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ENVIRONMENT AND HEALTH

**Science
Reporter**



MK Yadav Sir

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Households across the world waste 1 billion meals a day, says UN report

The Hindu Bureau
NEW DELHI

Households across the globe wasted over one billion meals a day in 2022, even as 783 million people struggled with hunger and a third of humanity faced food insecurity, according to the Food Waste Index Report 2024, a study jointly authored by the United Nations Environment Programme (UNEP) and WRAP (Waste and Resources Action Programme), a U.K.-based non-profit.

The report, released ahead of the International Day of Zero Waste (March 30), noted that in 2022, there were 1.05 billion tonnes of food waste generated (including inedible parts), amounting to 132 kilograms per capita and almost one-fifth of all food available to consumers. "Out of the total food waste



Rural areas generally wasted less food, the report said.

ed in 2022, 60% happened at the household level, with food services responsible for 28%, and retail 12%," the report observed.

The report stressed the importance of expanding and strengthening data infrastructure to enable the tracking and monitoring of food waste, pointing out that "many low- and middle-income countries continue to lack adequate systems for tracking progress

to meet Sustainable Development Goal 12.3 of halving food waste by 2030, particularly in retail and food services". At present, only four G-20 countries (Australia, Japan, U.K., U.S.) and the European Union have food waste estimates suitable for tracking progress to 2030.

Contrary to popular perception, food waste was not a "rich country problem", the report stated, with observed average levels of household food waste for high-income, upper-middle, and lower-middle-income countries differing by just 7 kg per capita. "Hotter countries appear to generate more food waste per capita in households, potentially due to higher consumption of fresh foods with substantial inedible parts and a lack of robust cold chains," the report noted.

Detailing the link between food waste and climate change, the report found that food loss and waste generated "8%-10% of annual global greenhouse gas (GHG) emissions – almost five times that of the aviation sector – and significant biodiversity loss by taking up the equivalent of almost a third of the world's agricultural land". It estimated the toll of both food loss and waste on the global economy at \$1 trillion.

Another trend revealed by the data was that compared to urban areas, rural ones generally wasted less food, due to "greater diversion of food scraps to pets, livestock, and home composting". The report urged governments to "raise climate ambition by integrating food loss and waste" into their Nationally Determined Contributions.

Context: The world wasted an estimated 19 per cent of the food produced globally in 2022, or about 1.05 billion metric tons, according to a UN Environment Programme's Food Waste Index Report.

UN Environment Programme's Food Waste Index Report

- **About:** It presents the most extensive compilation of food waste data to date, including thorough analysis and modeling.
- **Co-authored by:** UNEP and Waste and Resources Action Programme (WRAP), an international charity.
- **Objective:** It is designed to bolster the objectives of SDG 12.3.
- **New Estimate of Global Food Waste:** The report generates a fresh estimate of global food waste, offering valuable insights into the magnitude of the issue.

Key Findings

- **Global Food Waste Statistics:** The 2021 report estimated that approximately 17% of the food produced worldwide in 2019, amounting to 931 million metric tons (1.03 billion tons), was wasted.
- **Caution on Direct Comparisons:** Authors of the report cautioned against direct comparisons due to insufficient data from many countries, highlighting the need for more comprehensive and standardized reporting methods.
- **Per Capita Food Waste:** The analysis revealed that each person wastes approximately 79 kilograms (about 174 pounds) of food annually, translating to at least 1 billion meals wasted worldwide daily.
- **Primary Sources of Food Waste:** The majority of food waste, about 60%, was attributed to households, followed by food service (28%), and retailers (12%).

STARING AT A DISMAL FUTURE

Share of population in regions with identified data on food waste (in %)

	Household	Food service	Retail
North Africa	50	0	0
Sub-Saharan Africa	66	5	6
Latin America and Caribbean	75	19	59
North America	100	100	100
Central Asia	0	0	0
East Asia	98	95	95
Southeast Asia	92	5	5
Total*	85	36	40

*All regions not included

Source: UN Environment Programme's Food Waste Index Report

5,000 Indians in Cambodia, forced into cyber scams; MHA takes note

**MAHENDER SINGH
MANRAL**

NEW DELHI, MARCH 28

OVER 5,000 Indians are trapped in Cambodia, where they are allegedly being held against their will and forced to carry out cyber frauds on people back home. The government estimates that the fraudsters have allegedly duped people of at least Rs 500 crore in India over the past six months.

Earlier this month, the Ministry of Home Affairs (MHA) held a meeting with officials of the Ministry of External Affairs (MEA), Ministry of Electronics and Information Technology (Meity), the Indian Cyber Crime Coordination Centre (I4C) and other security experts to draw up a strategy to rescue the Indians trapped in Cambodia.

"The agenda of their meeting was to discuss the organised racket and bring back those who

are trapped there. Data shows that Rs 500 crore has been lost (to cyber fraud originating in Cambodia) in India in the last six months," the source said, adding that the investigation by Central agencies has so far revealed that agents were trapping people, mostly those from the southern part of the country, and sending them to Cambodia on the pretext of data entry jobs before forcing them to carry out cyber frauds.

CONTINUED ON PAGE 2

Cyber Crime

- **About:** It is an illegal activity involving computers, the internet, or network devices. Cybercriminals commit identity theft, initiate phishing scams, spread malware, and instigate other digital attacks.
- **Some examples of cybercrime include:**
 - Stealing and selling corporate data
 - Demanding payment to prevent an attack
 - Installing viruses on a targeted computer
 - Hacking into government or corporate computers.

Context: Over 5,000 Indians are trapped in Cambodia, where they are allegedly being held against their will and forced to carry out cyber frauds on people back home.

Cambodia

- **About:** It is a country on the Indochinese mainland of Southeast Asia.
- **Capital:** Phnom Penh.
- **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:** It includes the Tonle Sap (Great Lake) and the upper reaches of the Mekong River delta.
- **India's engagement:** Cambodia is a part of the Mekong-Ganga initiative.

Mekong-Ganga initiative

- **Established in:** 2000 at **Vientiane, Laos.**
- **Mandate:** To facilitate closer contacts among people inhabiting **Ganga and Mekong**, the 2 major **civilizational river basins.**
- **6 members:** India, Thailand, Myanmar, Cambodia, Laos and Vietnam (India + 5 ASEAN Countries/Mekong Basin Countries).
- **Four areas of cooperation:** Tourism, culture, education, and transportation.

Calendar for Auction of Government of India Treasury Bills

Context: The Government of India, in consultation with the Reserve Bank of India, recently notified the calendar for the issuance of Treasury Bills for the quarter ending June 2024.

Treasury Bill

- **About:** Short term (up to one year) borrowing instruments of the Government of India or by a central authority of any country which enable investors to park their short term surplus funds while reducing their market risk.
- **Issued by:** The Central Government.
 - The State governments do not issue any treasury bills.
- **Auctioned by:** Reserve Bank of India (RBI)
- **Minimum Investment:** As per the regulations put forward by the RBI, a minimum of Rs. 25,000 has to be invested by individuals willing to procure a short term treasury bill.
- **Types of Treasury Bills:** presently issued in three tenors, namely, 14 days, 91 days, 182 days and 364 days.
 - The 91-day T-Bills are issued on a weekly auction basis while 182-day T-Bill auction is held on Wednesday preceding Non-reporting Friday and 364-day T-Bill auction on Wednesday preceding the Reporting Friday.
 - In 1997, the Government had also introduced the 14-day intermediate treasury bills.
- **Eligible Buyers:** Individuals, Firms, Trusts, Institutions and banks
 - Interest on the treasury bills is determined by market forces.
 - To get money under repo, banks give the RBI treasury bills.
 - They can also hold it if they need to meet their Statutory Liquid Ratio (SLR) standards.
- **Taxation:** Short-term capital gains (STCG) on these bills are subject to STCG tax at rates determined by the investor's income tax bracket.
 - However, retail investors do not have to pay any tax deducted at source (TDS) upon redemption of these bonds, minimizing the difficulties of claiming the same through income tax returns if they do not fall into the taxable income level.

Southern Africa's new ecoregion brimming with undocumented life but in urgent need of conservation

Context: A recent study in southern Africa has unearthed a wealth of previously undocumented biodiversity in a newly recognised ecoregion called the **South East Africa Montane Archipelago (SEAMA)**.

South East Africa Montane Archipelago (SEAMA)

- **About:** It is a newly recognized **mountainous ecoregion** spanning from northern Mozambique to Mount Mulanje in Malawi, the second-highest mountain in southern Africa.
- **Unique Features:** The ecoregion comprises 30 granitic inselbergs rising above 1000 meters above sea level, hosting both the largest (Mt Mabu) and smallest (Mt Lico) mid-elevation rainforests in southern Africa, along with biologically unique montane grasslands.
- **Climate:** SEAMA experiences notably higher annual rainfall and humidity, particularly during the dry season, in comparison to surrounding regions.
 - SEAMA experiences significantly higher annual rainfall and humidity levels, particularly noticeable during the dry season, setting it apart from neighboring areas.
- **Research Implications:** These climatic distinctions prompted extensive surveys of nearby mountains, leading to the discovery of new species, notably from Mount Mabu.
- **Ecological Significance:** Mount Mabu's biodiversity, highlighted by the newfound species, solidifies its status as the largest mid-elevation rainforest in southern Africa.
- **Deforestation Threats:** Since 2000, the SEAMA has lost 18% of its primary humid forest cover (up to 43% in some sites) one of the highest deforestation rates in Africa.

Inselbergs

- **About:** These are also known as Monadnocks, are isolated, steep-sloped ridges, hills, or small mountains that rise abruptly above well-developed plains, resembling islands in the midst of a sea.
- **Formation:** Typically, inselbergs are erosional remnants, composed predominantly of harder igneous rock like granite, which is more resistant to erosion. However, they can also form in sedimentary rocks.
- **Characteristics:** Inselbergs exhibit distinctiveness in their appearance, standing tall and solitary amidst flatter surroundings, creating striking geological features.

2.47 mn TB patients in India susceptible to drugs in 2023

Report found that pvt sector had better success rates of treatment than public sector

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NEW DELHI

The number of individuals diagnosed with drug-susceptible tuberculosis in India was 2.47 million in 2023, according to the *India TB Report 2024* released by the Union health and family welfare ministry.

Out of 2.47 million patients, 2.36 million (95%) were initiated on treatment. Drug-susceptible TB (DS-TB) is identified in patients who have bacteriologically-confirmed or clinically-diagnosed case of TB without evidence of infection with strains resistant to drugs rifampicin and isoniazid. Rifampin and isoniazid combination is used to treat TB infection. It may be taken alone or with one or more other medicines for TB. Rifampin belongs to the class of medicines called antibiotics and works to kill or prevent the growth of bacteria.

ria.

Among the notified DS-TB cases, 61% were male, 39% female and 141,098 (5.7%) were below 15 years of age. Among the TB patients notified in 2022, 87.6% had been successfully treated, while 3.6% died during the treatment, 2.1% were lost to follow-up, 1.9% failed treatment (including regimen changed), and 0.4% were not evaluated (including still on treatment).

The annual report also found that the private sector had better success rates of treatment than the public sector. "Treatment success rates of patients notified from public and private sectors were 86.9% and 89.5% respectively," the report stated.

With growing incidents of drug resistance

cases in TB treatment, the report found that in 2023, a total 63,939 multidrug-resistant tuberculosis/rifampicin-resistant (MDR/RR-TB) cases were identified. Among these, 11,750 patients had pre-XDR-TB (fluoroquinolone-resistant), 144 XDR-TB (fluoroquinolone with linezolid and

bedaquiline-resistant) and 23,020 H-R-TB (poly-DR-TB). From the 2022 cohort, out of 10,799 patients treated with H-mono/poly-DR-TB regimen, a total of 9,316 were successfully treated, while 549 died during treatment, 543 were lost to follow-up, 205 failed treatment (including regimen changed), and 186 were not evaluated (including patients still on treatment or outcome not reported).

Among the notified drug-susceptible TB cases, 61% were male, 39% female and 141,098 (5.7%) were below 15 years of age

TB CASES IN INDIA OVER THE YEARS

	India TB Report 2020	2023	2024
Estimated TB cases	26.9 lakh	27.4 lakh	27.8 lakh
Number of cases reported	24.04 lakh	24.2 lakh	25.5 lakh
Reporting from private sector	6.8 lakh	7.3 lakh	8.4 lakh
% cases from private sector	28.20%	30%	32.90%
Estimated mortality	4.36 lakh	3.2 lakh	3.2 lakh

Recommendations

- **Achievement of Treatment Initiation Target:** India successfully achieved its 2023 target of initiating treatment in 95% of diagnosed TB patients, as indicated by the report.
- **Increased Testing for Drug Resistance:** The report highlights that 58% of diagnosed individuals were offered a test to determine drug resistance, a notable rise from 25% in 2015.

INDIA TB REPORT 2024 (Syllabus: GS Paper 2 – Health)

Context: According to the India TB Report 2024 recently released by the Union health and family welfare ministry, the number of individuals diagnosed with drug-susceptible tuberculosis in India was 2.47 million in 2023.

India TB Report 2024

- **About:** It is an annual publication under the National TB Elimination Programme (NTEP), initiated by the Central TB Division.
- **Prepared and published by:** Ministry of Health and Family Welfare, Government of India, since the year 2001.
- **Objective:** The report encompasses policy updates, program implementation strategies, and performance indicators at state and district levels regarding tuberculosis control and elimination efforts.

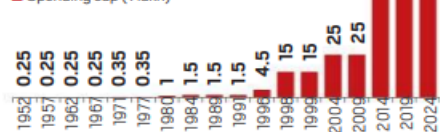
Highlights of the Report 2024

- **Reporting of the cases:** The majority of TB cases are still reported by government health centers, despite a rise in notifications by the private sector.
- **Increasing Private Sector:** Nearly 33% or 8.4 lakh of the 25.5 lakh cases reported in 2023 came from the private sector, marking a significant increase from only 1.9 lakh cases in 2015.
- **Consistent Mortality Rate:** The mortality due to TB infection remained steady at 3.2 lakh as per the latest data, showing no significant change.
- **Declining TB Mortality in India:** India's TB mortality dropped from 4.94 lakhs in 2021 to 3.31 lakhs in 2022, indicating a positive trend.
- **Reduction in Missing Cases:** The number of missing cases decreased to 2.3 lakhs in 2023 compared to 3.2 lakhs the previous year, reflecting an improvement in case tracking and reporting.
- **Decreasing Gap with Ni-kshay Portal:** The gap in missing cases has been shrinking over the years, particularly with the implementation of the government's Ni-kshay portal for tracking all TB patients.

A look at what Lok Sabha candidates can officially spend

LOK SABHA EXPENDITURE LIMIT FOR CANDIDATES

■ Spending cap (₹ lakh)



ANJISHNU DAS
NEW DELHI, MARCH 28

AMONG THE Election Commission's (EC) key responsibilities is monitoring poll expenditure, both by parties and individual candidates.

While there is no cap on how much parties can spend, candidates are limited to Rs 95 lakh for Lok Sabha constituencies and Rs 40 lakh for Assembly seats. In some smaller states and Union Territories, the cap is Rs 75 lakh and Rs 28 lakh for the Lok Sabha and Assemblies, respectively.

The spending limits have increased over the years, including from 2019, when these were Rs 70 lakh for Lok Sabha candidates and Rs 28 lakh for Assembly contenders.

The expenditure limit refers to the amount a candidate is allowed to legally spend on election campaigning. The EC frequently revises the spending limit, largely based on cost factors and the increasing number of voters. The last time the cap was revised was in 2022. In the

first general election in 1951-52, Lok Sabha candidates were allowed to spend a maximum of Rs 25,000, and just Rs 10,000 in some Northeastern states. The limits weren't changed until 1971, when the spending cap was raised to Rs 35,000 for most states. In 1980, the cap was raised to Rs 1 lakh. In 1984, it was raised to Rs 1.5 lakh in some states and Rs 1.3 lakh in some smaller states. For states with one to two Lok Sabha seats, the cap went only as high as Rs 1 lakh, with some UTs like Chandigarh restricted to just Rs 50,000.

The next change came in 1996, the post-liberalisation election, when the limit for most states was raised three-fold to Rs 4.5 lakh, with variations depending on UT status and number of seats. In the next election, in 1998, the spending cap was raised to Rs 15 lakh.

After more than a decade, in 2004, it was again raised to Rs 25 lakh. The limit went unchanged until 2014, when it was more than doubled to Rs 70 lakh.

FULL REPORT ON
www.indianexpress.com

Context: With the general elections underway, among the Election Commission's (EC) key responsibilities is monitoring poll expenditure, both by parties and individual candidates, through its own observers and state and Central enforcement agencies.

Election Expenditure Limit

- **About:** It denotes the maximum amount candidates are legally permitted to spend on election campaigning, encompassing various activities such as public meetings, rallies, advertisements, posters, banners, and vehicles.
- **Requirement of Expenditure Statement Submission:** All candidates are mandated to submit their expenditure statement to the Election Commission (EC) within 30 days following the conclusion of an election.
- **Revision Factors:** The EC frequently revises the spending limit, primarily considering cost factors and the escalating number of voters.
- **Revision Process:** In 2022, the EC revised the cap after forming a committee and soliciting input from political parties, chief electoral officers, and election observers.
- **Reasons for Revision:** The revision was prompted by a significant increase in the number of electors and the **Cost Inflation Index (CPI)** since 2014.
- **Cost Inflation Index:** The CFI, utilized to gauge the year-on-year inflation-driven rise in prices of goods and assets, surged from '240' in 2014-15 to '317' in 2021-22.
- **State Funding of Elections:** In this system, the states bear the election expenditure of political parties contesting the Election.

Cost Inflation Index

- **Purpose:** CII serves to gauge the annual increase in prices of goods and assets due to inflation.
- **Calculation Method:** It's computed to synchronize prices with the inflation rate, meaning a higher inflation rate results in increased prices.
- **Consumer Price Index (CPI):** CPI compares current prices of a basket of goods and services with those of the previous year to quantify price increases.

Skyroot closer to first private orbital rocket launch



ANONNA DUTT
New Delhi, March 28

SPACE-TECH COMPANY
SKYROOT Aerospace has successfully test-fired the second stage of its rocket Vikram-1, the company said Thursday, a major landmark that pushes it closer to India's first private orbital rocket launch in mid-2024.

Vikram-1 is a three-stage, solid-fuel based rocket. Testing of the "second stage" is significant because this stage propels satellites from the dense atmosphere of Earth to the deep vacuum of outer space.

"This is a significant milestone for the Indian space industry, marking the successful test of the largest propulsion system ever designed and manufactured by the Indian private sector so far, and the first carbon-composite-built motor tested at ISRO," said Pawan Chandana, co-founder and CEO of Skyroot Aerospace. "All test parameters are within expected bounds, and this achievement takes us another step closer to the upcoming orbital launch of the Vikram-1 rocket," he added.

Chandana had earlier told The Indian Express that Skyroot is planning to launch Vikram 1 "in the middle of

Context: Skyroot Aerospace has successfully test-fired the **Stage-2 of Vikram-1 space launch vehicle, called Kalam-250**, at the propulsion testbed of the Indian Space Research Organisation (ISRO), at its Satish Dhawan Space Centre (SDSC) in Sriharikota in Andhra Pradesh.

Vikram-1

- **About:** It is a three-stage, solid-fuel based rocket.
- **Features:** The Vikram I, the first rocket in the series, consists of three solid fuel-powered stages, each with a burn time ranging between 80 and 100 seconds.
- **Description of Final Stage:** The final stage of Vikram I is powered by the Raman engine, which uses MMH and NTO liquid fuels in a cluster of four engines generating 3.4 kN thrust.
- **Functionality of Raman Engines:** These are utilized for final adjustments in the orbit of the stage.
- **Payload Capacity:** Vikram I is designed to lift 290 kg to a 500 km Sun synchronous polar orbit (SSPO) and 480 kg to 45° inclination in a 500 km low Earth orbit (LEO).
- **Milestone Achievement:** The successful test of Vikram-1 represents a significant milestone for the Indian space industry, marking the successful test of the largest propulsion system ever designed and manufactured by the Indian private sector, and the first carbon-composite-built motor tested.

Skyroot Aerospace

- **About:** It is an Indian private aerospace manufacturer and commercial launch service provider based in Hyderabad, Telangana.
- **Founding by:** Former engineers and scientists from ISRO, the company benefits from their expertise and experience in the field of aerospace technology.
- **Focus:** To cater to the small satellite market by developing and launching its own series of small-lift launch vehicles, meeting the specific needs of this niche sector.



The Vikram-S launch vehicle or rocket is developed by the Kondapur (Telangana)-based **spacetech startup Skyroot**. The firm was launched by former ISRO Engineers **Pawan Kumar Chandana** (31) and **Naga Bharat Daka** (32) in 2018. Skyroot has raised **\$68 mn in funding** to date.

VIKRAM-S - VITAL STATS

Mass
546 kg

Length
8 m (approx. 27 ft)

Diameter
0.376 m (approx. 1.24 ft)

Peak Vacuum Thrust
7 t (7,000 kg)

Peak Combustion Pressure
80 bar

Peak Velocity
> Mach 5 (Hypersonic)

Payload Capacity
83 kg to 100 km altitude

INSIDE VIKRAM-S

- Made using composite materials, it has an **all-carbon fibre core structure**
- Equipped with **3D-printed engines** for spin stability during flight
- Co. claims it to be **one of the cheapest rockets built in its category, globally**
- A **200-engineer team** worked to build it in a record time of **2 years**

LAUNCH TO TEST

- 80% of onboard technologies for company's future Vikram Series launches
- Effectiveness of inflight avionics, including telemetry, tracking, inertial measurement, GPS, camera, and data acquisition and power systems

Measuring internet freedom in India in the last 10 years

How do internet shutdowns affect the daily lives of citizens, particularly in regions where they are frequently imposed? What are the primary reasons cited by the Indian government for imposing internet shutdowns?

Gautam Nirmal Doshi
Saumya Kalra
Rhea Gupta

The story so far:

For five straight years, India has topped the global list of countries imposing internet bans, with about 60% of all blackouts recorded in the world, between 2016 and 2022 having been in India. State imposed shutdowns in the last decade have cited national security and threats to public order. However, rights groups have argued that these shutdowns also violate court directives.

Internet shutdowns

The Indian government imposed a total of 780 shutdowns between January 1, 2014, and December 31, 2023, according to data collected by the Software Freedom Law Centre (SFLC). Shutdowns flared up during the protests against the Citizenship Amendment Act in 2019, the abrogation of Article 370 in 2019, and the

introduction of Farm Bills in 2020. Internet disruptions in India accounted for more than 70% of the total loss to the global economy in 2020. Data shows India shut down the internet for over 7,000 hours in 2023.

Indian States and Union Territories can impose an internet shutdown only in case of a "public emergency" or in the interest of "public safety", according to the Indian Telegraph Act. However, the law does not define what qualifies as an emergency or safety issue. The Supreme Court, in the landmark *Anuradha Bhasin v. Union of India* case, reiterated that internet shutdowns violate fundamental rights to freedom of expression and shutdowns lasting indefinitely are unconstitutional. Moreover, Courts have asked governments to make shutdown orders public, a provision poorly complied with, experts have noted.

British-era law

Regionally, Jammu and Kashmir saw the highest number of shutdowns – at 433 –

in the last 12 years. The longest blackout in 2023 took place in Manipur from May to December, amid ethnic clashes.

As of February 15 this year, internet shutdowns were active in Haryana amid the farmers' protests.

The Union government invoked powers under a British-era law to suspend mobile internet as Punjab farmers are holding protests in Delhi.

Activists have pointed out that India failed to meet the 'three-part test' in imposing blackouts in J&K and Manipur. Under international law, to block any access to content or invoke coercive measures that violate people's fundamental rights, countries should check if the action is provided for by law; pursues a legitimate aim; and follows standards of necessity and proportionality. The majority of internet outages in the last decade were localised to specific districts, cities and villages.

The trends differ globally: protests are the most common reason for internet shutdowns, followed by information

Context: For the straight years India has topped the global list of countries imposing internet bans, with about **60% of all blackouts recorded in the world, between 2016 and 2022** having been in India.

Internet freedom in India

- **Frequency of Shutdowns:** The Indian government enforced a staggering total of 780 shutdowns between January 1, 2014, and December 31, 2023, as per data collected by the Software Freedom Law Centre (SFLC).
- **Triggers for Shutdowns:** Shutdowns were particularly notable during protests against significant events such as the Citizenship Amendment Act in 2019, the abrogation of Article 370 in 2019, and the introduction of Farm Bills in 2020.
- **Economic Impact:** Internet disruptions in India contributed to over 70% of the total global economic loss in 2020, emphasizing the extensive ramifications of these shutdowns.
- **Legal Framework:** Indian States and Union Territories are authorized to impose internet shutdowns only in situations of "public emergency" or "public safety" according to the Indian Telegraph Act. However, the law lacks clarity regarding the definition of emergencies or safety issues.
- **Judicial Stance:** The Supreme Court, in the landmark *Anuradha Bhasin v. Union of India* case, affirmed that internet shutdowns violate fundamental rights to freedom of expression. The court also declared indefinite shutdowns as unconstitutional.

India and Global Trends

- **Global Internet Freedom Decline:** According to the latest Freedom House report, global Internet freedom has decreased for the 13th consecutive year, with deterioration seen in the online human rights environment in 29 countries.
- **India's Consistent Ranking:** Over the past three years, India's ranking in terms of Internet freedom has remained relatively stable, hovering around the same benchmark.
- **Decline in India's Score:** Despite the stability in ranking, there has been a noticeable decline in India's score from 2016 and 2017, where it scored 59 points, to 50 points in 2023, indicating a significant drop in Internet freedom perception.

From birds to animals on land, sea: what's driving deadly strain of H5N1?

ALIND CHAUHAN
NEW DELHI, MARCH 28

EARLIER THIS week, the United States Department of Agriculture confirmed that a form of avian influenza that has devastated wild bird populations around the world has been found, for the first time, in dairy cattle in Texas and Kansas.

Last week, officials in Minnesota announced that the highly pathogenic H5N1 strain had been found in goats, the first detection of the virus in a domestic ruminant. Since 2020, avian flu has killed tens of thousands of seals and sea lions in a vast area from the coast of northeast United States to Chile. The infection has also infiltrated mainland Antarctica for the time, In February this year, the Cambodian

health ministry said a 9-year-old boy infected with the virus had died, and several others were sick.

What is this new type of bird flu infection, and how bad is it?

Bird flu is an infectious viral illness seen mainly among poultry and some wild birds. Not all strains of the virus are dangerous — many of them have circulated for long among at least 100 bird species such as wild waterfowl without causing them much harm.

From time to time, the virus jumps from wild birds to poultry farms. While replicating in cramped warehouses of farmed birds, it evolves into a highly pathogenic form that causes a bigger wave of illness and death than usual.

The currently circulating H5N1 is one such

highly pathogenic type, which is thought to have descended from a virus that devastated farm bird populations in China from 1996 onward. The new H5N1 type first emerged in Europe in 2020, and spread rapidly to Africa and Asia. By late 2021, it had reached North America, and it appeared in South America in the fall of 2022. In February 2024, the virus raced through mainland Antarctica.

As of December 2023, this H5N1 strain had been reported in more than 80 countries, resulted in the culling of millions of chickens and turkeys at commercial poultry farms, and struck numerous species of wild birds such as gulls and terns, killing them by the thousands. In January, Dr Chris Walzer of the Wildlife Conservation Society said the on-

going bird flu outbreak was the worst globally and in US history, with hundreds of millions of birds dead since 1996.

Which animal species have been infected?

Besides farm birds and wild birds, some of which are already on the verge of extinction, the H5N1 virus has been reported in animals including foxes, pumas, skunks, and black and brown bears in North America, and farmed minks in Spain and Finland. Small mammal species that are often kept in filthy, overcrowded enclosures with ample opportunities for viral reassortment, are considered especially vulnerable. But it is marine mammals that are the worst affected. More than 20,000 sea lions

and a handful of dolphins have died in Chile and Peru after being infected with H5N1. Deaths of seals have been reported on both US coasts, and in Argentina.

"Sampling efforts suggest that more than 95 per cent of the Southern elephant seal pups born along 300 km of the Patagonia coastline died at the end of 2023. It's the first report of massive elephant seal mortality in the area from any cause in the last half-century. The sight of elephant seals found dead or dying along the breeding beaches can only be described as apocalyptic," Dr Walzer said in a statement.

Humans are theoretically also at risk, but they rarely contract bird flu. Most cases of human infection involve people who have come in contact with a large number of sick birds at poultry farms. The Cambodia case represents an exception.

What's behind the large-scale spread of the virus?

The precise factors behind the outbreaks remain unknown. Some scientists suggest that climate change could be a reason. Studies have shown that rising global temperatures impact the behaviour of birds in ways that hasten the spread of the flu. Birds are often forced to move into new territories, and mix with species that they usually don't interact with, which possibly boosts the chances of the virus spreading farther.

Higher sea surface temperatures may also have a role to play. Warmer water near northern Chile has led to a fall in the forage fish population, and that has made sea lions weaker and more susceptible to disease. Liesbeth van der Meer, director of the environmental group Oceana in Chile, told *The Associated Press*.

Context: Scientists recently reported that the deadly H5N1 bird flu virus has spread more aggressively than ever before in wild birds and marine mammals since its arrival in South America in 2022, heightening the risk of it evolving into a larger threat to humans.

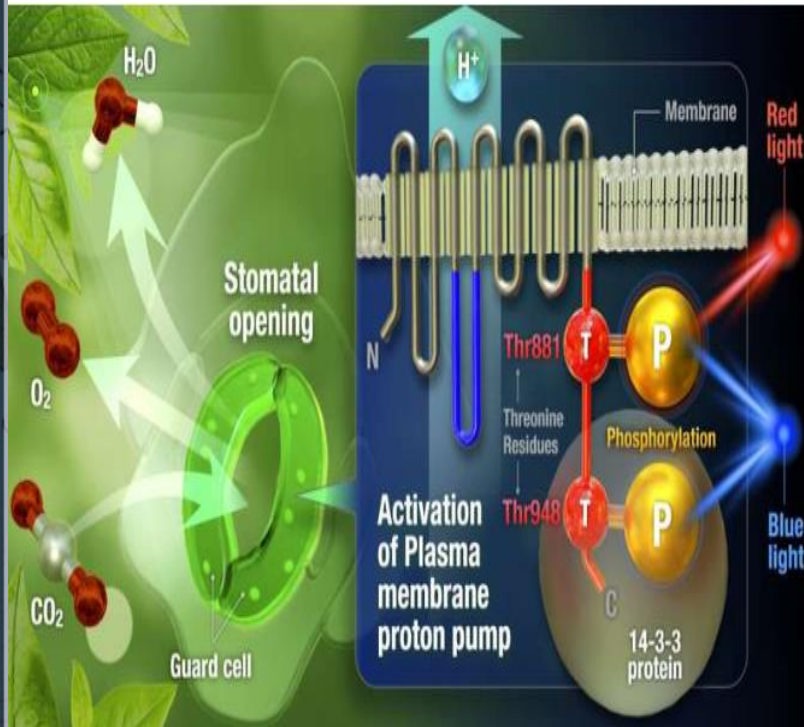
Bird Flu

- **About:** Influenza A viruses can be categorized into avian influenza (commonly known as bird flu) and swine influenza (often referred to as swine flu), depending on their origin host.
 - These viruses are **distinct from human influenza viruses** and do not readily spread among humans.
- **Two Categories:**
 - Low pathogenicity avian influenza (LPAI) that typically causes little or no clinical signs;
 - High pathogenicity avian influenza (HPAI) that can cause severe clinical signs and possible high mortality rates.
- **Hosts:**
 - **Primary host:** Wild birds, especially waterfowl, can carry the virus without showing symptoms.
 - **Secondary host:** Domestic poultry (chickens, ducks, turkeys), where the virus can cause severe illness and high mortality rates.
- **Transmission:** Typically spreads through direct contact with infected birds, their saliva, nasal secretions, and faces.
 - Human infections usually occur through close contact with infected birds or their environments.
- **Symptoms**
 - **In Birds:** Sudden onset of severe illness, Respiratory and digestive symptoms, and High mortality rates in poultry flocks.
 - **In Humans:** Fever, cough, sore throat, and in severe cases, respiratory distress.
 - Human cases are rare but can be severe, with a high mortality rate.

New Type of bird flu Infection

- The new H5N1 type first emerged in Europe in 2020, and spread rapidly to Africa and Asia.
- By late 2021, it had reached North America, and it appeared in South America in the fall of 2022. In February 2024, the virus raced through mainland Antarctica.

Discovery of amino acid unveils how light makes stomata open in plants



Context: Scientists from Nagoya University have uncovered a unique mechanism that regulates the opening of stomata in plants. Phosphorylation of the **amino acid Thr881** on the plasma membrane proton pump plays a key role in this process.

Stomata

- **About:** These are minute pores in plant tissue facilitating gas exchange, primarily in leaves but also in some stems.
- **Gas Exchange and Photosynthesis:** They enable the intake of carbon dioxide crucial for photosynthesis, contributing to plant growth and metabolism.
- **Regulation of Water Loss:** Stomata aid in reducing water loss by closing during hot or dry conditions, akin to tiny mouths aiding in transpiration.
- **Distribution:** Typically, stomata are abundant on the underside of leaves, minimizing exposure to heat and air currents, while aquatic plants exhibit a different distribution.
- **Specialised cells:** A stomata is surrounded by **two types of specialized plant cells** that differ from other plant epidermal cells.
 - These cells are called **guard cells and subsidiary cells**.
- **Guard cells:** They **surround** stomata, control their opening and closing, responding to internal pressure changes driven by environmental conditions.
 - Guard cells contain chloroplasts, essential for photosynthesis, enhancing their capacity to regulate stomatal activity.
- **Subsidiary Cells:** It provide structural support to guard cells, acting as a protective barrier against excessive expansion and safeguarding neighboring epidermal cells.
- **Circadian Rhythm and Stomatal Opening:** Stomatal activity follows a circadian rhythm, with a peak opening near noon after a dawn-triggered increase, subsequently declining to mitigate water loss.
- **Application of the discovery:** The study paves the way for the targeted manipulation of plant physiology, with potential applications in agriculture and environmental sustainability.

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