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INTERNATIONAL

GAZA IN FLAMES

Two months after Israel launched its attack on Gaza following Hamas's October 7 cross-border raid in which some 1,200 Israelis were killed, the tiny Palestinian enclave, with razed buildings, a maze of rubble and unprecedented human suffering, looks battered beyond repair. But the war is far from over. Over 1.7 million of Gaza's 2.3 million people have been forced out of their homes; some 16,000 Palestinians have been killed, and tens of thousands more wounded. Israel has taken over parts of northern Gaza and pushed its population towards the south. And now, the Israeli forces are expanding the offensive towards the south, particularly targeting Khan Younis, a city of 4,00,000 people in normal times that has seen its population more than double since the war. The widening offensive has displaced more Gazans who are now forced into a sliver of territory in Rafah, on the Egyptian border. Israel, which has witnessed mounting international criticism, seems unfazed by the unfolding humanitarian tragedy. Prime Minister Benjamin Netanyahu says Israel will continue the war until its goals are met — primarily the dismantling of Hamas.

When Israel stormed the al-Shifa hospital in northern Gaza, its claim was that a Hamas command centre was located in underground bunkers. Weeks after raiding the enclave's largest medical facility, Israel is yet to provide any proof that it was a command centre. Now, the IDF claims that top Hamas leaders, including Yahya Sinwar, are based in southern Gaza. The world did nothing when Israel turned northern Gaza into what the UN called a "graveyard of children". It should not be allowed to repeat the same in the south. The war has already exposed tensions in America's support for Israel's war. Secretary of State Antony Blinken travelled to Israel last week and reportedly told the war cabinet that the conflict should end in days not in months. Secretary of Defence Lloyd Austin warned Israel against civilian casualties, saying "if you drive civilians into the arms of the enemy, you replace a tactical victory with a strategic defeat". But these warnings are not enough. The U.S. continues to send aid to Israel and President Joe Biden still refuses to call for a ceasefire. The violence has already triggered regional tensions with Hezbollah firing rockets into Israel and the latter retaliating, and the Houthis of Yemen launching drones and missiles towards Israel, which are mostly being intercepted by American systems. An end to the violence in Gaza has become imperative for regional stability. Israel is unlikely to pause the offensive on its own. But the U.S. and other major regional powers should press Israel and Hamas to restart negotiations to find a lasting ceasefire and the release of hostages.

WHAT IS ARTICLE 99 OF THE UN CHARTER, INVOKED FOR THE FIRST TIME IN DECADES AS ISRAEL ATTACKS GAZA

Article 99 of the UN Charter allows the Secretary-General to bring attention to the Security Council about matters that, in their opinion, may threaten international peace and security. UN Secretary-General Antonio Guterres invoked Article 99 amid Israel's attacks on Gaza, urging the Council to help avert a humanitarian catastrophe by declaring a humanitarian ceasefire.

The UNSC is one of the principal organs of the UN. It comprises five permanent members – the United States, the United Kingdom, France, China and Russia – and 10 non-permanent members appointed for specific periods. On a rotational basis, each of these 15 countries holds the presidency for a month. The South American country of Ecuador is the President for December 2023.



The UN Charter is the founding document of the United Nations. Based on the powers conferred through it, the UN can take action on a wide variety of issues. The Charter is considered an international treaty, meaning UN Member States are “bound by it”. However, in practice, there is little that member countries can be forced to do.

This move is rare, and in the past, Article 99 has been invoked in situations such as the upheaval in the Republic of the Congo in 1960 and a complaint by Tunisia in 1961 against France's military actions. Guterres called for urgent action to spare the civilian population from further harm in Gaza and pressed for a humanitarian ceasefire. The United Arab Emirates presented a draft resolution to the UNSC based on Guterres' letter, demanding an immediate humanitarian ceasefire, but unanimous support from the permanent members is unlikely.

However, it is unlikely that the vote will see permanent members' unanimous support. The US and Britain have expressed support for Israel's military actions since October 7.

WHAT VLADIMIR PUTIN'S VISIT TO SAUDI AND UAE SIGNALS

Russia's President Vladimir Putin made a daylong visit to Abu Dhabi and Riyadh on Wednesday and, the very next day, hosted President Ebrahim Raisi of Iran at the Kremlin. Before this week, Putin had visited only China and Iran after Russia's invasion of Ukraine in February 2022. Russia is seen to have obtained a clear upper hand in the war in recent weeks, with the attention of the West focused on Gaza, and Ukraine facing a crisis of men, weapons, and funds.

Saudi and Russia together control one-fifth of the world's oil that is pumped each day. High prices of oil have sustained Russia's war in Ukraine, and further strengthened the Saudi economy.

Putin, who is 71 and has been in power continuously since the turn of the millennium, is eligible to seek two more six-year terms after his current term expires next year. This potentially allows him to remain in power until 2036.

...And signals for the world

More importantly, Putin, whom the West has sanctioned heavily, is looking for global partners to signal that he is not isolated.

Over the last year, MBS and MBZ (as Sheikh Mohamed is known), both leaders of rich and influential countries, have projected themselves as bridge-builders in a polarised world. Importantly, both countries are also key partners of the United States in the region.

In an article published on December 7 in *The Intelligence Operative*, the house journal of the Russian Foreign Intelligence Service (SVR), Putin's spy chief Sergei Naryshkin predicted that the US support for Ukraine would turn the conflict into a “second Vietnam”, a “black hole absorbing more and more resources and people”.

The West has given Ukraine more than \$246 billion in aid and weapons so far. But on Wednesday, Republicans in Congress blocked a \$111 billion emergency spending bill that would give about \$50 billion in security assistance to Kyiv, and more for economic and humanitarian aid.

They ignored appeals by President Joe Biden, who cautioned that “If Putin takes Ukraine, he won't stop there”, and “we'll have something that we don't seek and that we don't have today: American troops fighting Russian troops.”



NEEDLESS DIVERSION

Venezuela's move to hold a referendum on whether it should exercise sovereignty over Essequibo, a vast, oil-rich disputed region that is now part of neighbouring Guyana, has cut open old wounds and inflamed tensions between the South American nations. According to Venezuela's electoral authorities, more than 95% of the voters supported the country's claim. It is not clear what the government of President Nicolás Maduro is going to do next, but the fact that he held the referendum with just months left for the next presidential election suggests the leftist leader might keep the border tensions alive. Venezuela has always retained claims over Essequibo, which it says was stolen when the north-south border was drawn by colonial powers over a century ago. In 1966, Venezuela and the U.K. entered into a temporary Geneva Agreement on the border (Guyana was a British colony) to maintain the status quo while seeking to find a practical, peaceful and satisfactory solution for all. Tensions eased when Hugo Chávez, Mr. Maduro's leftist predecessor, was the President. But when an oil boom began transforming Guyana's economy, Mr. Maduro's regime started becoming more vocal about the country's claims over the region.

Guyana, the only English speaking country in Latin America, maintains that the 1899 border agreement between international arbitrators (from Britain, Russia and the U.S.) is final and approached the International Court of Justice in 2018, requesting a ruling. Venezuela on the other side has always argued that it was not part of the 1899 agreement, which it calls null and void. When Guyana moved the world court requesting a ban on the referendum, the court refused to do so but asked Caracas not to take any action based on the referendum altering the status quo. But Mr. Maduro has already dismissed the world court's jurisdiction over the dispute. He is under growing international pressure to hold free elections. Recently, the U.S. eased sanctions on Venezuela as the Maduro government reached a deal with the opposition for next year's election. While Mr. Maduro retains a tight grip over state institutions, he is also unpopular with sections who are increasingly frustrated with the state of the economy, particularly shortages of essentials, and hyperinflation. While a border crisis could be a welcome distraction for him from domestic woes as elections are approaching, it does not offer any solution to the myriad crises that the oil-rich South American country is facing. If anything, a border conflict would make the situation worse. Mr. Maduro should refrain from taking any unilateral action and continue to try and resolve the territorial issues with Guyana through talks in the true spirit of the Geneva Agreement.

CLASHES ERUPT IN SWEDEN'S THIRD LARGEST CITY AFTER ANOTHER QURAN BURNING AND AT LEAST 3 ARE DETAINED

Clashes erupted in Malmo, Sweden's third-largest city, after an anti-Muslim protester burned a Quran. The events, described as a "violent riot" by police, involved rock-throwing and the burning of dozens of cars, leading to at least three detentions. The clashes began when anti-Islam activist Salwan Momika burned the Quran, prompting an angry mob's reaction. Momika, a refugee from Iraq, has been involved in similar anti-Islam protests in Stockholm in recent months, leading to protests, attacks on Swedish diplomatic missions, and threats from Islamic extremists.

In the past months, Momika, a refugee from Iraq, has desecrated the Quran in a series of anti-Islam protests mostly in Stockholm that have caused anger in many Muslim countries. Swedish police have allowed his actions, citing freedom of speech.



The Quran burnings have sparked angry protests in Muslim countries, attacks on Swedish diplomatic missions and threats from Islamic extremists. Muslim leaders in Sweden have called on the government to find ways to stop the Quran burnings.

Sweden dropped its last blasphemy laws in the 1970s and the government has said it has no intention to reintroduce them.

However, the government has announced an inquiry into legal possibilities for enabling police to reject permits for demonstrations over national security concerns.

EXPRESS VIEW: THE FAMILIAR GASLIGHTING OF KIM JONG-UN

In an age of Animals and alpha men, a manipulative softboi has emerged from the unlikeliest of quarters. Supreme Leader of North Korea, dictator and all-around Bond villain, Kim Jong-un, was moved to tears over the fate of communism in his country. At the fifth National Conference of Mothers in Pyongyang, Kim spoke about the decline in birthrates in the country, and exhorted women to have more children. The demographic demand, though, couched as it was in the rhetoric of the importance of mothers, was also a textbook example of gaslighting.

North Korea's fertility rate, at 1.88, has declined but is still well ahead of South Korea (0.78), which is staring at a genuine population crisis. But in the latter, women are neither blamed nor held responsible for the situation — at least not as openly as Kim has done. But then, what choice does a dictator have? He cannot, after all, admit that according to most experts, the decline in fertility in North Korea is likely a result of his policies. The prolonged economic crisis has meant that most couples cannot afford more than one child. And years of forced family planning measures come with their own traumas. Addressing these structural issues requires a system that is more responsive and nuanced, not the tears of a dictator.

There is, of course, something most Indian women will recognise in Kim's outburst. Generation after generation, conservative family members have framed attempts at control in the language of duty. "All mothers should fulfil their responsibility and duty to society and families," could easily be a post by the patriarch in a family WhatsApp group. And the tears of partners and in-laws are among the most standard coercive tools in families. There's one thing to be said for the Indian family over the North Korean dictator though: At least the parivar doesn't pretend to be communist.



NATION

INDIA-ITALY TIES: HOW THE 'MELODI' CAME AFTER SETBACKS, WHAT IS AT STAKE

Last week, the hashtag #Melodi trended widely on social media, after Prime Minister Narendra Modi responded to a post on X by his Italian counterpart Giorgia Meloni. Meloni had posted a selfie with Modi, taken on the sidelines of the COP28 meet in Dubai, saying "Good friends at COP28". Meloni also added #Melodi, a combination of the two leaders' names.

Modi reposted the picture, writing: "Meeting friends is always a delight." The bonhomie and the hashtag represent the new harmony in India-Italy ties, coming after some rough years.

History

India and Italy are ancient civilisations with links going back 2,000 years. Italian port cities were important trading posts on the spice route. The Venetian merchant Marco Polo traveled to India in the 13th century and wrote about his experiences.

In the last century, Nobel Laureate Rabindranath Tagore visited Italy in May-June 1926, a visit arranged by Carlo Formichi, a Professor of Sanskrit at the University of Rome. Mahatma Gandhi visited Rome in December 1931 on his way back from the Round Table Conference in London. Leaders of the Indian freedom struggle read the works of the Italian revolutionary Mazzini.

Indian troops, serving with the British Indian Army, were deployed in Italy during World War II, fighting against the Germans and Mussolini's forces. After Independence, political relations between India and Italy were established in 1947. Since then, there has been a regular exchange of visits at political and official levels between both countries, including several visits by Heads of States.

Decade of setbacks

The Italian marines case: The bilateral ties faced a setback in 2012, when two Italian marines were accused of killing two Indian fishermen in February that year.

The marines, Salvatore Girone and Massimiliano Latorre, were guarding an Italian oil tanker off the coast of Kerala when they fired on the boat carrying the fishermen. The marines said they mistook the fishermen for pirates, and Italy argued the fishermen failed to heed warnings to stay away from the MV Enrica Lexie tanker. The two were arrested and charged with murder.

They were moved from Kerala to New Delhi, and stayed at the Italian embassy complex while their trial was on. The Italian ambassador at that time had to be their guarantor. The case blew up, with then Prime Ministerial candidate Narendra Modi raising it in his poll campaign in the run-up to the Lok Sabha elections in 2014. With the trial pending, the two men were allowed to return to Italy. In 2015, the two countries took the case to the Permanent Court of Arbitration (PCA) in Hague.

The PCA ordered Italy to pay compensation to India "for loss of life" and the cases were closed after Italy paid the agreed amount of Rs 100 million. Finally, the case was closed in 2021.

AgustaWestland allegations: Another controversy was the corruption allegations over the AgustaWestland deal.



In 2011-12, an investigation by the Italian attorney general's office into alleged unethical dealings by the state-backed defence major Finmeccanica widened to include corruption in an over Rs 3,500-crore deal signed with India by the group's subsidiary AgustaWestland.

The 2010 deal was a contract to supply 12 AW-101 helicopters to the IAF. After the corruption allegations came to light, the issue quickly snowballed in India. Sonia Gandhi's Italian origins gave the BJP further ammunition to attack the Congress, already reeling under graft scandals.

After the cancellation of the contract and after winning a legal case in Italy in June 2014, the Indian government encashed guarantees to the tune of Rs 2,000 crore. The Italian courts in 2018 dismissed all charges, on grounds of insufficient evidence. This verdict was upheld by the Supreme Court in Italy in 2019.

The repair

Work to repair the ties started 2018 onwards.

When then External Affairs minister Sushma Swaraj led an official delegation for the canonisation ceremony of Mother Teresa at the Vatican from September 2-5, 2016, she met her Italian counterpart Paolo Gentiloni, and the two sides decided to celebrate the 70th year of diplomatic ties. In 2018, this celebration was observed through a series of cultural events.

External Affairs minister S Jaishankar visited Rome in December 2019 and met then Prime Minister Giuseppe Conte. PM Modi and PM Conte co-chaired a Virtual Summit between India and Italy on November 6, 2020. At this, the 2020-2025 Action Plan was adopted, setting the ambitious agenda for an enhanced partnership between the countries. Modi paid his first official visit to Italy in October 2021 to attend the G20 leaders' summit. On the sidelines of the Summit, he held a bilateral meeting with then PM Mario Draghi.

On March 2-3, 2023, PM Meloni paid a state visit to India following her election win in September 2022. This was the first high-level visit from Italy to India after a gap of 5 years. During the visit, Meloni and Modi held discussions on promoting green economy, energy security and transition, defence co-production and co-innovation, and the blue economy.

The major outcome of the visit was the elevation of the bilateral relationship to the level of Strategic Partnership. A startup bridge between Indian and Italian startup companies was also established. She was also the Chief Guest and Keynote Speaker at the Raisina Dialogue 2023. When Meloni visited again in September this year for the G20 leaders' summit, the two sides were on the same page for the India-Middle East-Europe economic corridor. And, Italy's move to pull out of China's Belt and Road Initiative has added a strategic dimension to the ties.

The stakes

With Italy, India had a bilateral trade of USD 13.229 billion in 2021-22, a more than 50% increase over the previous financial year. Italy is India's 4th largest trading partner in the EU.

Over 600 large Italian companies are active in India, covering varied sectors. Italian brands such as Fiat and Piaggio to the recent Ferrero Roche, KinderJoy, Tic Tac, etc. are household names in India.

Strategically, Italy wants to partner with India in the defence sector. In 2016, following a corporate reorganisation, AgustaWestland merged into Leonardo SpA, Finmeccanica's new name, as its



helicopter division. Then Chief of Army Staff, General MM Naravane visited Italy from July 7-9, 2021. His visit took place after 14 years and at the Service Chief Level, the interaction occurred after more than a decade.

The Italian Defence Minister conveyed Italy's desire to "reboot defence relations with India". Dr. Matteo Peregò Di Cremnago, Italian Minister of State for Defence, led the Italian delegation in the Aero India Show in February 2023. With Leonardo again back in play, the Italian defence major is trying to rebuild ties.

Italy has also deployed an official from its Embassy for the Information Fusion Center-Indian Ocean Region (IFC-IOR) in February 2023 to enhance maritime security and to counter anti-piracy operations across the Indian Ocean Region.

Rethink by Italy on China

India has opposed the BRI since its inception, since it violated India's territorial integrity by crossing through Pakistan-occupied Kashmir. In 2019, during Chinese President Xi Jinping's visit to Rome, Italy became the first G7 country to join the BRI, in the hopes of China serving as a market for Italian products and Chinese investment boosting Italian infrastructure.

But the BRI would not meet Italian hopes and expectations. "Since Italy joined the BRI, its exports to China have increased from 14.5 billion euros to 18.5 billion euros, while Chinese exports to Italy have grown far more dramatically, from 33.5 billion euros to 50.9 billion euros. Similarly, Chinese FDI in Italy also dropped from \$650 million in 2019 to just \$33 million in 2021," an assessment by David Sacks, a fellow for Asia studies at the Council on Foreign Relations (CFR), said in August this year.

For the past year, Meloni has indicated that joining the BRI was a "big mistake" that she intended to correct. With its five-year memorandum of understanding up for renewal in March 2024, Italy has officially conveyed its position to Beijing. Thus, while Delhi and Rome view Beijing from different prisms and vantage points, India-Italy ties have found another strategic glue: that Beijing is not benevolent and benign power. The improvement in ties is music to the ears of both New Delhi and Rome. And while the melody is most apparent under Meloni's term, the long and arduous process was set in motion under Conte and Draghi.

ONLINE TIGER

Gurpatwant Singh Pannun, the New York-based attorney at the centre of a brewing India-U.S. crisis over an alleged attempt of assassination, first came to the attention of the public because of his campaign against the Aam Aadmi Party's fundraising activities in Canada. In 2016, Mr. Pannun started his now famous campaign mostly focusing on media channels complaining about the money that the AAP's Punjab leaders were allegedly raising from among the NRIs in Canada.

He opposed the fundraising saying Canadian laws did not allow that. He had claimed then that his lobbying had forced the Canadian government to stop AAP convenor Arvind Kejriwal from visiting Canada to raise funds. The attorney chose automated phone calls to the Indian media and social media influencers and spam emails as his chosen mode of communication.

Mr. Pannun had founded Sikhs for Justice in 2007 in memory of those killed in the 1984 anti-Sikh violence in Delhi and other parts of India in the aftermath of the assassination of Prime Minister Indira Gandhi. The Amritsar-born attorney believes in securing justice for those who perished in



that wave of violence as well as the uprising against the Indian state under Sant Bhindranwale that he in a recent interview with TIME magazine has described as “civil disobedience”.

Mr. Pannun landed in the U.S. in the 1990s and initially worked in an international bank before training to be an attorney. Mr. Pannun indicated in the interview that he was not satisfied with the way the legal options worked in getting justice in the cases concerning the victims of the anti-Sikh violence of 1984, and added, “so I decided I was going to use international laws to hold individuals accountable.”

Pro-Khalistan faces

He has been one of the few pro-Khalistan faces that gained attention in the last decade. While Amritpal Singh, who was at the centre of a cat and mouse chase earlier this year, and Deep Sidhu, who raised the Khalsa flag on the Red Fort during January 26, 2021, posed a challenge while being in India, Mr. Pannun has not visited India in recent years and is a dual U.S.-Canada citizen. Earlier this year, the National Investigative Agency (NIA) seized Mr. Pannun’s house in Chandigarh and an estate in Amritsar that belonged to his family.

Mr. Pannun who is fond of making video commentary hit the headlines on November 4 when he delivered a warning in Punjabi asking Indians not to board Air India after November 19. He also said the Indira Gandhi International Airport in Delhi would remain closed on that date. The online threat which went viral prompted the NIA to press charges against him under the UAPA (Unlawful Activities Prevention Act).

The Ministry of Home Affairs outlawed the Sikhs for Justice on July 10, 2019. Mr. Pannun was declared a terrorist on July 1, 2020. The attorney who is at times is seen with personal security guards gained greater prominence in the aftermath of the killing of Hardeep Singh Nijjar in Surrey, Canada, on June 10. The incident that triggered a major diplomatic spat between India and Canada is yet to be fully resolved as Canada has been insisting on India carry out a transparent investigation into allegations about what Prime Minister Justin Trudeau described as involvement of “Indian agents”.

After Nijjar’s killing, Mr. Pannun had carried out a series of campaigns against Indian diplomats stationed in Canada, the U.S., the U.K., Australia and New Zealand. These online campaigns were amplified by offline activism and triggered clashes among Indian community members in locations such as Brisbane, London, San Francisco, New York, etc.

With the latest allegation from the U.S., which accused Indian officials of planning an assassination of Mr. Pannun, the online Khalistani advocate has finally found the space that he had been looking for since 2007. While the U.S. authorities have indicated that they want a thorough probe into the alleged plot, there are uncomfortable question about the threat to Air India that Mr. Pannun has not answered till now.

WOONG INDIAN TOURISTS WITH VISA-FREE ENTRY

The story so far:

Malaysia has become the latest country to extend the advantage of visa-free travel to Indian citizens. The facility will be extended to Indian travellers till December 31, 2024 and will be valid for 30 days from the date of entry. The initiative is aimed at ensuring hassle-free travel for Indians who have emerged as one of the major tourist groups visiting Malaysia in the recent past.



According to industry sources, at present there are around 26 countries that extend visa-free entry to Indian citizens for various reasons.

What does the Malaysian decision imply?

Tourism has emerged as one of the key focus areas for Malaysia's post-COVID recovery strategy. Renowned for its scenic locations like the Langkawi beaches, Malaysia's tourism sector was hit hard during the COVID period when travel restrictions and visa problems nearly decimated its tourism industry. But under the Anwar Ibrahim government, Malaysia is taking serious steps to recover its leadership in the tourism sector. According to the Malaysia Tourism Promotion Board, 10.7 million visitors chose to visit the country in 2022 bringing in more than \$28 billion to the economy. The recovery can be measured by the fact that during the peak COVID period of 2021, only 0.13 million tourists visited Malaysia. The visa-free facility to Indian (and Chinese) travellers is, therefore, aimed at making the country a more attractive destination for recreation seekers from two of the major Asian economies.

Which are the other countries extending visa-free travel to Indians?

Among the major regional tourism destinations, Sri Lanka and Thailand are the nearby economies that have also extended visa-free travel facility to Indians. Sri Lanka which was hit by an economic crisis in 2022 has a reason to make itself an attractive destination. Its visa-free policy for Indians is driven by both economic and political reasons.

What are the categories of visa exemption?

India has visa exemption agreements with many countries in the world that cater to multiple categories of visas. According to the Ministry of External Affairs, at least 34 countries across the world, have agreements with India that exempt visas for the holders of Indian diplomatic passports. These include Germany, France, Iran, Japan, Norway, Turkey and others. That apart there are at least 99 countries with which India has operational agreements for "diplomatic, service/official passport holders". According to the MEA, (un-updated list), there are 16 countries that offer visa-free travel facility for a certain period of time to ordinary Indian passport holders — this includes, Nepal, Bhutan, Fiji etc. The list, however, keeps changing as countries keep on experimenting with their visa policy. According to the latest estimate available in the Passport Index website, there are at least 26 countries at present that provide visa-free facility to ordinary Indian passport holders.

Is the visa-free facility permanent?

Countries extend visa-free facility to Indian tourists for a certain amount of time or for a period depending on their advantage. But there are factors on the ground that may also determine whether a particular tourist is suitable for such facilities. Malaysia, for example, has mentioned that the scheme will be subjected to security clearance. Similarly, visa-free facility does not mean relaxation of security protocol in the port of entry. For example, in Dominica and El Salvador — that provide visa-free entry to Indians — strict checks are carried out in airports to prevent illegal or undocumented immigration to the Americas from India. There are reports from places like Guatemala that extended visa-free travel to Indians but withdrew in view of fear of undocumented immigration.



What are other advantages countries are providing to increase Indian tourist flow?

Tourism destinations like Singapore, Egypt and Albania provide e-visa facility to attract Indian travellers. E-visa is helpful for countries that do not have formal diplomatic missions in India. "Today, tourism plays a vital role in a nation's economy. Many countries, as a result, offer various attractions for tourists from across the world to visit the country. One such attraction is removing the usual hassles of travel logistics, such as visas. Therefore, providing visa free entry to tourists creates a large impetus for tourism, which is perhaps one of the prime reasons why many countries have extended such facilities," Honorary Consul General of Albania Dikshu Kukreja told The Hindu.

GOVT. NEEDS LATITUDE TO MAKE PEACE, SAYS CJI

Noting that the government should be given leeway if a 'compromise' is necessary to save the nation, Chief Justice of India D.Y. Chandrachud said on Wednesday that the Assam Accord of 1985 and the new citizenship regime which followed in its wake might have been an "adjustment" reached by the Rajiv Gandhi government to calm the waves of violent anti-immigrant protests that rolled over the northeastern State for years, and threatened national peace. "You must give the government that latitude. Even today, there are States in the northeast affected by insurgency and violence...," Chief Justice Chandrachud, heading a Constitution Bench, observed.

The Bench was hearing a series of petitions filed by indigenous groups from Assam which have challenged Section 6A of the Citizenship Act of 1955. The petitioners, represented by senior advocate Shyam Divan, claimed the provision became a "beacon" for more foreign "infiltration" into Assam, leading to the destruction of the local cultural identity.

'Not justified'

Mr. Divan said a justification that there was a violent political agitation, leading to a political settlement, was not sufficient basis to single out Assam for implementing an entirely new citizenship regime under Section 6A.

"Illegal immigration into Assam has been rewarded with the benefits of Indian citizenship," Mr. Divan submitted. "Obviously, every compromise made is never perfect. The State of Assam was riven with strife at the time. Does the government arrive at this compromise to bring peace to Assam or allow the strife-ridden State to continue in its path of violence merely because the compromise may 'discriminate' among States... These are vexed issues. Any solution found can be an inexact one," the CJI asked Mr. Divan.

But the senior lawyer argued that Section 6A was discriminatory in itself.

ON RE-CRIMINALISING ADULTERY

The story so far:

Last month, the Parliamentary Standing Committee on Home Affairs, examining the three new criminal law Bills set to replace the Indian Penal Code (IPC), Code of Criminal Procedure (CrPC), and the Indian Evidence Act, recommended the criminalisation of adultery on gender-neutral lines. This comes after a five-judge Constitution Bench of the Supreme Court unanimously decriminalised adultery in 2018 on several grounds including discrimination. The Committee reasoned that adultery be criminalised in a gender-neutral manner on the ground that it is crucial



to safeguard the sanctity of the institution of marriage. Opposition MPs have refuted this claim by underscoring that it is “outdated to raise marriage to the level of a sacrament” and that the state has no business entering into the private lives of couples.

What has the panel recommended?

In its 350-page report, the Committee suggested that adultery be reinstated as a criminal offence, but be made gender-neutral, thereby making both men and women equally culpable under the law. Highlighting the need to protect the institution of marriage, the report stipulates, “..the Committee is of the view that the institution of marriage is considered sacred in Indian society and there is a need to safeguard its sanctity.” The Committee also said that the revoked Section 497 of the IPC “only penalised the married man, and reduced the married woman to be a property of her husband.”

In his dissent note to the three Bills, Congress MP and former Home Minister P. Chidambaram emphasised that interference by the State in the private lives of consenting adults must be avoided. “Adultery should not be a crime. It is an offence against marriage which is a compact between two persons; if the compact is broken, the aggrieved spouse may sue for divorce or civil damages. To raise marriage to the level of a sacrament is outdated. In any event, a marriage concerns only two persons and not society at large. The State has no business to enter into their lives and punish the alleged wrongdoer,” the note reads.

What is its legislative history?

Lord Macaulay, instrumental in the early drafting process of the IPC, was not inclined to make adultery a penal offence, believing that a better remedy lay in pecuniary compensation. Distinguishing between a moral wrong and an offence, he wrote, “we cannot admit that a Penal code is by any means to be considered as a body of ethics, that the legislature ought to punish acts merely because those acts are immoral, or that because an act is not punished at all it follows that the legislature considers that act as innocent.” However, when the Court Commissioners reviewed the Penal Code, they believed it was important to make adultery an offence. The proposed section rendered only the male offender liable, keeping in mind “the condition of the women in this country” and the law’s duty to protect it.

In 1971, the Law Commission of India in its 42nd Report deliberated on the benefits of criminalising adulterous conduct. It noted, “though some of us were personally inclined to recommend repeal of the section, we think on the whole that the time has not yet come for making such a radical change in the existing position.” Notably, there was a strong dissent by Anna Chandy, who voted to revoke the provision saying it was the “right time to consider the question whether the offence of adultery as envisaged in Section 497 is in tune with present day notions of woman’s status within marriage.” The Commission did, however, recommend an important amendment — removal of the exemption from liability for women. Such a recommendation was reiterated in its 156th Report, taking into account the ‘transformation’ society has undergone.

In 2003, the Committee on Reforms of the Criminal Justice System, known as the Malimath Committee, proposed in its report that adultery be retained an offence but on gender-neutral terms. It observed that the “..object of the Section is to preserve the sanctity of marriage. Society abhors marital infidelity. Therefore, there is no reason for not meting out similar treatment to the wife who has sexual intercourse with a man (other than her husband).”



Why was the earlier law repealed?

A five-judge Constitution Bench of the Supreme Court led by then Chief Justice of India (CJI) Dipak Misra, and comprising current CJI D. Y. Chandrachud, and Justices A. M. Khanwilkar, R. F. Nariman, and Indu Malhotra, in *Joseph Shine versus Union of India* (2018), held that adultery is not a crime and struck it off the IPC. It, however, clarified that adultery would continue to remain a civil wrong and a valid ground for divorce.

The inception of the proceedings date back to 2017 when Joseph Shine, a non-resident Indian, hailing from Kerala, filed a Public Interest Litigation (PIL) under Article 32 of the Constitution, challenging the constitutional validity of the offence of adultery under Section 497 of the IPC read with Section 198(2) of the CrPC. The offence imposed culpability on a man who engaged in sexual intercourse with another man's wife and was punishable with a maximum imprisonment of five years. However, the wife who had consented to sexual intercourse with a man, who was not her husband, was exempted from prosecution. The provision was also not applicable to a married man if he engaged in sexual intercourse with an unmarried woman or a widow.

Notably, Section 198(2) of the CrPC empowered only the husband (of the adulterous wife) to file a complaint for the offence of adultery. In July 2018, the Centre filed an affidavit in the case arguing that diluting adultery in any form would weaken the institution of marriage and that the 'stability of a marriage is not an ideal to be scorned'. On September 27, 2018, the Bench pronounced a unanimous ruling in the form of four concurring judgments.

Former CJI Dipak Misra (writing for himself and Justice A.M. Khanwilkar), highlighted that adultery is not a crime if the cuckolded husband connives or consents to his wife's extra-marital affair, thereby treating a married woman as her husband's 'chattel'. Underscoring that adultery is "absolutely a matter of privacy at its pinnacle," the judge reasoned, "If it is treated as a crime, there would be immense intrusion into the extreme privacy of the matrimonial sphere. It is better to be left as a ground for divorce." Justice R.F. Nariman, in his concurring opinion, observed that Section 497 made a husband the 'licensor' of his wife's sexual choices and that this archaic law does not square with today's constitutional morality. He added that the offence perpetuates the gender stereotype that the 'third-party male' has seduced the woman, and she is his victim.

Reiterating similar concerns, Justice D.Y. Chandrachud held that the criminalisation of adultery subjugated the woman to a position where the law disregarded her sexuality. He reasoned, "Marriage does not mean ceding autonomy of one to the other. The ability to make sexual choices is essential to human liberty. Even within private zones, an individual should be allowed her choice." Notably, Justice Indu Malhotra was categorical that the autonomy of an individual to make his or her choices concerning his/her sexuality in the private sphere should be protected from criminal sanction. She explained that adultery although a moral wrong qua the spouse and the family, does not result in any wrong against the society at large in order to bring it within the ambit of criminal law.

According to senior Advocate Gopal Sankaranarayanan, the problem with adultery being in the IPC was two-fold. The first is criminalising it on the basis of the institution of marriage and the second is treating women as property. Making it gender neutral would do away with the second, but still leave the first.



Can such a ruling be overturned?

A ruling of the Supreme Court establishes a precedent and binds the lower courts to follow its dictat. However, the Parliament is well within its scope to overrule judicial rulings, but such legislative action will be considered valid only if the legal basis of the judgment is altered. Elaborating on this, the Supreme Court in *Madras Bar Association versus Union of India* (2021) held that “the test for determining the validity of validating legislation is that the judgment pointing out the defect would not have been passed if the altered position as sought to be brought in by the validating statute existed before the Court at the time of rendering its judgment. In other words, the defect pointed out should have been cured such that the basis of the judgment pointing out the defect is removed. “

In September this year, a division bench of the Supreme Court in *NHPC Ltd. versus State of Himachal Pradesh Secretary* reiterated that the legislature is permitted to remove a defect in an earlier legislation, as pointed out by a constitutional court, and that laws to this effect can be passed both prospectively and retrospectively. However, the court cautioned, ‘.where a legislature merely seeks to validate the acts carried out under a previous legislation which has been struck down or rendered inoperative by a Court, by a subsequent legislation without curing the defects in such legislation, the subsequent legislation would also be ultra-vires.’

IS UNMARRIED WOMEN HAVING CHILDREN BY SURROGACY AN ‘ACCEPTED NORM’, ASKS SC

“A single woman bearing a child is an exception and not a rule in Indian society because our society says to have children within marriage. A single woman bearing a child is outside marriage... That is not the accepted norm of Indian society,” Supreme Court judge B.V. Nagarathna orally observed.

The Bench, including Justice Ujjal Bhuyan, was hearing a petition filed by a 38-year-old single woman to become a mother through surrogacy. The petitioner, represented by senior advocate Saurabh Kirpal, said she was “heavily diabetic” and pregnancy would pose a grave risk to her. “Even an unmarried woman has the right to have a child,” he said.

The Surrogacy (Regulation) Act, 2021 allows a widow, a divorced woman between the ages of 35 and 45, or an infertile couple to get the benefit of surrogacy. Mr. Kirpal said the law only banned commercial surrogacy. The purpose of the petitioner was obviously not towards that end. Limiting the right to become a mother and discriminating against a woman on the basis of her status of marriage was discriminatory and violative of her fundamental rights.

Justice Nagarathna said Parliament had recognised the “potential” of a widow or a divorcee to have a child through surrogacy.

The petitioner’s side argued that it was not their “misfortune” which led Parliament to allow divorcees and widows to have children through surrogacy. They argued that the exclusion of unmarried women boiled down to “patriarchal stigma” against them.



SC PULLS UP CALCUTTA HC OVERRULING THAT ASKED ADOLESCENT GIRLS TO 'CONTROL SEXUAL URGES'

PULLING UP the Calcutta High Court for its observations in a ruling, in which it advised adolescent girls to “control sexual urges”, the Supreme Court Friday said that many parts of the judgment were “highly objectionable and completely unwarranted”.

In its ruling on October 18 in a case of kidnapping and sexual assault of a young girl, a division bench of Justices Chitta Ranjan Dash and Partha Sarathi Sen of the High Court had also stated that it was the duty of every adolescent girl to “protect her right to integrity of her body”.

The ruling came on the appeal of the accused against a trial court order of September 2022 that convicted him.

Issuing notice to the state of West Bengal, the accused and the victim girl, the Supreme Court bench comprising Justices A S Oka and Pankaj Mithal said, “The issue before the High Court was about legality and validity of the judgment dated September 19/20, 2022, by which the appellant before it was convicted...”

“The High Court was called upon to decide only the merits of the appeal and nothing else,” the bench said. “Prima facie, we are of the view that in such a case, the honourable judges are not expected to either express their personal views or preach.”

“After having carefully perused the judgment, we find that many parts thereof, including paragraph 30.3, are highly objectionable and completely unwarranted. Prima facie, the said observations are completely in violation of rights of adolescents under Article 21 of the Constitution of India,” the bench said.

The contentious observations of para 30.3 of the High Court judgment are: “It is the duty/obligation of every female adolescent to: (i) Protect her right to integrity of her body; (ii) Protect her dignity and self-worth; (iii) Thrive for overall development of her self transcending gender barriers; (iv) Control sexual urge/urges as in the eyes of the society she is the loser when she gives in to enjoy the sexual pleasure of hardly two minutes; (v) Protect her right to autonomy of her body and her privacy.”

The Supreme Court said that the suo motu writ petition under Article 32 of the Constitution was “initiated mainly due to sweeping observations/findings recorded by the Division Bench of Calcutta High Court”.

The counsel appearing for the state of West Bengal sought time to ascertain whether the state has filed any appeal against the judgment or intends to do so. The court appointed Senior Advocate Madhavi Divan as Amicus Curiae.

EXPRESS VIEW ON BJP MP'S COMMENTS ON LIVE-IN RELATIONSHIPS: HER CHOICE

BJP MP from Haryana Dharambir Singh's assertion that live-in relationships are a dangerous disease that requires eradication is of a piece with similar claims voiced by elective representatives across party lines from time to time. While Singh has urged for a law to protect Indian culture from the so-called evils of the West — in this case the freedom to choose who to love and how to consummate it — he was only echoing what many before him have said.



Last year, for instance, in the aftermath of a gruesome murder of a young woman by her live-in partner, Union Minister of State, Ministry of Housing and Urban Affairs, Kaushal Kishore, had suggested that educated women are complicit in violence against them when they opt for non-traditional relationships over marriages.

This tendency to police choices — be it with regard to partner or education, career or attire — reflects a pervasive and growing patriarchal anxiety over women claiming agency over their own lives. It is not incidental that it comes at a time when women have emerged as an irreversible force in India's public life, heading institutions such as the Council of Scientific and Industrial Research, helming projects such as Chandrayaan-2.

From the historic Nari Shakti Vandan Adhiniyam ensuring greater representation of women in legislatures to the permanent commission of women in the armed forces, from initiatives such as Beti Bachao Beti Padhao, and the Ujjwala scheme to the institution of Mahila Shakti Kendras in rural areas, the Centre, too, has repeatedly spoken of its commitment to women-led development. At such a time, the insistence on tradition as an arbiter of choice speaks of a failure to understand the aspirations of a large section of the nation's population, or comes as a backlash to its irrefutable expression.

Recently released data by the National Crime Records Bureau (NCRB) show an increase of 4 per cent in crimes against women in 2022 over the previous year. Of these, the largest number was perpetrated by intimate partners, family members or relatives. Just as India's low divorce rate is not any indication of the success of marriages, parental consent in the choice of a partner seems to offer little guarantee of a successful conjugal life. What will make a difference, though, is an unshackling of the mind from outdated ideas of sexism that cannot accommodate the idea of tradition moving, and changing, with the times.

THE ROLE OF SPECIAL INQUIRY COMMITTEES OF PARLIAMENT

The story so far:

The ethics committee of the Lok Sabha is believed to have recommended the expulsion of Trinamool Congress Member of Parliament (MP) Mahua Moitra from the Lok Sabha for her "unethical conduct" and "breach of privileges". This follows the ethics committee examining the complaints which accused her of asking questions to target a business house at the behest of a businessman in exchange for cash. She was also accused of sharing her log-in credentials with the businessman.

What is the role of ethics committee?

The ethics committee was constituted in 2000, to oversee the moral and ethical conduct of members and examine cases of 'unethical conduct' referred to it. The Committee examines complaints filed against members of the House by other members; outsiders through a member; or referred by the Speaker. The Committee makes a prima facie inquiry before deciding to examine a complaint and presents its report to the Speaker, who places it before the House for consideration. It must be noted that the term 'unethical' is not defined. It is left to the Committee to decide whether any act is unethical or not. In 2007, an MP accompanying his close female companion, impersonating her as his wife was considered 'unethical' by the Committee. It recommended suspension of the MP from 30 sittings of the House.



What are privileges committees?

The privileges committee or special inquiry committee examines the more serious accusations against a member. In 1951, a special committee found a member guilty of promoting a business interest by putting questions in return for financial benefits. It was again a special committee that inquired into the 'cash for query' scam of 2005 where 10 MPs of Lok Sabha were recommended for expulsion.

Is an expulsion constitutional?

The Constitution under Article 101 lists down the grounds for vacation of a seat by an MP. It includes voluntary resignation, disqualification and continuous absence from the House for 60 sittings. Expulsion is not mentioned explicitly in the Constitution. However, the Supreme Court has provided conflicting judgments in this regard. In *Raja Ram Pal versus Hon'ble Speaker* (2007), it upheld the power of Parliament to expel its members for breach of privilege by interpreting Article 101 to include expulsion as a ground.

But in *Amarinder Singh versus Special committee, Punjab Vidhan Sabha* (2010), the Supreme Court held expulsion by the State Assembly as unconstitutional. It held that such scenarios would frustrate the objectives of Parliamentary democracy.

How to reconcile privileges of the House and democratic representation?

The allegations of 'cash for query' against Mahua Moitra are serious in nature. However, can expulsion for such action be viewed as disproportionate punishment? Further, the citizens of the constituency would be left without a representative till next elections or a bye-election. The privileges of the House developed in medieval Britain to protect the House of Commons from an authoritarian King. It is important to preserve the dignity and privilege of the House. It is equally imperative, if not more in a modern democracy, to ensure that democratic representation is not prejudiced for political reasons. It must be noted that Parliamentary Committee proceedings are not as detailed as a judicial case that is conducted as per the Evidence Act. Even in this case, the ethics committee is believed to have recommended legal inquiry and the CBI has already registered a preliminary inquiry. It would be prudent to set up fast track courts to conduct trials for such cases in a time bound manner of say 60 days. If they are convicted in such a trial, it would result in their disqualification under the Representation of the People Act, 1951. Otherwise, they should continue to be a member of the House.

RS PASSES POST OFFICE BILL; PARTIES OPPOSE 'FREE HAND' TO OFFICERS

The Rajya Sabha passed the Post Office Bill on Monday, which repeals and replaces the Post Office Act of 1898. The Bill, the government said, will ensure the effective functioning of the postal department as a messenger service and as a provider of banking facilities. The Opposition, citing the provisions empowering any officer to intercept, open or detain any postal item in the interest of the security of the State, expressed concern that giving such a free hand to officers will harm the right to privacy. Section 9 of the Bill gives the power to intercept, open or detain any item or deliver item to customs authority by the post office officials.

Communications Minister Ashwini Vaishnaw said postal services were becoming irrelevant during UPA regime and there was a situation when post offices had to be phased out. "This new legislation is a reflection of the way post offices and postmen have been transformed into a service-delivery institution from being merely a mail-delivery mechanism, and the post offices



have been practically converted into banks,” Mr. Vaishnav said adding that 660 post offices were closed earlier but from 2014 to 2023, around 5,000 post offices were opened and about 5,746 new ones are in the process of being opened.

Congress MP Shaktisinh Gohil flagged the provisions in Section 9 and said the provision will infringe on the right to privacy. “I understand that security is important and you are doing it for the safety of the people but in the name of security... in which direction are we going,” he asked. His argument was supported by members of Left parties, AAP, Shiv Sena, DMK, TDP and other Opposition parties.

HOW EC DECIDES POLL SCHEDULE — AND WHY IT CHANGED MIZORAM’S COUNTING DATE

On Sunday, votes were supposed to be counted for new Assemblies in five states — Madhya Pradesh, Rajasthan, Chhattisgarh, Telangana, and Mizoram. That was until Friday, December 1. Then, late on Friday night, with just about 36 hours to go before counting began, the Election Commission of India (ECI) announced a change of plan: counting of votes for the Mizoram Assembly had been delayed by a day, and would now be held on Monday, December 4.

In a press release, the ECI said Sundays hold “special significance for the people of Mizoram” (and were therefore unsuitable for counting of votes) — referring to the fact that most people in the Christian-majority and deeply religious state attend church on Sunday mornings.

What does the Election Commission take into account while deciding the schedule for elections?

The election schedule includes all dates from the date of issue of gazette notification to the date before which the election process shall be completed. For ordinary voters, the two most important dates in the schedule are the date(s) of polling and counting.

The ECI can notify elections at any time within six months of the end of the term of Lok Sabha or a state Assembly, according to Sections 14 and 15 respectively of the Representation of the People Act, 1951. The election process has to be completed before the expiration of the existing term of Lok Sabha or the state Assembly.

While deciding the election schedule, the ECI looks at the availability and requirements for the movement of security forces, the logistics of arranging electronic voting machines (EVMs) and poll officials, as well as major national and local festivals, and the prevailing law and order situation.

If the terms of multiple state Assemblies are ending around the same time, the ECI tries to hold the elections together. While polling may be held on different days, the counting of votes usually happens on the same day.

So, what happened in this current round of Assembly elections?

After officials of the ECI, and the three Election Commissioners themselves, had made a series of visits to the five states to oversee preparations, the Commission announced the election schedule on October 9. Voting was to be held on four days — with Mizoram and roughly half the seats in Chhattisgarh going first on November 7, and Telangana last on November 30. Counting for all five states was scheduled on December 3.

According to sources in the ECI, the Commission did make sure that voting in Mizoram was not scheduled on a Sunday because a large number of electors attend church on Sunday. But counting was scheduled on a Sunday, along with the other four states.



However, after receiving several representations that counting should also not be on a Sunday, the ECI decided on December 1 to push back the counting in Mizoram by a day to December 4, Monday.

Have counting dates for elections been shifted earlier?

Yes, dates have been changed in earlier elections too, and various reasons have been given by the ECI.

In Mizoram itself, the ECI had initially announced that counting of votes in the Assembly elections of 2013 would be held on December 8, a Sunday, but had then changed the date to December 9, Monday.

In this round of elections, polling in Rajasthan was initially scheduled for November 23 — however, two days after making the announcement, the date was revised to November 25.

The ECI said political parties and social organisations had pointed out that there were “large scale wedding/ social engagement on that day which may cause inconvenience to large number of people”.

CIVIC VICTORY

A cursory look at the vote shares obtained by political parties in Mizoram — the victorious Zoram People’s Movement (ZPM) garnered 37.9%, the incumbent Mizo National Front (MNF) 35.1%, the Congress 20.8% and the Bharatiya Janata Party (BJP) 5.1% — suggests that the ZPM managed to win a clear majority, 27 out of the 40 seats, because of a fractured mandate. Yet, that will only be a limited reading as the regional party also upended a 36-year-old duopoly in the State with power rotating between the MNF and the Congress. Defeating the MNF was not easy either, as the Zoramthanga-led party had assiduously sought to promote ethnic nationalism by projecting its solidarity with the Kuki-Zo tribals in Manipur and the Chin people in neighbouring Myanmar, both of whom are mired in different conflicts. The Congress meanwhile tried to woo the voters in the predominantly Christian State by harping on the fact that the regional parties are prospective allies of the Hindutva-promoting BJP, especially the MNF which is part of the BJP-led North East Democratic Alliance. That a plurality of voters — more than a third of the 8.6 lakh strong electorate in India’s second least populous State — sought to look beyond the politics of ethnic nationalism or the communitarian appeals and endorsed the ZPM suggests that its call for a corruption-free regime and an agenda of governance with the interests of the youth at the core had a decisive number of takers.

The ZPM was successful in projecting itself as a force for change as it got popular members from Mizoram’s civil society to endorse the party, with even some to represent it as candidates. This gave a decisive heft to the party led by former IPS officer and presumptive Chief Minister Lalduhoma. With the ZPM coming to power on its own, it will be easier for it to remain true to its quasi-movement ideals, but it will receive overtures from the BJP (which won two seats) to accommodate the latter in a coalition. The ZPM will have to work out a delicate balance in achieving its goals of clean and independent governance even while seeking to build on the State’s relationship with the Union government. Smaller States, especially those in the North East, have limited avenues of resource mobilisation and are too dependent upon the Union government for their finances. Mizoram, for example, has among the highest Union transfers to revenue receipts ratios in the country — 85.7%. If the ZPM can focus on ways to diversify the economy beyond



agriculture, into areas such as eco-friendly tourism, and value-added services leveraging its population's high literacy rate and education, it can live up to its promise of decisive change in the State.

INVIDIOUS DIVIDE

The remark on North Indian States made by Dravida Munnetra Kazhagam Member of Parliament S. Senthilkumar in the Lok Sabha, since expunged from the records, was unworthy of a lawmaker. To speak disparagingly of fellow beings for their beliefs, food habits, or cultural practices is nothing short of bigotry. Political preferences vary from region to region in a vast country such as India. There are various imbalances in this vast landscape; for instance, in terms of literacy and education, natural resources, access to trade routes, and demographic composition. These imbalances also reflect in the country's political and economic structures. Some regions are more advanced economically while some others have a higher capacity to influence the political course of the country. Imbalances apart, there is vast diversity in India in terms of religion, language, culture and culinary habits. Nation makers grappled with these challenges of imbalances and diversity, to set in motion the consolidation of the most diverse, and most populated democratic country on the planet. While India has made significant progress in addressing these imbalances and managing the diversity, any honest appraisal would have to account for the unfinished tasks at hand. Regional identities and imbalances are not to be brushed under the carpet or forced into silence, unless the attempt is to create an authoritarian country.

The MP apologised for his unwarranted comments and so did his party. That episode should now be laid to rest. His comments were in the context of the Bharatiya Janata Party's victory in the three Hindi-speaking States of Madhya Pradesh, Rajasthan and Chhattisgarh, while Telangana voted for the Congress, suggesting a divergence between the northern and southern States in political preferences. India has had ruling parties and coalitions of different regional compositions, but the north by virtue of having a larger share of the population has had a bigger say in the country's governance. The suggestion of an invidious north-south divide is baseless and dangerous, while the issue of multiple imbalances is legitimate and real. The States in the south and west are growing faster economically, while those in the north and east are growing faster in population. These trends need to be reconciled in a manner that helps the progress of the country, rather than becoming a source of acrimony. Development outcomes also vary across religious and caste communities in particular regions. There is also a danger that these challenges can accelerate with the impending nation-wide delimitation of Lok Sabha constituencies and the growing gaps in development between regions, and communities. These questions of imbalances cannot be left unaddressed. It is essential that these discussions are informed and respectful; and devoid of any prejudice and hostility.

IS ANOTHER PROHIBITION SURVEY NEEDED IN BIHAR?

Why is the State going in for another survey after the previous one in February, 2023? What are the issues of concern despite the fact that the Bihar Prohibition and Excise (Amendment) Act, 2016 has been tweaked several times?

The story so far:

On November 26, at a function to mark Nashamukti Diwas or 'de-addiction day', Chief Minister Nitish Kumar announced that there would be a fresh "house-to-house" survey to assess the impact of liquor prohibition in Bihar. The survey is likely to begin from mid-December.

3RD FLOOR AND 4TH FLOOR SHATABDI TOWER, SAKCHI, JAMSHEDPUR



When did the State ban liquor?

To curb alcoholism, the Bihar government amended the Bihar Excise Act, 1915 and promulgated the Bihar Prohibition and Excise (Amendment) Act, 2016 from April 5, 2016, introducing total prohibition in the State. On October 2, 2016 it promised to “enforce, implement and promote complete prohibition of liquor and intoxicants in the territory of the State of Bihar and for matters connected therewith or incidental thereto”. However, since then, the Act has been amended several times.

Has the ban served its purpose?

Months after the Bihar Prohibition and Excise (Amendment) Act, 2016 was enforced, as many as 19 people died in August, 2016 at the Khajurbanni locality of Gopalganj district after consuming illicit liquor. Over 250 people have died since 2016 after consuming illegal liquor, but the Opposition Bharatiya Janata Party (BJP) says the toll is higher and could be over 1,000. Despite complete prohibition, illegal liquor bottles are known to have been funnelled into the State through States such as Uttar Pradesh, Jharkhand and West Bengal and sometimes, even after crossing the porous border of the neighbouring country of Nepal. Innovative ways are used including ambulances, hearses, gas cylinders, under vegetable sacks in pick-up vans and trucks and in pantry car coaches of trains. In courts, there is a huge pile-up of prohibition-related cases across the State. In December 2021, the then Chief Justice of the Supreme Court, Justice N.V. Ramana, expressed concern over the (prohibition) law saying it was enforced with “lack of foresight” which has led to the “clogging of courts in the State”.

How many households will the survey cover?

A form, in Hindi and English, will be circulated, seeking feedback from the people on whether they support the liquor ban, their family's economic condition, social strata, and whether their quality of life has improved because of prohibition, an official said. Krishna Paswan, joint commissioner of the State Prohibition, Excise and Registration Department, said, “talks are being held to finalise the modalities of the survey.” The survey will cover a minimum of 2,500 households in all 38 districts and will be completed in 12 weeks. The data of the survey will be collected on a day-to-day basis digitally. The department has already invited tenders from the institutions willing to conduct the survey, said the official.

How does the government assess the ban?

The Chief Minister has dismissed criticism, especially from the BJP, that prohibition has been a “total failure” in the State, given the number of hooch tragedies, cases of illegal liquor being seized and arrest of people allegedly involved in the illegal liquor trade. While asserting that the liquor ban would stay in the State as long as he is in power, Mr. Kumar said, “We have to plug the loopholes and make the implementation of prohibition more effective and strict.”

Have there been surveys on the ban earlier?

There have been two surveys on the impact of the liquor ban in the State — in August 2018 and February 2023, initiated by the State government. The first survey, conducted by Patna-based Asian Development Research Institute (ADRI) said there has been a positive impact after prohibition on people of the State as 1.64 crore have quit drinking, and spent the money saved to buy milk, vegetables and clothes. The second survey was conducted by the Chanakya Law University in association with the Bihar Rural Livelihood Project (Jeevika) which had covered



33,000-odd villages in 534 blocks across all 38 districts of the State covering over 10 lakh people. The survey had revealed that 1.82 crore have quit drinking but 4.39% admitted that they were still consuming liquor. “99% women and 92% men of the State are in favour of the prohibition,” the survey showed — figures which have been often quoted by Mr. Kumar. “Prohibition has also helped in the economic uplift of families, especially from poor classes among whom alcoholism has reduced drastically,” Mr. Kumar has often said.

What is the reason to conduct a fresh survey?

According to officials, despite the fact that the prohibition law has been amended thrice since April 2016, illegal trade in both Indian Made Foreign Liquor (IMFL) and country-made brew has been thriving. The government has been conducting regular raids using drones, breath analysers, and setting up more check posts with personnel holding hand-held scanners at inter-State borders. Over 5.5 lakh cases related to violation of provisions under the amended Act has been registered and over 7.5 lakh people have been arrested, but the conviction rate in such cases has been very low — 21.98% till February this year. Over 1.6 crore litres of illegal IMFL and 97 lakh litres of country-made liquor have been seized in the State since April 2016. As many as 74 special courts (excise) have been made functional and awareness programmes like street plays and posters are regularly put up but there has been no apparent let-up in the illegal supply of liquor. Hundreds of policemen and excise officials have been suspended for violating prohibition laws. The Chief Minister said that based on the findings of the fresh survey, new measures will be introduced.

KARNI SENA CHIEF KILLED

The chief of Shri Rashtriya Rajput Karni Sena (SRRKS), Sukhdev Singh Gogamedi, was shot dead in Jaipur, leading to calls for a Jaipur bandh by Rajput outfits. The Karni Sena has a complex history, with multiple groups using similar names. Shri Rajput Karni Sena (SRKS), founded in 2006, split into factions led by Lokendra Singh Kalvi and Ajit Singh Mamdoli. Gogamedi, expelled from Kalvi's faction in 2015, formed the SRRKS. The Mamdoli-led SRKS and Gogamedi-led SRRKS announced a merger in 2021. The Karni Sena has been in the spotlight for protests against the film Padmaavat, demanding historical accuracy. The group has also been involved in political issues in Rajasthan, reflecting the complex interplay between communities and politics in the region.

EXPRESS VIEW ON LATEST NCRB DATA: THE CRIME STORY

The latest edition of the National Crime Records Bureau (NCRB) report reveals disturbing trends. The recorded crimes against women, children, senior citizens, Scheduled Castes, and Scheduled Tribes show a steep increase, 468 people took their lives everyday in 2022 and cyber crimes went up by nearly 25 per cent.

The NCRB does not claim that these figures represent an accurate count of criminal offences across the country. The agency has underlined that its data record the incidence of registered crime, not the actual numbers. The report should, therefore, be read to understand the big picture in terms of crime registration.

Even then, the data is a valuable aid for policymakers and law enforcement agencies. They should not overlook that almost every NCRB compilation has framed the vulnerabilities of women and marginalised sections. The agency's latest round-up of crime makes a case for also prioritising the anxieties of senior citizens and making homes, educational institutions and public spaces safe for children.



The NCRB has flagged a caveat: An increase in crime numbers in state or city-level police data — in Delhi, for instance — could be on account of greater awareness, increased presence of law enforcement agencies or citizen-centric initiatives. But policymakers also need to be alert to under-reporting. As the NCRB points out, the perpetrators of violence are often acquaintances of those at the receiving end. Women, for example, find it very difficult to report abusers in their close circles — husbands, fathers, partners, family members, friends.

For the same reason, the true extent of violence against children is likely to be greater than that estimated by the bureau. An earlier NCRB report, in fact, acknowledged that it did not “capture the socio-economic causative factors”.

The agency’s data can, no doubt, be read along with studies that shine a light on the structural impediments faced by the underprivileged — for instance, NFHS reports or recent studies that show that women find it difficult to register FIRs. There is also a growing body of scholarship which shows that people from marginalised social groups are often pressured into not reporting crimes against them. The NCRB must sharpen its methodologies and make its reports more nuanced.

The growing incidents of cybercrime — the NCRB report underlines the seriousness of this threat — call for law enforcers to stay ahead of the curve. Across the world, data is becoming an important tool for ensuring public safety.

The NCRB cannot be impervious to conversations on the use of digital systems for crime prevention and investigation. It must step up to new challenges, and find ways to effectively address old ones.

ONE-THIRD OF ALL 2022 SUICIDES WERE OF DAILY WAGE EARNERS, FARMERS, SAYS NCRB REPORT

India reported a total of over 1.7 lakh suicides in 2022, nearly one-third of whom were daily wage earners, agricultural labourers, and farmers, the National Crime Record Bureau’s (NCRB) Accidental Deaths and Suicides in India (ADSI) 2022 report said.

Mizoram, which had reported no cases of atrocities against either SCs or STs in 2021, reported five cases of atrocities against SCs and 29 such cases of crimes against STs in 2022.

‘M.P. among top five’

Madhya Pradesh and Rajasthan continued to figure in the top five States with the highest incidents of crimes and atrocities committed upon SCs and STs.

Other States, where crimes and atrocities against SC/ST people were the highest are Bihar, Uttar Pradesh, Odisha, and Punjab.

Increase in UAPA cases

Further, the Crime in India report showed that cases of offences against the State had also increased marginally in 2022 compared with the previous year — showing about a 25% increase in cases registered under the Unlawful Activities Prevention Act (UAPA). Cases under the sedition section of the Indian Penal Code saw a dramatic dip on the other hand, possibly owing to the Supreme Court’s May 2022 decision to keep sedition cases in abeyance.



Fake currency notes

Moreover, the report went on to disclose that government authorities seized fake Indian currency notes (FICN) worth over ₹342 crore in 2022, out of which FICN worth ₹244 crore were copies of the ₹2,000 currency note, followed by seizures of ₹500 currency notes (this included discontinued currency as well), keeping with the trend of FICN seizures from 2021.

The suicide data published in the ADSI-2022 report showed that the maximum suicides in the year were reported from Maharashtra (22,746), Tamil Nadu (19,834), Madhya Pradesh (15,386), Karnataka (13,606), Kerala (10,162), and Telangana (9,980).

Apart from daily wage earners, and agricultural workers and farmers, the ADSI data showed that 9.6% of the suicides in 2022 were of persons who were self-employed or salaried professionals. This was followed by unemployed persons, who comprise 9.2% of all suicides reported in India in 2022. Among all suicides reported in the year, over 12,000 were of students.

No cases in some States

“Certain States/UTs (Union Territories) namely, West Bengal, Bihar, Odisha, Uttarakhand, Goa, Manipur, Mizoram, Tripura, Chandigarh, Delhi, Lakshadweep and Puducherry reported zero suicides of farmers/cultivators as well as agricultural labourers,” the ADSI report noted.

Home-makers

Among the around 48,000 women who died by suicide in 2022, the ADSI report found that over 52% were home-makers, which brings such women to about 14% of the total suicides reported in the year. This was followed by women who were students and daily wage earners respectively. The survey also showed that 28 trans-persons were also reported to have died by suicide in 2022.

The report pointed out that the most common causes for suicides reported in 2022 were “family problems” and “illness”, which together accounted for almost half of all suicides in the year. This was followed by “drug abuse”, “alcohol addiction”, “marriage related issues”, etc. However, under the cause of “marriage related issues” most number of people were women — specifically citing “dowry related” as one of the causes.

Those who require assistance for overcoming suicidal thoughts may contact Sanjivini, Society for Mental Health suicide prevention helpline 011-4076 9002 (10a.m. to 7.30p.m., Monday-Saturday)

PILATUS PC-7 MK II CRASH: 5 THINGS TO KNOW ABOUT THE TRAINER AIRCRAFT

Two Indian Air Force (IAF) pilots were killed today (December 4) after their Pilatus PC-7 Mk II trainer aircraft crashed during a routine training sortie from the Air Force Academy at Dundigal, Telangana.

The aircraft which took off from the Dundigal Air Force station in the morning, was found completely charred near the town of Toopran in the Medak district, some 40 km away. A Court of Inquiry has been ordered to ascertain the cause of the accident, an IAF statement said.

This is the first crash involving the aircraft since it was inducted into the Air Force almost a decade earlier, having clocked around 2 lakh hours of flying time since then.

Here are 5 things you need to know about the Pilatus PC-7 Mk II trainer aircraft.



What is a trainer aircraft?

A trainer is a class of aircraft designed specifically to facilitate flight training of pilots and aircrews. Modern military aircraft are notoriously difficult to master for rookie pilots. Hence, they must first be trained on other, more basic aircraft. Trainer aircraft are far more forgiving than the aircraft military pilots will eventually fly — they fly slower, have less complex systems, and are designed to be resistant to and recoverable from stalls and spins, a common challenge for rookie pilots. They are also much cheaper, allowing air forces to buy them in bulk to train cadets.

How many types of trainer aircraft does the IAF have?

Currently, there are 75 Pilatus PC-7 Mk II aircraft in service with the IAF (including the one which crashed today). These are used for basic training, the first stage in a rookie cadet's flight training.

After this, cadets graduate to the HAL Kiran, an intermediate jet-powered indigenously developed trainer aircraft, followed by the BAE Hawk, a British jet-powered advanced trainer aircraft. Currently, the IAF has 78 Kiran and 102 Hawk aircrafts in its fleet.

In addition to this, the IAF, Navy, and National Cadet Corps also operate the Pipistrel Virus, as a basic trainer for Flight Safety and Air Wing Cadets. Currently, 194 of these aircraft are in service, with 72 with the IAF.

What kind of an aircraft is the Pilatus PC-7 Mk II?

Pilatus Aircraft Ltd is an aerospace manufacturer located in Stans, Switzerland, which specialises in producing short take-off and landing aircraft, as well as trainer aircraft for air forces across the world.

The PC-7 is a low-wing, turbo-prop aircraft with tandem seating (the cadet sits in the front, the instructor behind him). While the original aircraft has been in service since the 1970s, the Mk II version was introduced in the 1990s, with a newer airframe and more advanced avionics. Powered by a Pratt & Whitney turbo-prop engine, it has a maximum speed of 412 km/h and can fly to a height of slightly more than 10,000 m. It has a range of 1,200 km without external tanks, which translates to slightly more than 4 hours of flying time.

It is (or has been in the past) used as the ab initio (literally, the first aircraft a cadet flies after training on simulators) trainer by over 20 air forces in the world. Moreover, the likes of Chad, Iran, and Mexico have used the aircraft for combat operations as well.

Why did the IAF obtain the PC-7 Mk II?

The IAF procured 75 of these aircraft under a contract signed in 2012, to meet the critical shortage of trainer aircraft urgently needed to carry out the basic flying training for its pilots. The shortage emerged after the indigenously developed HPT-32 aircraft were grounded in 2010, after fatal crashes which killed multiple IAF pilots, including two experienced instructors.

All the 75 Pilatus aircraft were delivered between 2013 and 2015 by the Swiss manufacturer, with the IAF having an option to make an additional purchase of 38 more aircraft. However, this contract was not signed after the Defence Ministry blacklisted the Swiss firm for a year in 2019, on corruption charges, which the Ministry claimed was crucial to Pilatus bagging the Rs 2,800 crore deal in 2012. This ban was partially lifted a few months later, to allow the IAF to maintain its fleet of 75 basic trainer aircraft.



Will the PC-7 Mk II be replaced by the IAF anytime soon?

In March, the Defence Ministry signed a contract with Hindustan Aeronautics Ltd to procure 70 HTT-40 at a cost of over Rs 6,800 crore.

Designed indigenously at HAL's Aircraft Research & Design Centre, the HTT-40 is a basic trainer aircraft powered by a four-bladed turbo-prop engine (PC-7 is three-bladed). The aircraft will have an air-conditioned cockpit, modern avionics, hot refuelling (with engines running), and zero-zero ejection seats.

The aircraft are scheduled to be delivered over a period of six years.

CHANDRAYAAN-3 PROPULSION MODULE RETRACES STEPS TO EARTH ORBIT: WHY IT MATTERS

Scientists have brought the Propulsion Module (PM) of the Chandrayaan-3 mission — which took the Vikram lander to within 100 km of the surface of the Moon before it detached and made the historic controlled descent to the lunar surface on August 23 — back into Earth orbit.

The PM, carrying the lander, left the Earth's orbit on August 1, and was inserted in a lunar orbit on August 5. Its successful return to Earth orbit is a significant achievement that marks a step towards bringing back samples from lunar missions in the future.

The manoeuvre, announced by the Indian Space Research Organisation (ISRO) on Monday, was not in the original mission plan. Like the impromptu 'hop' experiment of September 4 — in which the lander, just before going into sleep mode, fired its engines, lifted itself about 40 cm from the surface, and landed about 30-40 cm away — the PM's return to Earth orbit utilised the logistics advantages of the near perfect mission, especially the availability of more than 100 kg of fuel.

The Propulsion Module

Unlike Chandrayaan-2 — ISRO's second lunar exploration mission that failed in September 2019 — the Chandrayaan-3 mission featured, instead of a full fledged orbiter, a light Propulsion Module that was essentially only a system for the lander to travel to the Moon. For communications with Earth stations, the mission used the Chandrayaan-2 orbiter, which was still in orbit around the Moon with functioning systems on board.

The Chandrayaan-3 PM carried only an instrument called the Spectro Polarimetry of Habitable Planet Earth (SHAPE), an experimental payload to look back at Earth and study the signatures that make it habitable, so as to identify habitable exoplanets.

The PM separated from the lander (which carried the Pragyaan rover in its belly) on August 17, but it was expected to continue orbiting the Moon for another six months, with SHAPE looking at Earth.

Seizing the opportunity

According to ISRO, the initial plan for the PM was to operate SHAPE for about three months, which was essentially the module's mission life.

However, "The precise orbit injection by LVM3 (or Launch Vehicle Mark-3, which launched the Chandrayaan-3 mission) and optimal earth/ lunar burn manoeuvres, resulted in the availability



of over 100 kg of fuel in the PM after over one month of operations in the lunar orbit,” ISRO said in a release on Monday.

Return to Earth orbit

After considering fuel availability and aspects of safety, “the optimal Earth return trajectory was designed for October 2023 month,” ISRO said.

On October 9, the agency performed a manoeuvre to raise the orbit of the PM around the Moon to 5,112 km from 150 km (from 2.1 hrs to 7.2 hrs).

“Later, considering the estimate of available propellant, the second manoeuvre plan was revised to target an Earth orbit of 1.8 lakh x 3.8 lakh km. The Trans-Earth injection (TEI) manoeuvre was performed on October 13,” ISRO said.

Subsequently, the PM made four Moon fly-bys before leaving the Moon’s sphere of influence on November 10.

“Currently, the propulsion module is orbiting Earth... [and] the orbit period is nearly 13 days with 27 deg inclination. The perigee and apogee altitude vary... There are no threats of close approach with any operational Earth orbiting satellites,” ISRO said on Monday.

“As per plan, SHAPE payload is being operated whenever Earth is in its field of view... A special operation of...SHAPE...was carried out on October 28...during a Solar Eclipse. The SHAPE payload operations will continue further,” it said.

Why manoeuvre matters

Through efforts to bring the PM back to Earth orbit, ISRO has been able to understand what is involved in the “planning and execution of trajectory and manoeuvres to return from Moon to Earth” for a small spacecraft. The experiment allows ISRO to work towards developing a software module to plan going forward.

The experiment will also allow the planning and execution of gravity-assisted flybys across celestial bodies, as well as avoidance of “uncontrolled crashing of the PM on the Moon’s surface at the end of life of PM”, ISRO said.

MINING FOR CRITICAL MINERALS: WHAT IS THE AUCTION PROCESS, AND WHY IS IT IMPORTANT?

Twenty blocks of critical minerals are currently on auction for commercial mining by the private sector. The mineral blocks contain lithium ore, which has use in batteries and electric vehicles, and another 10 of the 30 minerals that the government declared as “critical” in July.

The bidding process began on November 29, and bids can be submitted until January 22 next year. The total value of these blocks is estimated at Rs 45,000 crore, subject to further discoveries or revisions in inferred reserves.

This is the first time that rights related to the mining of lithium ore are being auctioned to private parties. Other minerals in the blocks include nickel, copper, molybdenum, and rare earth elements (REEs). All these minerals are utilised in key supply chains for vehicle batteries, energy storage devices, consumer electronics, and vital industrial processes.



Where are these critical mineral blocks, and what rights are being auctioned?

The Notice Inviting Tender (NIT) floated by the Ministry of Mines says the 20 blocks are spread over eight states. There are seven blocks in Tamil Nadu, four in Odisha, three in Bihar, two in Uttar Pradesh, and one each in Gujarat, Jharkhand, Chhattisgarh, and Jammu & Kashmir.

Only four of these 20 blocks are being auctioned for a Mining Licence (ML), which means that once the licence is granted, the licensee can begin mining operations after obtaining the requisite clearances.

Three of these four blocks are in Odisha, and contain deposits of nickel, copper, graphite, and manganese. The fourth block is in Tamil Nadu, and contains deposits of molybdenum.

And what sort of rights are being auctioned for the other 16 blocks?

The remaining 16 blocks are being auctioned for a Composite Licence (CL), which allows the licensee to conduct further geological exploration of the area to ascertain evidence of mineral contents.

Once the licensee collects sufficient information on mineral deposits, they can make an application to the relevant state government to convert their CL to an ML to begin mining operations pending requisite clearances. The licensee has three to five years to complete the prescribed level of exploration, failing which the licence will be withdrawn.

What are the other clearances that will be required before operations begin?

The NIT notes that out of the total concession area of 7,197 hectares (for all 20 blocks), 17 per cent or 1,234 hectares is forest land with status as per the PM Gatishakti portal, the digital platform to facilitate integrated planning and monitoring of infrastructure projects around the country.

Once granted a licence, the licensee will have to obtain 15 approvals and clearances before beginning operations. These include forest clearance, environmental clearance, Gram Sabha consent, etc.

What are the estimated reserves of key critical minerals in these blocks?

The two blocks of lithium reserves, one each in J&K and Chhattisgarh, are up for auction for a CL.

According to the NIT, the J&K block has an inferred reserve of a 5.9 million tonne (mt) of bauxite column, which contains more than 3,400 tonnes of lithium metal content. This block also contains more than 70,000 tonnes of titanium metal content.

The block in Chhattisgarh contains lithium and REEs, but no drilling has been conducted yet to estimate total reserves.

Nickel ore reserves have been found in three blocks, one each in Bihar, Gujarat, and Odisha. While no drilling has been conducted for the blocks in Bihar and Gujarat, in the Odisha block, the NIT states an inferred value of 2.05 mt of nickel ore, which amounts to 3,908 tonnes of nickel metal content.



This Odisha block is being auctioned for an ML. It is also the only block among the 20 that contains deposits of copper — amounting to 6.09 mt of copper ore and 28,884 tonnes of copper metal content.

How does India currently get its supplies of these minerals?

Minister Joshi told Lok Sabha in August that in FY23, India imported 2,145 tonnes of lithium carbonate and lithium oxide at a total cost of Rs 732 crore. Lithium carbonate contains up to 19 per cent lithium. Lithium oxide, which is usually converted to lithium hydroxide, contains 29 per cent lithium.

India also imported 32,000 tonnes of unwrought nickel at a cost of Rs 6,549 crore, and 1.2 million tonnes of copper ore at a cost of Rs 27,374 crore, in 2022-23.

India is 100 per cent reliant on imports for its lithium and nickel demand. For copper, this figure is 93 per cent.

What will happen after the ongoing round of auctions is over?

The bidding process began after the government declared 30 minerals as “critical”, and amended a key law to allow for the mining of three critical minerals, lithium, niobium, and REEs, earlier this year. To attract bidders, the government also specified new royalty rates for critical minerals, matching global benchmarks.

The bid for each block will be awarded on the highest percentage of mineral dispatch value quoted by the bidder. After the ongoing auction is over, the process to auction a second tranche of critical mineral blocks is expected to begin. It is currently unclear if this second tranche would include new lithium reserves found in Rajasthan and Jharkhand.

The Ministry has told Parliament that the Geological Survey of India has taken up 125 projects in the current fiscal to explore critical mineral reserves in the country. In the preceding eight fiscal years, a total of 625 mineral exploration projects were undertaken. The Ministry’s Report of the Committee on Identification of Critical Minerals released in June this year recommended that a Centre of Excellence for Critical Minerals should be established to frame policies and incentives for creating a complete value chain of critical minerals in the country.

REGULATING DEEPPAKES AND AI IN INDIA

The story so far:

Last month a video featuring actor Rashmika Mandanna went viral on social media, sparking a combination of shock and horror among netizens. The seconds-long clip, which featured Mandanna’s likeness, was manipulated using deepfake technology. Deepfakes are digital media, video, audio, and images, edited and manipulated using Artificial Intelligence (AI). Since they incorporate hyper-realistic digital falsification, they can potentially be used to damage reputations and undermine trust in democratic institutions. This phenomenon has forayed into political messaging as well, a concern in the run-up to the general elections next year.

Have deepfakes been used in politics?

Back in 2020, in the first-ever use of AI-generated deepfakes in political campaigns, a series of videos of Bharatiya Janata Party (BJP) leader Manoj Tiwari were circulated on multiple WhatsApp



groups. The videos showed Mr. Tiwari hurling allegations against his political opponent Arvind Kejriwal in English and Haryanvi, before Delhi elections. In a similar incident, a doctored video of Madhya Pradesh Congress chief Kamal Nath recently went viral, creating confusion over the future of the State government's Laadli Behna Scheme.

Other countries are also grappling with the dangerous consequences of rapidly evolving AI technology. In May last year, a deepfake of Ukrainian President Volodymyr Zelenskyy asking his countrymen to lay down their weapons went viral after cybercriminals hacked into a Ukrainian television channel.

How did deepfake tech emerge?

Deepfakes are made using technologies such as AI and machine learning, blurring the lines between fiction and reality. Although they have benefits in education, film production, criminal forensics, and artistic expression, they can also be used to exploit people, sabotage elections and spread large-scale misinformation. While editing tools, like Photoshop, have been in use for decades, the first-ever use of deepfake technology can reportedly be traced back to a Reddit user who in 2017 had used a publicly available AI-driven software to create pornographic content by imposing the faces of celebrities on to the bodies of ordinary people.

Now, deepfakes can easily be generated by semi-skilled and unskilled individuals by morphing audio-visual clips and images. As such technology becomes harder to detect, more resources are now accessible to equip individuals against their misuse. For instance, the Massachusetts Institute of Technology (MIT) created a Detect Fakes website to help people identify deepfakes by focusing on small intricate details. The use of deepfakes to perpetrate online gendered violence has also been a rising concern. A 2019 study conducted by AI firm Deeptrace found that a staggering 96% of deepfakes were pornographic, and 99% of them involved women. Highlighting how deepfakes are being weaponised against women, Apar Gupta, founding director of Internet Freedom Foundation (IFF) says, "Romantic partners utilise deepfake technology to shame women who have spurned their advances causing them psychological trauma in addition to the social sanction that they are bound to suffer."

What are the laws against the misuse of deepfakes?

India lacks specific laws to address deepfakes and AI-related crimes, but provisions under a plethora of legislations could offer both civil and criminal relief. For instance, Section 66E of the Information Technology Act, 2000 (IT Act) is applicable in cases of deepfake crimes that involve the capture, publication, or transmission of a person's images in mass media thereby violating their privacy. Such an offence is punishable with up to three years of imprisonment or a fine of two lakh. Further, Sections 67, 67A, and 67B of the IT Act can be used to prosecute individuals for publishing or transmitting deepfakes that are obscene or contain sexually explicit acts. The IT Rules, also prohibit hosting 'any content that impersonates another person' and require social media platforms to quickly take down 'artificially morphed images' of individuals when alerted. In case they fail to take down such content, they risk losing the 'safe harbour' protection — a provision that protects social media companies from regulatory liability for third-party content shared by users on their platforms.

Provisions of the Indian Penal Code (IPC) can also be resorted for cybercrimes associated with deepfakes — Sections 509 (words, gestures, or acts intended to insult the modesty of a woman), 499 (criminal defamation), and 153 (a) and (b) (spreading hate on communal lines) among others. The Delhi Police Special Cell has reportedly registered an FIR against unknown persons by



invoking Sections 465 (forgery) and 469 (forgery to harm the reputation of a party) in the Mandanna case.

Is there a legal vacuum?

The IT Rules only addresses instances wherein the illegal content has already been uploaded and the resultant harm has been suffered; instead, there has to be more focus on preventive measures, for instance, making users aware that they are looking at a morphed image. “The laws place the entire burden on the victim to file a complaint. For many, the experience that they have with the local police stations is less than satisfactory in terms of their investigation, or the perpetrator facing any kind of penalty,” he asserts.

What has been the Centre’s response?

The Union Minister of Electronics and Information Technology Ashwini Vaishnaw on November 23 chaired a meeting with social media platforms, AI companies, and industry bodies where he acknowledged that “a new crisis is emerging due to deepfakes” and that “there is a very big section of society which does not have a parallel verification system” to tackle this issue. He also announced that the government will introduce draft regulations, which will be open to public consultation, within the next 10 days to address the issue.

However, the Minister of State for Electronics and Information Technology (MeitY) Rajeev Chandrasekhar has maintained that the existing laws are adequate to deal with deepfakes if enforced strictly. He said that a special officer will be appointed to closely monitor any violations and that an online platform will also be set up to assist aggrieved users and citizens in filing FIRs for deepfake crimes. Mr. Gupta points out, “The advisory issued by the MeitY does not mean anything, it does not have the force of law. It is essentially to show some degree of responsiveness, given that there is a moral panic around generative AI sparked by the Rashmika Mandanna viral clip. It does not account for the fact that deepfakes may not be distributed only on social media platforms.”

How have other countries fared?

In October 2023, U.S. President Joe Biden signed a far-reaching executive order on AI to manage its risks, ranging from national security to privacy. Additionally, the DEEP FAKES Accountability Bill, 2023, recently introduced in Congress requires creators to label deepfakes on online platforms and to provide notifications of alterations to a video or other content. Failing to label such ‘malicious deepfakes’ would invite criminal sanction. The European Union (EU) has strengthened its Code of Practice on Disinformation to ensure that social media giants like Google, Meta, and Twitter start flagging deepfake content or potentially face fines. Further, under the proposed EU AI Act, deepfake providers would be subject to transparency and disclosure requirements.

“We also have to keep in mind the Indian context which is that our economy is still sort of developing. We have a young and thriving startup eco-system and therefore any sort of legislative response cannot be so stringent that it impedes innovation” she says.

INDIA’S ALARMING ‘FIXED DOSE COMBINATION’ PROBLEM

A group of academics from India, Qatar and the United Kingdom recently published a worrying new study in the Journal of Pharmaceutical Policy and Practice (2023, 16:39) on the volume of



unapproved and even banned fixed dose combination (FDC) of antibiotics that are being sold in India. Using sales data of the pharmaceutical industry, the study documents that in the year 2020, 60.5% FDCs of antibiotics (comprising 239 formulations) were unapproved and another 9.9% (comprising 39 formulations) were being sold despite being banned in the country. That so many of these unapproved or banned FDCs contain antibiotics is alarming because of the increasing prevalence of antibacterial microbial resistance (AMR) in India.

FDCs are combinations of one or more known drugs and can be useful in the treatment of some diseases since the combination can improve patient compliance. For instance, if a patient has to take three different medications for a particular treatment, she may forget to take one. But if all three medications are combined into one tablet or one syrup, the chance of her forgetting to take one or two of the drugs is reduced. For diseases such as AIDS, it is well documented that FDCs have proven to be very useful in improving patient compliance, which at the end of day improves treatment outcomes.

Making FDCs, even though most consist of drugs with known safety and efficacy profile, is not an easy job. All drugs have side effects and when formulated together, there is a possibility that the active ingredient or even the excipients (inactive ingredients) may affect the way that each drug functions. For example, the drugs may interact in a way to reduce the therapeutic efficacy of each active ingredient, or, worse, the drugs may interact with each other to create a more toxic element, often called metabolites. This is why it is crucial that all FDCs go through a scientifically designed approval process where such interactions can be evaluated.

The pharmaceutical industry's love for FDCs

Pharmaceutical companies in India use these FDCs to escape liability under multiple laws without much concern for public health. One such law is the Drugs (Prices Control) Order (DPCO), under which the government fixes the prices of individual drugs. Since drug combinations were traditionally not covered under the DPCO, the pharmaceutical industry decided that making FDCs provided an easy way to escape the remit of the DPCO.

Driven by this cold logic of the market, and not public health, the Indian pharmaceutical industry introduced an astounding variety of FDCs that lacked any medical rationale. For example, anti-inflammatory drugs were combined with vitamins, anti-histamines were combined with anti-diarrhoeal agents, penicillin was combined with sulphonamides, and vitamins were combined with analgesics. These were combinations not found in any other country.

There were two added advantages of adopting this strategy for the industry. The first, the fact that because of the bewildering variety of FDCs being sold in the market, there were no standards set by bodies such as the Indian Pharmacopoeia Commission for testing these drugs for quality of manufacture. When there are no standards recognised by the law, there is no question of manufacturing “not of standard quality” drugs, and hence there is no possibility of prosecution under the Drugs & Cosmetics Act, 1940. At most, when these FDCs are sampled in the market and sent for testing, the usual protocol for government laboratories conducting such tests is to write to the manufacturer and ask for their own protocols to test the drug. In other words, the pharmaceutical industry gets to provide its own standards in order for the government to test their drugs.

The second advantage of going down the FDC route is that it gives individual companies a reason to charge higher prices for their drugs. For example, if 20 different pharmaceutical companies were manufacturing and selling a drug such as azithromycin, they would have to compete



furiously and reduce prices to capture a larger share of the market. But if they combine azithromycin with another drug, for example, cefixime to create a FDC, they can claim it as a new unique product catering to a specific need, thereby allowing them to charge a higher price until others introduce similar products, at which point the first mover may try to create a new FDC. When the market and the regulatory structure rewards these manufacturers of such pseudo-innovation rather than for discovering and developing true innovative medicines, this is what happens. These dubious FDCs can command higher prices. Of course, none of this is possible without doctors who are willing to prescribe such FDCs. While it is tempting to paint all such doctors as corrupt, the fact of the matter is that most doctors wrongly presume that the drug regulator is doing its job when a product is sold on the market.

The FDC problem has been on the regulatory radar since 1978 when the first government committee studied the issue and admitted that we had a problem on our hands. At the time, there was no system under the colonial-era Drugs and Cosmetics Act, 1940 to vet drugs for safety and efficacy prior to their sale in India. This meant that each State drug controller could hand out manufacturing licences for any drug formulation and there was little that the central government could do to stop their sale.

In 1982, Parliament changed the law to give the central government the power to “prohibit” the manufacture of specific drugs that lack therapeutic value or justification. Later in that decade, in 1988, the central government amended the rules to introduce a new requirement for manufacturers of all “new drugs”, including FDCs, to submit proof of safety and efficacy to the Drugs Controller General of India (DCGI) who heads the Central Drugs Standard Control Organization (CDSCO). These amendments also made it clear that State drug controllers could not grant “manufacturing licences” for “new drugs” that are not approved for safety and efficacy by the DCGI.

Unabated licensing

Despite the law being crystal clear on the issue, State drug controllers have simply ignored the law to continue issuing manufacturing licences for FDCs not approved by the DCGI with impunity. The manufacturers selling these FDCs that have not been approved by the DCGI can technically be prosecuted by the Central government for violating the law.

Instead of ordering criminal prosecutions, the Ministry of Health is playing a game of whack-a-mole by constantly invoking its powers under Section 26A to prohibit the manufacture of specific FDCs. It has issued 444 orders under this provision since 1983, banning mostly FDCs. Many of these orders have been embroiled in complex litigation, with the courts muddying the waters with inconsistent decisions.

The fact that these academics have discovered 239 unapproved FDCs being sold in 2020 in just one category of FDCs (their previous studies have revealed similar unapproved FDCs in other therapeutic categories), more than 42 years after the problem was first flagged is an astonishing indictment of the incompetence of the drug regulatory framework in India. As they point out in their paper, unregulated FDCs may end up contributing to the AMR problem in India. It is vital for the Ministry of Health to take immediate action.



6% OF COUGH SYRUP SAMPLES FAIL EXPORT QUALITY TEST

Recent data from the Central Drugs Standard Control Organisation (CDSCO), shows that at least 6% of cough syrup samples from 54 Indian manufacturers failed a mandatory quality test for export. This was until October this year. The CDSCO is the regulatory body for cosmetics, pharmaceuticals and medical devices.

India is a global leader in generic medicines and commands a 20% share in global supply by volume, according to Union Health Minister Mansukh Mandaviya.

He said India is indeed the 'pharmacy of the world'. It supplies a 100 countries with vaccines and 150 countries with medicines of various kinds.

Screening of medicines bound for the export market began earlier this year after quality concerns were raised about cough syrups manufactured in India for export.

Gambia, Uzbekistan, Cameroon and the World Health Organisation (WHO) raised red flags after children who had these drugs, died. prompting the Central government to take remedial action.

The government issued a list of government and private laboratories across the country where samples would be tested before export. Indian manufactured syrups were reported to be contaminated with glycol and ethylene glycol — toxic substances that can sometimes be fatal, especially for children. According to government data, of the 385 samples tested in the Gujarat lab, 51 were found to be NSQ (not of standard quality), while 29 out of 502 samples failed the quality test in the Ghaziabad lab.

The Central government admitted in Parliament that the WHO had issued a medical product alert for a batch of Guaifenesin Syrup, manufactured by an Indian company.

India's pharmaceutical sector contributes around 1.72% of GDP and the industry is worth approximately \$50 billion with more than half coming from exports. Around 20% of the global demand for generic drugs is met by India.

The Health Ministry has said the pharma industry should strive to maintain the nation's reputation.

NMC LOGO: WHY ARE DOCTORS PROTESTING NOW IF IT ALWAYS HAD DHANVANTRI'S IMAGE?

The logo of the National Medical Commission (NMC), with a colourful image of physician god Dhanvantri in the centre, has drawn criticism from doctors, with the Indian Medical Association (IMA) urging the the apex medical education regulator to take "corrective steps".

"The logo of any national institution ought to capture the aspirations of all our citizens in an equal manner and by remaining neutral in all respects thereby eliminating any possibility of any part or section of the society feeling aggrieved in any manner," the IMA said in a letter.

Officials from the NMC, however, maintained that the image of Dhanvantri had always been a part of its logo, albeit as a dark silhouette. The new logo colourises the image, while also replacing the word 'India' with 'Bharat'.



Why are doctors opposing the new logo?

Once the changes to the logo were highlighted last month, the IMA said it went against the “fundamental values” of doctors. Dr Sharad Agarwal, president of IMA, said: “Doctors take an oath to treat everyone irrespective of their caste, class, or religion. Why then should the logo of an institute that governs training of doctors have any religious connection?”

He added that while doctors can follow their faith at home, institutions must not do so. “Creating controversies is not the job of NMC, they should focus on improving the quality of medical education in the country,” he said. “The IMA calls upon the NMC to take corrective steps to adopt a logo which does not contradict the oath and duty of doctors towards all our citizens with complete neutrality, especially in shunning any attempt to connect or identify an institution such as NMC with any particular religion.”

Why has Dhanvantri been included in the NMC logo?

With Dhanvantri considered to be the god of Ayurveda and medicine, officials from the NMC said it was an appropriate addition to the logo for a medical body. An official said: “If the logo for doctors can be Caduceus — the staff surrounded by two serpents — that is entrenched in Greek mythology, why can’t we use symbols from our own mythology?”

Officials from both NMC and the Union health ministry emphasised that Dhanvantri has always been part of the logo. However, even the old logo was adopted only in 2022. The National Medical Commission took over from the former Medical Council of India in 2020. The logo was first approved in 2022, according to officials.

So why did doctors protest only after the change?

Dr Agarwal said the IMA took action as soon as the issue was highlighted. “The NMC has been asking why doctors are objecting only now when the logo always had the image of Dhanvantri. But clearly, the image was not prominently visible even to them, which is why they chose to colour and highlight it,” he said.

Is this the first time doctors have raised such concerns?

There were similar protests from doctors when the NMC introduced the “Charak Shapath” as part of undergraduate medical training last year. While it was initially thought that the Shapath would replace the doctor’s oath — which essentially says doctors should treat everyone and do no harm — the NMC later said the Charak Shapath would be taken at the beginning of the course and the doctor’s oath when the students graduate.

Mandatory inclusion of yoga as part of medical curriculum last year also faced similar resistance.

PREPARING FOR HEALTH EMERGENCIES AFTER FLOODING

Cyclone Michaung that swept through the coastal districts of Tamil Nadu and Andhra Pradesh earlier this week left thousands marooned for several days. Rescue work is underway in Chennai, Tiruvallur, Kancheepuram and Chengalpattu districts that were in the path of the cyclone. Neighbouring Andhra Pradesh has started assessing the damage and will soon start taking preventive health measures.



Tamil Nadu's Director of Public Health issued a pre-emptive four-page instruction to health officials across the State to prepare for the emergency. Floods disrupt access to food, water and safe shelter and jeopardise the community's ability to get the healthcare services they need. Contaminated water which is all around after flooding is responsible for vector-borne diseases such as cholera, typhoid, and malaria.

After the cyclone and rains died down, the State government also commissioned mobile medical units. The units, which include a doctor, staff nurse, a sanitary inspector and an assistant, will function all day in the urban health centres for at least a week.

The World Health Organisation states (on its website) that being prepared for the challenges such as an emergency pose reduce the magnitude of the physical and human costs. Ensuring that the affected get food; restoring primary care services, putting together mobile health teams and outreach, and conducting epidemic surveillance helps.

Acute diarrhoeal diseases and cholera can be prevented by ensuring safe water and sanitation. Those with severe symptoms will need rapid treatment with intravenous fluids and antibiotics. In localities that have a high risk of cholera, improved sanitation and oral vaccines have helped. Since most people show only mild to moderate symptoms it is often missed. Some are infected but do not develop any symptoms and the bacteria is present in faeces for as many as 10 days after infection. This could potentially infect others. Untreated acute watery diarrhoea and dehydration can cause death.

SHARED BLAME

Apportioning blame for calamity after a natural disaster is almost impossible, but Indian cities have often tried to ease this decision, and Chennai on December 4 was no exception. Late on December 3, rains began to pummel Chennai as Cyclone Michaung, soon to intensify into a super-cyclonic storm, parked itself roughly 100 km east of the city. By the next morning, most areas had recorded more than 120 mm of rain, with a few recording more than 250 mm. The figures represent a breath-taking volume of water to be delivered in a single day — and which Tamil Nadu Minister for Municipal Administration K.N. Nehru echoed when he said the city had not received as much rain in seven decades. But that is not the full story. The narratives built around disasters influence the responses to them, and proclamations that attribute a singularity to a natural calamity often feed an unfair line of reasoning in which nature shoulders all the blame. Just as the rain intensified over Chennai on December 4 morning, the Tamil Nadu Generation and Distribution Corporation Limited shut off power in the city as a precaution, presumably to prevent loose cables from electrocuting pedestrians in dirty water. That such a precaution was required at all speaks volumes about the state of the power infrastructure. There are no quick fixes or short cuts in addressing years of inadequate investment in maintenance and repair. Several trees were toppled, water stagnated on almost all roads, overhead cables flew loose, and storm water drains were choked with plastic trash. Many trains were cancelled, the airport had to be closed, and there were reports of people being stranded at many locations. Yet, that 2023 was not 2015 redux is to the city's as well as to the storm's credit: the former because of the warnings and preparation, more resilient civilian infrastructure, and people's memories of 2015; the latter because it dumped less water than the 2015 torrent did in a single day.

The extent to which climate change 'boosted' Cyclone Michaung is for attribution science to say, although it would be naive to wait for any verdict other than that warmer seas are feeding stronger cyclones. But the city's ability to respond to such storms has been compromised by



decades of unplanned construction, defiance of zoning, and some forms of public indiscipline, especially littering. Expecting the resulting problems to be resolved overnight, or even by a single government, is unreasonable, yet the progress needs to be much faster than it is at present, if only to preclude the need for drastic, even oxymoronic, measures such as cutting power supply to guarantee safety. Finally in Michaung's wake, Chennai can start by doing something it failed to in 2015: treating its sanitation workers — mostly Dalits and Adivasis — better.

WHAT MAKES CYCLONE MICHAUNG, HEADED TO THE ANDHRA COAST, SUCH AN UNUSUAL STORM?

Climatologically, about five cyclones develop in the North Indian Ocean basin — comprising the Bay of Bengal and the Arabian Sea — every year. Of these, an average of four cyclones develop over the Bay of Bengal and one over the Arabian Sea. However, Arabian Sea storms often reach higher intensities and carry the potential to cause widespread damage.

The North Indian Ocean basin is most prone to cyclone development during the pre-monsoon (April-June) and post-monsoon (October-December) months. Due to favourable ocean conditions, cyclones that form in May and November usually reach higher intensities than storms that form at other times.

Storm intensification

Tropical cyclones are fueled by ocean heat (in addition to other factors). Ocean temperatures of 26 degrees Celsius or more, prevailing at depths between 50 metres and 100 metres, are conducive for cyclogenesis, which refers to the processes that lead to the development and strengthening of a cyclone.

Warm oceans contribute to a cyclone's rapid intensification while at sea. An oceanographic parameter called the Tropical Cyclone Heat Potential (TCHP) is considered an important factor in cyclone genesis, intensification, and propagation.

The intensification process is highly complex, and is also influenced by a combination of various favourable atmospheric conditions including boundary layers (the fluid layer adjacent to a bounding surface), wind shear (changes in wind direction and/or speed over a vertical or horizontal distance), convection (transfer of heat within a fluid), Rossby waves (which occur in rotating fluids), upper ocean circulation, and air-sea interaction.

Storm surges and tidal waves up to 1.5 metres are predicted as the cyclone nears the coast.

After crossing the Andhra coast, the system is expected to continue to move northwestward towards southern Odisha. Here, the IMD has issued an 'orange' alert.

EXPRESS VIEW ON UNESCO TAG FOR GARBA: A DANCE FOR ALL

One of the most popular Garba songs starts with the line, "dholida, dhol re vagaad, maare heench levi chhe", an instruction to the dhol player to start playing so that the dancing may begin.

Across Gujarat, that's all it takes — a familiar beat — for people to form a circle and fall in step with each other, performing the folk dance synonymous with the state. This week, Garba joined other Indian dances, such as the Kalbelia folk dance of Rajasthan, Chhau from eastern India, Sankirtana from Manipur and Mudi yettu from Kerala, on the UNESCO's list of Intangible Cultural



Heritage of Humanity, becoming another representative of the richness of India's performing art traditions.

In one important way, Garba is distinct from many of the Indian, and non-Indian traditions, on the list. An indelible part of every Gujarati celebration, from wedding to birth, and, most notably, the annual nine-day festival of Navratri, it remains a thriving tradition.

One feature that keeps it alive is its strong roots in community, with everyone, young and old, male and female, expert and amateur, dancing around a perforated earthen pot — the metaphorical universal womb from which all of humanity emerged and a symbol of the earth's fertility. The other is its adaptability — every new generation refashions the dance to its tastes, with songs and techniques from over a hundred years ago being as popular as the more contemporary ones.

There is no existential threat to Garba, but its inclusive character has, of late, become imperilled. While the worship of goddess Amba (a form of Durga) is a key part of this tradition, as the film submitted to UNESCO by the Government of India states, people of other faiths were for long enthusiastic participants. Reports, in recent years, of performances being open to only Hindus, and Dalits being assaulted for attending events for upper-caste communities, must be taken seriously if this beloved intangible heritage is to continue to thrive.

WINTER BRINGS KABOOTARBAAZI TO LIFE

Between November and February, hundreds of pigeons are launched off terraces in the narrow lanes of Old Delhi daily from 12 p.m. to 5 p.m., racing against each other to far-off places and returning to their exact locations.

This traditional winter sport of pigeon racing, or kabootarbaazi, historically found patronage in the courts of Mughal emperors, but eventually spread across the Indian subcontinent. According to author and historian Rana Safvi, keeping and caring for pigeons was considered akin to the act of ishaqbaazi or romance during the Mughal period.

In this sport, flocks of pigeons are pitted against each other, with the owner of the winning flock awarded the title of an ustad, or master.

"Pigeons are intelligent creatures. They know exactly where their home is and they always come back," said Mohammad Islam, a resident of Turkman Gate.

India has over 100 varieties of racing pigeon, including Gola, Kabuli, Masakali, Magpie, Lahori, Ferozpuri, Rampuri, and Banka. While some are known for their flying prowess, others are renowned for their beauty. Some can fly for distances as long as 1,000 km.

Common pigeons like Masakalis, Kabulis and Golas cost between ₹300 and ₹500 each, while some rare varieties from Hyderabad may cost between ₹4 lakh and ₹6 lakh per bird, said Mr. Faisal.

Historian Sohail Hashmi said some families have been maintaining the tradition for generations. "Pigeons were trained to send letters from court to court and were often intercepted or kidnapped to prevent messages from being exchanged. This act turned into a larger sport over the years, but we cannot pinpoint the exact time it started," he added.



AN EMPEROR'S DREAM COME TO LIFE, A 13TH-CENTURY RESERVOIR HOPES TO RESTORE LOST GLORY

Home to a myriad dynasties one after the other, Delhi is a repository of the indelible legacy left by each of them in the form of various architectural marvels. One such legacy is the Hauz-i-Shamsi, a project which was Sultan Iltutmish's "dream come true".

Situated in Mehrauli near the Jahaz Mahal, Hauz-i-Shamsi, also known as the Shamsi Talab, is a water reservoir built between 1211-1236 AD.

Once spread over 100 hectares, this water body has shrunk into a patch of filthy water over the years. However, in recent years, some efforts have been made to restore and conserve it with the ASI taking up the task of repairing and maintaining the monuments near the tank. On Friday, the ministry of Jal Shakti organised a 'Jal Itihas Utsav' here to raise public consciousness about safeguarding water heritage sites.

According to a PIB statement, dated November 30, "The restoration work of the Shamsi Talab ... adequately reflects convergence of various Departments of Central and State government."

Elaborating on the Iltutmish connect, author Rana Safvi, in her book *Where Stones Speak: Historical Trails in Mehrauli, the First City of Delhi*, wrote: "According to legend, Sultan Iltutmish wanted to build a tank for his people... One night it was the Prophet Mohammad, who came in his dreams on his horse and instructed him to dig for water and build a water reservoir in the place marked by the hoof of his winged horse, named Buraq. The sultan... went to look for the place and found the mark of the hoof with water flowing from it and built the reservoir around it."

Safvi further wrote: "Sultan Firoz (Shah) Tughlaq got it repaired and it was refilled with water... Even today there is water in it—although extremely dirty—and weeds choke the tank..."

The reservoir also finds mentions in the works of famed traveller Ibn Batuta who had described the Hauz-i-Shamsi as a rectangular-shaped reservoir that was spread across an area of one mile by two miles.

Speaking to *The Indian Express* on the current state of the reservoir, writer Sohail Hashmi said, "In the middle of a depression in the Shamsi Talab was a rock... Today, this rock is not in the middle of the lake anymore but stands at the corner.

This suggests that more than 50% of the lake had been encroached upon..."

Author Swapna Liddle, in her book *14 Historic Walks of Delhi*, wrote: "The reservoir was an ambitious enterprise, occupying a large area and fed by underground springs as well as streams. The pavilion you see across the tank from the Jahaz Mahal once stood in the middle of the water... The tank had a tendency of silting up and required repeated excavation—first by Alauddin Khalji and then by Firoz Shah Tughlaq."

EXPRESS VIEW ON ICC WOMEN'S CUP 2023: HER OWN FIELD

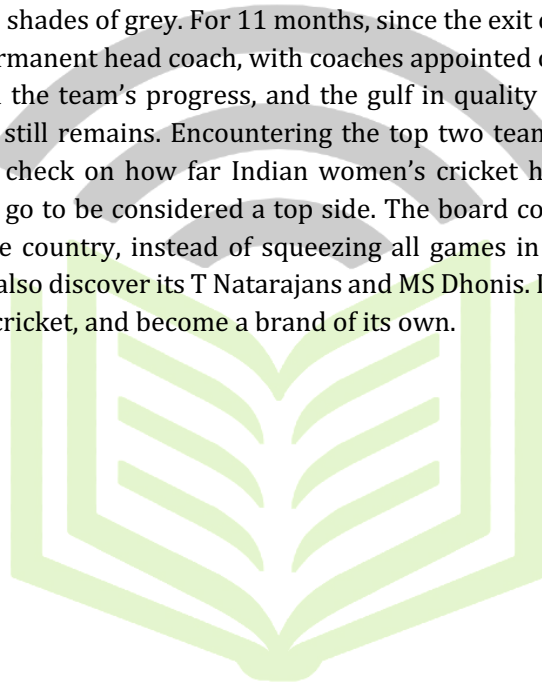
From an afterthought in the corner of cricketing wilderness, women's cricket in India has leapt into mainstream consciousness, capturing the imagination of the country. There is buzz before games and tournaments, anticipation and expectation; there are identifiable superstars, and familiar faces in prime-time ad space on tv. The next month or so will be the busiest in Indian



women's cricket, with them hosting England and Australia in a clutch of matches including two Tests, a rarity in Indian cricket.

The back-to-back Tests, one apiece against Australia and England, are in sync with the general liberation of women's cricket from its dark, neglected times in the last two-three years. In another four days, an intense bidding war is expected in the auction of the Women's Premier League. WPL, like IPL, has broadened the talent pool, with players emerging from the cricketing backwaters, from Rewa district in MP to Wayanad in Kerala, and the broadcast rights money for WPL-1 has fetched more money than IPL-1. As importantly, BCCI-contracted women cricketers get paid as much as the men. Thus, pay parity, prize-money, exposure, a packed calendar, access to high-class coaching and training facilities have given women's cricket a substantial impetus.

But the picture still has shades of grey. For 11 months, since the exit of Ramesh Powar, the Indian team did not have a permanent head coach, with coaches appointed on an interim basis. A lack of continuity has affected the team's progress, and the gulf in quality between leading teams like England and Australia still remains. Encountering the top two teams in the coming days, thus, would throw a reality check on how far Indian women's cricket has travelled and how much farther it still needs to go to be considered a top side. The board could also spread the game to different corners of the country, instead of squeezing all games in Mumbai and Navi Mumbai. Women's cricket must also discover its T Natarajans and MS Dhonis. It must emerge from the long shadow cast by men's cricket, and become a brand of its own.



DreamIAS



BUSINESS & ECONOMICS

EXPRESS VIEW: ON TRACK TO BECOMING THE THIRD LARGEST ECONOMY, INDIA NEEDS TO SEIZE MANUFACTURING OPPORTUNITY

The GDP estimates released last week by the National Statistical Office showed that the Indian economy grew at a healthy 7.6 per cent in the second quarter of the ongoing financial year, surpassing expectations. This has reaffirmed optimistic assessments of the country's medium-term growth trajectory. Alongside, the exuberance seen in stock markets after results of the recently concluded state elections were declared suggests that investors anticipate lower political and policy risks going into the general elections next year. Now, a new report by S&P Global says that the country will be the fastest growing major economy over the coming three years. This relatively high growth, it says, will drive India, currently the fifth largest economy in the world behind the US, China, Germany and Japan, to become the third-largest by 2030. Some analysts, though, expect the country to achieve that mark sooner. These are good signs.

Earlier, the International Monetary Fund, as per its October World Economic Outlook database, had pegged the Indian economy to grow at an average of 6.3 per cent per year between 2023 and 2028. This would translate in the Indian economy growing from \$3.7 trillion in 2023 to \$5.9 trillion in 2028. Alongside, the country's per capita GDP is expected to rise from \$2,612 to \$3,985 over this period. In comparison, the Chinese economy is widely expected to slow down — the IMF projects the economy to average just about 4 per cent per year during this period. In fact, a few days ago, Moody's Investors Service lowered its outlook for Chinese sovereign bonds to negative as it believes that financial support to regional and local governments and state firms poses downside risks. A slowing Chinese economy means that it may no longer be the driver of growth in the Asia-Pacific.

As per the projections in the S&P report, India, followed by Vietnam, will be the fastest growing emerging market between 2024-26. These countries, along with others like Mexico, are benefiting from the rearrangement of global supply chains. This ongoing diversification away from China is an opportunity for India to emerge as a major global manufacturing hub. But, central to this is "developing a strong logistics framework", as per the S&P report. There is a need to upskill workers, and increase the female labour force participation. This, as the report points out, will help India "realise its demographic dividend."

CREATING CERTAINTY

The Goods and Services Tax (GST), which turns six and a half years old this month, has yielded almost ₹3.4 lakh crore through October and November. While revenues in October marked the second highest monthly collections, November's kitty is the third highest. Both these months also recorded accelerated revenue growth after a sequence of slowing upticks that culminated with September recording a 27-month trough of 10.2%. October's GST inflows were up 13.4% and November's by 15.1%, with revenues from domestic transactions up 20%, the highest in 14 months. Festive fervour surely bolstered last month's nearly ₹1.68 lakh crore of GST revenues, which were based on transactions in October, and that trend may persist this month as well on the back of anticipated last-minute Deepavali spending. Prior to this two-month spike, GST revenues had crossed ₹1.65 lakh crore on only three occasions, which were typically driven by year-end compliances. Now, the average monthly collection so far in 2023-24 stands at ₹1.66 lakh



crore, and economists believe central GST receipts may surpass Budget estimates even if one factors in a relative slowdown in the final quarter of this year.

With revenues buoyant, in no small part due to tighter compliance and a crackdown on tax evaders, the government must consider resetting its ambitions and work towards making the GST a truly good and simple tax, as it was promised to be. At a recent industry interaction, responding to concerns about the manner in which a spate of GST demand notices and investigations have unfolded in recent months, Finance Minister Nirmala Sitharaman said the GST is still at a stage of moving from “uncertainty to certainty” on some grounds and those aspects are being sorted out now. That certainty needs to be pursued at a broader level to provide genuine comfort to investors about India’s tax regime being stable and predictable. For one, pending taxpayer appeals against central GST levies have risen by a quarter this year to hit nearly 15,000 cases by October and it is necessary that appellate tribunals cleared by the GST Council become operational at the earliest to unwind this pendency and set clear precedents for future tax treatment disputes. It is equally critical to lay down a road map to bring in excluded items such as petroleum and electricity into the GST framework as well as the rejig of its complicated multiple rate structure. With the general election ahead, some dithering on such reforms may be understandable, but the GST Council must not lose focus of the unfinished agenda and keep deliberating on its to-do list, so that these steps can be fast-tracked after the Lok Sabha election.

EXPRESS VIEW: RBI IS STAYING PUT

As was expected, the monetary policy committee of the Reserve Bank of India voted unanimously to keep interest rates unchanged in its December meeting. The repo rate currently stands at 6.5 per cent. Alongside, the MPC also voted 5-1 to remain focused on the withdrawal of accommodation. In his statement, RBI Governor Shaktikanta Das stated that policy has to be “actively disinflationary” to ensure that inflation aligns with the central bank target of 4 per cent, and reiterated the committee’s readiness to take appropriate policy actions if warranted.

In recent months, there has been a steady decline in inflation. Retail inflation, as measured by the consumer price index, fell to 4.87 per cent in October, after touching 7.44 per cent in July. The decline has been largely driven by food inflation which fell from 11.51 per cent in July to 6.61 per cent in October, as food prices, especially of vegetables, moderated. Alongside, there has also been a steady decline in core inflation, which excludes the more volatile food and fuel components. However, the near-term inflation outlook is uncertain. There is the possibility of an uptick in food prices in the months of November and December — as supply and demand in major commodities like cereals, pulses and sugar are in fine balance, climate related uncertainties over the rabi crop raise questions over the trajectory of food prices.

RBI Governor Shaktikanta Das also acknowledged this, noting that high frequency indicators do point towards an increase in prices of vegetables which may push up inflation. The central bank has thus projected inflation to ease slowly from 5.6 per cent in the third quarter (October-December) to 5.2 per cent in the fourth quarter (January-March). Inflation is expected to trend towards the central bank’s target next year, averaging around 4.3 per cent in the second and third quarters.

On growth, the central bank remains optimistic, saying that the economy shows remarkable resilience. While concerns over private consumption persist, the RBI sees urban demand as durable, and projects a gradual turnaround in rural demand. It notes that investment activity continues to be aided by government spending and expects the drag from external demand to



moderate as exports turn around. After the second quarter GDP estimates surpassed expectations, the RBI has raised its forecast for the full year to 7 per cent, up from 6.5 per cent earlier.

But, this forecast implies that growth will slow down from 7.7 per cent in the first half to 6.25 per cent in the second half. For next year, too, the central bank's projections are optimistic, pegging growth at 6.7 per cent in the first quarter, falling only marginally to 6.4 per cent in the third quarter. How this growth-inflation trajectory evolves, and whether it moves in line with the central bank's expectations, will determine when the committee begins to ease policy rates.

RBI ENHANCES UPI PAYMENT LIMITS, TO SET RULES FOR ONLINE LOAN AGGREGATORS

Along with steps to protect borrowers availing loans online, the Reserve Bank of India (RBI) on Friday enhanced the UPI payment limits for healthcare and education to ₹5 lakh from ₹1 lakh, and the limit on recurring e-payment mandates for credit card and insurance premia payments as well as mutual fund investments to ₹1 lakh from the current limit of ₹15,000.

While the RBI had introduced a regulatory framework for digital lending in late 2022, Governor Shaktikanta Das said that several concerns had come to the central bank's notice relating to the web-aggregation of loan products that were harming consumers' interests. He was referring to firms that aggregate loan offers from different lenders for customers to choose from.

"It has, therefore, been decided to lay down a regulatory framework for web-aggregation of loan products. This is expected to result in enhanced customer centricity and transparency in digital lending," he said.

The regulator also sought to get a better grip on the growing incidence of banks and non-banking finance companies partnering with fintechs by proposing the creation of a Fintech Repository by April 2024. FinTechs would be encouraged to provide relevant information voluntarily to this repository, he said.

The kind of details that may be compiled from fintechs were not yet clear. "While we wait for further guidelines, providing important information to the repository voluntarily can help in designing appropriate policy approaches," said Rahul Jain, CFO, NTT DATA Payment Services.

RBI's measures for web-aggregators of loans and fintechs could help "dispel the dark clouds of suspicion hanging over digital lending," said Shriram Finance executive vice chairman Umesh Revankar.

AS DEATHS DUE TO WORK-RELATED FACTORS GO UP, ILO REPORT URGES COUNTRIES TO STRENGTHEN SAFETY NET

Nearly 30 lakh workers die every year globally owing to work-related accidents and diseases, says a new report prepared by the International Labour Organization (ILO). More than 63% of these deaths are reported from the Asia-Pacific region.

Exposure to long working hours (55 hours or more per week) was the biggest "killer", with almost 7.45 lakh people dying of it in 2016, followed by exposure to occupational particulate matter, gases, and fumes (4.5 lakh deaths) and occupational injuries (3.63 lakh deaths).

The report, "A Call for safer and healthier working environments", will be discussed at the 23rd World Congress on Safety and Health at Work, one of the largest international conferences on this



subject, which began in Sydney on Monday. The report said mining and quarrying, construction, and utilities sectors were the three most hazardous sectors globally.

The Director-General of the Employees' State Insurance Corporation, Rajendra Kumar, is representing India at the conference.

ILO conventions

The report said that so far 79 out of the 187 member countries have ratified the ILO Occupational Safety and Health Convention (No. 155), while 62 countries have ratified the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187). India has not ratified both the conventions.

In the wake of the Uttarkashi tunnel collapse in which 41 workers have been trapped, the Central trade unions had urged the Union government to ratify the conventions.

"In line with the core principles of the two fundamental Conventions, a sound and resilient national occupational safety and health framework, built on social dialogue and participation, is essential for the realisation of the fundamental right to a safe and healthy working environment," the report noted.

It added that a majority of these work-related deaths, 26 lakh, was attributed to work-related diseases, while work accidents resulted in 3.3 lakh deaths. "The diseases that caused most work-related deaths were circulatory diseases, malignant neoplasms and respiratory diseases," it added.

The report said that the rate of trachea, bronchus, and lung cancers attributable to occupational exposure to chromium doubled between 2000 and 2016. Mesothelioma, attributable to asbestos exposure, has risen by 40%. The rate of non-melanoma skin cancer increased by over 37% between 2000 and 2020.

"On the other hand, deaths due to exposure to asthmagens and particulate matter, gases, and fumes decreased by over 20%," it added.

The report also recommended five categories of "Fundamental Principles and Rights at Work" for ensuring safety and health at work. These are freedom of association and the effective recognition of the right to collective bargaining, elimination of all forms of forced or compulsory labour, abolition of child labour, elimination of discrimination in respect of employment and occupation, and a safe and healthy working environment.

BANKS THAT FUNDED COAL PLANTS NEED AN ESCAPE PLAN

The Data Point published on Wednesday showed how India is progressing — albeit slowly — towards cleaner energy sources to generate power. While clean energy in the electricity mix has increased to about 23%, over 55% of India's current energy needs are still being met by coal. The acceleration of this transition towards greener energy is essential to keep the global temperature increase below 1.5°C.

Nonetheless, with the tightening of climate policies, a large portion of assets reliant on coal may diminish in value, leading to 'stranded' assets. Stranded assets are investments that face the risk of losing value and turning into liabilities. This risk arises due to unforeseen shifts in market conditions, changes in regulations, alterations in consumer preferences, and technological

3RD FLOOR AND 4TH FLOOR SHATABDI TOWER, SAKCHI, JAMSHEDPUR



advancements. This situation could impact banks and financial institutions that have both direct and indirect ties to the fossil fuel sector. While climate emergency does take priority, a plan to save the banks — which are exposed to the sector — should also be formulated to reduce impact, a paper published as part of the Reserve Bank of India's November 2023 bulletin argues.

In India, particularly, where the average age of coal plants is only 13 years, the financial risk associated with decommissioning these plants is considerably greater than it is in many other countries, the paper argues. More importantly, public sector banks and non-banking financial institutions (NBFC) carry most of the risk. Also, among NBFCs, the Power Finance Corporation and Rural Electrification Corporation, which operate under the Ministry of Power, bear 90% of the loan burden. Only 4% of the financing for coal-fired thermal power plants in India came from private.

While loans were given liberally to coal plants before, that is no longer the case now. Financiers have been increasingly reluctant to fund coal power projects, says the RBI study. In 2021, no new coal power projects were financed, except for the 1.32 GW Buxar thermal power plant in Bihar which received loans from banks such as the State Bank of India and Canara Bank. Banks are moving away from financing coal plants and increasingly funding companies which work in the area of renewable energy.

Over the past five years, while funding for new coal power projects has declined, there has been a steady rise in financing new power projects that rely on renewable energy sources.

That is why renewables have shown considerable rise in India's generation capacity even while coal continues to dominate the energy mix. In 2022-23, renewables constituted 41% of the total capacity, an increase from 32% in 2011-12. Starting from 2017, the yearly increase in renewable energy capacity has surpassed that of coal power.

So, while newer loans and capacity additions are decreasing in coal and increasing in renewables, it is the already existing burden that has to be taken care of. A 2019 research by The International Institute for Sustainable Development showed significant impacts on Chhattisgarh, Odisha, and Jharkhand due to their large shares of stressed assets (58%, 55%, and 27% of their State coal power capacities, respectively). This heightens the risk of these assets becoming stranded, indicating a considerable susceptibility to financial losses from asset devaluation as the country moves towards sustainable practices, the study argues.

EXPRESS VIEW: FARM DOS AND DON'TS

The Narendra Modi government can take credit for insulating Indian farmers from the volatility in international prices of fertilisers and their raw materials over the last two years or so. Take urea, which was being imported into India at \$900-1,000 per tonne in November-January 2021-22. It dropped to below \$300 towards June-July 2023, but has again risen to about \$400. Landed prices of imported di-ammonium phosphate (DAP) similarly peaked at \$950-960 per tonne in July 2022 and fell to an average \$440 a year later, only to climb to \$595 levels now. All through these fluctuations, the maximum retail price (MRP) of urea has been kept unchanged at Rs 5,628 per tonne. Even the MRPs of the so-called decontrolled fertilisers have been frozen — at Rs 27,000/tonne for DAP, Rs 29,400-29,500 for complexes such as 10:26:26 and 12:32:16, and Rs 33,000-34,000 for muriate of potash (MOP) — with companies simply “told” not to charge more.



These price controls, formal or otherwise, have no doubt ensured adequate supplies of fertiliser and shielded farmers from the global price shocks post the Russia-Ukraine war. But they have come at a cost. The Centre's fertiliser subsidy outgo, which was Rs 81,124 crore in 2019-20, has shot up to Rs 1,53,758 crore in 2021-22, Rs 2,51,339 crore in 2022-23 and a budgeted Rs 1,75,100 crore this year that is likely to be overshoot. Fiscal unsustainability apart, there is the environmental cost from farmers applying too much nitrogen and probably even phosphorus at the expense of all other nutrients. Agricultural scientists consider the ideal nitrogen:phosphorus:potassium ratio for Indian soils at 4:2:1. For the recent kharif cropping season, this ratio was estimated at close to 11:5:1. It shows that farmers today have little incentive to use MOP and other potassium-containing fertilisers costing more than urea and DAP. It would be even worse with respect to sulphur and micronutrients. The impact of such imbalanced nutrient use on crop productivity, produce quality and soil health in the medium and long run is something that should concern policymakers.

There are two things that the government must do sooner than later. The first is to bring urea under the nutrient-based subsidy regime. Decontrol its MRP along with all other fertilisers that are technically already decontrolled. Once decontrolled — if necessary, in stages — a per-tonne subsidy can be given on each fertiliser (including urea) linked to its nutrient content. Farmers will, then, start looking beyond urea. The second step is to extend the subsidy on a per-hectare basis. The government should let farmers buy any kind of fertiliser using this money. It will also force companies to come out with new value-for-money fertiliser products that are crop-, soil- and agro climatic region- specific.

SUPPLY-DEMAND GAP FOR PULSES, OILSEEDS, FRUIT TO PERSIST OVER THE NEXT SEVEN YEARS: REPORT

Price spikes in pulses this year may have been spurred by dented production prospects amid an uneven monsoon, but India's output shortfalls vis-a-vis demand for the key protein source and edible oils and fruits are expected to persist or even widen over the next seven years, says a new research report by agricultural economists.

Food deficits compel reliance on imports and raise the food import bill in the long run, cautioned the research report on "Prospects of India's demand and supply for agricultural commodities towards 2030", published by the National Bank for Agriculture and Rural Development (NABARD) and the Indian Council for Research on International Economic Relations.

"Commodities like oilseed, pulses, and fruits are expected to experience a supply and demand gap in the coming years. Therefore, there is a need to increase the level of production and productivity of oilseeds, pulses, and fruits since their demand in the future shows an increasing trend," the report's authors, Ashok Gulati and Shyma Jose, said.

As per capita incomes rise, the consumption basket of people tends to diversify towards nutritious and high-valued commodities, including fruits and vegetables and dairy products and away from staples such as rice and cereals, the report noted. So demand growth for non-cereals and high-valued commodities is expected to exceed the population growth rate and cereal commodities' growth in coming years, they argued.

The report assumes significance as recurrent high food inflation spells, as seen this year, cramp the room for monetary and fiscal policies to promote economic growth.



Three-year low

Output of pulses, some coarse cereals and groundnut oil seeds could hit a three-year low this Kharif season, as per initial independent estimates for crop output. Retail inflation in pulses accelerated sharply to 18.8% last month, while inflation in fruits picked up to hit 9.34%. Edible oils have witnessed deflation through most of this year, as their prices had surged sharply last year after the Ukraine conflict erupted.

Oil seeds production is expected to rise to 35 million to 40 million tonnes (MT) by 2030-31.

“Notably, the deficit of oilseeds in the food balance sheet in 2030 is worrisome for the country given the edible oil imports as high as 13.4 MT during 2020-21. A technological breakthrough in oilseeds to increase productivity or area expansion are two possible solutions to improve oilseeds’ balance sheet in the long run,” the report reckoned.

The report reiterated the recommendation of a 2012 report from the Commission for Agricultural Costs and Prices (CACP) to raise the import duty whenever the import price of crude palm oil falls below \$800 a tonne to protect Indian producers.

However, it also added that attaining self-reliance in water-intensive and long-gestation crops such as oil palm may not be worth pursuing as a sustainable goal either.

Mr. Gulati, who headed the CACP and is now a distinguished professor at ICRIER, and Ms. Jose, a research fellow at the think tank, projected demand for different farm produce up to 2030-31 based on three alternative growth scenarios that assumed per capita income (PCY) growth ranging from 4.1% to 6.1%. Supply-side estimations were done by assuming that trends will persist in line with those in the last 10 years (prior to 2020-21) or over the previous 15 years.

The report has called for policy attention to ensure a balance between domestic production and the absorption of these commodities, diversification towards high-value commodities that require major investments in market infrastructure, processing, and cold storage and warehousing facilities to build an efficient and reliable value chain.

RABI UNCERTAINTIES, POLITICAL COSTS OF DAL-ROTI INFLATION — THE GOVERNMENT MUST DO MORE

Rabi sowing is off to a sluggish start. One reason is the delayed harvesting of kharif crops, especially paddy, in states such as Punjab, Haryana and Uttar Pradesh that has, in turn, slowed the planting of wheat.

The acreage lag may reduce in the coming weeks, but the crop sown beyond the optimal time is more exposed to risks from temperature spikes, like in March 2022. However, what is of more immediate concern is the water situation. Cumulative rainfall since October has been about 26 per cent below average.

The lack of winter rain comes on top of a not-so-great southwest monsoon. While the monsoon rain was overall “normal”, it was unevenly distributed temporally (dry June and August) and spatially (deficient/subpar in eastern UP, Bihar, Jharkhand, West Bengal, Karnataka, western Maharashtra and Marathwada). The agriculture ministry has estimated production of kharif cereals, pulses, oilseeds and also cotton and sugarcane to be lower this time compared to last year.



The prospects for rabi don't look too bright either, for now. The winter-spring grown crops — from wheat, mustard and chana to onion, garlic and jeera — rely on water in underground aquifers and dams, besides the occasional showers from the northeast monsoon and western disturbance winds.

The latest data shows water levels in major reservoirs to be 20.2 per cent below last year and 92.9 per cent of the 10-year-average for this time. Reservoir levels are particularly low in the South (including the Nagarjuna Sagar, Srisailem, Somasila, Krishna Raja Sagara, Tungabhadra, Malaprabha, Mettur, Sholayar and Aliyar dams) and the cane belt of Maharashtra (Ujjani, Jayakwadi, Manjara and Girna).

And with a strengthening El Niño, forecast to last right up to April-June, the possibility of moisture stress for the standing rabi crop cannot be ruled out. Yields could also suffer from higher-than-normal temperatures, often seen during El Niño years.

The Narendra Modi government has been very proactive in supply-side management. The measures so far have ranged from the not-so-desirable (banning/curbing wheat, rice, sugar and onion exports and imposing stock limits on pulses) to sensible (restoring the monthly foodgrain quota for ration cardholders from 10 kg to the original 5 kg).

Given the rabi production uncertainties — and the political costs of double-digit retail inflation in cereals and pulses (dal-roti) ahead of national elections — it needs to do more. The current 40 per cent duty on wheat imports must be scrapped.

So long as the government is procuring the grain at its minimum support price, which has been significantly raised, farmers cannot complain. Nor does a 60 per cent customs duty on chana and 50 per cent (plus a minimum import price of Rs 200/kg) on yellow/white peas make sense. Augmenting supplies has to be accorded top priority today.

PRODUCING MORE FROM LESS: HOW INDIAN AGRICULTURE HAS GROWN WITH LIMITED 'FACTORS OF PRODUCTION'

In agriculture, there are four – what economists would call – “factors of production”: Land, water, labour and energy. Farmers use these factors or inputs to produce crops. For a given level of technology, the output produced by them is largely determined by the quantity of inputs used.

In the pre-Green Revolution era, agricultural production was primarily limited by the extent and quality of land available for cultivation. India's farm sector, according to a NITI Aayog paper by Ramesh Chand and Jaspal Singh, grew by an average 2.8% a year during 1950-51 to 1961-62. The driver was expansion in the land brought under the plough. The country's net sown area rose from 118.75 lakh to 135.40 lakh hectares (lh) over this period.

Agricultural land quality is a function of soil fertility and water availability. The alluvial soils in the Indo-Gangetic plains and the Kaveri, Krishna, Godavari and Mahanadi deltas of the eastern coast are the most fertile, followed by the black cotton soils of the Deccan, Malwa and Saurashtra plateaus. These yield more crop per acre than the lands with red, brown, laterite, mountain and desert soils, ranking in descending order of fertility.

Water availability is dependent on both rainfall and access to irrigation from rivers, lakes, tanks and ponds. The great ancient civilisations came up mostly in river valleys that could sustain vibrant agriculture.



As regards labour and energy, in traditional agriculture, the more the farm hands and bullocks there were to work the land, the more the produce that was harvested. Before the arrival of tractors, threshers, harvester combines and electric/diesel engine-driven tubewells, the main energy source in farms were bullocks. They ploughed the fields, and also treaded the crops to separate the grain from chaff and powered the Persian wheels to draw water from wells for irrigation.

Factors of technology

Just as the four “factors of production”, there are four, what one may term, “factors of technology” in agriculture. The factors of technology enable more efficient use of the factors of production. They result in higher yields – more produce from the same acre of land or number of labourers – besides better utilisation of water resources and replacement of animal and human power with mechanical and electrical power.

The four “factors of technology” are genetics, crop nutrition, crop protection and agronomic interventions.

Genetics is about seeds and plant breeding. There would have been no Green Revolution without the high-yielding wheat and rice varieties that Norman Borlaug, Henry Beachell, Gurdev Singh Khush and other scientists bred. These varieties incorporated dwarfing genes that reduced the height of the plants.

Traditional varieties, having tall and slender plants, didn't respond much to fertiliser or water application. When their ear-heads were heavy with well-filled grains, they bent over or fell flat on the ground. The new semi-dwarf varieties had strong stems that held the grain-bearing panicles upright even when heavily fertilised, enabling them to absorb more nutrients and convert these to grain.

Just as with reduced height/semi-dwarfing, there are genes in plants that code for proteins (enzymes) responsible for disease and pest resistance, drought and heat stress tolerance, nutrient use efficiency or even stem sturdiness and erect/compact canopy to allow mechanical harvesting. The genetic information for all these desirable traits is contained in the seeds of the plant varieties/hybrids developed through crossbreeding and agricultural biotechnology tools.

Farmers traditionally reared cattle for not just draught power and milk, but also their excreta that provided the nutrients necessary for plant growth. Farmyard manure – the decomposed mixture of dung and urine along with other farm residues – contains 0.5% nitrogen (N), 0.2% phosphorous (P) and 0.5% potassium (K) on an average.

The revolution in crop nutrition happened with chemical fertilisers having much higher NPK content: Urea (46% N), di-ammonium phosphate (18% N and 46% P) and muriate of potash (60% K). Synthetic fertilisers, in combination with the breeding of varieties responsive to high nutrient doses, led to a soaring of crop yields. Farmers also saved on labour in maintaining animals and collecting, storing and composting their manure; the fertilisers came from factories in bagged ready-to-use form.

With higher yields also came technologies for crop protection – defending plants against insect pests, pathogens (fungi, bacteria and viruses) and weeds, from the time of their sowing to harvesting and marketing. Crop protection chemicals are aimed at ensuring that the yield gains from genetics/breeding and nutrition/fertilisers are realised, to the maximum possible extent, in



farmers' fields. Some are labour-saving as well. Herbicides, for instance, can replace the manual removal of weeds.

The last factor of technology is mechanisation and other agronomic interventions. Tractors, apart from rendering bullocks redundant, have made it possible to use implements such as rotavators and reversible mould board ploughs that can do deep tillage, mixing and pulverisation of the soils and break their hardpan layers.

Agronomic interventions also extend to water-saving technologies – drip irrigation and laser land levelers (which help in uniform placement of seed and fertiliser too) – and intercropping or growing more than one crop simultaneously on the same piece of land. There are farmers today cultivating pomegranates in Rajasthan's arid desert soils through drip irrigation and water-soluble/liquid fertilisers. There are similarly those using tractor-drawn machines to make raised beds in fields. They plant sugarcane on the furrows and various short-cycle crops – potato, onion, garlic, vegetables and pulses – on the raised beds.

The next gamechanger – even if their bearing fruit in Indian farms may take time – could be drones for spraying fertilisers and agrochemicals and sensors for real-time monitoring of crop and field conditions.

More from same or less

The factors of technology, to use economics jargon, have “shifted up the aggregate production function” in agriculture. Instead of more output from more inputs (“moving along the production function”), productivity increases have delivered more output from the same or even less level of inputs. In other words, more crop per acre, per farmhand and per drop of water.

Table. Trend of annual growth rate in agriculture.

The effects can be seen from the net sown area in India rising by just 3.3% – from 135.4 lh to 139.9 lh – between 1961-62 and 2019-20, as against 14% during 1950-51 to 1961-62. The growth in agricultural production over the last 50 years or more has been mainly courtesy the factors of technology.

Chand and Singh have estimated the trend growth rates in gross value added from agriculture and allied activities for different periods, each representing “turning points towards either acceleration or deceleration”. The annual growth during the period from 2005-06 to 2021-22, at 3.7%, has been the highest among all phases. That isn't surprising, considering the faster diffusion of productivity-enhancing technologies and improvement in rural roads, electricity, irrigation and communications infrastructure since this century's start.

Simply put, the factors of technology have trumped the factors of production.

THE NEED TO TRANSFORM AGRI-FOOD SYSTEMS

The story so far:

A groundbreaking report from the United Nations Food and Agriculture Organization (FAO), published earlier this month, has laid bare the staggering hidden costs of our global agri-food systems, surpassing an astonishing \$10 trillion. In middle-income countries like India, these costs constitute nearly 11% of the GDP, which manifests as higher poverty, environmental harm, and health-related impacts, including undernourishment and unhealthy dietary patterns. The report

3RD FLOOR AND 4TH FLOOR SHATABDI TOWER, SAKCHI, JAMSHEDPUR



blames “unsustainable business-as-usual activities and practices” for these escalating costs, pointing to a need to transform agri-food systems. One way to do so is to shift to multi-cropping systems that have the potential to protect farmers’ well-being, improve nutritional outcomes for our communities, and positively impact ecological health.

What are the impacts of intensive agriculture?

Impressive improvements in agricultural productivity have been achieved in India over the last five decades by mainstreaming mono-cropping systems and chemical-intensive farming practices.

The Green Revolution focused on the marketing of high-yielding varieties of paddy and wheat on agricultural lands, which now constitute more than 70% of India’s agricultural production. The infusion of seeds purchased from multinational corporations and fertilizers undermined seed sovereignty, dismantled Indigenous knowledge systems, and fuelled a shift from diverse crop varieties and staples such as pulses and millets to monoculture plantations. This trend also compromised the nutritional needs of households and resulted in adverse ecological consequences including excessive extraction of groundwater.

This privatisation and deregulation of agricultural inputs also increased indebtedness among agrarian households. In 2013, the debt to asset ratio of a farmer’s household in India was 630% higher than in 1992. Agriculture in India has increasingly become unviable: the average monthly household income of a farming household sits at ₹10,816.

Which are the crops being favoured?

Under the National Food Security Act 2013, 65% of households (around 800 million people) in India are legally assured a right to food at subsidised rates through the Public Distribution System and welfare programmes such as the Integrated Child Development Services and the Mid-Day Meal Scheme.

To meet this requirement, the procurement of food crops is coordinated by the Food Corporation of India (FCI), which is required to maintain a central pool of buffer stock and to procure, transport, and store foodgrain stocks in the country. However, this procurement policy heavily favours rice and wheat. In 2019-2020, the FCI procured 341.32 lakh million tonnes (MT) of wheat and 514.27 lakh MT of rice. Whole wheat and rice also became export commodities. In contrast, the Indian government approved the procurement of a total of only 3.49 lakh MT of coarse grains such as jowar, bajra, ragi, maize, and barley by State governments for the central pool and local distribution, which is less than 1% of total foodgrain procurement. Not surprisingly, the area under cultivation of coarse grains dropped by 20% between 1966-1967 and 2017-2018, whereas the area under rice and wheat increased by nearly 20% and 56% respectively.

At the same time, other water-intensive cash crops like sugarcane and areca nut have also flourished under policies favouring investments in dams and canal irrigation (favourable for sugarcane) and free electricity for borewells (favourable for areca nut). This trend threatens food security and the production of nutritional crops. The expansion of sugarcane cultivation affects biodiversity, increases the pressure on groundwater resources, and contributes to air and water pollution. And ironically, small and marginal farmers in India are among the most food and nutrition insecure.

The global food system structure has a direct impact on the last mile — on both farmers and soil. Between 2012 and 2016, large fluctuations in soya prices in the global market and a glut in supply



from Latin American countries eroded income for soy farmers and agro-companies in Malwa. Historically as well, global trade relations have influenced food production systems in the Global South. In the pre-independence era, tax systems were introduced to efficiently collect revenue for British-enforced exports of primary raw materials, such as cotton.

How can crop diversification help?

A systemic shift in food regimes, from local to global value chains, is essential. The starting point for addressing these complex systemic issues could arise from local efforts, such as the diversification of farms.

Diversified multi-cropping systems, rooted in agroecology principles, could be a viable solution to revitalise degraded land and soil. Practices known by various names locally, like 'akkadi saalu' in Karnataka, involve intercropping with a combination of legumes, pulses, oilseeds, trees, shrubs, and livestock. This approach enables cash provision from commercial crops, food and fodder production, and offers ecosystem services such as nitrogen fixation and pest traps, and supports the local biodiversity. They also collectively contribute to improving soil health.

Critics have often argued against alternative farming systems, suggesting they may lead to a decline in farmer income even if the environment improves.

But the FAO report says that there are substantial "hidden costs" associated with the current systems which need to be factored into long-term evaluations of income. Moreover, millets, whose yield per hectare is comparable to those of rice and wheat, are also more nutritious, grow in semi-arid conditions without burdening groundwater tables, require minimal input, and provide a diversified food basket.

While crop diversification will involve some loss of productivity using a narrow metric of kg/Ha, it would preserve natural capital and allow farmers to become nutritionally secure. By redirecting subsidies, currently accruing to corporations, we can pay farmers for their contribution to sustaining natural capital, instead of incentivising them to deplete it.

How can farmers transition?

It is unrealistic to expect farmers to shift away from mono-cultivation of rice and wheat overnight. This transition needs to be systematic, allowing farmers to adjust gradually. For instance, moving from chemical-intensive practices to non-pesticide management, then adopting natural farming practices, can reduce input costs.

Farmers can diversify income through value addition, incorporating livestock and poultry. Some of these practices could be experimented with partially on specific portions of their lands.

Among the various transition pathways, a visual representation of a diversified farm involves allocating 70% for commercial crops, 20% for food and fodder, and 10% for environmental services like oilseeds (acting as trap crops). Over time, the fraction of commercial crops could be lowered to 50% and border crops could be replaced with locally-suitable tree species for fruits and fodder. Integrating livestock rearing could further improve incomes. Some preliminary economic modelling of these pathways indicates the potential to improve ecological outcomes for the landscape and sustain farm incomes in the short run (up to three years) and the long run (up to 25 years).

However, addressing challenges related to local seeds, institutional arrangements for market access, drudgery, and the need for farm labour is crucial when envisioning such a transition.

Scaling up these practices requires collaboration among institutions, policymakers, and social groups to articulate economic incentives for farmers to shift from high-input monoculture to diversified cropping.



DreamIAS



LIFE & SCIENCE

SIX EXOPLANETS FOUND ORBITING A NEARBY BRIGHT STAR

Planets with radii between that of the Earth and Neptune (referred to as ‘sub-Neptunes’) are found in close-in orbits around more than half of all Sun-like stars, but details of their composition, formation and evolution are not well understood. HD 110067 is a bright star in the Coma Berenices constellation (around 100 light-years away), which is visible from Earth’s Northern Hemisphere.

Observations of HD 110067 made by NASA’s Transiting Exoplanet Survey Satellite (TESS) in 2020 and 2022 revealed several dips in the star’s brightness, and with additional observations from the ‘CHaracterising ExOPlanets Satellite’ (CHEOPS) the signals were interpreted as six planets passing in front of the star, report Rafael Luque and colleagues. By studying the three innermost planets, the authors calculated the orbits of all six planets, ranging from around nine days for the innermost planet to around 54 days for the outermost planet.

The authors have calculated the masses of the planets and estimate the densities, which are relatively low; the authors suggest that the low densities could be explained by large, hydrogen-rich atmospheres. All six planets are in resonant orbits, in which the planets exert regular forces on each other as they orbit. This feature suggests that the system remains practically unchanged since its birth, at least four billion years ago.

HD 110067 is the brightest star found to host more than four transiting exoplanets to date, the authors note, and add that more planets may exist within or beyond the temperate zone, although such observations have not been made so far. They conclude that the HD 110067 system offers a chance to learn more about sub-Neptunes and how systems in this configuration might form.

UNDERSTANDING HOW THE GLOBAL POSITIONING SYSTEM (GPS) WORKS

Few everyday technologies have had the kind of revolutionary impact that the Global Positioning System (GPS) has. From civilians to the military, from precision scientific studies to urban planning and disaster risk estimation, GPS has significantly changed our expectations of where we are and our sense of place.

What is GPS?

The U.S. Department of Defence started the GPS programme in 1973 and launched the first satellite in 1978. The modern GPS satellite constellation consists of 24 satellites moving around the earth in six orbits. Each satellite completes two orbits in a single day. The overall programme has three main components — the space segment, the control segment, and the user segment.

The space segment, of course, consists of the 24 satellites. The six orbits they occupy are all 20,200 km above the earth, and each orbit has four satellites at all times. In this configuration, anyone on the earth will be able to ‘see’ at least four satellites at a time, which is a crucial requirement.

The control segment consists of a global network of ground-based control stations and antennae that track the 24 satellites, make sure their performance is as expected at all times, and transmit commands. The services provided by the GPS system are designed to meet the Standard Positioning Service (SPS) performance standard, the latest edition of which was published in April



2020. In essence, the SPS standard tells application developers and users anywhere in the world what they can expect from the GPS system. The control segment ensures these commitments are kept. The master control station is located at Schriever Air Force Base, Colorado, and the alternate master control station is at the Vandenberg Air Force Base, California. The ground antennae are in Florida (Cape Canaveral), Ascension Island, Diego Garcia island, and Kwajalein Atoll. There are monitoring and tracking stations in Hawai'i, Alaska, New Hampshire, Washington, D.C., Colorado, and Florida in the U.S., and in Greenland, Ecuador, Uruguay, the U.K., South Africa, Bahrain, South Korea, Guam, Australia, and New Zealand.

The user segment pertains to the use of GPS in various sectors and applications. The major sectors include agriculture, construction, surveying, logistics, telecommunications, power transmission, search and rescue, air travel, meteorology, seismology, and military operations. In 2021, according to one estimate, there were 6.5 billion Global Navigation Satellite System (GNSS) devices installed worldwide. The figure is expected to rise to 10 billion by 2031.

How does GPS work?

Each GPS satellite continuously broadcasts a radio signal containing information about its location in orbit, operational status, and the time at which the signal is emitted. The signals are transmitted at the L1 (1,575.42 MHz) and the L2 (1,227.6 MHz) frequencies at 50 bits/second. The signals are encoded with code-division multiple access. This allows multiple signals to be transmitted in the same channel and for a receiver to be able to disentangle them. There are two encoding types: the coarse/acquisition mode, which civilians can use to access coarse GPS data, and the precise mode, which is encrypted and is for military use.

Being an electromagnetic signal, the radio waves travel at the speed of light. On your smartphone, a GPS receiver picks this signal up and uses it to calculate its precise distance from the satellite. The distance is equal to the speed of light times the signal's travel time. The signal's travel time is equal to the time on the receiver's clock minus the time at which the signal was emitted. If the receiver has access to signals from four satellites, it will have the information required to calculate its location in four dimensions — three of space plus one of time relative to the satellite clock — and can thus accurately triangulate its location on the ground. This informs the need for every point on the earth being able to 'see' four satellites at a time.

Some adjustments are required to ensure the measurements are as error-free as possible. For example, the satellites around the earth are in a region of weaker gravitational potential, so their onboard clocks run 38 microseconds faster than those on the ground. This is explained by the general theory of relativity. The special theory of relativity requires engineers to account for the relative velocities of the satellite and the receiver.

How do the satellites keep time?

Good timekeeping is essential to ensure the GPS system works as well as possible. For example, not adjusting for the 38-microsecond offset between the clocks on the satellites and on the ground could lead to an error of 10 km within a single day. An offset of one millisecond can lead to an error of a full 300 km. For this reason, the satellites are all equipped with atomic clocks. In 1974, the U.S. Naval Research Laboratory first launched an atomic clock into space on board the NAVSTAR NTS-1 satellite. The clocks onboard the modern-day GPS constellation are all synchronised to within just 10 nanoseconds of each other, and with reference clocks on the ground.



An atomic clock takes advantage of a simple but profound fact. The atoms of all elements have some number of electrons around the nucleus. Each of these electrons can have a specific amount of energy, no more and no less. Imagine these amounts of energy to be steps on a staircase. An electron can occupy only these particular steps; it can't have some energy in between two steps. The size of these steps is the same for all atoms of a given element. For example, all caesium atoms in the universe have the same jump size between steps 2 and 3.

When radiation containing the exact amount of energy these electrons require to jump between two states — called the resonant frequency — is supplied, the electrons absorb it and jump. If too much or too little energy is supplied, fewer electrons will jump. So scientists begin with a radiation source and keep fine-tuning it to the frequency that causes the maximum number of electrons to jump. Once they have the frequency, they use it to measure time. For example, if it is 50 Hz, then one second will have passed when the radiation has completed 50 cycles. This is how an atomic clock works. Simply put, the electrons tell the source which frequency is 'correct'. The scientists can check the frequency at regular intervals to make sure that the source producing it isn't drifting off and losing/gaining time.

Do other countries have GNSS?

According to the U.S. Space-Based Positioning, Navigation, and Timing Policy, the GPS system will cooperate with the operation of other GNSS. Such systems are currently operated by Australia, China, the European Union, India, Japan, South Korea, Russia, and the U.K. Of these, Russia's GLONASS, the E.U.'s Galileo, and China's BeiDou systems are global. Officials of the U.S. government and their counterparts in other countries meet regularly to ensure their technologies are compatible with each other. There is also an International Committee on GNSS, operating under the United Nations Office of Outer Space Affairs. According to its website, it "promotes voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing, and value-added services".

India mooted its own Indian Regional Navigation Satellite System in 2006, later rechristened Navigation with Indian Constellation (NavIC). Its space segment consists of seven satellites: three in geostationary orbits and four in geosynchronous orbits. As of May 2023, the minimum number of satellites (four) could facilitate ground-based navigation. The master control facilities are located in Hassan in Karnataka and Bhopal in Madhya Pradesh. The NavIC satellites use rubidium atomic clocks and transmit data in the L5 (1,176.45 MHz) and the S (2,492.028 MHz) bands, with newer satellites also transmitting in the L1 band. They include a messaging interface that can receive messages from control stations and transmit them to specific areas, like warning fishers about being close to international borders, etc. India also operates the GPS-Aided Geo Augmented Navigation (GAGAN) system, which was developed by the ISRO and the Airports Authority of India. According to the ISRO website, GAGAN's primary purpose is "safety-of-life civil aviation applications catering to the Indian airspace" and for providing "correction and integrity messages for GPS".



GOOGLE GEMINI IS HERE... BUT IS IT BETTER THAN CHATGPT 4?

Google Gemini, a new multimodal general AI model, which the tech giant calls its most powerful yet, is now available to users around the world through Bard, some developer platforms, and even the new Google Pixel 8 Pro phones.

The flexible AI model, which comes in three sizes — Ultra (which is yet to be launched), Pro, and Nano — is being seen as Google's answer to ChatGPT, which has been ahead of the game so far when it comes to generative artificial intelligence (GenAI).

So what is Google Gemini?

Demis Hassabis, CEO and co-founder of the AI research lab Google DeepMind, said Gemini gets close to the vision of “AI that feels less like a smart piece of software and more like something useful and intuitive — an expert helper or assistant”.

Gemini has been built from scratch as a collaborative effort by teams across Google. It is also multimodal, which means it can work, understand, and operate across text, code, audio, image, and video. By contrast, ChatGPT cannot work on video at the moment, at least not natively. It is also much more powerful than existing models. Google claims Gemini Ultra's performance “exceeds current state-of-the-art results on 30 of the 32 widely-used academic benchmarks” used in large language model (LLM) research and development.

Gemini Ultra is the first model to outperform human experts on massive multitask language understanding (MMLU), which uses a combination of 57 subjects such as math, physics, history, law, medicine, and ethics for testing both world knowledge and problem-solving abilities, Google said. Also, Gemini can “understand, explain and generate high-quality code in the world's most popular programming languages, like Python, Java, C++ and Go”.

Why does Gemini come in three sizes?

They will cater to different needs. Gemini Ultra, the largest and most capable model, will be for highly complex tasks. Since this model is still completing trust and safety checks, it is available only to select customers, developers, partners, and safety and responsibility experts for early experimentation and feedback. It will be rolled out to developers and enterprise customers early next year.

Gemini Pro will be best at scaling across a wide range of tasks and is now available in Bard for regular users across the world. On Bard, it has a “specifically tuned version of Gemini Pro in English for more advanced reasoning, planning, understanding and more”. Developers and enterprise customers will be able to access Gemini Pro via the Gemini API in Google AI Studio or Google Cloud Vertex AI.

Gemini Nano will manage on-device tasks, and is already available on Pixel 8 Pro, powering new features like Summarise in the Recorder app and Smart Reply via Gboard, starting with WhatsApp.

Will Gemini also impact Google search?

Google says Gemini will be rolled out for more products and services like Search, Ads, Chrome and Duet AI. It is already starting to experiment with Gemini in Search, “where it's making Search Generative Experience (SGE) faster for users, with a 40% reduction in latency in English in the US, alongside improvements in quality”.



How does Gemini address issues of hallucination and safety?

Eli Collins, VP, Product, Google DeepMind, told The Indian Express that while they have done a lot of work on improving factuality in Gemini, the LLM can still hallucinate. “When we integrate these models with products like Bard, we have additional techniques to improve the accuracy of responses.”

On safety, Google said it is adding “new protections to account for Gemini’s multimodal capabilities”, and is considering potential risks and working to test and mitigate them at each stage of development. The company claims it has the “most comprehensive safety evaluations of any Google AI model to date, including for bias and toxicity”. It is also working with a diverse group of external experts and partners to stress-test models across a range of issues.

So is Gemini better than ChatGPT 4?

At the moment it is hard to say, but Gemini does seem to be more flexible. Its ability to work with video, and on devices without Internet give it an edge. Another factor is that Gemini is now free to use, while ChatGPT4 is only for paying users.

HOW GOOGLE DEEPMIND’S AI BREAKTHROUGH COULD REVOLUTIONISE CHIP, BATTERY DEVELOPMENT

Google DeepMind's recent AI breakthrough, using Graph Networks for Materials Exploration (GNoME), has the potential to revolutionize chip and battery development. This AI tool predicted the structures of over 2 million new materials, significantly impacting sectors like renewable energy, semiconductor design, and computing efficiency. GNoME, a graph neural network model, scales up the process of discovering stable materials by using filters to narrow down potential candidates that meet specific requirements.

The significance lies in the ten-fold increase in the number of 'stable materials' known to humanity. These materials, crucial for applications such as computer chips and batteries, must be stable to enable new technologies. DeepMind's AI-led discovery streamlines the process by generating potential material recipes, making it easier to identify those that can be synthesized and meet specific criteria. This is particularly relevant for advancements like solid electrolytes for Li-ion batteries or new layered compounds similar to graphene.

GNoME operates using two pipelines: one creating candidates with structures similar to known crystals, and the other following a more randomized approach based on chemical formulas. The model's precision rate for predicting materials stability increased from 50% to around 80%, equivalent to nearly 800 years of traditional knowledge. GNoME's predictions, publicly available, offer researchers a valuable resource for further breakthroughs in materials discovery.

The AI model's training data came from The Materials Project, a collaborative effort to compute the properties of inorganic materials. DeepMind's breakthrough showcases the potential for AI to accelerate materials discovery, providing a powerful tool for researchers in various fields.



WRITING FOR THE DARK TIMES

Irish writer Paul Lynch's novel, "Prophet Song," explores the impact of a fictionalized totalitarian Ireland in the midst of civil war, drawing parallels to real-life events like the stabbing attack outside a primary school in Dublin and subsequent far-right protests against immigration. The narrative follows microbiologist Eilish Stack, whose husband, a union leader, disappears amid the chaos. Lynch, winner of the Booker Prize for 2023, aims to shake readers out of complacency regarding Western democracies' unrest and draws inspiration from global crises like Syria's refugee crisis. Critics have given mixed reviews, with some praising its relevance, while others criticize it as a "lazy" political novel reminiscent of Orwell's "1984." The novel emphasizes radical empathy and confronts the West's empathy deficit towards refugees.

EXPRESS VIEW ON OXFORD WORD OF THE YEAR: GOT RIZZ?

Actor Tom Holland said he has only a limited amount of it, while Kai Cenat, the social media personality responsible for popularising it, believes he has more than most. You don't have to be born after 1997 to have it, although, if you understand what it means, you most likely are in the post-90s generation.

To those in the millennial generation or older, "Rizz", the Oxford Word of the Year for 2023, may sound like the first name of an award-winning actor (Ahmed, best known for The Sound of Metal).

It is really a shortened form of "charisma" — an unusual derivation that draws from the middle section of an existing word, instead of, as is usually the case, the beginning or end.

The idea behind the selection, as Oxford University Press editors explain, is to capture the "prevailing mood" of the year. Does "rizz" meet that requirement? With the pandemic having officially ended in May, for many, 2023 marked the first post-Covid year and a return to their more open and confident selves after two years spent in fear of a virus.

"Rizz", which means "style, charm or attractiveness; the ability to attract a romantic or sexual partner" certainly speaks to that sense of optimism. It also reflects how Gen Z is changing the way the world communicates and the role of the internet in speeding up and amplifying this process.

To those who take the English language a tad too seriously, "rizz" may seem like an absurd selection. It should be remembered, however, that previous words have included "refudiate" (2010), the emoji depicting a face with tears of joy (2015) and "goblin mode" (2022). There's nothing serious about this annual tradition. There is also nothing especially venerable. The first Oxford Word of the Year was chosen only in 2004, making this tradition as much a part of Gen Z as anyone talking about their "rizz", or lack of it.

THE JOURNEY TOWARDS A PLASTIC-FREE WORLD

The story so far:

The Intergovernmental Negotiating Committee (INC), under the United Nations Environment Programme, met in Nairobi from November 13 to 19 for its third round of negotiations to develop an international legally binding instrument to end plastic pollution worldwide. Under the UN Environment Assembly Resolution 5/14, the INC is responsible for delivering a global plastics treaty by 2025. The INC-3 was a make-or-break opportunity as countries came together to



negotiate the 'zero draft' text developed by the committee's secretariat, with various options for core obligations and control measures. INC-3 fared relatively better than INC-2, in Paris earlier this year, by being able to discuss the substantive contents of the treaty instead of debating only the rules of procedure.

What does the 'zero draft' say?

The zero draft as prepared by the secretariat contained strong options for an international legally binding treaty to end plastic pollution. But during negotiations, member states managed to water down their core obligations, particularly those pertaining to some high-impact elements such as primary polymer production, chemicals of concern, problematic and short-lived plastics, trade, and financial mechanisms, among others. Some states also disagreed on the objective and scope under UNEA Resolution 5/14.

Most countries agreed that the treaty's objective should be to end plastic pollution and protect human health and the environment. But a group of like-minded countries — including Saudi Arabia, Russia, China, Iran, and some members of the Gulf Cooperation Council — argued to include the clause "while contributing to the achievement of sustainable development", to ensure their economic interests and investments.

The most important provision, that is a reduction in the production of primary polymers, also stirred controversy because of its implications for industry. The industry's influence was apparent by its presence — with 36% more fossil fuels and chemicals sector lobbyists at INC-3 than in INC-2 — at the negotiations. Some member states also submitted that "to even discuss ... reducing plastic production was completely out of the scope of the mandate of UNEA Resolution 5/14 and that such a provision should be completely deleted from the draft" and that "UNEA Resolution 5/14 calls to end plastic pollution and not plastic production".

While it is agreed that plastic pollution can be managed only with strong, concrete measures at each stage throughout the lifecycle of plastics, many countries disagreed where the lifecycle begins. While this would ideally mean that it begins at the point of sourcing raw materials for production, some countries argued that the lifecycle starts at product design. Similarly, the same group objected to including provisions pertaining to eliminating compounds and polymers of concern and problematic and avoidable plastics, which are key in ending plastic pollution, and called for a 'null option' despite broad agreement from other countries that were pushing for a binding agreement.

HOW NAPOLEON'S FAILED EGYPT EXPEDITION GAVE BIRTH TO EGYPTOLOGY

A scene in Ridley Scott's latest film depicts Napoleon directing his troops to fire cannons at the pyramids of Giza. Sensational as its may be, it is inaccurate — just like the famous apocryphal story of Napoleon's troops blasting off the nose of Giza's Great Sphinx (evidence suggests that the nose was chiselled off centuries before his time).

"From what we know, Napoleon held the Sphinx and the pyramids in high esteem," Salima Ikram, a professor of Egyptology at the American University in Cairo, told The New York Times. "He definitely did not take pot shots at them," she said.

In fact, many scholars credit Napoleon for bringing Ancient Egypt to global consciousness, and literally giving birth to Egyptology as we know it. We take a look.



Driven by competition with the British

The French campaign in Egypt from 1798 to 1801 was driven by Napoleon's colonial ambitions and a desire to stymie British influence.

"Napoleon Bonaparte's invasion of Ottoman Egypt in the summer of 1798 was intended to forestall the drift of that province into the British sphere of influence, and to interrupt British communications with India," Juan Cole wrote in his book *Napoleon's Egypt: Invading the Middle East* (2007). With the Ottoman Empire in swift decline, the French feared that former Ottoman possessions, with Egypt among the most coveted, would soon fall into the hands of the British or Russians.

In July, 1798, the French fleet landed in Alexandria and quickly captured it. Then Napoleon took Cairo, after the Battle of the Pyramids. Despite these initial successes, his operation soon started to falter. Not only did France not have enough men to establish sufficient garrisons, its navy was no match against the British.

Thus, by 1799, Napoleon himself fled the country. The French would hold on for another two years but effectively, any colonial designs Napoleon held were long laid to waste.

Powering global Egyptomania

Despite being a military failure, the legacy of Napoleon's Egypt campaign can be felt till date. As Alexander Mikaberidze, an expert in Napoleonic history, told *The NYT*, the expedition can be credited with "the beginning of Egyptology, the beginning of this fascination with Egypt and the desire to explore Egyptian history and Egyptian culture."

Along with his army of around 50,000, Napoleon had taken 160-odd scholars to Egypt — specialists in a wide range of fields, from botany and geology to history. The idea was to document and understand Egypt like never before, to capture the idea of Egypt, as much as its physical territories.

Take the example of Dominique-Vivant Denon, an artist and novelist. Denon sketched and collected data on numerous pharaonic monuments and published, in 1802, his monumental *Travels in Lower and Upper Egypt*.

"While there was no precedent for the number, size, and quality of his works, there was also no precedent in terms of the subject matter," historian Miguel Angel Molinero wrote for *The National Geographic* in 2021. "The Egyptian monuments he drew — the Colossi of Memnon, the Temple of Hathor, and the Sphinx of Giza — had never been seen in such detail. Their beauty and distinction captivated France, and audiences were hungry for more," he wrote.

In 1809 the first volumes of the 22-part *The Description of Egypt* were published. Containing nine books of text and 13 of plates, illustrations, and maps, they were published till 1828 — well after Napoleon's death — and were seen as symbols of French national pride.

"For many modern scholars, the most enduring value of this work lies in the illustrations, for their fidelity and aesthetic dimension, accentuated by their enormous size. They mark the start of academic archaeology in the Nile Valley," Molinero wrote. "The topographical plans are exceptional... About 20 of the buildings depicted have since disappeared and all that remains of their appearance are the figures and explanations in the *Description*," he wrote.



Creating a market for Egypt's antiquities

By sparking interest in Egypt, Napoleon's expedition also created a thriving demand for Egyptian antiquities in Europe. French scholars wantonly seized artefacts from important Ancient Egyptian locations. This practice continues till date, often through clandestine and outrightly criminal channels.

Today, some of the greatest Egyptian antiquities, from Rosetta Stone which helped decipher ancient Egyptian hieroglyphs, to the beautiful Nefertiti bust, all remain in museums far away from home, much to the chagrin of many within Egypt.

Thus, Egypt's antiquities community has been working for years to repatriate as many artefacts as possible, although socio-political developments in the country do not make things easy. The Antiquities Coalition, a US-based non-profit, estimated that following the 2011 revolution, about \$ 3 billion worth of relics had been illegally smuggled out of Egypt.

SMALL WONDER: WHAT THREATENS THE EXISTENCE OF NEW ZEALAND'S PINT-SIZED BIRD?

The kiwi is a small bird and national identity of New Zealand, faces various threats. The decline in kiwi populations is attributed to historical factors such as hunting by Maoris and the introduction of invasive species by Europeans. Presently, predators like stoats pose a significant threat to kiwi chicks, reducing their chances of reaching breeding age. Conservation initiatives, both governmental and private, aim to create pest-free environments for kiwis, with efforts like the Canopy Conservation Trust working to eradicate pests in reserves. Organizations like Rainbow Springs Nature Park are involved in hatching and managing kiwis, releasing them into the wild to bolster their populations.

DE-EXTINCTING THE DODO: WHY SCIENTISTS ARE PLANNING TO BRING BACK THE BIRD TO MAURITIUS

The simile '(as) dead as a dodo' is used, often figuratively, to "stress that someone or something is dead". Since the last of its species died, sometime in the final two decades of the 17th century, the tubby flightless bird has become somewhat of an 'icon of extinction'.

An ambitious new project — a collaboration between genetic engineering company Colossal Biosciences and the Mauritian Wildlife Foundation — promises to not just bring the dodo back to life, but also re-introduce it in its once-native habitat in Mauritius.

How did dodos go extinct? How will they be resurrected? And why? We explain.

Why dodos went extinct

Popular representations make it appear that the dodo "deserved" its tragic fate. "What other fate could there have been for such a foolish-looking ground pigeon?... *Raphus cucullatus* had the air of a bird that stood still with a blank stare as the scythe of extinction lopped off its head," Riley Black wrote (satirically) in National Geographic in 2011.

This sentiment, however, paints a one-sided picture. Dodos were not simply dumb. They were remarkably well-adapted for the ecosystem they inhabited, with its abundant supply of food, and



lack of major predators. Their extinction, thus, was far from inevitable — that is until humans arrived on the scene.

Dutch colonists first landed in Mauritius in 1598. Dodos disappeared around 80 years later. Not only did the Dutch hunt the meaty bird, but the animals they brought with them — dogs, cats, rats, etc.— wreaked havoc on the defenceless dodos and their eggs.

It is the human hand in the dodos' extinction that has made for its enduring cultural resonance. As environmental historian Anna Guasco wrote in 'As dead as a dodo' (2020): "It is the canary in the coalmine of anthropogenic destruction. Its extinction is seen as the inevitable outcome of human interaction with nature."

How geneticists plan to bring the Dodo back

To de-extinct a species, the first thing required is accurate and complete genetic information. This is known as a species' genome — each genome contains all of the information needed to build that organism and allow it to grow and develop.

Beth Shapiro, Colossal's lead paleo-geneticist, has successfully sequenced the entire genome of the dodo using DNA extracted from a skull in the collection of the Natural History Museum of Denmark. This is now being compared to the genome of the Rodrigues solitaire, the dodo's closest (also extinct) relative to identify just what makes a dodo, a dodo.

Colossal has also sequenced the genome of the Nicobar pigeon, the dodo's closest extant relative, and found its primordial germ cells (PGCs). PGCs are basically embryonic precursors of a species' sperm and egg.

This is where the 'magic' begins. The Nicobar pigeon's PGCs will now be edited to express the physical traits of a dodo, with the help of the insight gathered from the comparison of the genomes of all three birds. These edited PGCs will then be inserted into the embryos of a sterile chicken and rooster, who will act as 'interspecies surrogates'. In theory, when the chicken and rooster reproduce, they will give birth to a dodo offspring.

"Physically, the restored dodo will be indiscernible from what we know of the dodo's appearance," Matt James, Colossal's chief animal officer, explained.

The challenge

"Colossal's idea is a sound one... [but] because of the complexity of recreating a species from DNA ...[it] can only result in a dodo-esque creature," Julian Hume, an avian palaeontologist at London's Natural History Museum, told CNN.

"It will then take years of selective breeding to enhance a small pigeon into a large flightless bird. Remember, nature took millions of years for this to happen with the dodo," he added.

Beyond complications posed by genetic engineering are the challenges that lie ahead. While de-extinction is currently in vogue, a proposal to reintroduce a long-extinct creature to its once-native habitat is nearly unheard of.

Mauritius of the past simply does not exist anymore, "much of it has already been replaced by sugar cane, buildings, villages (and) reservoirs," Vikash Tatayah, founder of the Mauritian Wildlife Foundation, told the media. For dodos to survive, invasive species including rats, feral cats, pigs



and dogs, monkeys, mongooses, and crows may need to be “excluded, rehomed or even controlled,” Tatayah explained.

This is why the foundation is considering reintroducing dodos not to the main island but to nearby Round Island and the islet of Aigrettes, both of which are uninhabited and relatively pristine.

So, why go through all this effort?

Tatayah believes that reintroducing the dodo to Mauritius can help restore its fragile ecosystem, citing “mutualistic relationships which have broken down since the loss of the dodo.” The bird’s large beak indicates that it consumed large-seeded fruits, and thus played a role in the seeds’ dispersal, he said.

Moreover, the technology that Colossal would use to revive the dodo would also help to conserve and restore other avian populations “at the brink”.

But perhaps most significantly, this is a project driven by symbolism. Ben Lamm, CEO and co-founder of Colossal, argues that “restoring the dodo gives us the opportunity to create ‘conservation optimism,’ that hopefully inspires people around the globe, in a time when climate change, biodiversity loss and politics can make things seem hopeless.”

Looking at things this way, there is perhaps no better animal to de-extinct than the one most associated with human-caused extinction.

PLANTS WARN EACH OTHER OF DANGER, AND NOW WE CAN WATCH THEM

If you’ve enjoyed the smell of fresh cut grass, you may have unwittingly eavesdropped on a conversation between plants.

The smell is caused by a group of compounds called green leaf volatiles (GLVs) that a plant releases into the air when it is injured. Although it can be a very pleasant smell to humans, to other plants it may be a warning letting them know that danger is near.

Scientists have known for some time that plants can eavesdrop on damage to other plants nearby.

Doing so can benefit a plant, which can take steps to defend itself. Scientists are considering harnessing this process to fight agricultural pests without having to use pesticides – although exactly how plants detect danger and protect themselves remains unknown.

A danger-signalling relay

Now, Masatsugu Toyota, a professor at Saitama University with a penchant for making microscopes, has found a way to ‘watch’ plants responding to these warning signals.

The new study, published in Nature Communications on October 17, could help unlock long-standing questions in the field of plant defence and pave the way to protect crops without pesticides.

Abdul Rashid War, a scientist working on crop health at NatCo Pharma, explained plants defence mechanisms, involving a chain of molecular reactions.



The reactions are triggered when a plant is damaged, he said, and GLVs are released as by-products. (By mounting a defence response, plants can make themselves less palatable or even indigestible to the insect attackers.)

The molecular cascade is mediated by calcium, a common mediator of chemical and electrical signals found throughout biology.

When an insect takes a bite of a plant leaf, calcium ions flood the leaves in the cells. Dr. Toyota inserted a gene into the mustard plant (*Arabidopsis thaliana*), causing the plants' cells to glow whenever they were flooded with calcium.

When he placed the mutant plant under a special microscope rigged to detect fluorescent signals, he saw it light up in response to being touched, cut with a scissor or eaten by a caterpillar.

So if Dr. Toyota's mutant mustard could eavesdrop on damage being done to another plant, it should also light up in response to GLVs.

A 'classic' marker for defence

To test this, his student Yuri Aratani set up a sensitive experiment. She pumped air laden with GLVs on the mutant mustard plant and watched it light up under the microscope. "This is the first time for human beings to visualise [plants sensing] the volatile components released from the damage to other plants," Dr. Toyota said.

The study, conducted on mutant mustard plants, revealed that these plants respond to green leaf volatiles (GLVs) released by neighbouring plants, activating a calcium-based signaling mechanism. The experiment demonstrated that when exposed to GLVs, mustard leaves lit up under the microscope, providing visual evidence of the plant's response to volatile compounds. The researchers identified specific volatile compounds, E-2-HAL and Z-3-HAL, that triggered calcium responses in certain cells of the leaves. The study suggests that plants can detect and respond to volatile signals, potentially using them as a defense mechanism. The findings could have implications for pest control, as diffusing GLVs over crops might activate plants' defenses. However, further research is needed to understand the specific mechanisms and applications of plant responses to volatile compounds.

METHANE: MORE POTENT, LESS PERSISTENT

WHAT IS IT?

Methane is an organic compound. Its molecule consists of carbon and four hydrogen atoms (CH₄). It's in the news of late because of its character as a potent climate pollutant. While climate talks have by and large focused on carbon and carbon dioxide emissions, there is increasing acknowledgement among the world's leaders as well as philanthropists of methane's effects on global warming. At the ongoing COP-28 climate talks in the United Arab Emirates, for example, a group of well-endowed philanthropic bodies, including the Sequoia Climate Foundation and the Bezos Earth Fund, announced that they would collectively invest \$450 million in solutions to tackle methane emissions.

Methane has a greater global warming potential (GWP) than carbon dioxide. The GWP is a measure of the warming caused by a substance relative to that due to the same mass of carbon dioxide; the GWP₁₀₀ measures this over a century at a time. If carbon dioxide has a GWP₁₀₀ of 1,



methane is 28, nitrous oxide is 265, and sulphur hexafluoride is 23,500. However, while carbon dioxide lasts for several decades at a time in the atmosphere before breaking down, methane breaks down in a matter of years. That is, it's a short-lived climate pollutant. Its sources include cattle-farming, landfills, wastewater treatment facilities, rice cultivation, and some industrial processes.

BRAIN FUNCTION

Is football heading linked to a measurable decline in brain function?

New research links soccer heading — where players hit the ball with their head — to a measurable decline in the microstructure and function of the brain over two years. While previous research has examined adverse effects on the brain related to soccer heading at a single point in time, this new study looked at brain changes over two years. Two-year heading exposure was categorized as low, moderate or high. The players were assessed for verbal learning and memory and underwent diffusion tensor imaging (DTI), an MRI technique, at the time of enrolment and two years later. DTI characterises the microstructure of the brain by tracking the microscopic movement of water molecules through the tissue. Compared to the baseline test results, the high-heading group demonstrated an increase of diffusivity in frontal white matter regions and a decrease in orientation dispersion index (a measure of brain organisation) in certain brain regions after two years of heading exposure.

STUDY OF 50,000 DOGS SAYS VACCINES, NOT CULLING, WILL STOP RABIES

A 16-year study in Tanzania has reported that individual dog behaviour plays a key role in the endemic nature of rabies. Through contact tracing, brain samples, and modelling, the researchers found that rabies spreads locally, with a few “super-spreader” dogs, and that vaccination is the best way to prevent it

Katie Hampson, now a professor of Infectious Disease Ecology at the University of Glasgow, began collecting data for a study back in 2002. She was just starting her Ph.D. then. She was interested in understanding how rabies — a deadly disease that infects humans primarily through a dog bite — spreads and persists among dogs in Tanzania in Africa. But that was just the start; the study that began during her PhD wouldn't see its end for more than a decade.

With the help of collaborators and other people who later joined her own lab, Dr. Hampson went on to collect data about rabies infections in the area over a period of nearly 15 years. The results and analysis of this massive project were recently published in *Science*, where the authors have reported that individual dog behaviour plays an important role in how rabies persists at low levels in the population.

Additionally, their analysis strongly implies that mass dog-vaccination – and not culling – is crucial to help prevent the spread of rabies.

Chains of transmission

Rabies is an endemic disease: it persists in some populations, especially in Africa and Asia, at low levels, despite causing many deaths upon an outbreak. The cause of nearly 60,000 human deaths a year worldwide, a virus called lyssavirus is the culprit behind the disease. There is, thankfully, some hope; rabies is preventable by a vaccine. But if the vaccine isn't administered in time after the bite, the virus can end up infecting the brain and lead to certain death. Even though there is a

3RD FLOOR AND 4TH FLOOR SHATABDI TOWER, SAKCHI, JAMSHEDPUR



variable incubation period after the bite, during which the dogs and humans show no symptoms, once the infection takes hold there is sadly no going back.

What allows a lethal disease like rabies to persist long-term at low levels? For years, this question has hounded many scientists. Intrigued by the endemic nature of rabies, Dr. Hampson established a contact tracing network to track the spread of rabies among the 50,000 dogs and 250,000 people in the Serengeti district of northern Tanzania.

Rabies can be diagnosed in dogs rather easily based on clinical signs. If a dog that's acting strangely bites other dogs or humans unprovoked and dies after biting, it's most likely to have been a rabid dog. As most dogs in the Serengeti district were owned by the different villagers – as opposed to the free-roaming stray dogs of India – the authors were able to trace the history of each bite and track down the dogs that were biting other dogs and humans. To make sure that they weren't barking up the wrong tree, they also obtained brain samples from the dead dogs whenever they could to confirm the virus's presence.

It takes a bite

A way that rabies differs from typical infectious diseases is the extent to which it can truly spread in a population, something that the researchers also found in their data. Usually, infectious diseases, like COVID-19, spread like wildfire and lead to many people getting rapidly infected, then recovering and developing an immunity against the virus. This is how we have been seeing the typical peaks and valleys of COVID infections over the last few years. But for rabies, the only way it can spread between dogs is by a bite. The researchers found that the spatial structure of the dog populations and the scale at which the virus spreads were very important. In most cases, the virus spread very locally as the dogs could only bite a few other dogs nearby.

By looking closely at how the virus affected dogs, the researchers were able to decipher how it wreaks a carefully controlled form of havoc in dog populations. As the virus attacks the central nervous system –which is a bit shielded from the immune system –there is, unfortunately, no natural immunity developed against the virus. But dogs that have been bitten and are in the non-symptomatic incubation phase could not get infected again, limiting the dogs that can get infected once the virus starts to spread.

Infected dogs either died or were killed once they showed symptoms and started biting, which also limited their ability to continue infecting. The researchers found that all these factors played a role in preventing the virus from spreading too much locally within a population. But then why is it that rabies doesn't just die out as more and more dogs get infected within a population?

'Sparks from a forest fire'

The answer seemed to lie in the differences in how the dogs behaved once they got infected. Most of the dogs seemed to be biting around two other dogs in their immediate vicinity, but a few dogs bit a lot more, with one dog biting more than 60 others. A small number of dogs also ran incredibly long distances, close to 15 km, away from their home after being infected, and ended up biting dogs very far away from their home. This variability was an important element when the researchers modelled their data – without which it would have been very difficult to study rabies outbreaks the way they happen. Simply taking the average of how many dogs were bitten would have led the researchers to miss the few "super-spreader" dogs that either bit many dogs or travelled vast distances.



In fact, by travelling long distances, some dogs ended up being a vehicle to carry the virus away from the local community, where one can slowly run out of susceptible dogs (as more and more get infected), to a new community where the virus has more room to thrive. “It’s like sending out sparks from a forest fire. And all those little sparks are circulating in the landscape,” said Dr. Hampson.

Vaccine inequity redux

Keeping these different facets of how rabies seemed to circulate in mind, the researchers built computational models to dissect the nuts and bolts of rabies transmission in the population. By reconciling the movement and biting behaviour of rabid dogs along with the number of rabies cases they saw in their model, they realised that traditional infectious disease models don’t work well with predicting how rabies would spread. Rabies seemed to operate at a very local scale, with low rates of transmissibility –except in the few rare cases of super-spreader dogs that took the infection with them into new communities. Another key finding of their study was that a lower density of dogs didn’t necessarily mean a drastically lower rate of transmission, implying that culling dogs to reduce their number wouldn’t help prevent the spread of the virus.

In fact, Dr. Hampson firmly believes that large-scale dog vaccination is the only effective way to break the chain of transmission and prevent rabies from spreading. Even if one area has fewer dogs, an infected dog from that area simply needs to travel and bite just one unsuspecting dog somewhere else.

If the dogs are vaccinated, an infected dog can bite other dogs, but that will prove futile. So instead of killing dogs en masse in every area, mass vaccinations can help save the dogs’ lives as well as our own.

High-income countries have used vaccination drives to successfully eliminate rabies in their dog populations, but these life-saving vaccines are not equitably distributed around the world. The countries that now need these vaccines the most don’t have access to them because of their high cost.

India also has a high burden of rabies, with around 20,000 people dying every year of the disease.

With 30-60 million stray dogs roaming the streets, much of the efforts in the country have focused on sterilising dogs over vaccinating them.

Culling a waste of time

Gowri Yale, a veterinarian with a Ph.D. in rabies epidemiology, has been working to eliminate rabies in Goa with the help of large-scale surveillance and mass vaccination drives. Dr. Yale is a scientific advisor to Mission Rabies, a UK-based charity working with the Goan government to ensure at least 70% of the dogs in Goa are vaccinated. The efforts have led to a tremendous decrease in the number of rabid dogs in the state over the last few years.

But Goa doesn’t exist in isolation: it shares borders with densely populated Maharashtra and Karnataka, where the virus is still endemic. Dr. Yale and her colleagues have now begun advising vaccination efforts in Mumbai, Bengaluru, and Kerala as well.

“It’s a fantastic paper to promote mass dog-vaccination, which is the only way forward to eliminate canine rabies,” Dr. Yale said about the Science study. “If there is any discussion of culling



dogs, their model shows that culling dogs is just a waste of time, money, and resources, and is also just not welfare friendly.”

Our cuddly, canine friends have evolved to live together with us humans over tens of thousands of years. Sadly, the deadly rabies virus turns these friends into foes from time to time. But reducing dog numbers by killing them is ethically wrong and, now we know, scientifically ineffective. Vaccination is the way to protect dogs from the terrible fate of rabies and thus ourselves as well.

BCG REVACCINATION STUDY IN ADULTS TO BEGIN IN 23 STATES

Twenty-three States have consented to participate in the BCG revaccination study in adults that will be undertaken in a “programme implementation study mode” to evaluate the effectiveness of the vaccine in reducing TB disease incidence. The study will target some high-risk groups — those older than 50 years, prior TB disease, underweight adults, diabetics, and those who smoke and consume alcohol. The phase-1 of the study will be conducted in Uttar Pradesh and Madhya Pradesh, says a Delhi-based official.

No clinical trials have been carried out in India to study the efficacy of BCG revaccination in adults to prevent TB disease, and studies in other countries have thrown up mixed results. Two clinical investigation studies by St. John’s Research Institute, Bengaluru have found BCG revaccination in adults to be significantly immunogenic.

Despite the recommendation of an expert committee that a clinical trial be carried out first, the government has decided to go ahead with the programme implementation study. “An expert committee constituted by ICMR recommended that a robust trial be carried out in India and implementation at population-level be undertaken once evidence of efficacy was available,” says Dr. Soumya Swaminathan, former Chief Scientist at WHO and a member of the expert committee. “Most studies of BCG revaccination globally have not found major impacts on reducing TB incidence. Therefore, it is not recommended by the WHO currently. However, a recent phase-2 trial in South Africa suggested it may prevent TB infection. Hence, further trials are warranted to assess the effectiveness of BCG revaccination in different populations, age groups, by timing of revaccination and types of TB.”

Since the government felt that a trial would take too long to complete and wanted to implement BCG revaccination at scale, the committee had suggested that some districts be used as an intervention arm and some as the control arm, and TB incidence be captured over a couple of years. Accordingly, 50% of the districts in a State will be included in the intervention arm and the remaining 50% will act as control.

The BCG revaccination study in adults is based on retrospective data analysis from a 1968 trial, but the study has limitations, including a small sample size and unknown factors such as nutritional status and TB exposure. Tamil Nadu has agreed to participate in the study, while Kerala, Bihar, Chhattisgarh, West Bengal, and Uttarakhand have not consented, citing field constraints and an already burdened immunization program.

CHINA PNEUMONIA: IS DRUG-RESISTANT BACTERIA CAUSING SEVERE DISEASE?

After China, some European countries have also started witnessing an increase in cases of severe pneumonia in children. While China has not provided information on the cluster of pneumonia cases, the World Health Organisation (WHO) has quoted its health agency as attributing the



increase to common respiratory pathogens such as Sars-CoV-2, RSV, influenza and mycoplasma pneumoniae.

Among them, the surge of mycoplasma pneumoniae, a bacterial infection that remained suppressed for three years, is making headlines. While the world had witnessed a decline in common respiratory infections during the pandemic owing to measures such as social distancing and masking, the numbers are bouncing back as restrictions have been done away with.

Why is the pathogen that causes “walking pneumonia” resulting in severe symptoms?

Mycoplasma pneumoniae is one of the common causes of walking pneumonia — a mild form of the disease that does not need bed rest or hospitalisation.

One of the reasons could be China coming out of the harsh, long lockdowns implemented during COVID-19. The long absence of mycoplasma pneumoniae has made people vulnerable and incapable of fighting it. An international consortium monitoring mycoplasma pneumoniae infections in a paper published earlier this year warned that when the infection does emerge, it is likely to result in “rare severe disease and extra-pulmonary manifestations” with waning herd immunity and populations not exposed to the infection for years. A paper published by the consortium on the same day as WHO’s statement about the situation in China said that after three years, there were signs of resurgence in mycoplasma pneumoniae in Europe and Asia.

The second reason could be high levels of resistance to antibiotics that work on the pathogen.

What is the role of antimicrobial resistance?

Dr Rama Chaudhary, the only collaborator for the consortium from India and dean of research at NIMS (National Institute of Medical Sciences) Jaipur, explains how the indiscriminate use of antibiotics during the pandemic has made them ineffective against what it was intended for, combatting mycoplasma pneumoniae. “The unusual suppression of mycoplasma pneumoniae cases could be due to people consuming azithromycin — one of the drugs effective against the bacteria — during the pandemic. This probably resulted in antibiotic-resistant bacteria,” says the former HOD of microbiology, AIIMS, New Delhi.

Is drug-resistant mycoplasma pneumoniae a new thing?

No. China has previously reported high resistance of the pathogen to the category of drugs called macrolides that includes azithromycin. “In a study, macrolide resistance of mycoplasma pneumoniae in Beijing was at a high rate of more than 90 per cent between 2008 and 2012. The authors of this study recommended establishing long-term monitoring of the pathogen to guide clinical treatment of the infection,” says Dr Kamini Walia, senior scientist and programme officer of antimicrobial resistance at the Indian Council of Medical Research.

Mycoplasma pneumoniae is a peculiar bacterium. It doesn’t grow on commonly used culture mediums, making it difficult to identify. Sometimes molecular tests that look for genetic material are needed to diagnose it. It is also extremely small and without a cell wall. The missing cell wall means certain categories of common antibiotics such as penicillin and cephalosporin do not work on it. Only drugs such as azithromycin and doxycycline work on the infection.



Is there a threat of the disease spreading to India?

Dr Chaudhary says that mycoplasma pneumoniae is not new and India has previously seen such cases. It can re-emerge in India as well. It is possible for the infection to spread through travel. But antibiotics exist to fight it.

THE TRANSFORMATIVE BENEFITS OF POPULATION-LEVEL GENOME SEQUENCING

Many programmes take advantage of unique populations to understand disease prevalence and biomarkers, and use that to find novel therapeutic targets. Other efforts seek to use genomic data in decision-making and medical care. Integrating medical records and genealogies also resulted in new drugs and therapeutics

In the last decade, genomics has undergone a revolutionary shift with the advent of technologies that have significantly improved throughput and reduced the cost of whole-genome sequencing, giving rise to population-scale genome-sequencing programmes – where scientists decipher the complete genetic makeup of large populations, offering unprecedented insights into the intricate view and tapestry of human diversity.

This week, the UK announced the completion of half a million whole-genome sequences, almost 0.7% of its population. Such data-sets are transformative, with far-reaching implications for both immediate and long-term advancements in the biological sciences.

The deCODE initiative

An early effort to use large-scale population genetic studies was initiated in Iceland by deCODE genomics in 1996, with most of the Icelandic population enrolling for genetic studies in around a decade's time. The initiative, along with the democratisation of sequencing technologies, provided the initial impetus for programmes that wished to use population-scale genomic data for precision medicine and public health.

The deCODE effort considerably improved our understanding of the genetics of diseases and the utility of such data in risk assessment. It also contributed significantly to the methods, infrastructure, and standards with which researchers handle large-scale genomic data and set up discussions on their bioethics. The project also laid the groundwork to integrate medical records and people's genealogies, resulting in new drugs and therapeutics.

deCODE's success plus the wider availability of sequencing technologies gave rise to a number of population-scale genome initiatives around the world, including many pilot programmes initiated in the last decade. At first, several projects worked with hundreds to thousands of genomes, but in the last half a decade, such endeavours have leapfrogged to lakhs of genomes.

The merit of population-scale efforts

Indeed, one of the first such was the UK's '100K Genome' project, which aimed to bring genomics into routine healthcare. We estimate more than a dozen countries today have genome programmes of a lakh genomes or more. A recent initiative by the pharmaceutical companies Regeneron Genetics Center, AstraZeneca, Novo Nordisk, and Roche, along with the Meharry Medical College, Tennessee, has even planned to sequence more than five lakh individuals of African ancestry through the Diversity Human Genome Initiative.



Many large-scale genome programs are currently underway, including the AllofUS programme in the U.S., which will collect genetic information of a million people with funding from the National Institutes of Health. The European Union recently launched the '1+ Million Genomes' initiative. A 'Three Million African Genomes' is also currently in the works, as is the Emirati genome programme's scheme to sequence more than a million samples (more than 400,000 have already been completed).

Population-scale genome efforts have significantly diverse objectives. Many programmes take advantage of a unique population composition to understand disease prevalence and biomarkers for diseases, and use that to inform the discovery of novel therapeutic targets. Other efforts seek to build scalable public-health initiatives where genomic data is used in decision-making and medical care.

For example, according to one estimate, 18.5% of the UK's 100K initiative was actionable, translating to direct healthcare benefits to participants.

The cost of whole-genome sequencing is also falling in tandem. Together with a growing body of evidence as to the data's usefulness, it is entirely possible that a significantly large number of humans around the world will have their whole genome sequenced in their lifetimes in the coming decade as well as a similarly significantly large number of people being able to access information derived from sequencing data for routine diagnostic workups.

Of course, just as population-scale programmes open new doors, they also confront new challenges, especially with regard to the ethics of and the access to these genomes, and the discoveries that build on them. There are also significant concerns regarding the equitable representation and access to the fruits of discoveries (e.g. over-representation of certain ethnic groups in population-scale data sets).

Countries like the U.S. have also proactively created regulatory frameworks to prevent the misuse of genetic data, such as to prevent insurance and employment discrimination, using the terms of the Genetic Information Non-discrimination Act.

Genomes from India

Asia, and India, are not far off vis-à-vis population-level sequencing either. The GenomeAsia project, led by multiple partners across the continent, plans to sequence a lakh whole genomes from diverse populations. An initial pilot data set with whole genomes of 1,739 individuals belonging to 219 population groups in 64 countries was published in Nature in 2019.

A pilot programme for population genomes in India named IndiGen provided an early view of more than a thousand genomes of individuals from cosmopolitan areas in India. It also yielded some clues to the landscape of many treatable genetic diseases and variants of clinical significance, including the efficacy and toxicity of drugs and the prevalence of rare disorders. A larger programme to sequence 10,000 whole genomes from diverse population groups is in the works under the GenomeIndia initiative.

Looking to the horizon, the long-term impact of population-scale genomics extends beyond individual health, shaping our comprehension of human evolution, migration patterns, and adaptation to diverse environments. It will also contribute significantly to our knowledge of human biology. In essence, population-scale genomics stands at the forefront of a genomic revolution, poised to revolutionise healthcare, illuminate our evolutionary history, and propel us



towards a future in which precise, personalised approaches will influence the landscape of medical and biological understanding.

And just as the day when we will sequence a billion genomes in a single project isn't far off, the time for an individual acquiring a right to access and understand their own genome sequence is also at hand.

IMPROVED DRUG REGIMENS FOR TB LIKELY TO REDUCE TREATMENT TIME

This November, at The Union World Conference on Lung Health 2023, there was much optimism, as it seemed that there were finally tools available to fast track work on multiple aspects of TB control. Four, new improved drug regimens that could cut treatment time for drug resistant tuberculosis by up to two thirds, were the primary source of this optimism.

For nearly five decades, few advances have been rolled out in TB care. While TB does not yet have a viable vaccine that can render prevention possible, news of possible treatments that work, and specifically address the elephant in the room in TB care- duration of treatment- naturally gets spirits up. It is the long duration of treatment, and subsequent drug toxicity, that leads to patients being unable to tolerate the drugs, and also non compliance with treatment schedules. This ultimately leads to drug resistant TB.

Echoing this optimism, Madhukar Pai, Global Health Associate Director, McGill International TB Centre, McGill University, Canada, said: "To me, the biggest progress in the recent past is the development of shorter regimens for all forms of TB, especially the 6 month all-oral treatments for drug-resistant TB. It is critical that all countries, especially India, scale up these 6 month shorter regimens for DR-TB."

Regimens are hard

The reason is clear: treatment regimens are hard. For MDR TB, patients might require up to 14,000 pills. The problem is huge in terms of number of people affected too: MDR-TB affects half a million people each year.

On the opening day of the Union World Conference, three regimens were presented, as having achieved favourable outcomes in between 85-90% of participants for treatment of multidrug-resistant tuberculosis or rifampicin-resistant tuberculosis (MDR/RR-TB). Research led by Médecins Sans Frontières, Partners in Health, and Interactive Research and Development, found that a further fourth regimen showed a strong treatment response at 85.6% and represented an alternative for people who cannot tolerate bedaquiline or linezolid.

According to the Conference website, these drug regimens for MDR/RR-TB "represent similar efficacy and safety to conventional treatments, but have reduced treatment time by up to two-thirds." Many living with TB face treatments that last up to 24 months, and 14,000 pills. Such regimens can be ineffective, with only 59% treatment success in 2018, and can often cause terrible side effects. Some patients even have to endure months of painful, daily injections.

Over 750 participants from 11 sites, 7 countries, and 4 continents were involved in the study, funded by Unitaid, on tackling MDR/RR-TB. The trial showed how combining antibiotics in new ways could treat this form of the disease more effectively than ever before, offering much-needed hope.



Carole Mitnick, Professor of Global Health and Social Medicine at Harvard Medical School and Partners in Health Director of Research for the endTB project, said: “We stand on the cusp of a significant breakthrough in the battle against MDR, a disease that disproportionately affects impoverished populations around the globe. Our results offer hope to those in dire need and underscore the urgency of continued research and innovation—and accountability of private companies that receive public funds—to address diseases that too often strike the most vulnerable among us.”

The researchers’ findings are a significant step and could address issues around access to and affordability of quality TB care, experts agree.

While TB diagnostics have been technically ushered into the modern age with sensitive molecular tests, and AI assisted conventional tests, in India, sputum smear microscopy continues to be the deployed the most, though some State governments have made headway with advanced devices to diagnose TB. The WHO says over-reliance on direct sputum smear microscopy is inherently associated with a relatively high proportion of pulmonary TB cases that are clinically diagnosed, as opposed to bacteriologically confirmed.

Sputum smear microscopy reportedly has about 50% sensitivity, and therefore contributes to the huge burden of missed cases in the country. It is also not equipped to diagnose cases of drug-resistant TB.

The world, today, has X-rays with AI assistance to flag abnormalities, AI-assisted cough diagnosis, new advances in the molecular detection of TB, multiple products built on the faster nucleic acid amplification test (NAAT) and whole-genome sequencing.

In a recent paper published in the Indian journal of Medical Research, Dr. Soumya and Dr. Pai wrote in the article ‘India is well placed to scale innovations in tuberculosis diagnostics’: Several molecular tests are now endorsed by the WHO, including Xpert MTB/RIF Ultra (Cepheid Inc., USA), TrueNAT MTB and TrueNAT MTB-RIF Dx (Molbio Diagnostics, India), loop-mediated amplification (LAMP-TB), assay line probe assays and centralized assays. Some are low-complexity tests, while others are moderate-to-high-complexity assays.

Again, at the Union World Conference on Lung Health Tony Hu, Professor at Tulane University, spoke of how rapid portable, battery-operated tests could be a new tool for point-of-care TB testing requiring minimal equipment and user expertise.

Point-of-care testing does not require specialised clinical or laboratory equipment, making this an invaluable tool in preventing the spread of a disease through early detection.

Additionally, it has the potential to be scaled up quickly if disease hotspots are identified, allowing scientists to respond rapidly to TB outbreaks, Dr. Hu explained.

Also on display was an interesting experiment: researchers from Tanzania, Belgium, Mozambique, and Ethiopia presented an analysis into rats that could sniff out TB.

Dr. Pai, who is also a grand advocate for newer diagnostic tools adds: “Another big takeaway is the growing acceptance that we must phase out old diagnostic tools like smear microscopy and replace them with rapid molecular tests. This is essential to narrow the big diagnostic gap.”



U.S. FDA APPROVES PAIR OF GENE THERAPIES FOR SICKLE CELL DISEASE

The U.S. Food and Drug Administration (FDA) on Friday approved a pair of gene therapies for sickle cell disease, including the first treatment based on the breakthrough CRISPR gene editing technology.

The agency approved Lyfgenia from bluebird bio, and a separate treatment called Casgevy by partners Vertex Pharmaceuticals and CRISPR Therapeutics for the illness.

Both the therapies were approved for people aged 12 years and older.

The Vertex/CRISPR gene therapy uses the breakthrough gene editing technology that won its inventors the Nobel Prize in 2020.

Sickle cell disease is a painful, inherited blood disorder that can be debilitating and lead to premature death. It affects an estimated 1,00,000 people in the U.S., most of whom are Black.

In sickle cell disease, the body makes flawed, sickle-shaped hemoglobin, impairing the ability of red blood cells to properly carry oxygen to the body's tissues.

The sickle cells tend to stick together and can block small blood vessels, causing intense pain. It also can lead to strokes and organ failure.

Makers of both the therapies have pitched them as one-time treatments, but data on how long their effect lasts is limited. The only longer-term treatment for sickle cell disease is a bone marrow transplant.

Sceptical results

"I actually am very reticent to call them a cure. I prefer to call them a transformative therapy because patients will still have sickle cell disease on the other side of gene therapy," said Dr. Sharl Azar, medical director of the Comprehensive Sickle Cell Disease Treatment Center at Massachusetts General Hospital.

IN 2022, 66% OF MALARIA CASES IN SOUTHEAST ASIA WERE FROM INDIA

In 2022, India accounted for 66% of malaria cases in the WHO Southeast Asia Region, noted the World Malaria Report, 2023, published by the World Health Organization (WHO).

It adds that almost 46% of all cases in the region were due to Plasmodium vivax, a protozoan parasite and human pathogen which is the most frequent and widely distributed cause of recurring malaria.

'More people infected'

Released earlier this week, the report highlights that despite strides in expanding access to insecticide-treated nets and medicines to help prevent malaria in young children and pregnant women, more people were getting sick with malaria.

The WHO Southeast Asia Region accounted for about 2% of malaria cases globally, while malaria cases declined by 76% from 23 million in 2000 to about five million in 2022.



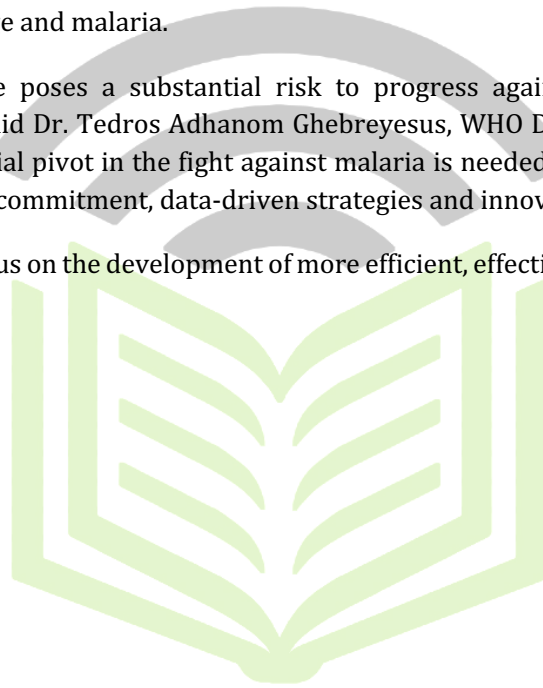
“Malaria case incidence in this region decreased by 83%, from about 18 cases per 1,000 population at risk in 2000 to about three cases per 1,000 population at risk in 2022,” said the report.

Giving the global picture and trends in malaria, the report stated that in 2022, there were an estimated 249 million cases globally, exceeding the pre-pandemic level of 233 million in 2019 by 16 million cases.

In addition to the disruptions caused by COVID-19, the global malaria response has faced a growing number of threats, such as drug and insecticide resistance, humanitarian crises, resource constraints, climate change impacts and delays in programme implementation particularly in countries with a high burden of the disease, said the report, which also delves into the link between climate change and malaria.

“The changing climate poses a substantial risk to progress against malaria, particularly in vulnerable regions,” said Dr. Tedros Adhanom Ghebreyesus, WHO Director-General, in his note, adding that a substantial pivot in the fight against malaria is needed, with increased resourcing, strengthened political commitment, data-driven strategies and innovative tools.

“Innovation should focus on the development of more efficient, effective and affordable products,” he said.



DreamIAS



HOW COP28 PRESIDENT'S REMARKS HAVE REKINDLED FOSSIL FUEL DEBATE

It may sound incredible, but none of the hundreds of decisions that have been taken at the annual climate change conferences over the last three decades have ever acknowledged the role of fossil fuels in global warming, or the need to eliminate their use. Fossil fuels have always been the elephant in the room that everyone has chosen not to see.

But the furore created by the remarks of Sultan Al Jaber, who is presiding over the ongoing COP28 climate meeting in Dubai, may force countries to include, for the first time, a reference to a fossil fuel phase-down in the final outcome of a climate conference.

The controversy

A video has surfaced from an online event held two weeks ago, in which Al Jaber, in response to questions on whether he would lead the effort to include a fossil fuel phase-down proposal in the final agreement, is heard saying that achieving the 1.5 degree Celsius target was not contingent on an elimination of fossil fuels.

“There is no science out there, or no scenario out there, that says that phase-out of fossil fuel is what is going to achieve 1.5 (degree Celsius target). 1.5 is my north star. And a phase-down or phase-out of fossil fuel, in my view, is inevitable, it is essential, but we need to be real, serious and pragmatic about it,” Al Jaber said. “Please show me a road map for a phase-out of fossil fuel that will allow for sustainable socio-economic development, unless you want to take the world back into caves,” he said.

Besides being a minister in the UAE government, Al Jaber is CEO of the Abu Dhabi National Oil Company, the world's 12th largest oil company by production. This latter role has provoked attacks since he was appointed president of COP28. Ahead of the conference, Al Jaber was accused of trying to promote the interests of his oil company during meetings with governments. He has denied these accusations.

Fossil fuel debate

Fossil fuels — oil, gas, coal and their derivatives — account for at least 80 per cent of all greenhouse gas emissions. There is no way that emissions can be reduced without substantially cutting down the use of these fuels. But that is exactly what influential countries have been attempting to do in the climate negotiations — aiming to cut emissions without touching its source.

Efforts to cut emissions have so far been focused mainly on reducing the relative consumption of energy or on improving energy efficiencies. And global production of fossil fuels continues to rise. No wonder then that none of the climate targets have ever been achieved. And the current targets too seem way beyond reach right now. According to the latest projections, all the current climate actions being taken by countries are estimated to bring down annual emissions by just 2 per cent from 2019 levels by 2030 — science says this figure must be at least 43 per cent if any hope of keeping global temperature rise to within 1.5 degree Celsius from pre-industrial averages is to be entertained.

Installation of renewable energy sources like solar or wind, which do not have emissions, are now outpacing new fossil fuel projects, but most of these are meant to cater to increased demand. The replacement of fossil fuel capacity with renewable energy is not happening at a fast enough pace.



The Indian initiative

Interestingly, it was India that set the cat among the pigeons at the COP27 meeting in Sharm el-Sheikh, Egypt, last year by calling for a phase-out of fossil fuels to be included in the final outcome of the meeting. India was trying to turn the tables on the western countries after being stung by the inclusion of coal in the final outcome of COP26 in Glasgow.

It was only a vague mention, though — calling for acceleration of a phase-down of “unabated” coal, without any specific schedule. But it was the first time that any fossil fuel had ever been mentioned in an official COP decision.

India fought hard to get the word ‘phase-out’ changed to ‘phase-down’, with the tacit support of many powerful countries, including the United States and China, both big consumers of coal, like India. It is not clear what the terms ‘phase-out’ and ‘phase-down’ refer to in practical terms — or what “unabated” coal use means. These are terms that would be defined during the negotiations, and are expected to be extremely contentious.

At COP27 last year, India argued against the singling out of coal, and called for the phase-down of all fossil fuels. Coal has been the favourite whipping boy, while oil and natural gas have got a free pass. Last year, the European Union (EU), facing an energy crisis because of the Russia-Ukraine war, even declared natural gas as “green” in some specific uses.

After initial hesitation, both the EU and the US, two of the most influential developed country players in these talks, agreed to back the Indian proposal. But it was eventually torpedoed in the behind-the-scenes negotiations. India does not plan to take the lead on this issue at COP28.

Fossil fuels phase-out is a sensitive subject for most of the powerful players in these negotiations — the US, the EU, China, India, Australia, Saudi Arabia, the UAE, etc. They are either major producers or consumers of fossil fuels, and their economies are dependent on the use of these fuels. It has, therefore, been convenient for them to frame the climate change objectives in more generic terms like emission reductions or temperature targets.

Ready for entry

But that is about to change now. Fossil fuels are most likely to finally make an entry into the climate negotiations at COP28. The pressure to do so is intense — not least because the world is nowhere close to achieving its 2030 targets.

Sultan Al Jaber has said he has invited countries to submit their proposals on fossil fuels phase-out for them to be negotiated upon. The final decisions of COP28 might indeed have a mention of the need to phase down fossil fuels. That itself might be radical, considering it has remained unmentioned for three decades. But the specifics and schedules are unlikely to be decided upon. That will require several more rounds of intense negotiations.

RISE IN GREEN ENERGY CAPACITY, STOPPING FOSSIL FUELS, REDUCING METHANE DISCUSSED FOR FIRST TIME AT COP28

The first draft of negotiating texts at the COP28 climate conference introduces discussions on critical issues such as tripling renewable energy capacity, phasing out fossil fuels, and targeted reduction of methane. These topics, under consideration for the first time at COP, are among the most closely watched and contentious matters. Fossil fuels, responsible for nearly 80% of global



emissions, are proposed for a phase-down, a shift highlighted during the Glasgow conference in 2021.

International Energy Agency assessments suggest that increasing global renewable energy capacity from approximately 3,400 GW to about 11,000 GW by 2030 could prevent nearly one billion tonnes of carbon dioxide equivalent emissions annually. Tripling renewable energy has garnered broad support from countries, with backing from the G20 and over 120 nations at COP28. However, the outcome remains uncertain, given the consensus-based decision-making process at COP meetings.

Methane reduction emerges as a contentious issue, particularly with countries like India opposing it due to concerns about agriculture and livestock. In Glasgow, over a hundred countries pledged to reduce methane emissions by 2030, although this decision was outside the COP process. The draft also includes a proposal for the rapid phase-out of unabated coal power, sparking anticipated heated debates among nations. The deadline for countries to reach a final agreement is December 12.

While the U.S. and Brazil, the second and third-largest holders of installed renewable energy capacity, have signed the pledge, India's decision not to do so has disappointed some experts. The absence of India's signature is viewed as a setback in the global push towards tripling renewable energy and doubling energy efficiency by 2030, crucial steps in achieving net-zero commitments and phasing out fossil fuels.

HONEST RECKONING

The boundary wall enclosing discussions around global climate is 1.5°C, or the average increase in global temperatures since pre-industrial times. Now that 1°C is crossed, all the wrangling under way at the climate summit in Dubai is to cap the half-degree rise. Global pledges to cut emissions are insufficient to achieve this. Current estimates are that to limit warming to 1.5°C, the world requires three times more renewable energy capacity by 2030, or at least 11,000 GW. That there is wide global consensus on the need for this tripling was first formally articulated in the New Delhi Leaders' Declaration at the G-20 summit in Delhi in September. In the run-up to the Dubai summit, it was perceived that this would be widely endorsed by the larger group of about 190 countries signatory to the UN convention on climate. It turns out that, so far, 118 countries have endorsed the pledge and two major countries, i.e., India and China, have so far abstained from signing. The Global Renewables and Energy Efficiency Pledge, while still a draft text, says that in their pursuit of tripling renewable energy capacity, signatories should also commit to "...phase down of unabated coal power, in particular ending the continued investment in unabated new coal-fired power plants". This is a major red line for India.

While India has positioned itself as a champion for renewable energy — its 2030 targets as articulated in its formal, nationally determined contributions (NDC) speak of tripling renewable energy capacity to 500 GW from the current 170 GW — it has reiterated several times that it could not be forced to give up certain fuels. Coal-fired plants are responsible for nearly 70% of India's greenhouse gas emissions. Developed countries that have made commitments to give up coal often have other large, fossil-fuel resources as back-up. The United States joined 56 other countries at Dubai in a commitment to completely eschew coal for its energy use, by 2035. However the U.S. only draws about 20% of its energy from coal and at least 55% from oil and gas, with plans to actually produce more of it in 2030 than at present. The paradox of the world's major economies' commitment to renewable energy is that it is not, as of now, actively geared to replace



fossil fuel. Till there is an honest commitment to actually replace existing and future fossil capacity with clean energy, pledges and declarations are worth little more than the paper they are drafted on.

CLEAN ENERGY SHARE IN INDIA AND ITS STATES' ELECTRICITY MIX

As the world wrangles over its next steps in fighting climate change, each country has its own concerns and interests they hope to advance at this year's U.N. climate summit starting on Thursday in Dubai. Brazil, South Africa, India and China make up a bloc of populous, fast-developing countries. Each has asked for more climate financing and equity through the United Nations Framework Convention on Climate Change (UNFCCC) concept of "common but differentiated responsibilities" — meaning rich countries that emitted the most historically should do more to address the problem.

The reduction in the share of fossil fuels in China's power generation — from 82% in 2000 to 65% in 2022 — was unmatched among the BRICS nations. However, China leads the world in both clean and dirty energy, with more renewable energy capacity and more coal consumption than any other country globally. Responsible for about 30% of annual global emissions, China is the world's biggest greenhouse gas emitter.

India's progress has been relatively slow with its share of clean energy in power production rising from 17% to 23% in this period. India, last year, proposed widening a deal on phasing down coal to include oil and gas. It won backing from more than 80 countries, but Saudi Arabia and other oil and gas producers blocked it. Over 99% of Saudi Arabia's power is produced by fossil fuels — about 67% of which is from gas. Among BRICS nations, Saudi Arabia has the highest such percentage, as UAE improved its clean energy share post 2020 with the nuclear fuel in the electricity mix rising.

Brazil is among the only two countries in BRICS, along with Ethiopia, where the share of clean energy in power generation is higher than fossil's share. In fact, in both countries, clean fuel contributes to over 90% of generation. In past summits, Brazil has spearheaded negotiations on rules for carbon credit markets, through which it plans to monetise its vast forests.

South Africa, where fossil fuel's share in power generation is still very high at 86%, with a meagre shift recorded in past years, secured a 2021 deal for \$8.5 billion from the EU, United States and other nations to help its shift from coal to renewable energy. But the country now is facing its worst power crisis, with rolling blackouts and ageing coal plants frequently breaking down.

States of India

Gujarat has recorded a drastic decrease in its usage of fossil fuel for power generation from 80% in 2019 to 60% in 2022. Rajasthan, too, along with Gujarat, has recorded a decline.

Karnataka and Himachal Pradesh are the only States among the top 15 producers where the share of clean energy is already higher. Tamil Nadu was inching closer to the 50:50 mark but progress has stagnated in recent years.

On the other hand, the share of fossil fuel in power generation was more than 90% consistently in Uttar Pradesh, Madhya Pradesh, Chhattisgarh, West Bengal and Bihar. In the four years considered, the share has not budged at all in these States. Odisha's fossil fuel usage has shown an increase in recent years along with Punjab.



COP28 SUMMIT: 22 NATIONS, INCLUDING US, COMMIT TO TRIPLING NUCLEAR CAPACITY BY 2050

In a bid to attain a net-zero emissions status, more than 20 countries have pledged to triple the global nuclear installed capacity by 2050, at the COP28 climate meeting.

Just as in the case of the pledge tripling renewable energy, India is not a part of the nuclear energy commitment as well, in keeping with its position not to join alliances outside the COP process.

Led by the United States, 22 countries including France, the United Kingdom, Japan, Canada, South Korea and Ukraine, pledged last week to “work together” to advance a “global aspirational goal” of tripling nuclear energy capacity from 2020 to 2050, recognising the key role that nuclear energy can play in keeping global warming below 1.5 degrees Celsius from pre-industrial times, and in ensuring net-zero transitions.

Nuclear energy is a clean but non-renewable source of energy. As of now, about 370 GW of operational nuclear power capacity is installed in 31 countries, providing about 10 per cent of the world’s total electricity, according to the International Atomic Energy Agency (IAEA). A tripling would see this go up to at least 1,000 GW by the middle of the century.

Nuclear power plants do not emit greenhouse gases and are an essential part of almost every pathway that takes the world to a net-zero emissions state by 2050.

“Studies confirm that the goal of global net-zero carbon emissions can only be reached by 2050 with swift, sustained and significant investment in nuclear energy,” a statement from IAEA director general Rafael Mariano Grossi said.

A recent study by the International Energy Agency said nuclear power had avoided nearly 70 billion tonnes of carbon dioxide equivalent emissions — in the last 50 years.

Former chairman of India’s Atomic Energy Commission Anil Kakodkar said India must also be planning a rapid expansion of its nuclear energy sector in pursuit of its net-zero goal by 2070.

“I am not aware of the current diplomatic dynamics because of which India did not join the other countries in taking the tripling pledge at COP28, but we must be doing it. In fact, our requirements are such that we have to do much more than tripling. Our nearly 7 GW of installed capacity is already planned to grow to about 22 GW by 2032, so that itself is a tripling of capacity, but we need to go much further. There are scenarios for 2070 where India’s nuclear sector needs to grow by 100 times from current capacities,” Kakodkar said.

India currently has 6,780 MW of installed nuclear capacity, and is constructing eight new reactors, which will add almost an equal amount – 6,800 MW, thereby doubling its capacity in the near future.

“There is a perception that renewables will solve everything. In the short-term that might be the case. But as our hunger for clean energy increases, the demand cannot be met without getting into nuclear energy in a big way. Every projection shows that,” Kakodkar said, adding that in his opinion, it made sense for India to join the coalition at COP28.

At the COP28 event, the IAEA director general also announced that a first of its kind Nuclear Energy Summit would be held in Brussels in March next year to discuss the role of nuclear energy in reducing the use of fossil fuels, enhancing energy security and boosting economic development.



INDIA'S CO2 EMISSIONS LIKELY TO REGISTER BIGGEST RISE FOR SECOND YEAR, SAYS REPORT

For the second successive year, India is likely to register the largest growth in carbon dioxide emissions among the major economies, the annual study of Global Carbon Project has revealed.

The study, one of the several that are released at the annual climate change conference, says there was a 50 per cent chance that in the next seven years, the world would start to breach the 1.5 degrees Celsius on a consistent basis if the current emission trends continued. Daily or weekly breaches are already happening, and at least one annual breach is almost certain in the next five years.

Carbon dioxide is the most important and extensive but only one of the six greenhouse gases whose rising concentrations in the atmosphere is leading to global warming.

The 8.2 per cent rise in India's annual CO2 emissions for 2023 would be more than double the expected increase in China, which is set to see a 4 per cent growth this year. Last year, India's emissions had grown by 6 per cent while China had seen a decline of one per cent.

However, China's CO2 emissions, which accounts for 31 per cent of the global CO2 emissions, are about 4 times that of India. In absolute amounts, therefore, China's increase in emissions in 2023 would be much higher than that of India.

"In India, the growth is largely driven by the high growth in demand for power, with new renewable capacity far from sufficient to meet the demand. Consolidated data now confirms that India's CO2 emissions are now above those of the European Union since 2022," the study said.

China's growth, it said, was partly caused by a delayed rebound from the significant Covid-19 lockdowns.

India's CO2 emissions are expected to be 233 million tonnes higher than previous year, 176 million tonnes of which is expected to be contributed by the coal-fired power plants.

Global CO2 emissions are expected to touch 36.8 billion tonnes — a new record — and 1.1 per cent over last year, the study said. Emissions from all kinds of fossil fuels — oil, gas and coal — are expected to rise, with oil likely to register a growth of 1.5 per cent, the highest. Emissions were expected to decline in 26 countries this year, accounting for about 28 per cent of global emissions. Last year, it had declined in 22 countries.

"If current CO2 emission levels persist, the remaining carbon budget for a 50 per cent chance to limit warming to 1.5 degree Celsius could be exceeded in seven years, and in 15 years for 1.7 degree Celsius would also be breached. Returning global temperatures below these thresholds after they have been crossed would require a massive scale-up of carbon dioxide removal after global net zero emission has been reached," the study said.

CLIMATE CHANGE IS MAKING THE WORLD SICK

These are just some ways public health has been compromised by climate change - a focus for the first time ever at the annual U.N. climate summit COP28. Government ministers are expected to discuss ways they can protect people from climate-driven health threats, which now threaten to undo decades of progress in public health.



From 2030, experts expect that malnutrition, malaria and dengue, diarrhoea, and heat stress will push global death tolls up by 250,000 per year, according to the World Health Organisation (WHO).

Mosquitoes that carry viruses including dengue, malaria, West Nile, and Zika are shifting into new parts of the world as warmer temperatures and heavy rains create more hospitable conditions for them to breed.

Reported dengue cases have grown from around half a million in 2000 to more than 5 million in 2019, according to the WHO.

Climate change is also having an unpredictable impact on malaria, with 5 million more cases registered in 2022 than the previous year, the WHO's World Malaria Report found.

Floods in Pakistan last year, for example, led to a 400% increase in malaria cases in the country, the report said. The disease has also spread into the highlands of Africa that previously had been too cold for mosquitoes.

Similarly, after decades of progress against cholera, an intestinal infection spread by contaminated food and water, case numbers are rising again, including in countries that had all but extirpated the disease.

In 2022, 25% more countries reported cholera cases over 2021, according to the WHO, which noted the role played by cyclones, floods, and drought in cutting off access to clean water and helping bacteria thrive.

Diarrhoea also receives a boost from climate change, via increasingly erratic rainfall. It's the world's second leading cause of death among children under 5, claiming the lives of more than half a million kids every year.

Heat stress is projected to impact hundreds of millions of people as temperatures continue to climb through the next few decades.

With the world already about 1.1 degrees C warmer than the average pre-industrial temperature, people in 2022 experienced about 86 days on average of dangerously high temperatures, a report from the The Lancet medical journal found.

If the world warms by 2 C above pre-industrial levels, the report said, yearly heat deaths could more than quadruple.

The heat has also made forests drier, fuelling extreme wildfires that have swept across large swathes of the world in recent years.

WHY IS COP-28 SUMMIT FOCUSING ON HEALTH?

The story so far:

On December 3, for the first time in 28 years of climate change negotiations, the climate-health nexus will take centre stage at the United Nations Conference of Parties (COP-28) summit in the UAE. Unabated greenhouse gas emissions are triggering extreme weather events, air pollution, food insecurity, water scarcity and population displacement, which in turn, are altering the trajectory of vector-borne diseases. And Africa, Asia, South and Central America, and small island



states, which have contributed the least to climate change, are bearing the brunt. Addressing these issues, on December 2, 123 governments endorsed the COP-28 Declaration on Climate and Health.

Why is there a 'Health Day' at the summit?

The 'groundbreaking Health Day at COP-28', as COP-28 president Sultan Ahmed Al Jaber put it, is expected to pose two questions: how public health can become resilient to climate change, and who will finance this transformation. India also highlighted the intricate link between climate change and public health during the health talks held under its G-20 presidency this year. In September, Dr. Al Jaber spoke in the backdrop of the New York Climate Week: "The connection between health and climate change is evident, yet it has not been a specific focus of the COP process — until now. This must change." Health is not a stranger to climate change talks. The United Nations Framework Convention on Climate Change (UNFCCC) recognises the health impacts of climate change. "Health events have been held at COP for several years, including at the WHO Health Pavilion, but this is the first time there has been an official 'Health Day'," says Jess Beagley, policy lead at the Global Climate and Health Alliance (GCHA). This is also the first time there will be a health inter-ministerial meeting, with ministers of health, environment, finance and other types of ministries joining in. While the Declaration text is final, the health ministers will be able to add supplementary comments during the meeting.

However, a "Health Day in itself doesn't necessarily mean that health will be reflected in the negotiations," said Dr. Jeni Miller, executive director of GCHA. "One of the things we need to see to determine whether this is truly a 'Health COP' is whether the focus on health carries on to negotiations," she said.

What can we expect from the Health talks?

The COP-28 UAE Declaration on Climate and Health includes dialogue on mitigating emissions, health sector adaptation to climate change, mainstreaming of health into climate policies and the sticky question of climate financing for health.

The Declaration, however, doesn't mention fossil fuels. It recognises the need for climate mitigation, "strengthening research on the linkages between environmental and climatic factors and antimicrobial resistance"; and "intensifying efforts for the early detection of zoonotic spill-overs" to prevent future pandemics. It does not mention pollution-related harms or identify 'fossil fuels' — coal, oil and gas — as a driver of health threats, or emphasise the need to end fossil fuel dependence. Fossil fuels are seen as the largest contributor to global climate change.

British epidemiologist Sir Andy Haines at the briefing said that a commitment to phasing out fossil fuels and transitioning to renewable energy would be an important health outcome. "If we move from fossil fuels to renewable energy, for instance, we reduce preventable deaths of air pollution as well as reduce the risk of dangerous climate change."

What are the concerns?

Most G-20 countries, including wealthy industrialised nations responsible for the majority of historic greenhouse gas emissions, have failed to centre health in their climate action, as per a 2023 analysis by the GCHA. Low-and middle-income countries like Burundi and Congo were found to be better at engaging with health concerns in their Nationally Determined Contributions (NDCs). "This is likely to reflect the undeniable links between health and environment — and disease and climate change — which cannot be ignored in these countries whose populations are



enduring the most severe health impacts of climate change,” Ms. Beagley explained. Changing weather patterns and rising temperatures are altering the life cycle of vector-borne diseases such as dengue and malaria, which disproportionately impact poorer, marginalised groups (the spread of dengue has increased in India over the last two decades, research shows).

Then there is the matter of finance. Health crises triggered by warming climate are expected to chart a financial toll of around \$2-4 billion annually by 2030. Another estimate shows that 40% of climate-related poverty would be due to direct health impacts, as people’s income, productivity and health costs would soar. Dr. Al Jaber had called on private financial institutions to plug this need and “contribute generously” to the Green Climate Fund. On December 2, the Green Climate Fund, the Asian Development Bank, the Global Fund and Rockefeller Foundation pledged a new \$1 billion finance pledge for climate and health. “This \$1 billion sum is a tremendous addition to current levels of climate and health finance,” said Ms. Beagley. “It is also key that funding for climate and health be truly new and additional, and not pulled from other key areas...that are vital to protecting health, such as water and sanitation, food security, and humanitarian action.” Developing countries had earlier asserted the need for grant-based international public finance that doesn’t add to their debt burden. However, the Declaration endorses climate-health funding from “domestic budgets, multilateral development banks, multilateral climate funds...”, along with philanthropies and private sector actors.

Where does India stand?

In India, particulate air pollution is said to be the “greatest threat to human health”, and heat-related deaths may kill an additional 10 lakh people annually by 2090, according to data. India scored 2/15 points in the 2023 GCHA scorecard that assessed India’s inclusion of clean air in its national climate commitments. India’s NDCs thus far have focused on reducing emissions intensity, transitioning to non-fossil fuel sources and creating additional carbon sinks. Experts, including Amref Health Africa CEO Dr. Githinji Gitahi, emphasised that health has to be woven across streams at the COP negotiations — which includes discussions on clean water, clean air and sustainable cities.

What counts as a successful Health COP?

“Stakes are really high — we need to see progress on one of the root causes of climate change... we will be looking at [a fossil fuel phase-out] as one of the metrics of whether this has been a ‘Health COP’ or not,” said Dr. Miller. Other metrics include a just transition to renewable energy, commitment to reducing emissions, and grant-based climate financing.

AN ICY WARNING

Few barometers measure the climate crisis as evocatively as the state of glaciers, a key component of the cryosphere. The World Meteorological Organization’s recent report, “The Global Climate 2011-2020”, gives a broad view of the planet’s response to greenhouse gas emissions. In the section on the state of glacier health, it points out that, on average, the world’s glaciers thinned by approximately a metre a year from 2011 to 2020. When compared across decades, there is significant regional variability, but the overall pattern remains that glaciers in all regions of the world are becoming smaller. In fact, some of the reference glaciers, which are used to make long-term assessments of glacier health, have already melted away as the nourishing winter snow is completely melting away during summer. In Africa, glaciers on the Rwenzori Mountains and Mount Kenya are projected to disappear by 2030, and those on Kilimanjaro by 2040. The report



points to the rapid growth of pro-glacial lakes and the likelihood of glacier lake outburst flood (GLOF), posing additional threats to ecosystems and livelihoods. The reports singled out how “...water from glacial melt contributed to one of the decade’s worst flooding disasters, the Uttarakhand floods of June 2013”.

The fury of a GLOF event was brought home this year by the destruction of the Chungthang dam in Sikkim after the South Lhonak Lake flooded from a melting glacier, triggering catastrophe downstream. Earlier this year, a separate report by the International Centre for Integrated Mountain Development found that the disappearance of glaciers in the Hindu Kush Himalayas was “65% faster in the 2010s than in the previous decade”. At the current rate of global greenhouse gas emissions, which is expected to see temperatures increase by 2.5°-3°C by the end of the century, the volume of glaciers is forecast to decline anywhere from 55% to 75%. This means sharp reductions in freshwater supply in the immediate vicinity of 2050. The sensitivity of glacier systems to warming underlines the need for their careful monitoring. Despite awareness of the risks posed by Himalayan glaciers there is no early warning system for the likelihood of GLOF events. Much like warnings before cyclones, floods and earthquakes, authorities must elevate threats from contracting glaciers to the same category of risk. Correspondingly, there is a need to make comprehensive risk assessments, map regions of vulnerability and commission infrastructure development with the highest standards of care.

GLACIERS SHRANK 1 M A YEAR IN A DECADE: WMO

The 2011-2020 decade, though warmest ever recorded in history, saw the lowest number of deaths from extreme events, said a report from the World Meteorological Organisation on Tuesday.

The agency attributed this to an improvement in the “early warning system” driven by improvements in forecasting and better disaster management. In India, for instance, improvements in forecasting cyclone formation and the time it took to reach land have led to greater preparedness and evacuation of those most at risk.

“The 2011-2020 decade was the first since 1950 when there was not a single short-term event with 10,000 deaths or more,” says the report *The Global Climate 2011-2020: A Decade of Acceleration*.

The report also says that this was the first decade that the depleted ozone hole visibly showed recovery. Glaciers that were measured around the world thinned by approximately 1 metre per year on an average between 2011 and 2020. Greenland and Antarctica lost 38% more ice during the period than during the 2001-2010 period. The report also had a mention of the 2021 Uttarakhand rock-avalanche that was triggered from a breach in the Nanda Devi glacier in the Himalayas.

The report further underlined that human-caused climate change significantly increased the risks from extreme heat events. Heatwaves were responsible for the highest number of human casualties, while tropical cyclones caused the most economic damage.

Public and private climate finance almost doubled during the period. However, it needed to increase at least seven times by the end of this decade to achieve climate objectives, including keeping global temperature from rising by more than 1.5 degrees Celsius by the end of the century.