men. In others, the gender difference in turnout was not that high.

Looking at turnouts alone would paint an incomplete picture. We need to see female turnout relative to the electorate. If a State has a skewed electorate with higher composition of men, a relatively higher turnout among women could still mean that men turned out more because of the

latter's higher electorate numbers.

Chart 3 plots the ratio of female to male electors (eligible voters) against the ratio of female to male voters (absolute numbers of those who turned out). Bihar stands out among States that had a higher female-to-male (voters) ratio despite having a lower female-to-male electorate ratio. This means that in Bihar, more women turned out to vote than men in absolute numbers even though there were more registered male electors than women. Jharkhand and Himachal Pradesh also come under this category but the difference between these ratios is less stark compared to Bihar.

In States like Tamil Nadu, Kerala, and Andhra Pradesh, more women were eligible to vote compared to men, while in the rest, it was the opposite. The gender difference in turnout was highest in Bihar, even as the overall turnout was relatively low. Bihar apart, Jharkhand and Uttarakhand also experienced higher female turnout relative to males. Among States with high turnout, Arunachal Pradesh, Meghalaya, Manipur, and West Bengal had higher female turnout compared to males. In States with moderate turnout, Odisha, Kerala, and Himachal Pradesh had a similar gender divide in turnout.

The situation was the opposite in States like Gujarat, and Madhya Pradesh among others where female voters were outnumbered by male voters as there were more registered male electors than women.

What could explain the drastic difference in female and male voting in States like Bihar and Jharkhand? The reasons could be political factors (which motivate more women to vote) or structural factors such as the migration of male workers to other States and their inability to return to their home States to vote despite being registered as voters there.

Table 4 looks at the top 10 common sources and destinations of migrant workers who used unreserved tickets to travel to other States in 2023. Note how Bihar features in four entries among the top 10 sources and the fact that there are two States/U.T. destinations for Bihar's migrants which are not neighbouring States/U.T.s.

Out-migration seems a possible reason for lower male turnout in States like Bihar. Establishing this fact might require more granular data processing beyond the scope of this article.

Making her presence felt

The data for the charts were sourced from the Election Commission and the Economic Advisory Council to the Prime Minister (EAC-PM)

Chart 1: The chart shows the difference between female and male voter turnouts across Lok Sabha polls in % points

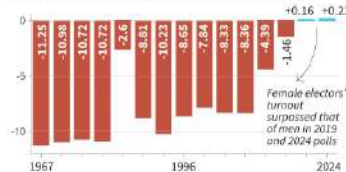
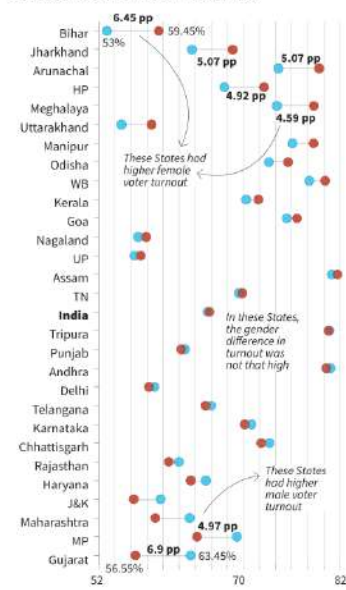


Chart 2: The chart shows the male and female voter turnout in the 2024 Lok Sabha elections in %. If the male is to the right, female voter turnout was higher and vice-versa. The bigger the gap between circles, the higher the gender difference in turnout. Difference is denoted in % points (pp)



Getting inked: Female voters in Karakat in Bihar after voting in the Lok Sabha polls

Chart 3: The ratio of female to male electors (eligible voters, X axis) against the ratio of female to male voters (absolute numbers of those who turned out, Y axis)

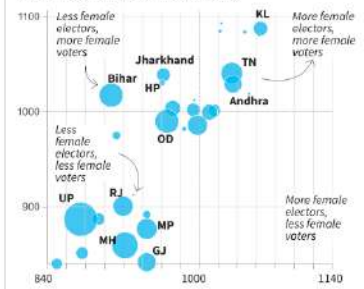


Table 4: The top 10 common sources and destinations of migrant workers who used unreserved tickets to travel to other States in 2023

Sources	Destination
UP	Delhi
Gujarat	Maharashtra
Telangana	Andhra
Bihar	Delhi
Bihar	WB
Bihar	UP
UP	Maharashtra
Bihar	Maharashtra
Andhra	Karnataka
Jharkhand	Bihar

Table 5: The table shows the five seats in which the difference between the female and male turnout was the most and the five seats in which it was the least

State	Seat	Male v%	Female v%	Difference
Jharkhand	Kodarma	54.02	70.01	+15.99
West Bengal	Jangipur	68.75	82.75	+14
Bihar	Supaul	56.94	70.56	+13.62
Bihar	Madhubani	46.58	60.07	+13.49
Bihar	Jhanjharpur	48.08	61.38	+13.3
All India		65.55	65.78	+0.23
Gujarat	Rajkot	64.49	54.5	-9.99
J&K	Srinagar	43.71	33.22	-10.49
Gujarat	Kheda	63.34	52.61	-10.73
Gujarat	Jamnagar	62.97	52.02	-10.95
Gujarat	Porbandar	57.14	46.1	-11.04



UPI duopoly's rise and market vulnerabilities

The rise of Unified Payments Interface (UPI) in the eight years since its launch has been meteoric, with the UPI ecosystem now accounting for nearly eight in every 10 digital transactions in India, with a value of over ₹20.60 lakh crore in August of this year alone.

This success, however, is no small feat for a country like India, which is characterised by low digital literacy and a historic reliance on cash, and is deeply reflective of the critical role UPI has played in fostering public trust in digital payments.

UPI's continued success will heavily depend on whether its ecosystem can maintain and build upon such public trust, which will, in turn, depend on the ecosystem's performance on metrics such as resilience, reliability, and openness to innovation. This is particularly important as UPI's penetration remains at 30% of the population, which is impressive for a new payments technology, but shows how much of India remains to be brought into the digital payments fold. Achieving this will require substantially new innovations in everything from service offerings to app design and the overall product base of the UPI ecosystem to make it relevant for the remaining 70% of the country.

A major hindrance is the extreme market concentration of two Third Party App Providers (TPAPs) in the UPI network – Phone Pe and Google Pay. Together, they control over 85% of the total market share, whereas the next biggest player, Paytm, controls merely 7.2%.

Major risks

The emergence of a duopoly, especially a foreign-owned one, at a relatively early stage in the UPI ecosystem creates three major risks. The first is the increased systemic vulnerability. High market concentration in the payments space can lead to single points of failure, where any



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Under the right conditions and with the right incentives, the UPI ecosystem has every potential to offer smaller market participants a level playing field

sudden stoppage or break in services can have ripple effects across the entire financial structure. Given that nearly eight out of 10 transactions carried out via UPI in a month take place on either PhonePe or GooglePay, these two apps have effectively become such single points of failure. For a system as critical as UPI to remain robust, it is essential to develop failsafes and backup mechanisms to ensure the system continues to function smoothly.

Second, there is the risk of decreased competition and innovation in the payments and financial ecosystem. By consolidating a disproportionately large share of the market and user base, the two dominant TPAPs benefit from a scale that creates high barriers to entry for smaller and newer market participants. Given that all service providers in the UPI network are subject to a zero-charge framework for users, they primarily compete to achieve user scale, which they then leverage for commercial purposes by cross-selling other financial products.

The widespread scale of operations and user base that the two foreign-owned TPAPs have consolidated creates an inherently uncompetitive market. The lack of competition also disincentivises investment in new innovations, as the existing dominant players need not do anything more to maintain their current positions.

Third is the risk of foreign dominance. Both TPAPs in the duopoly are foreign-owned – PhonePe by Walmart and GPay by Google. No Indian TPAP or service provider can realistically hope to compete against the dominant TPAPs without billions of dollars in funding. Further, this foreign ownership creates multiple potentially new lines of failure, including data protection and backdoor access to sensitive information of Indian citizens, many of which Indian regulators might not even be aware of. It is therefore prudent policy to encourage the development of

Indian TPAPs, which can strengthen the UPI ecosystem by providing a counterbalance to the current dominant platforms. This is not an argument against having foreign-owned UPI players or service providers, but rather a call to create a more level playing field for Indian apps and developers.

While the existing duopoly has been repeatedly flagged for its associated risks by regulators and parliamentarians alike, it remains to be substantially addressed. In 2020, the National Payments Corporation of India (NPCI) issued a circular instructing all TPAPs to cap their market share at 30% of the total volume of transactions processed via UPI during the previous quarter and imposed an upper limit of two years for implementation. However, the NPCI subsequently extended this deadline. Four years later, the two TPAPs in question are no worse for the wear, with PhonePe alone accounting for 48.36% and Google Pay for 37.3% of market share in volume, as of August 2024. It is now being reported that such delays could continue beyond this year.

To further add to the troubles of Indian developers, recent reports suggest that the NPCI may potentially increase the market share cap from 30% to 40%. However, every subsequent extension given by the NPCI, with any potential increase in the market share cap, will only allow the dominant TPAPs to consolidate their hold.

Under the right conditions and with the right incentives, however, the UPI ecosystem has every potential to offer smaller market participants a level playing field where they can innovate and compete with larger established players. As UPI enters its next phase of growth in both reach and innovation, the implementation of a market cap is a key step in insulating the ecosystem from such risks that stand to substantially erode public trust and derail UPI's success and future transformational capabilities.

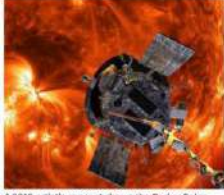
Currency concerns

The rupee's rapid stumble poses a fresh challenge for the economy

It has been a tumultuous time for the Indian rupee even as the Reserve Bank of India (RBI) has been actively stepping into the foreign exchange market to stem its free fall in pursuit of what it calls an 'orderly' exchange movement. The rupee had hit an all-time low of 85 to the U.S. dollar on December 19. Last Friday, it came precariously close to the 86-mark before a late intervention by the central bank pulled it back to 85.53. A confluence of factors at work have hurt the rupee in recent times, including the sustained outflows of foreign portfolio investments from securities markets after key indices peaked in late September. Overstretched stock valuations, a demotivating corporate performance in the July-September quarter, and China's economic stimulus, nudged emerging market portfolios from Mumbai to Beijing. The Donald Trump factor added a fresh headwind with the dollar strengthening since his U.S. presidential electoral victory, and emerging market currencies were further rattled by his warning of a 100% tariff on BRICS nations for a common currency plan to challenge the dominance of the U.S. dollar in global trade.

Even before fears about Mr. Trump's generally protectionist stance on trade matters materialise, India's goods trade story is sputtering. Record trade deficits and import bills are going to show up in this quarter's current account deficit, which is expected to double from around 1.2% of GDP in the second quarter. Services trade is still throwing up a surplus but the uncertainty around the H-1B visa regime will be a key monitorable, despite Mr. Trump's latest soothing comments on the system. The previous RBI Governor, Shaktikanta Das, did well to forthrightly dismiss the BRICS currency as just an idea in the air, and stress that India has no de-dollarisation agenda. The government must also issue an unequivocal statement to this effect in public fora and in diplomatic parleys to put the issue to rest. It is true that the currencies of other emerging markets have taken a bigger hit and a falling rupee bodes well for exporters, but India also needs to worry about importing inflation, especially on inelastic items such as edible oil and crude petroleum. Moreover, foreign investment flows are uncertain as is the U.S. monetary policy outlook for 2025. There is also a limit to the extent the central bank can deploy forex reserves to manage the rupee's trajectory, and the Finance Ministry has conceded that recent exchange rate movements cramp the freedom for monetary policymakers. India's present economic woes are linked to domestic drivers such as faltering consumption and reluctant investments. With the rupee coming under pressure, the country's external resilience could be tested as well in 2025, and policymakers must gear up to manage this new risk.





A 2018 artist's concept shows the Parker Solar Probe flying into the sun's outer atmosphere on a mission to help scientists learn more about the sun. NASA/JONAS HOFFMANN/AP/STEVE GRANITZ

NASA probe flies closer to the sun than any spacecraft

Agence France Presse

NASA's pioneering Parker Solar Probe made history on December 24 when it flew closer to the sun than any other spacecraft, with its heat shield exposed to scorching temperatures topping 530 degrees Celsius.

Launched in August 2018, the spaceship is on a seven-year mission to deepen scientific understanding of our star and help forecast space-weather events that can affect life on the earth.

Tuesday's historic flyby should have occurred at precisely 5:23 am IST (05:30 GMT), although mission scientists will have to wait for confirmation until December 28 as they lose contact with the craft for several days due to its proximity to the sun.

"Right now, the Parker Solar Probe is flying closer to a star than anything has ever been before," at 6.1 million kilometres away, NASA official Nicky Fox said in a video on social media on the morning of December 24.

"It is just a total 'yay, we did it' moment."

If the distance between the earth and the sun is the equivalent to the length of an American football field, the spacecraft should have been about four metres from the end zone at the moment of closest approach, a point that scientists call perihelion.

"This is one example of NASA's bold missions, doing something that no one else has ever done, before to answer long-standing questions about our

Launched in 2018, the spaceship is on a seven-year mission to deepen scientific understanding of our star and help forecast space-weather events that can affect life on the earth

universe," Parker Solar Probe programme scientist Arik Posner said in a statement on December 30.

"We can't wait to receive that first status update from the spacecraft and start receiving the science data in the coming weeks."

So effective is the heat shield that the probe's internal instruments remained near room temperature – around 29 degrees Celsius – as it explored the sun's outer atmosphere, called the corona.

The Parker Solar Probe will also be moving at a blistering pace of around 690,000 km/hr, fast enough to fly from New Delhi to Chennai in around 10 seconds.

"Parker will truly be returning data from uncharted territory," said Nick Pinkine, mission operations manager at the Johns Hopkins Applied Physics Laboratory (APL) in Laurel, Maryland.

"We're excited to hear back from the spacecraft when it swings back around the sun."

By venturing into these extreme conditions, the Parker probe has been helping scientists tackle some of the sun's biggest mysteries: how solar wind originates, why the corona is hotter than the surface below, and how coronal mass ejections – massive clouds of plasma that hurt through space – are formed.

The Christmas Eve flyby was the first of three record-setting close passes. The next two are set to occur on March 22 and June 19, 2025, and both are expected to bring the probe back to a similarly close distance from the sun.

After its launch in 2018, the probe has been gradually circling closer towards the sun, using flybys of Venus to gravitationally pull it into a tighter orbit.



Grave new world: human-induced loss of elders threatens various species

Climate extremes and habitat destruction caused by human activity can hasten the loss of elders in a species and disrupt the stability of populations. Ecologists have documented a cascade of consequences moving through the population when elders disappear, altering structures and behaviour

Rupsy Khurana

As people age, they accrue richer experiences, and their wisdom deepens. So do animals. From elephant matriarchs to shark grandmothers, the elders of the animal kingdom carry a treasure trove of knowledge, having guided, and still guiding, their families through the uncertainties of life in the wild.

The earth's life forms are very diverse and unsparingly complex. No two species age the same. Yet there is also a growing body of evidence that older, wiser individuals are crucial in similar ways to many species.

"Because of the diversity in animal social systems, the important position that older individuals often occupy can be for a variety of reasons, but often involves them either being particularly dominant individuals who stabilise the social hierarchy in some way through their presence or by acting as repositories of information that they've acquired over their lifetime – which can be particularly important when times get tough," Josh Firth, an associate professor at the University of Leeds, said.

"There are a range of potential benefits of older individuals across different types of animals. They are not the same for all species," Keller Kopf, a senior lecturer in ecology at Charles Darwin University, Australia, added.

Without these elders, fish may never find their spawning grounds, and birds would get waylaid as they flew across continents.

Ageing in the wild

A review published in *Science* on November 21 suggested that the worldwide loss of old individuals due to shrinking habitats, hunting, climate change, and other human-caused disturbances can be particularly detrimental to long-lived species.

According to the researchers, protecting a species' elders is important for all its members to be able to pass on their cultures and what they know about adapting to changing weather to their future generations, and to help buffer them against human disturbances.

While this may go for both short- and long-lived species – the mayfly lives for a day, whereas the Antarctic glass sponge can live for millennia – the focus on long-lived species in particular is partly because of data.

"Evidence for the contributions of older individuals in short-lived species is limited," Kopf, the lead author of the study, said.

Scientists have been studying ageing for decades, but most of their research has focused on the negative effects of biological ageing on human health. Only recently have they been looking at the benefits of ageing in wild populations.

"Research on the benefits of old individuals has been happening in different disciplines in silos," Kopf said.

What old means

He and his team analysed more than 9,800 peer-reviewed studies from 1900 to 2023, investigating the roles of elderly individuals in several species. These roles included knowledge transmission, assisted parental care, nutrient cycling,



A herd of elephants follows its leader in Tarangire National Park, Tanzania. MAXIM MEDVEDEV

and coping with extreme weather.

"Until now, no study has pulled together data across different taxonomic groups to highlight the range of potential benefits of growing old," according to Kopf.

Before the team could analyse the data, it had to agree on what "old" meant. A three-year-old mouse could be considered old, whereas a 30-year-old elephant could be considered young, Kopf said. But the lack of data on short-lived species limited the researchers' options to two groups: long-lived mammals and birds (which are often social species that invest significant time and effort in parenting their offspring) and cold-blooded animals (like fish and reptiles, which continue to grow throughout their lifespan).

"Traits such as social behaviour, migration, parental care, and increased reproductive output make older individuals in moderate to long-lived species essential for their ecology and therefore conservation," Kopf said.

"However, this importance exists on a continuum and is not a binary."

Of elephants and orcas

Climate extremes and habitat destruction caused by human activity can hasten the loss of elders in a species and disrupt the stability of populations. Ecologists have documented a cascade of consequences moving through the population when the elders disappear, altering social structures and behaviour.

For example, young elephants of both sexes depend on help from the matriarch, the oldest female and often the largest. One 2011 study of African elephants in the wild found that when they were played recordings of lions roaring, a herd's members would create a defensive formation. Groups led by matriarchs more than 60 years old gathered faster and confronted the threatening calls with more aggression.

"If older individuals are removed from

the wild, by capture or unnatural death, younger ones struggle to survive without their knowledge," Anindya Sinha, a professor at the National Institute of Advanced Studies, Bengaluru, said. "Because they are directionless, there might be an increased risk of negative interactions with humans."

"Our work on Asian elephants in Bandipur and Nagarhole National Parks in Karnataka shows that females in herds [with calves] and fewer experienced individuals exhibited high levels of stress hormone," Sanjeeta Sharma Polkheal, an assistant professor at Kyoto University in Japan, said. A 2018 study she co-authored suggested that the higher stress could be due to lack of help with parental care, the high energy demands of vigilance, and the responsibility of protecting calves from predators.

Studies have also found that older female orcas (*Orcinus orca*) undergo menopause. According to experts, one compelling explanation for this phenomenon is called the grandmother hypothesis. Grandmother orcas stop being able to reproduce so they can help their daughters care for calves, protect them from predators, and guide them to the best feeding grounds.

A new conservation paradigm

Because of the great benefits of protecting the older members of a species, the researchers have advanced a new paradigm called longevity conservation.

"Biodiversity conservation and threatened species policies should protect age structure," Kopf wrote in *The Conversation*. "This is particularly important in long-lived species that produce more offspring with age, or where migration, social networks, and cultural transmission of knowledge are required for survival."

For example, in fish and reptiles, the older individuals lay more eggs and give birth to offspring better equipped to

Protecting a species' elders is important for all its members to be able to pass on their cultures and what they know about adapting to changing weather to their future generations and to help buffer them against human disturbances

survive environmental fluctuations. So Kopf advocates age and size-based fisheries, management strategies that better protect older individuals.

But significant challenges arise when the longevity conservation paradigm comes in contact with ground realities, such as in India.

More than 700 marine fish species are caught every year along both coasts of the country, with fishing vessels targeting multiple species simultaneously. How experts can implement a management strategy that protects individuals while allowing uninterrupted harvesting is unclear.

"Protecting larger, older fish is important for conservation, but in a multi-species fishery like India, it's extremely challenging," Mayuresh Gangal, a research affiliate at the Nature Conservation Foundation, said.

"Different species vary in size as they age, and their life histories differ significantly. On top of that, the fishing gear cannot be very target-specific in multi-species fisheries. It is difficult to tailor gear to target specific species or sizes effectively."

Kopf also wrote in *The Conversation* that the "loss of old individuals is not yet recognised by the International Union for Conservation of Nature as a means of listing threatened species."

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Centre inks contracts for AIP, torpedoes for submarines

The Hindu Bureau

NEW DELHI

The Defence Ministry on Monday signed two contracts related to Scorpene-class submarines worth ₹2,867 crore.

The first contract is for the construction of the air independent propulsion module (AIP) developed by the Defence Research and Development Organisation (DRDO), and its integration aboard. The second contract is for the integration of the electronic heavy-weight torpedo being developed by the DRDO.

“The contract for construction of AIP Plug and its integration was inked with Mazagon Dock Shipbuilders Limited, Mumbai, [which is] worth around ₹1,990 crore, while the contract for integration of EHWT, being developed by DRDO, was signed with Naval Group, France at an approx. cost of ₹877 crore,” a



Waiting on: An indigenously developed AIP module, after delays, is awaiting fitment on Scorpene submarines. FILE PHOTO

Defence Ministry statement said.

An indigenously developed AIP module, after delays, is awaiting fitment on Scorpene submarines. Towards this, the DRDO has already entered into an agreement with the France-based Naval Group, the original manufacturer of Scorpenes.

Enhanced submarines

The construction of the AIP Plug and its integration would enhance the endurance of conventional sub-

marines, and would generate employment of nearly three lakh man days, the Ministry said. The integration of the EHWT would be a collaborative effort between the Indian Navy, the DRDO, and the Naval Group, the statement added.

The submarines have been operating without a dedicated, modern heavy-weight torpedo so far, as the torpedoes meant to be procured from the company were embroiled in a corruption scandal.

Army installs Shivaji statue on Pangong Lake bank; Ladakh councillor, others question its relevance

Dinakar Peri
NEW DELHI

The councillor of Chushul in Ladakh has questioned the relevance of a statue of Chhatrapati Shivaji Maharaj that was installed by the Indian Army on the banks of the Pangong Tso (lake) in eastern Ladakh, a point also raised by several veterans on social media.

The incident comes shortly after the controversy over the removal of an iconic painting from the Army chief's lounge earlier this month.

According to defence sources, the statue is within the location of a Maratha unit. It was built with voluntary contributions from serving and retired personnel of the unit.

"As a local resident, I must voice my concerns about the Shivaji statue at Pangong. It was erected without local input, and I question its relevance to



Maratha icon: Army personnel standing next to the statue of Chhatrapati Shivaji on the bank of the Pangong Lake. PTI

our unique environment and wildlife. Let's prioritize projects that truly reflect and respect our community and nature," Konchok Stanzin, councillor of Chushul, said on X.

Towering symbol

On December 26, the statue of Chhatrapati Shivaji Maharaj was inaugurated on the banks of Pangong Lake at an altitude of

14,300 feet, the Leh-based 14 Corps said on X on Saturday.

"The towering symbol of valour, vision and unwavering justice was inaugurated by Lt. Gen. Hitesh Bhalla... General Officer Commanding (GOC), Fire and Fury Corps and Colonel of the Maratha Light Infantry. The event celebrates the unwavering spirit of the Indian ruler,

whose legacy remains a source of inspiration for generations," it added.

Questioning the relevance of Shivaji at Pangong Lake, several veterans and others noted that Zorawar Singh would have been a more appropriate choice. However, defence sources said infantry units have a long tradition of placing unit-related icons within their premises to motivate soldiers.

"There are the statutes (or laws) of war, but of late our armed forces are studying the 'statues of war'..." Major-General Birender Dhanoa (retd) said in a post on X. He questioned, "Why was a unit and 'colonel of the regiment' affair publicised on social media? Are all fixed class units erecting statues across the Corps Z (zone) that are in keeping with their ancestral satraps? If not then social media isn't the place for a one off."

Another veteran Colonel Sanjay Pande observed that Zorawar Singh went through Pangong Tso to Khurnak Fort, established posts right up to Mansarovar. "He died fighting in Tibet. Leh Fort is called Zorawar Fort...Zorawar Singh fought wars 180 years back, weather was as found today. He deserves to be there."

Sajjad Kargili, a political activist, said on X that there was no cultural or historical relevance of Shivaji in Ladakh. "While we respect his legacy, imposing such cultural symbols here is misplaced. We would appreciate the installation of statues honoring local historical figures like Khree Sultan Cho or Ali Sher Khan Anchen and Seenge Namgyal. However, even these should not be placed in environmentally sensitive areas like Pangong, which require careful preservation," he said.



Unconventional methods like AI-based warfare a big challenge, says Rajnath

Press Trust of India

MHOW (M.P.)

Defence Minister Rajnath Singh said on Monday that unconventional methods like Artificial Intelligence (AI)-based warfare and cyber attacks pose a big challenge.

Addressing officers at the Army War College in Mhow Cantonment in Madhya Pradesh, Singh said India's defence exports have crossed a record ₹21,000 crore from ₹2,000 crore a decade ago. He said a target has been set to achieve defence exports of ₹50,000 crore by 2029.

"Unconventional methods like information warfare, AI-based warfare, proxy warfare, electromagnetic warfare, space warfare, and cyber-attacks are posing a big challenge," Mr. Singh said.

He stressed the need for the military to be well trained and equipped to fight off such attacks and lauded training centres in Mhow for their valuable contributions.

Mr. Singh said mastering frontier technologies is the need of the hour in the constantly evolving times, noting that military training centres are playing a crucial role in equipping



Defence Minister Rajnath Singh pays tributes to the brave-hearts at the Infantry Memorial at Mhow in Indore on Monday. ANI

and readying soldiers to deal with future challenges.

"Our defence exports, which were around ₹2,000 crore a decade ago, have crossed the record figure of ₹21,000 crore today. We have set an export target of ₹50,000 crore by 2029," Mr. Singh said.

He said 'made-in-India' equipment is being exported to other countries.

Mr. Singh commended the training centres for constantly improving their training curriculum as per changing times, and striving to make the personnel fighting fit for every kind of challenge.

He appealed to officers to explore the possibility of promoting integration through training in areas such as weapons training

in Infantry School; AI and communication technology in Military College of Telecommunication Engineering (MCTE), and leadership - junior and senior command in AWC.

Mr. Singh said that some officers will work as defence attaches in the future, and they should strive to secure national interests at the global level.

He said the government is committed to making India one of the strongest economic and military powers in the world.

Chief of the Army Staff General Upendra Dwivedi and other senior officials of the Army were present on the occasion.

The Defence Minister laid a wreath and paid homage to brave-hearts at the Infantry Memorial.

Demographic data to check influx from Myanmar: Home Ministry

Ministry says Northeast is 'walking on the path of peace and prosperity' and that there is a need for extensive mapping for mineral, oil and coal reserves in the region; says a whole-of-the-government approach will end drug menace in country

Vijaita Singh
NEW DELHI

The Union Home Ministry said on Monday that demographic data along the Myanmar border, especially in Nagaland, Mizoram, and Manipur, should be mapped to help in fencing of the international border and stopping infiltration.

In its year-end review for 2024, the Ministry reiterated that the Ministry has decided to scrap the Free Movement Regime (FMR) between India and Myanmar to ensure the internal security of the country and maintain the demographic structure of India's northeastern States bordering Myanmar.

Though the Ministry said that the FMR was being suspended, on December 6 it finalised fresh protocol to regulate the movement of people living within 10 km, reduced from earlier 16 km territorial limit, on either side of the largely unfenced international border, indicating that FMR continues.

The Hindu reported on December 25 that the not-



Army personnel at the border overlooking the Kabaw valley on the Myanmar-Manipur border. FILE PHOTO

ification ending the FMR, which involves a bilateral agreement with Myanmar, is yet to be notified by the External Affairs Ministry, the nodal Ministry. Myanmar shares 1,643 km of largely unfenced border with Arunachal Pradesh (520 km), Nagaland (215 km), Manipur (398 km) and Mizoram (510 km).

The year-end report by the Home Ministry said that "the Modi government has taken the path of building bridges of unity in the Northeast in a bid to usher in an era of peace

with unprecedented success" and "the Northeast is walking on the path of peace and prosperity."

It said there is a need for extensive mapping for mineral, oil and coal reserves in the Northeastern States, which will financially benefit from the royalty received for these minerals.

Fight against LWE

It added that in 2024, the security forces achieved exemplary success in curbing left-wing extremism, "eliminating 287

Naxalites and arresting as many as 992."

Among those killed, at least 14 belonged to the highest decision-making body of the Communist Party of India-Maoists. It said that Home Minister Amit Shah has resolved to end the menace of left-wing extremism before March 31, 2026. It also said that in three months, the Union government and Chhattisgarh government will bring a comprehensive scheme for the overall development of people affected by LWE.

The Home Ministry is heading with a whole-of-the-government approach in its mission to weed out the menace of drugs and the perpetrators of the crime, the report said.

In a joint operation carried out by the Narcotics Control Bureau (NCB), the Indian Navy, and the Gujarat Police, a consignment of 3,132 kg of drugs was seized.

Security agencies busted an international drug trafficking cartel and seized over 700 kg of contraband methamphetamine in Gujarat. NCB confiscated 82.53 kg of high-grade cocaine in New Delhi. The massive drug consignment worth approximately ₹900 crore was tracked down by a bottom-to-top approach after drugs were seized from a courier center in Delhi.

"The agencies also seized 4,134 kg narcotics in the year 2024 from the deep seas," it said.

The Ministry has set the target to dispose of seized drugs as a stern message to the narcotics cartel. In 2024, the agencies under the Ministry destroyed 1,17,284 kg of narcotics.



ISRO's docking mission on; spacecraft reach right orbit

Hemant C.S.
SRIHARIKOTA

The Indian Space Research Organisation (ISRO) successfully launched the Space Docking Experiment (SpaDeX) mission on Monday.

The PSLV C60 rocket carrying two small satellites, SDX01 (Chaser) and SDX02 (Target), along with 24 payloads, lifted off from the first launchpad of the Satish Dhawan Space Centre in Sriharikota at 10 p.m.

About 15 minutes after lift-off, the two small spacecraft weighing about 220 kg each were launched into a 475-km circular orbit as intended.

"The rocket has placed the satellites in the right orbit which is into a 475-km circular orbit. The spacecraft's solar panels have been deployed successfully. The two SpaDeX satel-

lites have moved one behind another so over a period of time it will pick up further distance; the distance will increase by 20 km over the next few days and then the rendezvous and docking process will start. The docking process can happen in another one week; the nominal time will be approximately January 7," said ISRO Chairman S. Somanth.

Technology for future

With the SpaDeX mission, the ISRO aims at exhibiting technologies needed for spacecraft rendezvous, docking, and undocking using two small satellites which have been mastered by only an elite group of spacefaring nations.

The demonstration of this technology is essential for futuristic missions, including sending an Indian astronaut to the moon, sample return from the

moon, and the building and operation of an Indian space station.

ISRO said that the demonstrated precision of the PSLV vehicle would be utilised to give a small relative velocity between the Target and Chaser spacecraft at the time of separation from the launch vehicle.

"This incremental velocity will allow the Target spacecraft to build a 10-20 km inter-satellite separation with respect to the Chaser within a day. At this point, the relative velocity between the Target will be compensated using the propulsion system of the Target spacecraft," ISRO said.

ISRO added that at the end of this drift arrest manoeuvre, Target and Chaser will be in the same orbit with identical velocity but separated by about 20 km, known as Far Rendezvous.



Great start: The PSLV-C60 craft lifts off from Sriharikota spaceport on Monday night. B.VELANKANNI RAJ

