



CURRENT AFFAIRS for UPSC

19th January to 25th November 2023



INTERNATIONAL

GLIMMER OF HOPE

The Israel-Hamas deal to release hostages and Palestinian prisoners in return for a pause in fighting offers a much-needed humanitarian relief to the 2.3 million people of the Gaza Strip who have been living in unspeakable misery since October 7. According to the deal, clinched in talks mediated by Qatar, Hamas will release 50 civilian hostages while Israel will release 150 Palestinian prisoners. Both sides will also halt fighting for four days. The Israeli government has stated that if Hamas releases more hostages, the pause in fighting could be extended, offering a glimmer of hope for securing a more sustained ceasefire. Hamas captured about 240 hostages during its October 7 cross-border attack in Israel, in which at least 1,200 people were killed. When Israel launched its counter-attack the same day, it promised to “crush Hamas”, eliminate security threats from Gaza for good, and free the hostages. In the past six weeks, Israeli attacks have turned Gaza into a graveyard, killing at least 13,000 Palestinians, a vast majority of them women and children. But Israel simultaneously began indirect talks with Hamas seeking to free hostages, which resulted in the current deal.

But this is not enough. What the people of Gaza, who have been bombed, shelled, displaced, and denied essential supplies such as food, fuel and medicines, immediately want is a lasting ceasefire. Israel initially refused to have any talks with “Hamas terrorists” and promised to dismantle the Islamist militant group. Israel’s anger was understandable given the horrors unleashed by Hamas. But in its response, a vengeful Israel is collectively punishing the people of Gaza. Several Israeli Ministers have issued dangerous and repugnant statements, from nuclear threats to welcoming epidemics in southern Gaza. But after six weeks of fighting, Israel is far from achieving its own declared objectives, which raises questions about the effectiveness of its military strategy. It stormed Al-Shifa Hospital, Gaza’s largest medical facility, alleging that a Hamas command centre was located beneath it. More than a week since, Israel is yet to produce any credible evidence to back this claim. But the fact that Israel and Hamas have reached a deal suggests that both sides are ready to engage with each other even amidst high decibel propaganda and bloody fighting. They should build on the momentum generated by the deal and extend the pause into a full-fledged ceasefire. That is the only way to release all the hostages, provide lasting relief to the Palestinians, and calm spiralling tensions in West Asia.

COMEBACK CONSERVATIVE

David Cameron, the former U.K. Prime Minister (2010-2016), has made a surprising return to government as the Foreign Secretary. His reentry comes seven years after resigning in the aftermath of the Brexit referendum, in which he advocated for remaining in the EU but faced a narrow majority in favor of leaving. Cameron's political journey began with early involvement in the Conservative Party, eventually leading him to become party leader in 2005.

Cameron's tenure as Prime Minister was marked by the implementation of austerity measures to address the 2008 financial crisis, drawing criticism due to his elite upbringing and background. His leadership coincided with significant international events, including the Arab Spring and the intervention in Libya in 2011, where he faced accusations of lacking a coherent strategy, leading to instability in the region.



Despite his long leadership of the Conservative Party, Cameron's legacy is often associated with the failure of his Brexit campaign. His return to government as Foreign Secretary is not without controversy, particularly regarding the Greensill Capital scandal. In 2021, a parliamentary inquiry found him lacking judgment in lobbying government officials for the financial services firm. Cameron, acknowledging the need for formal channels in such communications, has responded to the allegations.

WHAT IS THE RULING AGAINST THE U.K.'S RWANDA DEAL?

The story so far:

The government policy of the U.K., of creating a mechanism for the transfer of asylum seekers not considered by the U.K. to Rwanda, has been ruled as unlawful by the U.K. Supreme Court.

What is the Rwanda deal?

The Migration and Economic Development Partnership (MEDP) was announced in April 2022 by former Prime Minister Boris Johnson. The objective of the deal is to “create a mechanism” for the transfer of asylum seekers not considered by the UK into Rwanda. The inadmissibility clause of the UK's asylum system plays a key role in categorising people who enter the U.K. through “irregular journeys” such as the English Channel. According to the Memorandum of Understanding between the two nations, the U.K. will screen asylum seeker applications and arrange for safe transport to Rwanda. On arrival of the refugees, Rwanda is obliged to provide accommodation for every individual and protect them from ill-treatment and refoulement. Rwanda will be the sole authority to recognise or not recognise the refugee status of an individual. If an individual is not recognised, they will be moved to their country of origin.

Why did the U.K. choose Rwanda?

Rwanda offers three solutions for those sent out by the U.K.. It facilitates returning them to their country of origin; helps in moving them to a third country; or helps them settle in Rwanda with decent housing, access to universal health insurance and the right to work. The U.K. will bear the accommodation and transit costs. Rwanda was not the first country to be approached. Former Prime Minister Tony Blair attempted to persuade Tanzania for asylum claims but failed. Britain's colonial history aligns with the current scenario where it used to move particular sections of migrant labour to certain territories. The U.K. has, in the past, moved refugees to colonised countries under the guise of development and economic growth. The MEDP arrangement resonates with this colonial scheme of dispersing refugees.

Why was it ruled unlawful?

The ruling was based on two major issues. One, the Court of Appeal's entitlement to intervene in the High Court's ruling, and two, if the Court of Appeal had looked into the real risk for asylum seekers when moved to Rwanda. On the first, the Supreme Court found the High Court decision to be “erred,” due to its failure to consider the evidence of the risk of refoulement. Under the European Court, it is the U.K.s responsibility as a removing state to protect the refugee from refoulement and ensure asylum. Instead, the High Court recognised the expertise and promise of Rwanda.

Second, the Supreme Court found evidence that asylum seekers face a real risk of ill-treatment from refoulement. Rwanda's track record on human rights and its non-compliance with



assurances were taken as instances for considering the real risk of refoulement. While Rwanda has become a key partner of the U.K., the court highlighted the periods of violence in Rwanda since 1994 and how its human rights record was viewed as critical for the ruling.

Why are domestic responses mixed?

The reason behind different perceptions is the uncertainty over the legality of the arrangement and treatment of the refugees in Rwanda.

According to civil society organisations, double voluntarism from the U.K. and Rwanda to create a safe transit or guaranteeing rights is impossible. The UNHCR clearly states that once a refugee enters a territory via land or sea it becomes the responsibility of the respective country to ensure the safety of the refugee. In this case, the U.K. cannot be relieved from this duty even after the transfer of the refugee to Rwanda. While the U.K. government argues over simultaneous investment in refugees and Rwanda's economy for development, the doubts over refoulement and the implications to other EU countries do not seem to end. This might trigger other EU nations to consider such deportation schemes leading to a decline in humanitarian standards and creating risks for refugees in third-party countries.

LEAP IN THE DARK

The election of Javier Milei, a self-declared anarcho-capitalist, as the President of Argentina, marks the sharpest turn towards the right in the four decades of democracy in the Latin American country. When the initial results were out, Mr. Milei had won 56% of the votes against the 44% of Sergio Massa, the Economy Minister in the outgoing leftist government of President Alberto Fernández. During the campaign, Mr. Milei had vowed to “flatten” the political establishment, which has been dominated by the centre-left Peronist movement for decades, “blow up” the central bank, and rebuild the economy. Argentina's leaders have historically tried to fix the economy and failed. But even by Argentina's own standard, the economy is in a pretty bad shape today. Annual inflation has crossed 140%, which is one of the highest in the world; more than 40% of the population is in poverty, and the peso, the currency, has plummeted to historical lows; a dollar is now equivalent to 1,000 pesos, from the 80 pesos it was in the early 2020s, before COVID-19 struck. While Mr. Milei attacked the political establishment and leftists in particular for the economic woes, Mr. Massa, on whose watch the latest crisis unfolded, struggled to mount an effective counter-campaign.

Mr. Milei's victory is a boost for the far-right in the Americas. An admirer of Donald Trump of the U.S. and Jair Bolsonaro of Brazil, what has pushed Mr. Milei into the political limelight are the same views that raise concerns about his future administration. He wants to replace Argentina's currency with the U.S. dollar, ban abortion, dismantle the public health-care system and move public education into a voucher system. He has said that under his administration, Argentina will have better relations with countries, such as the U.S. and Israel, that fight socialism. He has often attacked the media, claimed that Argentina was controlled by a shadowy cabal, has backed Mr. Trump's claims of the 2020 U.S. elections being “stolen” and warned against election rigging against him (after his victory, his campaign stated that the elections were clean). He has projected himself as a crusader against Peronism, which in his narrative was the embodiment of the ills of Argentina. Fed up with economic miseries and hungry for political change, voters bought into his promises. But there is no clarity on what his untested libertarianism has to offer to fix the chronic economic woes. He may not be able to implement his most radical promises for lack of legislative support (his Liberty Advances party has seven seats in the 72-member Senate and 38 in the 257-



seat House), but as a President who is at constant war with the country's institutions, he could weaken Argentina's democracy while worsening its economic problems — just as in Brazil under Mr. Bolsonaro. Testing times are ahead for South America's second largest country.

MALDIVES 'REQUESTS' INDIA TO WITHDRAW MILITARY PERSONS

President Mohamed Muizzu of the Maldives, shortly after taking office, has officially requested India to withdraw its military personnel from the country. The request was made during a meeting with India's Minister of Earth Sciences, Kiren Rijiju, who represented India at the swearing-in ceremony. President Muizzu cited the strong mandate given to him by the Maldivian people in the September presidential election as the basis for the request.

The Progressive Party of Maldives, led by President Muizzu, won the September election, defeating President Ibrahim Mohamed Solih's Maldivian Democratic Party. President Muizzu had earlier announced that the Maldives would not have any foreign military personnel, without explicitly naming India. Indian sources argued that the presence of unarmed Indian military personnel was for the purpose of training Maldivian personnel and equipment maintenance.

The request for the withdrawal of Indian military personnel comes amid ongoing geopolitical developments and shifts in alliances. President Muizzu's message was delivered during a meeting with Minister Rijiju, who had attended the swearing-in ceremony along with other international delegates. It remains to be seen how India will respond to this request and the potential implications for bilateral relations between India and the Maldives.

During the stay, the Indian minister also visited the Exim Bank-funded Social Housing Units Project at Hulhumale which is one of the largest Indian developmental projects in the Maldives.

THE BANGLADESH GARMENT WORKERS UNREST

The unrest in Bangladesh involving the country's ready-made garment (RMG) sector workers demanding a significant increase in their minimum wages has triggered a series of events, including political protests and strikes. Here's a breakdown of key points related to the issue:

Workers' Demands: The 4.4 million-strong RMG sector workers in Bangladesh are demanding a threefold increase in their legally mandated minimum wages, from 8,000 Bangladeshi Taka (BDT) to 23,000 Taka. This demand comes after over five years since the last revision of the minimum wage in 2018.

Economic Significance: Bangladesh is the world's second-largest exporter of fast fashion, with the RMG sector accounting for 85% of the country's export earnings of \$55 billion in 2022. The sector plays a crucial role in poverty reduction and foreign exchange earnings for the country.

Inflation and Economic Challenges: Steep inflation, worsened by the COVID-19 pandemic and volatility in oil prices due to the Russia-Ukraine war, has impacted the cost of living for Bangladeshis. The country's foreign exchange reserves have more than halved, and the government has implemented austerity measures, including import restrictions on luxury goods, affecting the functioning of the RMG sector.

Role of Brand Importers: Global fashion brands, including big names like H&M, Nike, and Zara, have faced criticism for driving down procurement costs and not contributing sufficiently to workers' rights. Recent shifts in the industry, driven by concerns about climate change, have seen



initiatives like Action, Collaboration, Transformation (ACT) pledging support for a living wage in the RMG sector in Bangladesh.

Carbon Emissions and Green Initiatives: The textile and RMG sector in Bangladesh contributes significantly to the country's carbon emissions. Efforts to decarbonize the supply chain face challenges, including inadequate financial incentives and outdated machinery in RMG facilities. Despite some certified green factories, there is room for improvement in achieving emission reduction targets.

Political Ramifications: The unrest comes at a critical time for Prime Minister Sheikh Hasina, seeking a record fourth term in office in the upcoming January 7 polls. The government has faced criticism for imprisoning opposition leaders, and the handling of the workers' grievances will be a crucial test for the administration.

Social and Economic Impact: The protests have resulted in criminal cases filed against numerous workers, police repression, and counter-violence, leading to casualties and property damage. Balancing the demands of the workers, the domestic RMG sector, and international brands while addressing economic challenges will be a significant challenge for Prime Minister Hasina.

In summary, the ongoing unrest in Bangladesh's RMG sector reflects a complex interplay of economic, social, and political factors, with implications for the country's economy and governance.

KERALA NURSE FACING DEATH PENALTY IN YEMEN: THE MURDER CASE NIMISHA PRIYA IS CONVICTED IN

Nimisha Priya, an Indian nurse, is facing the death penalty in Yemen for the murder of a Yemeni citizen in 2017. Here are the key details of her case:

Background: Nimisha Priya, a nurse from Kerala, India, moved to Yemen with her husband in 2011. They planned to start their own clinic, and Priya encountered Talal Abdo Mahdi, whom they approached as a potential business partner.

Clinic Ownership Dispute: Disputes arose over the ownership of the clinic, leading to a criminal case. Priya claimed she was forced into an ownership deal that favored Mahdi, who allegedly forged documents to show Priya as his wife.

Abuse and Torture: Mahdi allegedly physically abused Priya and forced her into unwanted sexual relations. He also prevented her from speaking to her family in Kerala and refused to return her travel documents and passports.

Murder: In July 2017, Priya injected Mahdi with sedatives, causing his death. With the assistance of a Yemeni nurse, Hannan, Mahdi's body was chopped into pieces and disposed of in a water tank.

Arrest and Trial: Priya and Hannan were arrested, and the case went to trial in Yemen. In 2020, Priya was sentenced to death, while Hannan received a life term.

Save Nimisha Priya Campaign: The Save Nimisha Priya International Action Council was formed to seek her release. Efforts included seeking support at the national and international levels.



Indian Government's Assistance: The Indian government provided assistance by seeking consular access to Priya in jail and offering legal representation through the Indian Community Welfare Fund.

Plea for Pardon: Priya's family, including her mother and daughter, sought permission from the Indian government to travel to Yemen and negotiate with Mahdi's family for a pardon. Islamic law allows for the release of a convict after paying blood money.

Travel Restrictions: India has a travel ban to Yemen due to the civil war, but the government indicated the possibility of relaxing the ban for specific reasons and durations.

Recent Development: Yemen's Supreme Court dismissed Priya's appeal, heightening concerns about her fate. The family's plea for pardon remains a last resort to secure her release.

The case highlights the complex legal, cultural, and humanitarian issues surrounding the situation of Nimisha Priya, with efforts ongoing to explore all possible avenues for her release.



DreamIAS



NATION

WHICH COUNTRIES RECOGNISE HAMAS AS A 'TERRORIST' ORGANISATION?

Israel designated Lashkar-e-Taiba (LeT) as a terror organisation on Tuesday (November 21), calling it a “deadly and reprehensible terror organization, responsible for the murder of hundreds of Indian civilians as well as others.”

The move comes a few days ahead of the 15th anniversary of the 26/11 terror attacks in Mumbai that began on November 26, 2008, amid Israel’s ongoing conflict with the Palestinian militant organisation Hamas.

“While Israel only lists terror organisations who are actively operating against it from within or around its borders, or in a similar manner to India — those globally recognised by UNSC or the US State Department; the Israeli ministries of Defense and Foreign affairs, have jointly worked in the last few months towards an expedited and extraordinary listing of the Lashkar -e-Taiba organisation on this date, to highlight the importance of a Unified Global Front in combating terrorism,” the Embassy said in a statement.

India and Israel cooperate on counter-terrorism, and the attack on the Chabad House Jewish centre and the heroic rescue of Baby Moshe by his Indian nanny during 26/11 did strike a special chord with Israel — however, the designation of the LeT at this juncture is being seen as a nudge to India to do the same with Hamas.

This is important for Israel as it seeks to rally international support for its campaign in Gaza, which is being judged increasingly harshly for the death and suffering of Palestinian civilians, including a very large number of children. Only a handful of jurisdictions in the world currently designate Hamas as a terrorist organisation.

India did initially describe the Hamas raids in southern Israel as a “terrorist attack”, but has since spoken of the need for a two-state solution to the wider Israel-Palestine conflict. The Israeli Embassy said on November 21 that it had not been requested by India to designate the LeT. However, Israel’s Ambassador to India, Naor Gilon, has previously sought the declaration of Hamas as a “terrorist organisation in India”.

Which countries currently designate Hamas as a terrorist organisation?

As of now, Israel, the European Union, Australia, Canada, the United Kingdom, Japan, Paraguay, and the United States designate Hamas as a terrorist organization. What does designation as a terrorist organisation entail?

A government designates a terrorist organisation under specific national laws, such as Section 219 of the Immigration and Nationality Act, 1952 in the US (which allows the Secretary of State to designate Foreign Terrorist Organisations (FTOs), the Terrorism Act, 2000, in the UK, or the Unlawful Activities (Prevention) Act, 1967, in India.

Designation is done based on specific criteria and can attract a range of curbs, including the freezing of assets and the takeover of the properties of the designated organisation. India amended the UAPA in August 2019 to include a provision for designating an individual as a terrorist; before that only organisations could be designated. Currently, 44 organisations are designated as terrorist organisations under the First Schedule of the UAPA.



END THE SECRECY

India's decision to resume e-visas for Canadian citizens worldwide is a significant step towards restoring travel ties with Canada, which were snapped in September during the diplomatic stand-off following Canadian Prime Minister Justin Trudeau's allegations that Indian government agents had masterminded the assassination of a Khalistani leader. While India had restored certain categories of the visa last month, e-visa and tourist visas remained under suspension due to the threat to Indian diplomats from Khalistani groups. According to External Affairs Minister S. Jaishankar, the restoration of visas for Canadians was due to the "situation becoming more secure". However, the step does not necessarily mean a restoration of normal ties. After India cancelled visas for Canadians and demanded that Canada cut down its diplomatic strength by two-thirds for "parity purposes", Canada had flown out more than 40 of its diplomats and their family members and reduced its visa issuance capacity as well. With travel visas curtailed on both sides, business and investment ties too suffered, especially as Canada had already suspended talks for a Free Trade Agreement after the killing of the Khalistani leader, Hardeep Singh Nijjar. While Mr. Jaishankar and the Canadian Foreign Minister met each other in the U.S. in September, political ties have virtually shut down.

In addition, a new controversy, sparked by Washington, has emerged over a report that Indian government agencies were plotting to target another Khalistani leader, Sikhs for Justice leader Gurpatwant Singh Pannun, in the U.S. Like Nijjar, Pannun, a U.S.-Canadian dual national, is wanted in India for inciting violence against Indians and Indian diplomats, and for recently issuing a "warning" to travellers not to take "Air India" flights after November 19. This menacing statement harks back to the bombing of Air India Flight 182 out of Montreal, which killed all 329 on board, in 1985. A White House statement confirmed news reports that U.S. officials had raised the issue during Prime Minister Narendra Modi's visit to Washington in June. This indicates that the issue over Khalistani separatists is far from dying down, despite New Delhi's conversations with western partners at the 2+2 dialogues with the U.S. and Australia, respectively, and Mr. Jaishankar's recent visit to the U.K. In sharp contrast to the recent past, the government, which had rejected the Canadian allegations as "absurd and motivated", has been surprisingly accommodating of the U.S.'s allegations. The External Affairs Ministry issued a statement that said India is examining the "U.S. inputs" and would take "necessary follow-up action". While these are no doubt matters of national security, it is time the government shed some of the secrecy surrounding its dual responses and crafted its future course of action more coherently.

WHO IS GURPATWANT SINGH PANNUN, THE ALLEGED TARGET OF A PLANNED HIT JOB IN THE US?

Gurpatwant Singh Pannun, in his mid to late 40s, is a Pro-Khalistan lawyer based in the US and the leader of Sikhs for Justice (SFJ), a pro-Khalistan advocacy organization. SFJ was formed in 2007 with the goal of achieving self-determination for Sikhs and establishing a sovereign state, known as Khalistan. Pannun has been at the forefront of SFJ's activities, including the controversial "Referendum 2020" conducted among the Sikh diaspora. The Indian government views him as a "terrorist," and almost a dozen cases, including sedition charges, have been registered against him and SFJ in India. Pannun has been advocating violence despite SFJ's stated motto of "ballots not bullets." The US government recently foiled a conspiracy to assassinate Pannun on American soil, leading to tensions between the US and Indian governments.



QUAD, CECA ON TOP OF AGENDA FOR INDIA-AUSTRALIA 2+2 DIALOGUE

India and Australia are set to hold the second 2+2 Ministerial dialogue on Monday where the upcoming Quad summit is expected to figure prominently while the sides will also take stock of the ongoing negotiations for a Comprehensive Economic Cooperation Agreement (CECA). The dialogue comes shortly after the India-U.S. 2+2 dialogue last week and will be an opportunity to discuss regional developments including the crisis in West Asia.

While Australian Deputy Prime Minister and Defence Minister Richard Marles will travel to Delhi from Ahmedabad where he will watch Sunday's cricket World Cup final, Foreign Minister Penny Wong will travel to Delhi to hold a number of meetings and attend cultural events.

Apart from the 2+2 Dialogue on Monday, Ms. Wong and External Affairs Minister S. Jaishankar will hold the 14th Foreign Ministerial Framework Dialogue (FMFD) on Tuesday "to take stock of cooperation under the Comprehensive Strategic Partnership and exchange views on regional and global issues of mutual interest".

All eyes will be on whether there will be an announcement on the date for the next Quad Summit to be held in India in 2024. While Australian and Japanese governments have informally conveyed to the External Affairs Ministry that they would be able to attend the Quad Summit on January 27, New Delhi has been waiting for a confirmation from U.S. President Joseph Biden's office, as he had been invited as chief guest to the January 26 Republic Day Parade.

In addition, Australian Prime Minister Anthony Albanese's visit would be an opportunity to sign the India Australian Comprehensive Economic Cooperation Agreement (CECA).

LIMITED PEACE, UNLIMITED TENSIONS

Thirty years ago, officials from both sides, meeting in the aftermath of the Sumdorong Chu stand-off that strained relations, thrashed out what would be a historic first ever border agreement between the neighbours who had, in 1962, fought a war. Signed in September 1993 during Prime Minister Narasimha Rao's visit to China, what's now known as the Border Peace and Tranquility Agreement (BPTA) — or to give it its full name, the "Agreement on the Maintenance of Peace and Tranquility along the Line of Actual Control (LAC) in the India-China Border Areas" — for the first time saw both sides legally commit to respecting the status quo and reduce the risk of an unplanned confrontation.

That the 30th anniversary of what was in many ways a historic development, passed without mention underlines its contested legacy today. For at least two decades, the BPTA, and subsequent agreements that it paved the way for, helped keep the peace on the longest undemarcated border in the world. Yet, the limited nature of the agreement would also ironically push both countries into an infrastructure race, ultimately leading to increasingly frequent incidents, starting in 2013, culminating in the deadly clash at Galwan in June 2020.

Indeed, the very first article of the BPTA saw a commitment that "neither side shall use or threaten to use force against the other by any means" and that "pending an ultimate solution to the boundary question between the two countries, the two sides shall strictly respect and observe the line of actual control (LAC) between the two sides". Both also committed that neither side shall overstep the LAC and that "each side will keep its military forces in the areas along the LAC to a minimum level compatible with the friendly and good neighbourly relations between the two



countries” and would “agree to reduce their military forces along the LAC in conformity with the requirements of the principle of mutual and equal security to ceilings to be mutually agreed.” None of those commitments now appear valid, with the ongoing crisis entering its fourth winter and more than 100,000 troops from both sides deployed in forward areas close to the LAC.

AFGHANISTAN EMBASSY IN DELHI SHUTS DOWN

The Afghanistan Embassy in Delhi has permanently closed down, effective from November 23, citing pressure from both the Taliban rulers in Kabul and the Government of India. The embassy had stopped functioning on September 30, and despite an eight-week wait, the objectives of visa extension for diplomats and a shift in the Indian government’s conduct were not realized. The closure marks the end of the diplomatic presence of the pre-Taliban regime in Afghanistan, and the responsibility of diplomats appointed by the Islamic Republic of Afghanistan has officially come to an end. The statement also acknowledged that handing over the property to India is in the “best interest of Afghanistan,” leaving the future course of action to Indian authorities.

WHY ARE PEOPLE FLEEING MYANMAR FOR MIZORAM?

The story so far:

In a spillover of the civil war in Myanmar, more than 1,500 nationals of India’s neighbouring country, took refuge in Mizoram’s Champhai district early this Monday following a gunfight between the Myanmar Army, and pro-democracy militias in the country’s western Chin State abutting Mizoram. Reports indicate that the attacks on the ruling military junta (or the Tatmadaw) involving the Chin National Army (CNA) and the Chin Defense Force among others led to the capture of two bases — the Khawmawi and Rihkhawdar military camps — by the rebels.

What is the situation in Myanmar?

The attacks in Chin State coincidentally followed a major coordinated attack on regime forces by three ethnic armed groups — the Myanmar National Democratic Alliance Army (MNDAA), Ta’ang National Liberation Army (TNLA) and the Arakan Army (AA) in Myanmar’s north Shan State abutting China. The coordinated attacks, termed “Operation 1027” on October 27, by the Three Brotherhood Alliance as the three groups called their collective, led to serious setbacks for the junta’s forces in Shan State and brought about a sequence of other rebel attacks — including those in the Chin State. Scores of military outposts and bases were either abandoned by the junta forces or were captured by the rebels, with the UN stating that 60,000 people in Shan State and 2,00,000 overall in the country have been displaced following the current hostilities taking the total number of civilian displacements to more than two million since the coup.

What led to the current civil war?

In February 2021, a new junta, the State Administration Council (SAC) dominated by the Myanmar armed forces, organised a military coup that ousted the civilian National League for Democracy-government and detained its leader Aung San Suu Kyi among many other legislators and party officials. The junta said it captured power because of irregularities in the November 2020 elections, even though international observers called the elections fair. The coup led to the collapse of the democratic phase that opened up after the 2008 Constitution. This Constitution allowed for reserving 25% of the Parliament of Myanmar for serving military officers, and control over home, border affairs and defence by the military, thereby limiting civilian powers.



After the February 2021 coup, there were nationwide protests and civil disobedience campaigns, leading to what was called the “Spring Revolution”. Members of the deposed NLD and other elected ethnic lawmakers formed a new political body called the Committee Representing Pyidaungsu Hluttaw (or National Parliament in Burmese), which along with other civil society actors, ethnic party representatives and others later formed the National Unity Consultative Council (NUCC) — a dialogue platform seeking to unite pro-democratic forces. The NUCC agreed upon a “federal democratic charter” (FDC) that sought to come up with a future constitution, and a political roadmap to a “federal democratic” country to be led by a National Unity Government (NUG) that was announced in April 2021. A final publication of the FDC happened in March 2022, after incorporating ethnic demands of recognition and equality for non-Bamar minority identities. The United States Institute of Peace argues that the resistance is now “led by the most inclusive political coalition in Myanmar’s history”.

The junta responded by violently cracking down on the largely peaceful movement leading to the NUG announcing the creation of People’s Defense Forces (PDF), and in September 2021, explicitly gave the call for the PDF and other rebels to attack the junta, launching a civil war.

What has been the ethnic organisations’ response to the coup?

The ethnic armed actors, despite coming under severe attack over the years from the Tatmadaw, have managed to establish autonomous enclaves in their areas. With the Tatmadaw unable to defeat them entirely, it signed ceasefires with groups that allowed them to retain arms and some autonomy in minority areas, a situation that persists even today. The ethnic armed groups’ responses to the insurrection call by the NUG have been varied. A paper by Paul Vrieze in the Asian Survey journal last year pointed to three divergent responses. Groups such as the Karen (Karen National Union), Kachin (Kachin Independence Organization), Chin (Chin National Front) and Karenni (Karenni National Progressive Party) rebels support the NUG, fighting the army and helping forming anti-coup militias. They do so while rejecting a NUG proposal for a single “Federal Army” under unified NUG command.

What happened after Chin was targeted?

The junta’s first punitive action against ethnic armed organisations was targeted at those in Chin State in October 2021, an initiative that failed but resulted in several refugees fleeing to Mizoram and Manipur in India. While New Delhi passed strictures not to open camps or provide assistance, the Mizoram government defied the Union government’s order to deport the refugees and allowed them to take shelter. The Mizo people regard those from the Chin community as ethnic brethren. The influx of refugees in Manipur has heightened the ethnic conflict between the Kuki-Zo community and the majority Meiteis in the State.

Eight groups including the Restoration Council of Shan State (RCSS), New Mon State Party (NMSP), Pa-O National Liberation Organization (PNLO) initially joined the NUCC dialogue, but after the junta’s crackdown, decided to retain their ceasefire status with the junta. The TNLA, the Kokang-based MNDAA, and other northern groups in Shan State, besides the Rakhine state based AA used the post-coup situation to strengthen themselves without provoking the junta. However, the Brotherhood Alliance between the MNDAA, AA and the TNLA and its attack on the junta forces since late October has changed equations suddenly, increasing the number of battlefields for the junta and stretching it thin.



How has China reacted?

Myanmar's closest ally, China, has leverage over some of the northern ethnic armed forces that are now engaged against the junta. While Beijing has publicly called for a cessation in hostilities, experts aver that the Chinese are willing to tolerate the actions as the rebels have evinced interest in reining in illicit activities such as "telecom scam centres" in the Kokang zone. The MNDA announced that it is planning to attack the Laukkai township in Kokang which is controlled by junta-affiliated militias and is also host to many cybercrime compounds. These illicit centres have trapped thousands of Chinese nationals besides many from Southeast Asia, forcing them to carry out internet fraud, theft and cybercrime activities targeting Chinese citizens and others.

HARYANA'S EMPLOYMENT RESERVATION LAW

The story so far:

The Punjab and Haryana High Court on November 17 quashed a law enacted by the Haryana government in 2021 that guaranteed 75% reservation to locals in private sector jobs in Haryana. A division bench of Justices G. S. Sandhawalia and Harpreet Kaur Jeewan ruled that the Haryana State Employment of Local Candidates Act, 2020, was unconstitutional and violated fundamental rights.

What does the reservation law say?

In November 2020, the Haryana Assembly passed the Haryana State Employment of Local Candidates Bill which made it mandatory for employers in the State to reserve 75% of jobs paying a monthly salary of less than ₹30,000 (originally ₹50,000) for local residents of the State. The Bill received the Governor's assent on March 2, 2021, and came into effect in January last year. The law is applicable to all private entities in the State including companies, trusts, societies, partnerships, and limited liability partnerships. It also covers any person employing 10 or more persons for the purpose of manufacturing or providing any service.

A 'local candidate' has been defined under the law as anyone domiciled in Haryana for the past five years. Such candidates will have to mandatorily register themselves on a designated portal in order to avail benefits and employers have to make recruitments only through this portal. Companies can seek an exemption if they do not find local candidates of a desired skill or qualification, but this claim can be rejected by government officials if they doubt its legitimacy. Employers found to be violating the Act are liable to a fine between ₹10,000 and ₹2 lakh.

Why was the law challenged?

Several industry associations challenged the validity of the law on the ground that it violates Article 19 of the Constitution, which guarantees the right to freedom, including to reside and settle in any part of the Indian territory and practise any profession, business or trade. They also contended that the law was an infringement of Article 14 (equality before the law) and Article 15, which prohibits discrimination on various grounds such as religion, race, caste, sex or place of birth. The court was also apprised that the reservation creates a wedge between persons domiciled in different States and is contrary to the concept of common citizenship envisaged in the Constitution.



How has the State defended it?

The State government contended that the law intends to 'protect the right to livelihood of people domiciled in the State', and that the enactment was rooted in the rising unemployment in Haryana. It was also asserted that the government is empowered to create such reservations under Article 16(4) of the Constitution, which stipulates that the right to equality in public employment does not prevent the State from 'making any provision for the reservation of appointments or posts in favour of any backward class of citizens which, in the opinion of the State, is not adequately represented in the services under the State'.

Have other States enacted such laws?

States such as Maharashtra, Karnataka, Andhra Pradesh and Madhya Pradesh have enacted laws providing reservations for their local residents in the private sector. In November 2019, the Andhra Pradesh Assembly passed the Andhra Pradesh Employment of Local Candidates in the Industries/Factories Bill, 2019, reserving three-fourths of jobs for local candidates within three years of the commencement of the Act. The law was subsequently challenged in the Andhra Pradesh High Court, which opined that 'it may be unconstitutional'. However, the challenge is yet to be heard on its merits.

Has the Supreme Court intervened?

On February 3, 2022, the High Court passed an interim order staying the law following which a division Bench of the Supreme Court bench set it aside on the ground that the High Court had not provided 'sufficient reasons' for putting the law on hold. The High Court was ordered to expeditiously decide the petition and the Haryana government was also directed to not take any coercive steps against companies for non-compliance until the matter is finally decided upon.

Why did the High Court quash it?

The court ruled that the law was unconstitutional to the extent that 'a person's right to carry on occupation, trade, or business' under Article 19(1)(g) of the Constitution was being impaired. It also highlighted that the law discriminates against individuals who do not belong to a certain State by 'putting up artificial walls throughout the country'. Placing reliance on Article 35 of the Constitution, the court outlined that the provision bars the State legislature from legislating on matters that fall within the purview of Article 16(3) of the Constitution (equality of opportunity in matters of public employment) since only the Parliament can pass laws on such subjects. Referring to Section 6 of the Act which requires employers to submit quarterly reports with details of local candidates employed and Section 8, under which officers could call for documents to ensure the law was being implemented, the court said that these restrictions amounted to 'Inspector Raj' that furthered State control over private employers.

THE ROLE OF THE GOVERNOR IN LEGISLATURE

The story so far:

Tamil Nadu Governor R. N. Ravi has 'withheld' assent for certain Bills passed by the Tamil Nadu Legislative Assembly. This follows the Supreme Court expressing 'serious concern' over inaction by the Governor on Bills presented for his assent. The court expressed displeasure on similar delays by Governors of Telangana, Punjab and Kerala.



What does the Constitution say?

Article 200 of the Constitution lays down that when a Bill, passed by a State Legislature, is presented to the Governor for their assent, they have four alternatives — may give assent to the Bill; may withhold assent to the Bill, that is, reject the Bill in which case the Bill fails to become law; may return the Bill (if it is not a Money Bill) for reconsideration of the State Legislature; or may reserve the Bill for the consideration of the President.

As held by the Supreme Court in various cases including the Shamsheer Singh case (1974), the Governor does not exercise their discretionary powers while withholding assent or returning a Bill to the State Legislature. They are required to act as per the advice of the Council of Ministers. The situation of 'withholding assent' may arise in case of a Private Members' Bill (any Member of State Legislature other than a Minister) passed by the State Legislature, which the council of ministers do not want to be enacted into a law. In such an instance, they would advise the Governor to 'withhold assent'. However, this is an unlikely scenario as the council of ministers who enjoy a majority in the Legislative Assembly would not allow the passage of such a Bill. Secondly, if the incumbent government whose Bill has been passed by the legislature falls or resigns before it is assented to by the Governor, the new council may advise the Governor to 'withhold assent'.

The return of any Bill to State Legislature for reconsideration is also to be done based on ministerial advice. However, Governors in the past have exercised their discretion in returning Bills, like the Tamil Nadu Governor with respect to the Bill prohibiting online gambling. However, the Governor shall assent to such a Bill if it is passed again by the State Legislature.

The Governor must reserve certain Bills, like those which reduce the powers of the High Court, for the consideration of the President. They may also reserve Bills on concurrent list that are repugnant to a Union law based on ministerial advice. It is only under rare circumstances that the Governor may exercise their discretion, where they feel that the provisions of the Bill will contravene the provisions of the Constitution and therefore, should be reserved for the consideration of the President. It must however be noted that the Constitution does not lay down any time limit within which the Governor is required to make a decision.

What were the recommendations?

The Sarkaria Commission (1987) has submitted that it is only the reservation of Bills for consideration of the President, that too under rare cases of unconstitutionality, that can be implied as a discretionary power of the Governor. Save in such exceptional cases, the Governor must discharge his functions under Article 200 as per the advice of ministers. It further recommended that the President should dispose of such Bills within a maximum period of six months. In the event of the President 'withholding assent', the reasons should be communicated to the State Government wherever possible. The Punchhi Commission (2010), had recommended that the Governor should take a decision with respect to a Bill presented for their assent within a period of six months. However, these recommendations have not been implemented till date.

How can this impasse be resolved?

The underlying disease that has plagued our federal set up has been the politicisation of the gubernatorial post. Many political leaders starting from C. N. Annadurai to Nitish Kumar have called for the abolition of the Governor's post in the past. However, as per our Constitutional scheme, there is a need for a nominal head of the State executive just like the President for the



Union executive. Further, the Governor acts as an appointee of the Centre who may be required for maintaining the unity and integrity of the nation in critical times. However, federalism is a basic feature of our Constitution and the Governor's office should not undermine the powers of elected governments at the States.

As the Supreme Court observed, it is necessary for the Governors and Chief Ministers to do 'a little bit of soul-searching'. The Constitution may be amended to provide that the Chief Ministers shall be consulted before appointment of the Governors. The recommendation of the Punchhi Commission that Governors may be removed through an impeachment by the State Legislature can also be considered. This would arm the State legislatures with the power to remove an uncooperative Governor. These amendments would have a salutary effect on the Central and State Governments resulting in responsible cooperation in the matters of appointment and functioning of the Governors.

READ UP PUNJAB CASE VERDICT ON GIVING ASSENT TO BILLS, SC TELLS KERALA GOVERNOR

The Supreme Court directed the office of Kerala Governor Arif Mohammed Khan to review a recent judgment, which held Governors accountable for adhering to the State Legislature's framework and not wielding a non-existent veto power over Bills awaiting their assent. The judgment, pertaining to a case filed by Punjab against Governor Banwarilal Purohit, emphasized that Governors cannot unduly delay Bills. Kerala, represented by advocate K.K. Venugopal, cited this judgment in a plea, asserting that the Governor had been sitting on crucial Bills for two years. The Chief Justice of India, D.Y. Chandrachud, advised the Kerala Governor's office to examine the Punjab case judgment and determine the appropriate course of action. The state argued that the prolonged delay in Bills, including those addressing post-COVID public health concerns, infringed upon the fundamental right to life and undermined representative democratic institutions. The case was scheduled for further hearing on November 28.

T.N. RE-ENACTS BILLS DENIED ASSENT BY GOVERNOR RAVI

During a Special Session, the Tamil Nadu Assembly reapproved 10 Bills that Governor R.N. Ravi had previously withheld assent. The Assembly, following a resolution by Chief Minister M.K. Stalin, reconsidered and passed the Bills, two of which were from the previous AIADMK regime, and eight were from the current Assembly. The Bills primarily focused on amendments to university laws, empowering the State government rather than the Governor to appoint Vice-Chancellors. The Governor had withheld assent without providing reasons, prompting the Assembly to challenge this action. The Chief Minister argued that Article 200 of the Constitution obligates the Governor to give assent when a Bill is re-adopted by the Assembly. The Bills were reintroduced and discussed under Rule 143 of the Tamil Nadu Assembly, allowing reconsideration after being returned by the Governor.

CENTRE'S SELECTIVE TRANSFERS, APPOINTMENTS MAY TRIGGER 'EMBARRASSING' OUTCOMES: SC

The Supreme Court on Monday said the government's tinkering with judicial seniority through "selective" appointments and transfers of High Court judges may trigger responses from the collegiums, which may create "embarrassing" outcomes, including deferring the swearing-in of new judges or the withdrawing of judicial work. "What will happen at some stage is we cannot let



judges whom we do not want to work in a court to continue to work in that court... Please do not let that happen. It will dilute the authority of judges. It will embarrass these judges,” Justice Sanjay Kishan Kaul addressed Attorney-General R. Venkataramani, appearing for the Centre.

The Bench, including Justice Sudhanshu Dhulia, referred to a recent decision of the Gauhati High Court to defer the swearing-in of senior advocate Kaushik Goswami as a judge of the court. Mr. Goswami was recommended for judgeship along with advocate N. Unni Krishnan Nair by the collegium in October. Mr. Nair’s name was placed before Mr. Goswami’s in the collegium resolution. The government had, however, only cleared Mr. Goswami. The government appointed Mr. Nair as judge two days after the High Court deferred the swearing-in of Mr. Goswami.

Senior advocate Dushyant Dave, for the petitioners, said it was time the top court issued a mandamus to the government to clear all the pending names within the next 24 hours. He said the Supreme Court had granted the collegium the power of mandamus in the 1992 Second Judges Case verdict. Mr. Dave said even a time limit had been prescribed by the government to clear the pending names. Justice Kaul said some of the candidates whose names had been kept pending by the government were senior to those being appointed as judges. “If a candidate does not know what seniority he or she would have, it will be difficult to persuade other eligible and deserving candidates to join the Bench,” Justice Kaul pointed out.

The Supreme Court had earlier made it clear to the Centre to not selectively bypass people recommended by the collegium for judicial appointment merely for their political connections or for defending a case against the government in court.

The Bench had in the previous hearing criticised the government for continuing with its policy of selective transfer of High Court judges despite repeated cautions from the top court. The court warned that the government’s actions risked an “unpalatable” reaction from the collegium.

The court had said the government’s pick-and-choose policy both in appointment and transfers of judges was a matter of “great concern”.

COLLEGIUM’S OPACITY IS INJURIOUS TO THE INSTITUTION’S HEALTH

Recent statements by three high court chief justices, including Pritinker Diwaker of Allahabad High Court and Justice Sanjib Banerjee of Madras High Court, have raised concerns about the lack of transparency in the functioning of the Supreme Court Collegium. The judges expressed uncertainty and lack of information regarding their transfers, highlighting a broader issue with the Collegium system. Transfers are often made for reasons such as testing judges’ performance or as a punitive measure, but the lack of transparency in the process has raised questions about accountability. While some argue that a degree of “opaqueness” is necessary for the Collegium system to function, the recent statements suggest that excessive opacity could harm the internal health of the institution and erode public confidence in the judiciary’s independence. The need for a balance between transparency and maintaining the integrity of the Collegium system is emphasized.

J&K HIGH COURT UNDERLINES THAT CRITICISM OF A GOVERNMENT CAN’T BE CALLED A TERRORIST ACT — AND DRAWS A VITAL RED LINE

In times when defining “terror” can become an exercise of state power that is arbitrary, opaque and oppressive, and the stringent anti-terror law weaponised to restrict fundamental rights and



freedoms, the Jammu and Kashmir High Court has drawn some much-needed red lines. Granting bail to journalist Fahad Shah, and quashing charges framed against him under the Unlawful Activities (Prevention) Act — Shah was held under provisions of the UAPA in April 2022, nearly 11 years after publication of an article “The shackles of slavery will break” on his portal in 2011 — the court raised the bar for state action. It said that an investigative agency must justify the arrest of an accused under the UAPA, on the anvil of “clear and present danger of the accused to the society at large, if enlarged on bail”. It rejected police arguments that honour and dignity of India is a property under the anti-terror law, the destruction of which is a terrorist act — this argument, the court said, “would literally turn criminal law on its head... mean that any criticism of the central government can be described as a terrorist act because the honour of India is its incorporeal property... collide headlong with the fundamental right to freedom of speech and expression...” It is a strike by the court for justice, democratic accountability and press freedom.

The court has gone to the heart of this matter before. In June 2021, in perhaps the first instance of a court underlining the state’s misuse of UAPA, three Delhi High Court orders granting bail to three student activists in a case connected to the 2020 Delhi riots, had drawn similar lines, asked similar questions. Terror activity cannot be so broadly defined as to include ordinary penal offences, ruled the court. Rejecting the broad interpretation of the terror clause by Delhi Police, including its blurring of lines between “intent to threaten the unity and integrity...” and the “likelihood” to do so, the court cautioned that it is a “sacrosanct principle of interpretation of penal provisions” that they be strictly and narrowly construed. “The extent and reach of terrorist activity must travel beyond the effect of an ordinary crime...”.

And in April this year, in the Media One case, which did not involve UAPA, but which featured a government citing an undisclosed national security consideration to deny renewal of license to a Malayalam news channel, the Supreme Court said that “... national security claims cannot be made out of thin air”. And flagged a disturbing trend: “the state is using national security as a tool to deny citizens remedies that are provided under the law. This is not compatible with the rule of law”. In asking hard questions of the state, in pointing to the flimsiness of a case sought to be papered over by the harsh law, the court has stepped up to the role and responsibility of the judiciary as the vital check against an overstepping state. The onus is now on the government — to listen to the court, and to respect the vital distinctions it makes, necessary for guarding against unfreedom.

FATHIMA BEEVI, FIRST WOMAN JUDGE IN SUPREME COURT, DEAD

In 1950, she was the first student to complete a degree in law with full marks in all subjects, and eight years later, she emerged first in a competitive exam conducted by the Public Service Commission and joined the judicial services as a munsiff. Years later, she became the first woman member of the country’s Income Tax Appellate Tribunal, before becoming the first Muslim woman to enter the higher judiciary as a judge in the Kerala High Court in 1983. Determined to recast the role of women in Indian judiciary, she then went on to become the first woman judge in the Supreme Court of India, six years later.

Fathima Beevi was born to Annaveetil Meeran Sahib and Khadeeja Beevi of Pathanamthitta in 1927. She completed her schooling at the Catholicate High School and did an undergraduate degree in Chemistry from the University College, Thiruvananthapuram. In line with her father’s aspiration to make her a lawyer, she did a degree in law and enrolled as lawyer in November 1950.



She was the Governor of Tamil Nadu from 1997 to 2001, and her most controversial decision was to administer the oath of office and secrecy to former Chief Minister Jayalalithaa within hours of the AIADMK securing a majority in the Assembly election in May 2001. Jayalalithaa had suffered disqualification from contesting elections that year on account of her conviction in two TANSI land deal cases.

In September that year, the Supreme Court unseated Jayalalithaa. Fathima Beevi's tenure ended abruptly in a couple of months after the swearing in of the AIADMK leader. Following the midnight arrest of then DMK president M. Karunanidhi in a corruption case, the Centre was displeased with the report submitted by her.

COURTS CAN GIVE LIMITED PRE-ARREST BAIL IN FIRS FROM OUTSIDE STATE: SUPREME COURT

The Supreme Court Monday ruled that a Sessions Court or the High Court in a state can grant "limited" anticipatory bail to an accused though the FIR is registered outside their jurisdiction. "Considering the constitutional imperative of protecting citizen's right to life, and personal liberty, the High Court/Sessions Courts should grant limited anticipatory bail in the form of interim protection under Section 438 of the CrPC in the interest of justice with respect to FIR registered outside the territorial jurisdiction of the said court," a bench of Justices B V Nagarathna and Ujjal Bhuyan said in its judgement.

The bench was of the view that an interpretation leading to an absolute bar on the jurisdiction of a Sessions Court or a High Court from granting such interim relief may lead to an anomalous and unjust consequence for bona fide applicants who may be victims of wrongful, mala fide or politically motivated prosecution.

The Supreme Court noted that it will not be possible to outline every situation that would call for such an order to safeguard the fundamental right of the applicant, and underlined that it should be exercised in "exceptional and compelling circumstances only" whereby denying it "would cause irremediable and irreversible prejudice to the applicant".

The court also laid down the conditions to be followed while allowing interim protection, including notice to the investigating officer and public prosecutor who are seized of the FIR on the first date of the hearing. It, however, added that "in an appropriate case", the concerned court "would have the discretion to grant interim anticipatory bail". The order granting the limited relief must record reasons as to why the applicant apprehends an inter-state arrest and the impact of such protection on the status of the investigation.

The judgement added that the applicant must also satisfy the court regarding his inability to seek anticipatory bail from the court which has the territorial jurisdiction, whether it be the apprehension of threat to life or personal liberty in the jurisdiction where the FIR is registered, apprehension of arbitrariness or medical reasons.

The SC also cautioned that this may lead to a situation where the accused would choose the court of their choice for interim protection and said that to prevent abuse, there should be "territorial connection/proximity between accused and the territorial jurisdiction of court" which he or she approaches for relief.

The ruling came in a petition in a matrimonial dispute in which the husband was granted anticipatory bail by a sessions court in Karnataka though the FIR was registered in Rajasthan.



IN TELANGANA AND RAJASTHAN, THE YOUTH WANT JOBS, NOT WELFARE

In the current round of assembly elections, one of the issues that is reportedly high on the minds of voters, but not framed adequately by parties, is that of youth unemployment and the missing opportunities. It is exacerbated by widespread scams and interminable delays in the entrance examinations and announcement of results for government jobs and professional degrees in the states. In Telangana, Congress has promised a job calendar; and the BJP, a transparent and timebound resolution to Telangana Public Service Commission examinations. In Rajasthan, there is reportedly support for candidates who speak out against the serial delays in recruitment in government jobs. Examinations conducted by the Rajasthan Public Service Commission have been mired in controversies involving paper leaks, manipulation of results and litigation that have led to the cancellation of eight examinations in the last four years. In Madhya Pradesh, a state still haunted by the spectre of the Vyapam scam, handouts might have trumped employment as a poll issue but only by relegating the concerns and priorities of young voters.

In a country that has the largest population of young people in the world — around 66 per cent of India's total population is below the age of 35 years — it is hardly surprising that discontent on the jobs front should make itself seen and heard and present a challenge for governments and parties. According to the Periodic Labour Force Survey of 2022-23, youth unemployment in the five election-bound states stands at 15.1 per cent, 12.5 per cent, 11.9 per cent, 7.1 per cent and 4.4 per cent in Telangana, Rajasthan, Mizoram, Chhattisgarh and Madhya Pradesh respectively. Of these, Telangana, Rajasthan and Mizoram have recorded a higher youth unemployment rate than the national average of 10 per cent. The figures for women in the same age group are even higher.

What this translates into is a culture of anxiety and cut-throat competition, worsening predicaments already pockmarked by the inequities of caste, class, gender and religion. This is evident in the proliferation of coaching centres in places like Kota, where students flock every year to train for competitive examinations and which register a distressing number of students' suicides. If having the course of a lifetime decided by an unforgiving standardised examination is not farcical in itself, to have it further impinged upon by systemic corruption is a travesty. The fact that it figures on poll manifestos is a reason for cautious hope. But these promises need to be kept, not merely used as weapons in pre-poll blame games.

CHHATTISGARH SHOWS PROGRESS, BUT HAS A LONG WAY TO GO

Chhattisgarh has shown progress in various social indicators in recent years, as highlighted by a comparison with data from 2015-16 and 2005-06. Despite improvements, the state continues to feature in the bottom half of rankings in many indicators, reflecting its economic challenges and the need for further development. The state's economic performance is considered relatively poor, particularly due to a marginal contribution from the manufacturing sector. However, Chhattisgarh has managed to secure a place in the top half of rankings in education-related parameters. While the state has seen improvements in several social indicators, it lags behind in areas such as female education, where only about 69.3% of females aged six years and above have attended school. Chhattisgarh's economic progress is also constrained, as indicated by its rank of 23rd out of 29 states in per capita Net State Domestic Product for 2021-22. Despite challenges, the state has made mixed progress in environment-related parameters. The overall assessment places Chhattisgarh at the 24th position among 30 states in the 2021 Human Development Index due to its rankings in social measures.



TELANGANA LEADS IN ECONOMIC INDICATORS, LAGS IN SOCIAL MEASURES

Telangana, ahead of the upcoming Assembly elections, exhibits superior economic performance compared to many states, ranking fourth in per capita Net State Domestic Product for 2021-22. However, this economic progress has not translated into positive outcomes in women empowerment and child development measures. The state ranks poorly in various social indicators, with a decline in performance between 2015-16 and 2019-21. Notably, Telangana faces challenges in women's education, early marriage rates, infant mortality, and underweight children. Despite economic leadership, the state lags in environmental aspects, generating significant hazardous and plastic waste. The overall Human Development Index for 2021 positions Telangana at 17 out of 30 states, indicating a gap between economic success and social development.

SEEKING 'SELF-GOVERNANCE'

Organisations permanent and temporary are dime a dozen in Manipur. Each has its moment or an extended phase of relevance but very few have been in the news as much as the Indigenous Tribal Leaders' Forum (ITLF) since Manipur started spiralling into chaos after clashes between the Kuki and Meitei people broke out on May 3.

On November 17, the officer in charge of Churachandpur police station lodged an FIR against ITLF general secretary Muan Tombing for "attempting to wage war" against the government of India. This was in reference to his announcement on November 15 that a "separate administration" would soon be formed comprising districts such as Churachandpur, Kangpokpi, and Tengnoupal, dominated by the Kuki-Zomi people. The FIR was lodged a day after the MLAs of the ruling BJP condemned his statement and sought legal action against him and the ITLF.

The ITLF was formed on June 9, 2022, at the office of the Kuki Inpi Churachandpur (KIC) in Tuibong village by leaders of recognised tribes within the Churachandpur district. Apart from the Kuki Inpi, an apex body of the Kuki people, the constituents of the ITLF are the Paite Tribe Council (PTC), Simte Tribe Council, Vaiphei People's Council and Mizo People's Convention. Pagin Haokip, the executive member of the KIC, is the chairman of the ITLF while Mr. Tombing is also the secretary of the PTC. Another key founder-member of the ITLF is its spokesperson Ginza Vualzong.

Almost two years before the ITLF was formed, Mr. Vualzong had launched the Research & Preservation of the Zo Identities (RPZI) that focused on studying issues and correcting the 'distorted history' of the communities belonging to the Zo family, which includes the Kuki-Zomi of Manipur, Mizos of Mizoram, Chins of Myanmar and Chin-Kukis of Bangladesh. Soon after its formation, the RPZI petitioned the Chief Minister to "denotify and correct" the Chivu stone inscription at the Chivu-Chandrakirti Park in Churachandpur district's Tonzang that "wrongly claimed the victory" of (Meitei king) Chandrakirti over four Lushai (Mizo) chiefs and the subjugation of 112 villages during 1871-72.

'War on drugs'

The Chivu controversy followed the Manipur government's "war on drugs 2.0" and preceded an eviction drive against encroachers of reserved forests (RFs) and protected forests (PFs), both allegedly targeted at the Kuki-Zomi people who have come to be labelled as "narco-terrorists".



The State government claims both drives have been community-neutral, pointing out that Meitei squatters were uprooted from 16 RFs and PFs compared to Kukis from four.

According to the Coordinating Committee on Manipur Integrity, an umbrella body of Meitei organisations, Kuki-Zomi organisations spearheaded by the ITLF have for long nurtured a dream of achieving a separate administration, independent state, or country. This, it said, was evident from the call for a Zo homeland, encompassing the Kuki-Zomi-inhabited areas of Manipur, endorsed by the Mizo National Front that rules the adjoining Mizoram. Ten Kuki-Zomi MLAs of Mizoram, seven of them belonging to the BJP, have also supported the demand for a separate administration for the community.

The ITLF, which formed six departments after the ethnic crisis that unfolded in Manipur on May 3 “to tackle pressing issues and ensure the overall welfare of our Kuki-Zomi-Hmar-Mizo tribal communities”, clarified that Mr. Tombing’s announcement of a “separate administration” was more of a plan for “self-rule” within the framework of the Constitution of India than a threat to secede from Manipur.

“So many of us have been killed. We have been driven out of (the Meitei-dominated) Imphal Valley, called names, and branded illegal immigrants. Meitei organisations have declared war on us and we cannot trust the Biren Singh government. We need self-governance for our welfare instead of waiting for the government to give us a solution,” Mr. Vualzong said.

WHAT IS TANTALUM, THE RARE METAL FOUND IN SUTLEJ?

A team of researchers from the Indian Institute of Technology (IIT), Ropar has found the presence of tantalum, a rare metal, in the Sutlej river sand in Punjab.

The discovery has been made by a team headed by Dr Resmi Sebastian, assistant professor at the institute’s Civil Engineering Department. According to experts, the presence of tantalum is significant not only for Punjab but also India as the metal is widely used in electronics and semiconductors.

What is tantalum? When was it discovered? What are its properties? Where is it used? We take a look.

What is tantalum?

Tantalum is a rare metal with the atomic number 73 — the number of protons found in one atom of the element. It’s grey, heavy, very hard, and one of the most corrosion-resistant metals in use today. It possesses high corrosion resistance because when exposed to air, it forms an oxide layer that is extremely difficult to remove, even when it interacts with strong and hot acid environments.

When pure, tantalum is ductile, meaning it can be stretched, pulled, or drawn into a thin wire or thread without breaking. Moreover, it “is almost completely immune to chemical attack at temperatures below 150°C, and is attacked only by hydrofluoric acid, acidic solutions containing the fluoride ion, and free sulphur trioxide,” according to the US Department of Energy.

Notably, tantalum also has an extremely high melting point, exceeded only by tungsten and rhenium.

**When was tantalum first discovered?**

Tantalum was discovered by Anders Gustaf Ekenberg, a Swedish chemist, in 1802 in minerals obtained from Ytterby, Sweden. Initially, it was thought Ekenberg had found only a different form of niobium, an element that is chemically similar to tantalum.

“The issue was finally settled in 1866 when, Jean Charles Galissard de Marignac, a Swiss chemist, proved that tantalum and niobium were two distinct elements,” the US agency said.

How did tantalum get its name?

The rare metal has been named after a Greek mythological figure Tantalus, the rich but wicked king of a town above Mount Sipylus in Anatolia. Tantalus is best known for the terrible punishment he received from Zeus after the former tried to serve his son at a feast with the gods.

The king was banished to the underworld, where he forever stood in a pool of water with clusters of fresh fruit hanging overhead. Whenever he tried to drink the water, it receded. Whenever he tried to pick the fruit, the branches drew back.

“This name was selected because of the insolubility of tantalum in acids; thus, when placed in the midst of acids, it is incapable of taking any of them up,” the US Department of Energy added.

What are the uses of tantalum?

Tantalum is most prominently used in the electronic sector. The capacitors made from tantalum are capable of storing more electricity in smaller sizes without much leakage than any other type of capacitor. This makes them ideal for use in portable electronic devices such as smartphones, laptops, and digital cameras.

As tantalum has a high melting point, it is frequently used as a substitute for platinum, which is more expensive. The rare metal is also used to make components for chemical plants, nuclear power plants, aeroplanes and missiles. Tantalum does not react with bodily fluids and is used to make surgical equipment and implants, like artificial joints, according to the US Department of Energy.

“A composite consisting of tantalum carbide (TaC) and graphite is one of the hardest materials known and is used on the cutting edges of high-speed machine tools,” it added.

EXPLAINED: THE DEBATE OVER APPROPRIATE AGE OF ADMISSION TO CLASS 1

Schools in Delhi this year will continue to admit students to Class 1 below the age of 6 years. This is contrary to recent letters from the Union government to all states, urging them to align the age of entry to Class 1 with the new National Education Policy 2020.

According to a response furnished by the Union government in the Lok Sabha in March 2022, there are wide variations in the age criteria among states when it comes to admission to Class 1. There were 14 States and Union Territories, as of March 2022, that allow Class 1 admission for children who have not completed six years.

What age is appropriate for children to begin formal education and why is it important? We explain.



What does the NEP 2020 say about the minimum age to admit students in Class 1?

The new NEP pitches for a “5+3+3+4” design for formal schooling corresponding to the age groups 3-8 years (foundational stage), 8-11 years (preparatory stage), 11-14 years (middle stage), and 14-18 years (secondary stage). This brings early childhood education (also known as pre-school education for children of ages 3 to 5 years) under the ambit of formal schooling. This effectively means that a child should be 6 years old to be eligible for admission into Class 1, after completing three years of early childhood education.

So why is it in the news now?

Since the launch of NEP 2020, the Union Education Ministry has been writing to the States and Union Territories, urging them to “align” their age for admission to Class 1 at six years, in accordance with the new national education policy. Given that the age of entry varies across states — some admit students to Class 1 after reaching the age of 5, while others admit at 6 years — whenever the Centre issues a reminder emphasising the NEP provision and its adherence, the matter gains attention in the news.

For instance, last year, when Kendriya Vidyalayas increased the age of admission from five to six years for Class 1 in an effort to sync with the recommendations of the NEP 2020, a group of parents challenged this decision in court. They argued that the change was introduced suddenly, just before the admission process was set to begin in February 2022. The Delhi High Court ultimately dismissed their plea, and this decision was later upheld by the Supreme Court.

This year, and until very recently, after the Education Ministry sent another reminder to the states regarding aligning the entry age, the Delhi government decided, at least for this academic year, to continue with its existing guidelines in accordance with the Delhi School Education Rules (DSEAR 1973), which permit admission to Class 1 below the age of 6 years.

What does the Right to Education (RTE) Act, 2009 say about the age of entry for Class 1?

The RTE Act guarantees education from the age of 6 years to 14 years. This means that a child is expected to begin elementary education (read: Class 1) at the age of 6 years. According to academicians who were associated with the drafting of the Right to Education law, the age of 6 years was identified considering the universal age that most countries across the world have been following, i.e. to admit a child into grade one at the age of 6 or 7.

Professor R Govinda, former Vice Chancellor of the National University of Educational Planning and Administration who was part of the drafting exercise told The Indian Express, “The age 6, which the RTE says is the age to begin Class 1, is simply a reiteration of what has already been a part of our Constitution. This was also the same in Gandhi’s idea of basic education and was also stated in the report of the Sargent Commission (on post-war education development in India), which goes back to the 1940s.”

RTE Act had to specify the entry age for enforcement of formal compulsory education which has been ignored even now by many States leading to the confusion of the actual age for admitting students grade1. In fact, most of the clauses in the RTE Act have remained unimplemented fully,” Govinda added.



What does research say about the entry age for formal education?

David Whitebread, from the Faculty of Education at Cambridge University in his paper titled 'School starting age: the evidence' explained why children may need more time to develop before their formal education begins in earnest.

In his research, Whitebread stated that "Studies have compared groups of children in New Zealand who started formal literacy lessons at ages 5 and 7. Their results show that the early introduction of formal learning approaches to literacy does not improve children's reading development, and may be damaging. By the age of 11, there was no difference in reading ability level between the two groups, but the children who started at 5 developed less positive attitudes to reading and showed poorer text comprehension than those children who had started later. In a separate study of reading achievement in 15-year-olds across 55 countries, researchers showed that there was no significant association between reading achievement and school entry age."

What is the age to start formal education across the world in various countries?

"Six is the standard age for starting primary school across East Asia, not just in Japan. This age is also common in most European countries. It is usual (though not compulsory) for younger children in these societies to attend some sort of preschool. In this regard, the USA and the UK, where children generally start school at 5, appear to be outliers," said Latika Gupta, an Assistant Professor at the Department of Education, Delhi University.

Scandinavian countries, on the other hand, start at 7 because they have universal child care. The childcare aspect of schooling needs to be borne in mind. In England and the USA, childcare provision for under-5s is patchy and expensive, whereas in Scandinavia, care for the under-7s is universal and state-supported," she added.

VIR DAS'S EMMY OPENS UP SPACE FOR INDIAN COMEDIANS GLOBALLY

Speaking at the Indian Express Adda last month, Vir Das summarised the importance of his craft — stand-up comedy — in an era of "hurt sentiments" and keyboard outrage: "What I love about my art form is that we can fundamentally disagree about it and laugh about it at the same time." Das won the International Emmy Award for Comedy for his Netflix special *Landing on Monday*. The recognition is bound to increase the space for comedians from India globally.

In a sense, you could say that this moment marks a Priyanka Chopra and Arundhati Roy moment for the comedy scene. Like the former, Das was successful in India, before branching out to Hollywood, and "making it" there. Like the latter's Booker Prize, the Emmy could be a watershed moment for the sector as a whole. There is also the fact that Das, like a small proportion (but fairly large number) of Indians, belongs to the English-as-a-first language class that came of age post-liberalisation. He has an easy comfort with the American cultural touchstones, and how they played out in India. Significantly, he has also been a fairly political comedian, particularly with his 2021 monologue, "I Belong to Two Indias".

The only dark question that lines an otherwise silver cloud is this: Will the lure of global recognition limit authenticity and creativity — the ephemeral essentials for great stand-up comedy — for Indian Vir Das wannabes? Das began his career at a time when people could laugh about their disagreements much more easily, without fear of trolls, abuse and more dire consequences. Now, those who want to follow in his footsteps will have a much harder time, especially as stand-up moves from being an English-only, relatively upper-class art form. After all,

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



too often and in too many places, there are no Emmys — only FIRs. It is, sadly, becoming more difficult to belong to Two Indias in India.

SCHOLAR STANDS BY HIS LECTURE AT O.P. JINDAL UNIVERSITY, REGRETS ITS 'MISINTERPRETATION'

After the Haryana-based O.P. Jindal Global University asked critically acclaimed writer and former Delhi University Professor Achin Vanaik to “express regret” over his remarks in a closed lecture titled “The history and politics of the Palestinian present”, he told The Hindu that he had informed the university that he stood by what he had said in the lecture, and regretted its misinterpretation and the confusion that had arisen as a result.

After Professor Vanaik’s lecture on November 1, the Israeli Ambassador to India, Naor Gilon, in a letter addressed to the founding Vice-Chancellor of O.P. Jindal University, C. Raj Kumar, was critical of the lecture. “I cannot understand why an event delegitimising the state of Israel was hosted at the University,” Mr. Gilon’s letter stated.

Professor Vanaik said that Israel had been characterised as a settler-colonial apartheid state by many groups and individuals.

‘Objectionable remarks’

On November 13, Dabiru Sridhar Patnaik, registrar, O.P. Jindal University, wrote in a letter to Professor Vanaik that the latter’s remarks that “Hindutva is anti-Muslim” were unnecessary and objectionable.

“This is not something that I say but many people say because Hindutva is exclusivist. It is open to interpretation that it is discriminatory. When you prioritise one particular community, this is in contrast with another conception of nationalism, which in India is that of composite nationalism,” Prof. Vanaik said.

Mr. Patnaik, in his letter, also said: “Your remarks about motivation of suicide bombers and terrorists intended to explain that they are more determined to die for their cause than to kill came across as an expression of sympathy towards them instead of unalloyed condemnation of the violence and death caused by them.”

Prof. Vanaik said there had been a large turnout at the lecture; many had recorded and posted parts of it online. “The idea that I am pro-terrorism is absolute nonsense. My words were absolutely taken out of context,” he said.

“I would want to clarify here that I do consider Hamas’s action as a terrorist action and criticise it. But terrorism is something that individuals, groups, and apparatus of states also carry out and one must be universal and impartial in condemning terrorism no matter who the agents are. It should be understood as a reference to a means or a method,” he added.

IMA, NURSES’ ASSOCIATION HONOURED WITH INDIRA GANDHI PEACE PRIZE

The Indira Gandhi Prize for Peace, Disarmament, and Development for 2022 was jointly awarded to the Indian Medical Association (IMA) and the Trained Nurses Association of India. The award was presented by former Vice-President Hamid Ansari to Sharad Kumar Agarwal, the president of the IMA, and Roy K. George, the president of the Trained Nurses Association of India. The award



recognizes the efforts of COVID-19 warriors in the country, honouring their selfless service, dedication, and perseverance. Sonia Gandhi, the head of the Indira Gandhi Memorial Trust, emphasized that the award is for every doctor, nurse, paramedic, and staff member who contributed to the fight against the pandemic.

“Be it her political career where she challenged orthodoxy to introduce equity oriented, pro-poor policies; be it her fight to defeat hunger in an international environment that disliked self respecting sovereign states; be it her extraordinary work to quell divisive tendencies in India; be it her unparalleled role in the creation of a new nation to honour people’s aspirations — she was a valiant crusader of people’s causes,” she said.

INDIA’S DRUG DETOX: DIGITAL UPDATE, REGULATOR UPGRADE

In recent years, adverse reports on Indian generics have led to questions being asked of the regulatory procedures governing the pharma industry. At least seven Indian-made cough syrups have been flagged as substandard by the WHO. The US FDA, too, has raised serious concerns. The country’s policymaking has been slow to respond to these charges. It has either resorted to piecemeal solutions or denied allegations of regulatory failure. In August, the government belatedly directed medicine manufacturers to follow WHO standards. It has now followed up this move by setting up a team to develop a portal that will enable tracking of drug-making processes. Medicine manufacturers will be required to feed in details of raw materials and distributors will need to upload their invoices on this platform. The site will also contain information about spurious and poor-quality drugs unearthed by inspectors — this could help tackle the problem posed by the movement of substandard medicines across state borders. The platform will also track court cases related to the pharma industry.

Studies have shown that pharma majors outsource production to small units which often escape the regulatory radar. State regulatory bodies find it difficult to track down supply chains of firms that comprise fly-by-night operators. While adulteration gets belated attention at times, experts believe that a more intractable problem is that of substandard drugs that delay or compromise treatment. By all accounts, a large section of physicians in the country do not seem to have faith in unbranded drugs. In August, a doctors’ protest forced the National Medical Commission to take back its directive on prescribing generic medicines. The use of IT-enabled procedures could make the pharma industry’s processes transparent and improve coordination between the country’s 36 regional regulators. But a single window for all drug regulation should be seen as only the first step towards restoring the credibility of generics.

India has among the toughest laws against spurious drugs. However, a robust regulatory mechanism also requires an effective system for monitoring manufacturing and sales units. That is still in the works. Most states haven’t found a way to adopt the 20-year-old formula of the Mashelkar committee which recommended one drug inspector for 50 production units and one inspector for every 200 retail units. In several states, there is no clear demarcation between the roles of drug testing and food regulatory agencies. Field officials are often tasked with administrative work related to the cancellation and renewal of licenses. Their primary responsibility of scrutinising the safety and efficacy of medicines suffers as a result. That’s why the creation of a portal for drug control should be accompanied by measures to enhance the capacity of regulatory bodies.



MODEST START TO BIG STRIDES: SPACE PROGRAMME TURNS 60

Sixty years ago, the launch set India on a journey that saw two more milestones before the country became part of an elite international group. The first was the launch of India's first truly indigenous rocket, on February 22, 1969 — a “pencil-sized” vehicle, in the words of Vasant Gowariker, later Director of the Vikram Sarabhai Space Centre (VSSC), that weighed around 10 kg. The second came on July 18, 1980, when its home-grown Satellite Launch Vehicle-3 (SLV-3) rocket, weighing 17 tonnes, placed the 35-kg Rohini satellite in orbit — and India in a small group of countries that could launch their satellites into orbit using their own launch vehicles. The only others were the Soviet Union, the U.S., the U.K., and France.

When the Nike Apache rocket soared into the sky, the Kerala Assembly was in session, and its members ran out to see the spectacle above. The sight also fascinated thousands of people in the area. Some of them later said the moment captivated them enough to join the Indian Space Research Organisation (ISRO) later. The launch was an international effort under the United Nations. The rocket came from the U.S., the payload from France, and the range clearance from an Mi-4 helicopter from the then Soviet Union. The rocket and payload engineers were Indians.

The rocket was mated with the payload in St. Mary Magdalene Church, Thumba, which had been taken over by the government. The parish priest's house became the mission control centre. Vikram Sarabhai was present during the launch, along with E.V. Chitnis, P.D. Bhavsar, A.P.J. Abdul Kalam, and the French payload specialist Jacques Blamont. The SLV-3s led to the Augmented Satellite Launch Vehicles (ASLVs), the Polar Satellite Vehicles (PSLVs), and the Geostationary Satellite Launch Vehicles (GSLVs). India also has a variety of sounding rockets to study the upper atmosphere.

Of course, the ISRO has also had its share of disappointments. Its first SLV-3 flight in 1979, its first two ASLV flights, the first PSLV mission, and a few GSLV missions all failed. The agency has had trouble accepting the fate of these missions as such, preferring to call them “partial successes” instead. To its credit, however, the ISRO eventually also vaulted to full successes. Today, India is an influential spacefaring nation. On July 14, 2023, its Launch Vehicle Mark 3 (LVM-3), weighing 640 tonnes, rose from the second launch pad at Sriharikota and placed the four-tonne Chandrayaan-3 composite module into an earth-orbit.

On August 23, 2023, Chandrayaan-3's lander Vikram soft-landed on the moon, making a different kind of history for India. ISRO Chairman S. Somanath called it “the beginning of a golden era”. He also told The Hindu that he believed the LVM-3 launch to have been the most crucial aspect of the mission. The LVM-3 is a highly sophisticated machine, and its roots go back to the Nike Apache launch 60 years ago.

Today, its rockets allow India to conceive of satellites for a variety of applications, including remote-sensing, weather-forecasting, communications, navigation, surveillance, tele-education, cartography, and prospecting marine resources. India has also embarked on deep-space science missions to study the moon, Mars, sun, and distant stars. The result, in the words of the late S. Ramakrishnan, a rocket technologist and former VSSC Director, is that “India has assured access to space.”

B.R. Guruprasad, former ISRO scientist and science writer, says 95 launch vehicles had lifted off from Sriharikota from 1979. The ISRO has put into orbit 90 Indian satellites and deployed in orbit 431 satellites from 34 countries using its launch vehicles.



DEEPPFAKE ALARM: CHALLENGES AS AI'S SHADOW LOOMS OVER THE ENTERTAINMENT INDUSTRY

As has always been the case with any technological development, most common discussions around Artificial Intelligence (AI) centre on the direct, perceivable pros and cons it poses (thanks to sci-fi's favourite plot of robots taking over all humanity). It takes an unfortunate scapegoat to force us out of our voluntary or involuntary ignorance, look at everything that lies beyond, and acknowledge the gaping divide between those who are willing and not willing to participate in AI-related discussions.

Earlier this month, a deepfake video (a video featuring a human whose appearance was digitally altered using AI tech) surfaced featuring Rashmika Mandanna's facial likeness morphed over that of British-Indian social media personality Zara Patel. While those familiar with deepfakes could spot its eeriness immediately, Rashmika's pan-Indian popularity, the fact that she was the first Indian actor to voice out against deepfake abuse and that it got even the Prime Minister voicing out his concerns, attracted colossal media attention. The only silver lining in the controversy that erupted is that it has demanded that social media users from India pay attention to the global conversations on both AI as well as the regulation of the use of the tech in the hands of humans. For most of us, the allure of AI applications has certainly made scrolling through social media a fascinating exercise. Who would have ever thought one could listen to 'Ponmagal Vandhal' in the voice of PM Narendra Modi?. '80s Rajinikanth and Silk Smitha came alive in a video tribute and in quite an eerie incident, we heard a Rajini song sung by the late S. P. Balasubrahmanyam. What grabbed the most eyeballs was a deepfake video of the 'Kaavaalaa' song from Jailer that had Tamannaah Bhatia's face swapped with that of Simran. Both the female stars were overcome with joy, but if you are wondering why we were largely made aware of AI through entertainment media, Simran reminds us that it has always been the case. "I believe it's one way, it seems, the creators of AI are letting the world know of their presence," she says.

But there's a vital, high-risk aspect of deepfakes that makes systems established to tackle pre-existing cyber-crimes like morphing and Revenge Porn — the sadly normalised forms of cyber-attacks that female public personalities are often subjected to — seem redundant. Because the threat is no longer just a photo being morphed onto another photograph or a non-consensual upload of demeaning private media. What we are discussing is also the product of generative AI that can create something new, almost perfect renditions, with what it has been fed. The baffling rate at which generative AI is advancing makes the Rashmika controversy seem almost mild in comparison to what the future holds.

Awareness and vigilance

What we are discussing is a minute aspect in the gamut of AI — misuse of generative AI, by humans, for personal attacks. The Indian government has been vigilant in implementing measures to tackle AI-related issues since before the term became a parlance and measures combating Dark AI are being developed every millisecond globally. But what resolution exists for victims of deepfakes currently in India?

Say a deepfake video featuring your digital likeness was released online. The first step pundits advise you to do is to report the post to the social media platforms, which are legally bound to not only address grievances relating to cybercrime but specifically in this case, remove it within 36 hours. Ashwini Vaishnaw, the Union Minister for Electronics and Information Technology and



Communications, held a high-level meeting with social media platforms and professors pioneering in AI to discuss measures to tackle deepfakes.

The wait for proper legislation that directly addresses deepfakes and AI-related crimes is awaited, but meanwhile, the internet and law enthusiasts are happy to help you in guiding you with legal recourse. They say it's best for a victim to lodge a complaint with the National Cyber Crime Helpline — 1930. Avail the services of a good cyber lawyer who would explain the many provisions of Section 66 of the Information Technology Act of 2000, the Copyright Act, and other provisions under the Indian Penal Code that can provide legal remedies. If the nature of the deepfake or any morphed picture is intimate (or even if any intimate image was posted without consent), victims can avail help at the online forum stopncii.org which also promises to safeguard privacy. But is there anything else that can be done to prevent such content from reaching unaware consumers? Imagine what would happen to WhatsApp Universities if — like Facebook's and X's fact-check tools — social platforms could help sort through AI content. It might be possible for the source post but what about the media files that are duplicated and forwarded? If only we knew of a machine that could be trained to relentlessly fight any duplication.

Fighting AI with AI

AI models are being developed to counter Dark AI activities and one can only hope for more open-source tools — in the same vein as Nightshade, which when applied can slightly tweak the digital artwork in the back end, making it hard for AI models to train themselves on — to first prevent misuse of our social media images, and second, alert consumers when they come across an AI-altered media. A simple Google search on how the tech world is combating deepfakes with AI lends many fascinating results, like Intel's deepfake detector called FakeCatcher, which is said to spot 'blood flow' in the pixels of a video (measures how much light is absorbed or reflected by blood vessels) to detect deepfakes. There have been other notable measures in providing transparency in the use of AI, like the Coalition for Content Provenance and Authenticity (C2PA), an open technical standard created by the coming together of many software companies with an aim to authenticate digital pictures.

We must not forget that in the aforementioned deepfake controversy, there were two victims — Rashmika Mandanna, and Zara Patel. It's no news that actors and social media influencers, particularly women and other marginalised genders, are forced to face the brunt of deepfakes and other cyber crimes, and there is no support system in place to guide them. Even if not for personal attacks, the recently held Hollywood strikes have proven that Indian cinema lacks a national union like SAG-AFTRA, the union for Hollywood actors, to take a stand against the potential use or abuse of AI by studios that can threaten the livelihood of actors. Simran agrees as well. "The bad side of AI is really nasty but the good side is that we all know about the worst side of it." For now, there's little we can do other than be aware of new AI tech and measures to combat Dark AI, and let legislature and human-friendly AI models do their jobs.

SOCIAL MEDIA PLATFORMS TO BE SUMMONED OVER DEEPFAKE ISSUE

Amid serious concerns over deepfake videos, the government is all set to meet social media platforms on the issue, with Union IT Minister Ashwini Vaishnaw on Saturday asserting that safe harbour immunity clause will not apply if platforms do not take adequate steps to remove deepfakes.



Mr. Vaishnav told presspersons that the government had recently issued notices to companies on the deepfake issue, and while the platforms have responded, companies will have to be “more aggressive” in taking action on such content.

Safe harbour clause

Internet platforms and social media platforms like Google, Facebook, X and others fall within the ambit of an intermediary.

The safe harbour clause — under India’s Information Technology framework — protects intermediaries from legal action on them for content posted online by their users.

GOVT TO HELP USERS FILE FIRS AGAINST SOCIAL MEDIA FIRMS OVER DEEPPAKES

The Union government has nominated an officer who will help users file FIRs against social media firms in cases related to deepfakes, said Minister of State for Electronics and IT Rajeev Chandrasekhar Friday.

During a meeting Friday, the ministry pulled up the platforms for not having aligned their terms of service with India’s internet laws and told them to immediately start informing their users what can and cannot be posted on their platforms.

Officials from companies including Meta, Google, Telegram, Koo, Sharechat, Apple, HP and Dell, among others, met Chandrasekhar as part of the second-leg of a two-day meeting over the threat of deepfakes. The first meeting took place with IT Minister Ashwini Vaishnav on Thursday.

This inaction has led the government to nominate an officer to create a mechanism for verifying platforms’ compliance with the rules, and issue notices warning them of losing their legal immunity from user-generated content. This officer will also assist aggrieved users to file FIRs in cases related to deepfakes, Chandrasekhar said.

Chandrasekhar said the companies must raise awareness of the rules by reminding users every time they log in that they cannot post such content, or by issuing reminders.

He said that while new rules are needed for curbing deepfakes, current rules offer enough regulatory teeth to deter such content. On Thursday, Vaishnav had said that the government will come up with regulations to control the spread of such content on social media platforms.

Last Friday, Prime Minister Narendra Modi said it is important to understand how AI works as it could be used to create deepfakes to purposefully spread false information or have malicious intent behind their use.

Several deepfake videos targeting leading actors have gone viral on social media platforms in the recent past.

GOVT INVESTIGATING WHETHER CHINA-LINKED AGENCIES ARE BEHIND APPLE SPYWARE ATTACK

As part of its investigation into claims that several Indian Opposition politicians and journalists received threat notifications from Apple, the government’s nodal cybersecurity agency has shifted its focus on a predictable foe – it is exploring whether agencies linked to the Chinese government were behind the attempted breach, The Indian Express has learnt.



“Most of the iPhones that were targeted were made in China, as per preliminary inputs we have received from Apple. The Indian Computer Emergency Response Team (CERT-In) is investigating if the place of production has something to do with a vulnerability in the iPhones, and whether the hack was attempted by agencies linked to China,” a senior government official, privy to CERT-In’s investigation, told this paper.

In October, Opposition leaders across parties — from Congress’s Shashi Tharoor to AAP’s Raghav Chadha to TMC’s Mahua Moitra — received a “threat notification” from Apple warning of a “potential state-sponsored spyware attack” on their iPhones. They hit out at the Centre, and suggested that it was behind the spyware attack attempt.

Apple later issued a statement saying it “does not attribute the threat notifications to any specific state-sponsored attacker”. IT Minister Ashwini Vaishnaw at the time said that much of the information provided by Apple on the issue was “vague and non-specific in nature”, and urged the iPhone maker to join the probe with more accurate information about the alleged spyware attack.

It is learnt that since Apple started sending out these alerts in late 2021, individuals in 150 countries have received such threat notifications. This paper has also learnt that according to Apple India’s internal records, at least 20 Indians with iPhones received the threat notification from the company last month.

Earlier this month, the CERT-In sent a detailed questionnaire to the company asking about current vulnerabilities in Apple’s operating system and how long the company will take to issue a security patch to fix the holes. Another key question the agency is investigating, as is Apple, is whether there was a breach, or if it was an attempted hack.

The agency has also asked the company to explain what it means by a “state-sponsored attack” and when it concludes that an attack was initiated by a state-backed entity.

Apple is understood to have preliminarily told the government that iPhones can have loopholes especially when military grade hacking attempts are made, and that the company is not equipped to remotely analyse the hack on a device level since it would require a great degree of access which could impact a user’s privacy further. Apple did not respond to a detailed set of questions despite multiple requests. An email sent to the IT Ministry went unanswered.

Investigations into similar issues in the past haven’t yielded much. In 2021, the Supreme Court had formed a committee of technical experts to look into allegations of unauthorised surveillance using the Pegasus software developed by Israeli firm NSO Group.

The Pegasus controversy had broken following media reports of alleged illegal use of the software to tap the phones of some activists, journalists and politicians. Subsequently, several petitions were filed in the Supreme Court seeking an inquiry into the charges.

In August 2022, the committee of technical experts found no conclusive evidence on use of the spyware in phones examined by it but noted that the Central Government “had not cooperated” with the panel.

WHERE HAVE THE ELEPHANTS GONE?

The challenges to human-wildlife coexistence has taken a toll on Assam’s rich fauna, which is dwindling fast. If experts are to be believed, doomsday for Guwahati’s wildlife population is only



10 years away unless remedial steps are taken without delay. According to field-level officials of Assam Forest Department, no effort has been made to develop a “strength, weakness, opportunity, threat framework” required for planning wildlife conservation in and around Guwahati city.

For a city which takes pride in 11 reserve forests — one of the highest urban wildlife concentrations in the world — there is no written plan till now for its management.

More than 40 elephants have been killed in Assam in the past three years. Poisoning, electrocution, illegal hunting, and last but not least, train accidents have been the cause.

Most of the fatalities have taken place near prime elephant habitats where the animals have been hit by trains mostly at night or during times of poor visibility. For the elephants, the chances of survival are near-zero after being hit by a passenger or goods train travelling in some speed of consequence. Even at 40 kmph, a full-grown elephant would have its life snuffed out within minutes of contact with a locomotive. And trains running through their habitat is not the only flashpoint that is worrisome. More than 4000 sq.km of reserve forest area in the State is under encroachment from settlers. Because of the disturbance to their natural habitat, these animals invariably cross over into human habitations. While 40% of the reserve forests now lie encroached, 90% of the encroachment was for dwelling purposes and the rest for extended cropping. According to the Central Empowered Committee, constituted by the Supreme Court, one of the main reasons for rampant encroachment is the lack of political will.

It is a battle between lopsided adversaries, where odds are overwhelmingly stacked against the elephants. Trains in Assam have been the cause of death of several elephants and have maimed many more. With elephants forced to wander out into human settlements in search of food owing to encroachment-induced depletion of resources, more deaths are perceived as inevitable.

Though the government had constituted the Guwahati Wildlife Division in January 2006 for effective management of wildlife conservation in the city, it still hasn't been able to chalk out a plan for the management of urban wildlife.

WHAT LED ICC TO SUSPEND SRI LANKA CRICKET?

The International Cricket Council (ICC) suspended Sri Lanka Cricket (SLC) due to government interference, a violation of ICC rules. Following Sri Lanka's poor performance in the 2023 World Cup, the Sports Minister sacked the SLC board, appointing Arjuna Ranatunga as the head of an interim committee. However, a court stay order reinstated the previous regime, leading to further conflict between the government and SLC.

The ICC rules (Article 2.4, clause D) prohibit government interference in cricket governance. Sri Lanka's suspension follows a similar suspension of Zimbabwe in 2019. In 2014-15, SLC faced demotion due to issues with timely elections, and the ICC refused involvement in India's cricket reforms.

The suspension deprives Sri Lanka of ICC membership rights, including participation in events and receiving ICC revenues. The impact on Sri Lanka's cricket activities will depend on the ICC board's decision after the Men's Cricket World Cup.

The Sports Minister intends to appeal through the ICC's dispute resolution committee, and if unsuccessful, may turn to the Court of Arbitration for Sport in Switzerland. The future also hinges



on the Sri Lankan Court of Appeal's two-week stay order and the potential return of the interim committee led by Arjuna Ranatunga.

Ranatunga accused BCCI secretary Jay Shah of influencing and harming Sri Lanka cricket, leading to diplomatic tensions between Sri Lanka and India.

ON ICC BAN ON TRANSWOMEN IN WOMEN'S WORLD CUP: CATCH UP AND PLAY

Can a sport's commitment to inclusion align with its aim to protect the integrity of the game? That is the question thrown up by the new set of eligibility rules approved by the International Cricket Council (ICC) on November 21. The rules bar players who have transitioned from male to female and have been through puberty from playing in international women's matches, regardless of any surgery or gender reassignment treatment they may have undergone. As per the ICC, the rules are based on the following principles, in order of priority: "protection of the integrity of the women's game, safety, fairness and inclusion." They have effectively ended the international career of Canada's Danielle McGahey who, only two months ago, became the first transgender cricketer to play in an official international game.

The argument against the inclusion of trans athletes in women's games is based on the perceived physical advantage they gain — greater lung capacity, stronger bones, more lean muscle mass — from having undergone male puberty. However, research that compares the actual pre and post transition performance of transgender athletes is limited and the question cannot be treated as settled. Some sporting bodies, notably in swimming, have got around the issue by introducing open categories for trans athletes, but a long-term resolution would require not only more nuanced policy, but also more research on the science of gender and its relation to sports.

The ICC rules underline the dilemma that sports bodies around the world have been grappling with since the landmark 2004 ruling by the International Olympic Committee which allowed transgender athletes to participate in the Olympics. As the universal understanding of gender progresses beyond the binary, fairness in sport — a key marker of that most vaunted of attributes called sportsmanship — cannot exist alongside exclusion. Put another way, for how much longer would a transgender person have to make a heartbreaking choice between affirming their identity and pursuing a sport that they love?

DreamIAS



BUSINESS & ECONOMICS

DECEPTIVE SIGNALS

Last month, India's goods exports recorded only their second uptick this financial year, with a 6.2% rise. Merchandise imports grew a sharper 12.3% over last October and nearly 21% over September's tally to hit an all-time high of \$65.03 billion. The trade deficit, as a result, also hit a record \$31.5 billion. The import bill was expected to go beyond the relatively tepid trends in recent months, spurred by anticipation of festive demand for items such as jewellery and high-end electronics. But this surge, and the deficit tally, was beyond expectations, with economists describing it as 'a rude shock' thanks to 'idiosyncratic' effects. The Finance Ministry's monthly economic review asserted that merchandise exports "surprised on the upside" with the highest growth in 11 months, and that exports and imports have grown "despite fears of weak global demand".

The high imports and the likely deficit trajectory need not trigger much anxiety yet. The recent decline in oil prices should help this inelastic import bill recede from the seven-month high of \$17.7 billion. While festive and wedding demand spiked gold and silver imports to an extent, price drops in precious metals in early October also played a role as jewellers sought to ramp up stocks before prices rebounded. Similarly, not all of the bump up in electronics imports can be construed as consumption demand. That October was the last month of free imports of personal computers, laptops and servers before the 'deferred' implementation of new import 'licensing' norms, now euphemistically rephrased as an 'import management system', also triggered players into stockpiling inventories of these items. The government has been trying to rein in the import bill through such measures and a slew of quality control orders, but boosting exports is more critical to support job creation and economic growth. What is worrying is October's headline uptick in exports is a statistical kink – the shipments' value of \$33.6 billion is actually the lowest in 12 months and 6% below the 2021 tally. Global trade grew 2% month-on-month in October, but Indian exports dropped 2.6%. This is a clear sign that incremental opportunities that a slowing world is throwing up are being lost out on.

THE OTHER OIL IMPORTS INDIA NEEDS TO WORRY ABOUT

India's edible oil imports have risen almost 1.5 times and more than doubled in rupee value terms during the last 10 years.

Imports of vegetable oils — used in cooking and frying of foods, as opposed to petroleum fuels — touched a record 16.5 million tonnes (mt) in the year ended October 2023, according to data from the Solvent Extractors' Association of India (SEA). While up from the 14 mt of the 2021-22 oil year, the value of imports fell both in dollar (from \$19.6 billion to \$16.7 billion) and rupee (Rs 156,800 crore to Rs 138,424 crore) terms, on the back of a crash in global prices.

From a 10-year perspective, India's edible oil imports have increased from 11.6 mt (valued at Rs 60,750 crore) in 2013-14 to 16.5 mt (Rs 138,424 crore) in 2022-23, with the jump pronounced in the last three years. During the previous 10 years between 2004-05 and 2013-14, imports had shot up even more, from 5 mt to 11.6 mt.



Dipping self-sufficiency

In 2022-23, India's edible oil production from domestically grown oilseeds and alternative sources such as cottonseed, rice bran and maize/corn amounted to around 10.3 mt. Adding imports of 16.5 mt took the total availability to 26.8 mt, with the share of domestic production in this at only 38.6%.

Compare this to 2004-05, when domestic output, at 7 mt, exceeded imports of 5 mt and translated into a self-sufficiency ratio of close to 60%. "Last year, our availability (from imports plus domestic production) was more than the actual consumption requirement of 24-25 mt. We are projecting the latter to reach 30-32 mt by 2029-30. If adequate efforts aren't taken to boost production, our annual imports could top 20 mt," said BV Mehta, executive director of the Mumbai-based SEA.

That would further bring down the self-sufficiency ratio to a third or below.

Data on India's edible oil imports and production over time. Additionally, data on inflation in vegetable oils domestically and globally. Data on India's edible oil imports and production over time. Additionally, data on inflation in vegetable oils domestically and globally.

Profile of domestic oils

The two biggest contributors to India's edible oil production now are mustard and soyabean. At No. 3 and No. 4 are cottonseed and rice bran.

The kapas or raw un-ginned cotton harvested by farmers contains only about 36% lint, the white fluffy fibre that textile mills spin into yarn. The balance is seed (62%) and wastes (2%) that are separated from the lint during ginning. Cottonseed, in turn, contains 13% or so oil.

Higher yields from genetically modified (GM) Bt technology helped boost not only lint, but also cottonseed oil production from less than 0.5 mt to 1.5 mt between 2002-03 and 2013-14.

Falling cotton output and yields in recent times — from Bt technology's diminishing effectiveness and the emergence of new insect pests has led to the production of its oil dropping too, to 1.25 mt in 2022-23.

Just as with cotton, there have been spin-offs from increased output of rice and maize, in terms of their byproducts. The oils extracted from bran (the outer brown layer of rice after removal of the husk and before polishing/whitening) and germ (the inside endosperm of maize grains separated during milling) have both seen significant production growth over the last decade or more. So has oil from domestically cultivated palm trees, albeit from a low base.

Among conventional oilseeds, only mustard has retained its sheen. While groundnut oil production has also grown, roughly half of its kernels are today either directly used for table consumption or exported. That leaves not much for crushing and oil extraction. It makes groundnut more of a dry fruit and less of an oilseed.

The other oils — coconut, sesame, sunflower and safflower — have all registered declines in domestic output. Although there are some premium homegrown brands — for instance, 'Parachute' coconut oil of Marico and 'Idhayam' sesame oil of the Virudhunagar (Tamil Nadu)-based VVV and Sons Edible Oils Ltd — these oils have struggled against the onslaught of cheaper imported oils.



The 16.5 mt of edible oil imports in 2022-23 included palm (9.8 mt; from Indonesia, Malaysia and Thailand), soyabean (3.7 mt; from Argentina and Brazil) and sunflower (3 mt; from Russia, Ukraine and Argentina). The bulk of imports comprise crude oils. Like crude petroleum, these are shipped in tankers and processed in giant refineries. Refining involves de-gumming (removing gums, waxes and other impurities), neutralisation (removing free fatty acids), bleaching (removing colour) and de-odourisation (removing volatile compounds).

Vulnerability to imports

A major side effect of high import dependence is the vulnerability of both producers and consumers to international price fluctuations. Edible oil inflation in India has broadly moved in tandem with global inflation. However, the extent of volatility — be it increases or decreases — is more in the latter's case (see chart).

The UN Food and Agriculture Organization's vegetable oils price index (base period value: 2014-2016=100) soared from 98.7 points in August 2020 to an all-time-high of 251.8 points in March 2022, the month that followed Russia's invasion of Ukraine. The index has since plunged to 120 points in October 2023. Landed prices of imported oils more than halving — from \$1,828 to \$910 per tonne for crude palm and from \$2,125 to \$1,005 for sunflower between March 2022 and now — has also brought down retail edible oil inflation in India to negative territory since February this year.

Stepping up edible oil output from domestic sources will go some way in insulating Indian farmers and households from excess global price volatility. But that would require openness to technology — including GM hybrids in mustard and soyabean amenable to herbicide application — and the government providing some kind of price support to oilseed growers, whether through procurement or tariff policy.

Such assured minimum support price (MSP)-based procurement is currently available only for wheat and paddy. And with the main national parties — the BJP and Congress — competing to offer more than the Centre's MSP for the two cereal crops in some states, there isn't much incentive for farmers to switch acreages to oilseeds or pulses. Nor does the surging import bill on the two seem to be moving policymakers for now.

RURAL WORKERS IN MP, GUJARAT GET THE LOWEST DAILY WAGES: RBI DATA

Rural agricultural workers in Madhya Pradesh (MP), which had gone for Assembly polls on Friday, get the lowest daily wages in the country, much below the national average.

According to data compiled by the Reserve Bank of India (RBI), in MP, male agricultural workers in rural areas got a daily wage of just ₹229.2 while in Gujarat, which claims to be a model state, it worked out to ₹241.9 in the year ended March 2023. The national average for the year was Rs 345.7.

If a rural farm worker gets work for 25 days in a month in MP, his monthly earning will be around ₹5,730 per month which may not be sufficient to meet the household expenses of a family of four or five. However, a rural farm worker in Kerala, which pays the highest wage of ₹764.3 per person among states, gets an average of ₹19,107 for 25 days of work in a month. In the case of Gujarat, the monthly wage for a farm worker would have been around ₹6,047.



As per a calculation by rating firm Crisil, the cost of a vegetarian thali was ₹27.9 and non-vegetarian thali ₹61.4 as of September this year. This means a family of five will have to shell out ₹140 for a veg thali meal or ₹8,400 per month.

While the financial year 2021-22 was bad for the rural economy with the Covid pandemic hitting the jobs and income levels, high inflation and interest rates played havoc in the fiscal 2022-23, hitting the rural demand.

Among other poorly paid states, in Uttar Pradesh, rural farm workers got an average daily wage of ₹309.3 and Odisha ₹285.1 in 2021-22. Male farm workers in Maharashtra, which boasts of being most industrialised state, got Rs 303.5 daily.

The high wages in Kerala have attracted farm workers from other poorly paid states with around 25 lakh migrant workers reportedly living in the state.

In Jammu & Kashmir (J&K), farm workers get an average wage of ₹550.4, Himachal Pradesh ₹473.3 and Tamil Nadu ₹470 per person.

According to the RBI data, in the case of male non-agricultural workers, the lowest wage was in MP with an average wage of ₹246.3 while Gujarat workers got a daily wage of ₹273.1 and Tripura ₹280.6 — all below the national average of ₹348. On the other hand, Kerala again leads in non-agricultural workers' daily wages with ₹696.6 per person. Kerala was followed by J&K with ₹517.9, Tamil Nadu ₹481.5 and Haryana ₹451 for the year ended March 2023.

Gujarat and Madhya Pradesh are again below the national average of ₹393.3 in the case of rural male construction workers. Gujarat rural construction workers got an average wage of ₹323.2, MP ₹278.7 and Tripura ₹286.1 per day during the fiscal ended March 2023.

However, daily wage for rural construction workers was ₹852.5 in Kerala, ₹534.5 in J&K, ₹500.9 in Tamil Nadu and ₹498.3 in Himachal Pradesh, as per the RBI data.

According to a Crisil study, rural income prospects remain dependent on the vagaries of weather.

“Increasing frequency of extreme weather events, therefore, remain a key monitorable. While lowering of demand for MGNREGA jobs is an encouraging sign for the rural economy from a job perspective, depressed wages are a matter of concern for rural demand,” it said. Rural jobs are dependent on agriculture which in turn is influenced by monsoon and rabi and kharif production. Real rural wage growth virtually stagnated in 2022-23 despite a visible uptick in economic activity. Although job demand under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) declined on a year-on-year basis, it still prevailed above the pre-pandemic level in 2022-23, indicating that the recovery, especially in the unorganised segment of the economy is not yet complete, according to the RBI's Annual Report for 2022-23.

Wage growth for agricultural and non-agricultural labourers remained subdued during 2022-23, averaging 5.8 per cent and 4.9 per cent, respectively.

Nevertheless, there was an increase in the pace of wage growth for agricultural and non-agricultural labourers, reaching an intra-year peak of 7.7 per cent in January 2023 and 5.6 per cent in November 2022, respectively, before moderating in March 2023, RBI report said.



RBI, LOAN SCAMMERS AND FINANCIAL LITERACY: A LOOK AT INDIA'S FINTECH SCENE

In recent years, there has been a dramatic expansion in all facets of the digital economy in India. This has created conditions for a surge in digital lending, driven in part by new-age fintech companies. Alongside, there has also been a proliferation of unscrupulous players who tend to take advantage of the financially less savvy in the low and middle income classes, including students and shopkeepers in smaller towns across the country. An investigation in this paper has outlined the modus operandi of these digital lending platforms, how they are able to take advantage of the unsuspecting and the gullible.

These fraudulent loan apps flood social media platforms with ads promising loans despite an individual having a low credit score. While the advertised interest rates are low, and tend to act as an inducement, the agents ask for much more money in repayment — in one such case, the amount asked to be repaid was more than thrice the borrowed amount. Many have been caught in their crosshairs and this issue has finally caught the attention of policymakers. In August 2022, an RBI working group had suggested the creation of an independent body to verify digital lending apps. In September 2022, the finance minister chaired a meeting on illegal lending apps in which it was decided that the central bank would prepare a white list of legal lending apps and the Ministry of Electronics and Information Technology (MeitY) would ensure that only these apps are hosted on the app stores. In the last such meeting held on October 13, MeitY had suggested KYC norms for lending apps. Considering that social media platforms are used to advertise and disseminate these apps, tech platforms also have a role to play. As reported in this paper, both Google and Apple have blocked several such apps. For instance, Apple has taken down those like Cute Sweet Food Record and Kevin Basketball Train Plan which offered instant loans from a platform called Trust Loans. However, fraudsters often come up with ingenious ways to find their way back online. At times they have presented themselves as loan aggregators or calculators to deceive the review processes.

The promise of easier and faster access to low cost loans is an appealing one. More so for those with low credit scores and the financially less included. Coupled with low levels of financial literacy, this creates conditions for fraudulent activity unless closely monitored. The government and the central bank must step up to the challenge of ensuring awareness through greater financial literacy, while dealing with fraudulent activities firmly.

FORMER RESERVE BANK OF INDIA GOVERNOR S. VENKITARAMANAN PASSES AWAY AT 92

S. Venkitaramanan, former Reserve Bank of India (RBI) Governor, passed away at the age of 92. Born on January 28, 1931, in Tirumayam of Pudukottai district, Venkitaramanan served in various key positions, including Finance Secretary in both the Tamil Nadu government and the Union government. He became the RBI Governor in December 1990 during a critical period of a severe balance of payments problem. Venkitaramanan played a crucial role in addressing the crisis with determination and courage, overseeing measures such as shipping gold out of India to raise foreign exchange. His two-year tenure also coincided with the multi-crore securities scam, and he was later given a clean chit by the then Union Finance Minister Manmohan Singh. Venkitaramanan is remembered for his contribution to economic reforms, including banking sector reforms and the initiation of the exchange rate management system.



WHAT IS THE NEW INVESTOR RISK REDUCTION ACCESS PLATFORM, AND HOW IT STANDS TO BENEFIT INVESTORS

The Investor Risk Reduction Access (IRRA) is a platform that will act as a 'safety net' for investors in case of technical glitches faced by a trading member or a stock broker registered with SEBI. It will provide investors an opportunity to close open positions and cancel pending orders in case of disruption at the stock brokers' end.

IRRA has been jointly developed by all the stock exchanges – BSE, NSE, NCDEX, MCX and Metropolitan Stock Exchange of India (MSE) and was launched Monday by Securities and Exchange Board of India (SEBI) Chairperson Madhabi Puri Buch. We explain how it works and how investors can access it.

What is the IRRA platform?

IRRA platform has been developed to reduce risks faced by investors in the eventuality of technical glitches at the trading member's end at both the primary site and disaster recovery site. Its purpose is to provide investors with an opportunity to square off/close their open positions and cancel pending orders using the IRRA platform in case of technical glitches or unforeseen outages that render the trading member's site inaccessible.

SEBI chairperson said the IRRA platform has been designed to reduce risks for investors participating in the market. It is not meant for taking fresh positions or orders, but only to cancel the pending orders.

Why was there a need for it?

With increasing dependence on technology in the securities market, there has been a rise in instances of glitches in trading members' systems, some of which lead to disruption of trading services and investor complaints. In such instances, investors with open positions are at risk of non-availability of avenues to close their positions, particularly if markets are volatile.

As the respective business continuity plans, if any, of the trading members, may not be able to prevent disruption in some cases like the trading member being unable to move to the Disaster Recovery site within stipulated time and cyber-attacks, SEBI, in December last year, announced that a contingency service will be provided by the stock exchanges in the event of such disruption.

"The hope is that this (IRRA) is a system that we will never need to use. It's like a safety net which is there for a trapeze artist...he hopes to never use that safety net but it really needs to be there," Buch said after the launch.

How will the IRRA platform work?

IRRA can be invoked by trading members when they are faced with a technical glitch at their end impacting their ability to service clients across exchanges from both – the primary site and disaster recovery site, where relevant.

Even stock exchanges can also monitor parameters like connectivity, order flow and social media posts, and suo moto initiate the enablement of the IRRA service, if needed, irrespective of any such request by the trading member, according to SEBI. This service shall be enabled by the exchanges, suo moto, only in case of disruption of trading services of trading member across all the exchanges, where the trading member is a member



On invocation, after basic checks, the platform downloads trades of the trading member from all the trading venues and sends SMS/email to investors using internet trading or wireless technology along with a link to access IRRA.

How will the platform help investors?

Once the investors are authorized to access the IRRA platform, investors can view and cancel pending orders across all segments and all stock exchanges from the order book, square off/close the open positions across segments and exchanges and cancel the orders across segments which are pending at the exchanges.

IRRA is not available for algo trading and Institutional clients. Securities available for trading and settlement on a Trade-for-Trade basis will not be available for square-off, as per the Frequently Asked Questions (FAQ) available on the BSE's website.

How can investors login into the IRRA platform?

Once the trading member is migrated to the IRRA platform, the investors of the affected trading member will be enabled to access the IRRA platform through a secure login system using their Unique Client Code (UCC) or investor's PAN number. Investors will get access through a one-time password (OTP) sent to their registered mobile numbers and email IDs for authorization. The communication will also include a link to access the IRRA platform.

Access to the IRRA platform will be available to the investors over a new Internet-based Based Trading (IBT) web URL and mobile application. The IRRA platform is different from the web URL / mobile application used by the investor, as provided by the affected trading member. Investors can also download the mobile application beforehand for ease of login, in case of an unforeseen contingency.

Web URL Link – <https://login.irra.live/stocks/jsp/irra/>

Mobile Application Link (AppStore) – Search IRRA to download the IRRA Mobile App.

Mobile Application Link (Play Store) – Search IRRA to download the IRRA Mobile App.

What is the timeline for a trading member to request migration to the IRRA platform?

Before requesting stock exchanges to migrate to the IRRA platform, trading members are required to put efforts into restoring the primary and DR sites. A trading member can inform the stock exchange via email to migrate to the IRRA platform before the start of the market session or after the start of the market but at least 2.5 hours before the scheduled closure of market hours of the segment in which it holds an open position.

How will the reverse migration of a trading member from the IRRA platform happen?

Based on the trading member's request and confirmation from all exchanges, the IRRA system services will be shut down to enable the trading member to resume business from the original trading system. In this scenario, the trading member will need to take a full download from the exchanges in order to get the latest state of orders and trades.



Only one reverse migration will be allowed during a trading day, the BSE's FAQ said.

A trading member will be required to fix the issue and perform sufficient testing subject to the satisfaction of all exchanges. In case the trading member is down again on the same trading day, and the TM moves to IRRA, then reverse migration from IRRA to the trading member will not be allowed again.

The request for reverse migration needs to be submitted at least 1 hour before the scheduled closure of the market in which the trading member holds an open position.

Once the trading member has achieved normalcy and informs the stock exchanges, the process for reverse migration will be jointly evaluated by all the exchanges. After the process for reverse migration is started, the IRRA platform will send notifications to all mobile numbers and emails.

WHY INDIA NEEDS TO PAY CLOSER ATTENTION TO FDI TRENDS

In 2021-22, total foreign direct investment flows into India had touched a high of \$84.8 billion. However, in the subsequent year, overall flows — equity, reinvested earnings and other capital — fell 16 per cent to \$71 billion. The disaggregated data shows that while equity flows (through the government/automatic/acquisition route) fell from \$58.7 billion to \$46 billion, reinvested earnings seemed to have held steady over this period. The recently released data shows that even though there has been an uptick in September this year, overall FDI equity flows in the first six months of the year (April-September) stood at \$20.48 billion, down 24 per cent from \$26.9 billion over the same period last year. This warrants closer examination.

As per the disaggregated data, some of the sectors which have witnessed the steepest declines in FDI flows between 2021-22 and 2022-23 have been computer software and hardware, where inflows fell from \$14.4 billion in 2021-22 to \$9.3 billion in 2022-23, the automobile industry (from \$6.9 billion to \$1.9 billion), construction which involves infrastructure activities (\$3.2 billion to \$1.7 billion) and metallurgical industries (\$2.2 billion to \$219 million). On the other hand, FDI flows remained healthy in the services sectors — this includes financial, banking, and insurance services, outsourcing, research and development, courier, tech, testing and analysis (flows rose from \$7.1 billion in 2021-22 to \$8.7 billion in 2022-23), chemicals other than fertilisers (\$966 million to \$1.8 billion) and drugs and pharmaceuticals (from \$1.4 billion to \$2.05 billion). In the first six months of this year, flows have fallen in the services sector, computer hardware and software, chemicals (other than fertilisers), but have risen in construction (infrastructure activities), among others. Alongside, data on the investing country shows that between 2021-22 and 2022-23, FDI flows fell from countries such as Mauritius, US, Netherlands, Cayman Islands and Germany, but rose from Singapore, UAE and Cyprus. And among the major states attracting investments, FDI flows have fallen most between 2021-22 and 2022-23, and in the first six months of the ongoing year.

In 2022, global foreign direct investment had declined by 12 per cent to \$1.3 trillion as per a report by the United Nations Conference on Trade and Development. However, this was largely a consequence of lower volumes of financial flows and transactions in developed countries. In comparison, FDI in developing economies rose marginally as per the report. While several factors influence capital flows into countries — these range from the prevailing global and domestic macroeconomic environment, the domestic policy and regulatory environment and political stability, among others — considering that India is widely expected to be a big beneficiary of the China plus one strategy, policymakers must pay closer attention to these trends in FDI.



AC COACHES RISE AT THE COST OF SLEEPER AND SECOND CLASS

For some time now, the Indian Railways has been introducing AC coaches in trains by replacing either Sleeper or Second-Class coaches. In May, in four pairs of trains operating out of Mangaluru Central Railway Station, one Sleeper Coach each was replaced by an AC 3-tier Economy Class coach each. In September, in Bagmati Superfast Express, Rapti Sagar Superfast Express and Muzaffarpur Express, an AC 3-tier Economy Class coach was introduced in place of a general Second Class coach each.

These changes have serious implications as the probability of travellers reserving a ticket in Sleeper and Second Classes has come down, forcing them to either upgrade to AC coaches or make alternative travel plans. Those holding an unreserved ticket to travel in General Coaches also may find it tough to get seats. With a relatively smaller share of people able to afford the higher costs of AC coaches, and in scenarios where alternative arrangements are not possible, incidents of general ticket holders invading reserved compartments have become common.

A comparison of passengers carried in 2019-20 and a decade back in 2009-10, shows that the above examples are not exceptions but the norm.

For instance, in 2019-20, of all passengers carried by Indian Railways (including both reserved and unreserved), 7.8% were in the AC coaches, a sharp jump from 3.6% a decade back — an increase of 4.2 percentage points. The share of those who travelled in the Second Class reduced from 85.3% to 76.5% — a decrease of 8.7 percentage points.

The share of reserved passengers carried by AC coaches increased by 9.8% points while that of Sleeper Class decreased by 2.8% points and that of Second Class decreased by 6.6% points in the decade considered.

A zone-wise comparison shows that the share of AC seats rose sharply in the Central, Northern and Western Railways, while the rise in Southern and Eastern Railways was not that steep. When both reserved and unreserved passengers are considered, in the Central, Northern and Western Railways, the share of AC seats increased by over 5% points, while Second Class' share decreased by about 10% points or more.

The average rate (in paise) charged per passenger per kilometre across various classes of travel in Indian Railways in 2019-20. There is an 80 paise difference per passenger per kilometre between AC 3-tier coaches and reserved Sleeper Class in 2019-20. Moreover, the fare of AC 3-tier has increased by 33 paise per passenger per kilometre in the past decade, while that of reserved Sleeper Class increased only by 17.4 paise, validating the affordability concerns of travellers.

These changes were mandated due to the poor operating ratio of the Indian Railways — which worsened after the pandemic. Before the pandemic Indian Railways on average used to spend ₹98 to earn ₹100. In 2021-22, it spent ₹107 to earn every ₹100.

REASONING BEHIND THE RISE IN INDIAN RAILWAYS' AC COACHES

Why the Indian Railways is pushing for higher-priced AC coaches, a move that may hinder its social service obligations, merits discussion. The Indian Railways is in a tough spot financially. Unlike private concerns, the Railways cannot shy away from plying trains in uneconomic lines, nor can they increase the fare of the cheapest class too high.



Due to that the revenue generation from internal resources — such as ticket sales — made by Railways is dwindling at a faster pace. The internal revenue, which was already at a sticky wicket, was scarred further by the COVID-19 pandemic. Operating Ratio (OR) of the Indian Railways measures the amount spent to earn ₹100 by Railways.

In FY15 and FY16, the OR was around ₹90. It increased to ₹98 in the following years, only to rise to ₹107 in FY22. That meant, in FY22, the Railways spent ₹107 to earn ₹100. While this may come down again after the pandemic impact wears off, the pre-COVID figures were not impressive either.

The reason for such a high OR lies in the high losses incurred by the Railways while operating various classes of passenger service. All the classes recorded losses in the past two years. While this was due to the pandemic, even in the years before, AC 3-tier was the only class which made consistent profits. Also, the losses were progressively widening in successive years (even before the pandemic).

This validates the Railways' recent experimentation with more AC 3-tier coaches. Railway Ministry's answers in the Lok Sabha for multiple questions regarding the reduction of Sleeper coaches show that the addition of AC coaches is seen as a way to "garner additional revenue" or to at least mitigate losses.

The Railways is also facing a crisis on the expenditure front. Due to the implementation of recommendations of 7th Central Pay Commission, the share of salaries and pensions spiked in recent years. The share of pension and staff costs combined increased from 60% to 69% between FY15 and FY22. Following this, due to COVID, the internal revenue generation was also hindered.

Poor revenue generation meant the Railways had to rely on extra-budgetary resources such as funds from LIC and market borrowings to fund their capital expenditure (like new tracks and new trains). The share of internal resources fell from 79% in FY15 to 48% in FY21, while reliance on EBS to raise funds rose from 5% to 42%. In FY22, due to record budget allocation for Railways, the GBS share increased again, slightly reducing dependency on EBS, but share from internal resources stayed put. A high dependency on market borrowings meant increasing interest and principal payments which would further hurt the finances.

CYPRUS CONFIDENTIAL: SHINING A LIGHT ON TAX EVASION

An investigation by The Indian Express, in collaboration with the International Consortium of Investigative Journalists (ICIJ), has further lifted the veil on the vexed problem of tax havens. The "Cyprus Confidential" focused on how the Mediterranean island has become the preferred port of call for the global rich in their quest for a shadowy financial hub to wash dirty money. Over the past decade, a series of investigations — from Offshore Leaks in 2013, HSBC Swiss Leaks in 2015, Panama Papers in 2016, Paradise Papers in 2017, to the Pandora Papers in 2021 — have exposed the complex maze of transactions that show how tax havens help the rich across the world to siphon off wealth and avoid paying taxes in their native countries. The use of tax havens to avoid paying the full quota of taxes is an enormous policy challenge that needs sustained attention. According to the State of Tax Justice 2023, authored by advocacy group Tax Justice Network, countries the world over are on course to losing \$4.8 trillion to tax havens over the next 10 years. That's an amount almost equal to the GDP of Japan — the world's third largest economy.



Cyprus Confidential, which involved more than 270 journalists from more than 60 media houses in 55 countries and territories, entailed close examination of 3.6 million documents, in English and Greek, sourced from six Cyprus-based financial service providers and a Latvian agency with an office on the island — in India, the Indian Express analysed more than 20,000 documents. The investigation has exposed investments made by prominent Indian businessmen, cashing in on a range of benefits provided by Cyprus: From preferential — and loosely controlled — tax rates to tax exemptions on income and gains of offshore trusts; zero estate duty, no trust registration requirements and the promise of beneficial owner secrecy. The investigations also revealed the names of several prominent Indian investors who became Cypriot nationals under the country's Golden Passport scheme valid between 2007 and 2020. In it, Cypriot passports were made available in return for an investment of 2 million Euros and gave the new recipients not just the freedom of movement but also a protective shield for their secretive investments in that country.

From an international perspective, a big takeaway from the Cyprus Confidential revelations is how Cyprus, despite being a EU member state, became a hospitable financial hub for Russian oligarchs. In essence, the investigation has shown how an EU member state has facilitated Russian President Vladimir Putin's autocratic regime and other dictators and anti-democratic actors in evading taxes and money laundering. Within the country, the findings of the investigation shine the light in dark corners, all the better for government and regulatory agencies to move forward on, more purposefully.



DreamIAS



LIFE & SCIENCE

ENERGY BURST IN DISTANT GALAXY DISTURBED IONOSPHERE

About two billion years ago in a galaxy far beyond our Milky Way, a big star met its demise in a massive explosion called a supernova that unleashed a huge burst of gamma rays, which pack the most energy of any wave in the electromagnetic spectrum.

Those waves traversed the cosmos and finally reached the earth last year. This gamma-ray burst, researchers said, caused a significant disturbance in the earth's ionosphere, a layer of the planet's upper atmosphere that contains electrically charged gases called plasma.

Scientists previously determined that this was the strongest such burst ever detected.

The ionosphere is situated about 50-950 km above the earth's surface, stretching to the very edge of space. It helps form the boundary between the vacuum of space and the lower atmosphere inhabited by people.

The gamma rays from the burst impacted the atmosphere for about 13 minutes on October 9, 2022. They were detected by the European Space Agency's Integral (International Gamma-Ray Astrophysics Laboratory) space observatory and various satellites orbiting close to the earth.

The gamma rays caused a strong variation in the ionosphere's electric field, according to Mirko Piersanti, a space weather researcher at the University of L'Aquila in Italy and lead author of the research published in the journal Nature Communications.

"It was similar to what happens in general during a solar flare event," Piersanti said, referring to powerful bursts of energy from the sun.

But the gamma-ray burst occurred a vast distance away - with the rays traveling about two billion light years - compared to the sun's relative closeness, showing how even faraway events can influence Earth.

Instruments on the earth showed that the gamma rays disturbed the ionosphere for several hours and even set off lightning detectors in India.

Scientists since the 1960s have been measuring gamma-ray bursts - outpourings of energy released in supernovae or the merging of two neutron stars.

The ionosphere, which helps protect life on the earth by absorbing harmful ultraviolet rays from the sun, is sensitive to changing magnetic and electrical conditions in space, usually connected to solar activity.

While this gamma-ray burst did not cause deleterious effects for life on the earth, it has been hypothesised that a strong one originating within the Milky Way and pointed right at us could subject the planet's surface to a flood of harmful ultraviolet radiation.

However, "the probability that this happens is really negligible," said astronomer and study co-author Pietro Ubertini of the National Institute for Astrophysics in Italy.



STREAMING HD VIDEOS FROM SPACE? WHY A NASA SPACECRAFT FIRED A LASER AT EARTH

NASA's Psyche spacecraft, currently over 16 million kilometres away in space, successfully fired a laser signal at Earth on November 14.

The spacecraft is on its way to a unique metal-rich asteroid, orbiting the Sun between Mars and Jupiter. Scientists believe this asteroid is the nickel-iron core of an early planet, studying which could provide unique insights into the impenetrable iron core of our own planet.

Simultaneously, it will also carry out another mission that might hold the key to future space exploration. What is this mission, and what does it have to do with 'space lasers'?

Space communication's data rate problem

Communicating with spacecraft far away from Earth poses many challenges, of which the problem of data rates might be the most critical. Simply put: how does a spacecraft transmit vast amounts of data over extremely long distances, all while itself moving at rapid speeds?

Like wireless communications on Earth, spacecraft encode data on various bands of electromagnetic frequencies. Currently, most space communication is carried out using radio waves — having the highest wave lengths but lowest frequencies in the electromagnetic spectrum.

However, higher bandwidths (range of frequencies) carry more data per second. Thus, scientists would ideally like to transmit data at the highest bandwidths possible to increase the rates of data transfer. But this throws up its own set of challenges.

Radio waves are more widely used for communication than other electromagnetic waves primarily because of their desirable propagation properties, stemming from their large wavelength. What this means is that they have the ability to pass through the atmosphere regardless of weather, pass through foliage and most building materials, as well as bend around obstructions. Shorter wavelengths tend to scatter when in contact with any interference.

NASA's revolutionary new technology

This is where NASA's Deep Space Optical Communications (DSOC) experiment comes in — pioneering the use of near-infrared laser signals for communication with spacecraft. Much like fibre optics replacing old telephone lines on Earth, NASA says that DSOC will allow data rates at least 10 times higher than state-of-the-art radio telecommunications systems of comparable size and power, enabling higher resolution images, larger volumes of science data, and even streaming video.

The Psyche spacecraft is the first to carry a DSOC transceiver, and will be testing high-bandwidth optical communications to Earth during the first two years of the spacecraft's journey to the main asteroid belt. The tech demo achieved "first light" in the early hours of November 14 after this transceiver locked onto a powerful uplink laser beacon transmitted from the Optical Communications Telescope Laboratory at the NASA's Table Mountain Facility near Wrightwood, California.

But given the limitations on propagation of higher bandwidths, how does this technology work? "Extremely precise pointing," says a NASA report. "The flight laser transceiver and ground-based laser transmitter will need to point with great precision. Reaching their targets will be akin to

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



hitting a dime from a mile away while the dime is moving,” the report says. A dime, or a 10 cent coin, is less than 2 cm in diameter.

To achieve this, the transceiver aboard the spacecraft needs to be isolated from the craft’s vibrations. Moreover, since the positions of Earth and the spacecraft will be constantly changing as the photons travel, the DSOC ground and flight systems will need to compensate, pointing to where the ground receiver and flight transceiver will be when the signal arrives. Lastly, given the distance between the spacecraft and Earth, new signal-processing techniques will be utilised to squeeze information out of the weak laser signals transmitted over the vastness of space.

Preparing for the future of space travel

In 2013, NASA’s Lunar Laser Communications Demonstration tested record-breaking uplink and downlink data rates between Earth and the Moon using similar technology. DSOC, however, is taking optical communications into deep space, paving the way for high-bandwidth communications far beyond the Moon and over a 1,000 times farther than any optical communications test to date.

Why does this matter? With humanity’s ambitions to travel in space, far beyond the Moon, improving communications technology is crucial.

As Trudy Kortez, director of Technology Demonstrations for the Space Technology Mission Directorate at NASA put it: “Achieving first light is one of many critical DSOC milestones in the coming months, paving the way toward higher-data-rate communications capable of sending scientific information, high-definition imagery, and streaming video in support of humanity’s next giant leap: sending humans to Mars.”

AI-POWERED CHEMIST MAKES OXYGEN FROM MARTIAN METEORITES

Oxygen-producing materials made from meteorites found on Mars have been produced using a robotic artificial intelligence (AI)-chemist. The research, published in *Nature Synthesis*, provides a proof-of-concept for generating oxygen and may have implications for future manned missions to Mars.

Potential future manned missions to Mars will require oxygen as it is essential to human activity on the planet, being used in rocket propellants and life-support systems.

One of the ways to make these potential missions more cost-effective in the long term and less complex would be to use resources already present on the planet to create oxygen, rather than transport materials from Earth. Recent evidence of water on Mars and analysis of the elemental composition of meteorites found on the planet could provide an opportunity to make catalysts using Martian resources.

Jun Jiang from the University of Science and Technology of China, Hefei, China and others developed a robotic AI-chemist that is able to create catalysts that can be used to produce oxygen from Martian materials without human intervention. “Using a machine-learning model derived from both first-principles data and experimental measurements, this method automatically and rapidly identifies the optimal catalyst formula from more than three million possible compositions,” the authors write.



The authors selected five different categories of meteorites that come from or have been confirmed to exist on Mars, which were analysed by the robotic AI-chemist. The robotic AI-chemist was able to convert the meteorites into chemical compounds and make catalysts from these compounds before testing the catalysts' oxygen production performance. This process was repeated by the robot until the best catalyst had been found, which they suggest could have taken 2,000 years of human labour. The authors then showed that this catalyst could operate under simulated Martian conditions.

"The synthesised catalyst operates at a current density of 10mAcm⁻² for over 550,000 seconds of operation with an overpotential of 445.1mV, demonstrating the feasibility of the artificial-intelligence chemist in the automated synthesis of chemicals and materials for Mars exploration," they write.

This robotic AI-chemist allows for the automated production of catalysts using Martian meteorites, which may lead to a way for humans to make oxygen on Mars in the future, the authors conclude.

THE OECD REPORT ON CLIMATE FINANCE

A new report, published by the Organisation for Economic Cooperation and Development (OECD), showed that economically developed countries fell short of their promise to jointly mobilise \$100 billion a year towards climate mitigation and adaptation needs of developing countries in 2021 — one year past the 2020 deadline. The report said that developed countries mobilised \$89.6 billion in 2021 and that finances for adaptation fell by 14% in 2021 compared to 2020.

Why is the OECD report important?

The OECD is largely a group of rich countries including the U.S., the U.K., Germany, France, Switzerland, Canada, and others. The report, as such, offers a peek into their idea of climate finance ahead of the COP28 climate talks in the United Arab Emirates (UAE) next week, where the topic is expected to be a key bone of contention.

The report also comes against the backdrop of a pledge by the bloc of developed nations at the COP26 talks in Glasgow, in 2020, to double adaptation finance. Parties to the United Nations Framework Convention on Climate Change (UNFCCC) had also said at Glasgow, "with deep regret", that the developed nations bloc hadn't met the \$100 billion climate finance goal in due time in 2020. The failure to mobilise adequate climate finance lowers capacity in developing countries to address climate mitigation (like emissions reduction with renewable energy) and adaptation needs (like developing and incentivising climate-resilient agriculture), and reduces trust among the world's poorer countries that the developed world is serious about tackling the climate crisis.

How is climate finance accounted for?

The OECD report showed that of the \$73.1 billion mobilised in 2021 by the public sector via bilateral and multilateral channels, \$49.6 billion was provided as loans. While the report doesn't classify them in terms of the rates at which they're provided, data available elsewhere sheds light on the extent to which rich countries rely on loans at commercial rates to fulfil their climate finance obligations. For example, an assessment by the American non-profit research group Climate Policy Initiative of global climate finance flows between 2011 and 2020 found that 61% of climate finance was provided as loans, of which only 12% was at concessional interest rates.



So, when the OECD report states that two-thirds of public climate financing was provided as loans, it means the conditions attached to such financing could further exacerbate debt stress in poorer countries. This is also a critique of the OECD report as it considers loans at face value, not the grant equivalent, when arriving at total climate finance figures. This means that while poorer countries shell out money towards repayment and interest, the loan is still counted as climate finance provided by the developed world.

What is additionality?

Another issue in the OECD report pertains to additionality. The UNFCCC states that developed countries “shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under the convention”. This means that developed countries cannot cut overseas development assistance (ODA) in order to finance climate needs because that would effectively rob Peter to pay Paul. In real-world terms, it would mean cutting off support for healthcare to reallocate that money to, say, install solar panels.

The “new and additional finance” also means that developed countries cannot double-count. For example, a renewable energy project could contribute to both emission reductions and overall development in a region. However, as per the UN Convention, donor countries cannot categorise such funding as both ODA and climate finance because it wouldn't fulfil the “new and additional” criterion. Yet they do. A few years ago, European Union officials admitted to double-counting development aid as climate finance.

What counts as climate finance?

At present, there is no commonly agreed definition of ‘climate finance’ because developed countries have endeavoured to keep it vague. For example, at the COP27 in Egypt last year, Australia and the U.K. even sought to end discussions to define ‘climate finance’. In the run up to the COP26 in Glasgow, the U.S. led an effort to block debate on a common definition, alongside Switzerland, Sweden, and some other developed countries.

The lack of definitional clarity has reportedly led to ridiculous situations like the funding of chocolate and gelato stores across Asia and a coastal hotel expansion in Haiti being tagged as climate finance. The ambiguity works in favour of richer countries because it leaves the door open to arbitrarily classify any funding, including ODA and high-cost loans, as climate finance and escape the scrutiny that a clearer definition might bring. Therefore, while developed countries can claim they have provided billions in climate finance, the actual flows need to be checked to know whether they went into climate mitigation and adaptation in developing countries or something else.

How much financial assistance do developing countries need?

The latest OECD report claims, based on preliminary and as-yet-unverified data, that the \$100 billion goal was likely met in 2022. But the data is neither finalised nor published, and the advisable take-away is scepticism. It is also important to note that the figure of \$100 billion came out of thin air at the COP15 talks and isn't based on an assessment of how much climate investment developing countries actually need. The OECD report added that by 2025, developing countries are estimated to require around \$1 trillion a year in climate investments, rising to roughly \$2.4 trillion each year between 2026 and 2030. The \$100 billion goal pales in comparison, dwarfed further by the fact that it remains unmet.



What role can the private sector play?

To meet the scale of the challenge, people like the U.S. climate envoy John Kerry and World Bank President Ajay Banga have routinely emphasised the role the private sector could play.

But the OECD report itself threw cold water on such hopes, showing that private financing for climate action has stagnated for a decade, while public funding from multilateral channels, both multilateral development banks (MDBs) and multilateral climate funds, increased in the same period. In 2021 in particular, it showed that private funding reverted to its 2019 level following a slight dip in 2020.

As a course-correction measure, the OECD report suggested de-risking with government intervention and called on MDBs to integrate private finance mobilisation strategies as part of their core objective. Its reasoning is that the private sector can help enable climate action but that it “requires the proactive involvement of governments and international institutions to support, incentivise and de-risk individual projects, as well as to create the necessary conditions for investment in developing countries more generally”.

But as of today, there aren't any signs that the private sector is interested in massively scaling up its climate investments. The problem is particularly worse for climate adaptation, because investment in this sector can't generate the sort of high returns that private investors seek and which the mitigation sector — like a solar or wind farm — could generate.

At the end of the day, the ball rolls back into the court of public funding, that is governments in the developed world plus multilateral development banks. The OECD report shows that even those who place hope in higher private funding for climate action in the future recognise that it is governments and MDBs that are the enabling parties here.

ALARMING COUNTDOWN

The title of the United Nations' latest report, Broken Record, is a clever pun. Not only does it suggest that previous warnings of the consequences of rising greenhouse gas emissions (GHG) are being ignored but also that new ceilings are being breached. The annual emissions report, usually timed close to the beginning of the climate talks, reiterates in sharper language that progress, since the Paris Agreement (PA) of 2015, has been tardy. The stated goal was to keep temperatures from rising over 2°C, and 'as far as possible' below 1.5°C, of pre-industrial levels. In the last few years, much of the consensus has been that we should be directing all our efforts towards keeping it below 1.5°C. The Broken Record report, however, suggests that accounting for all commitments made by countries, as per the PA, to minimise their economies' reliance on fossil fuel, temperatures would still result in an overshoot of 2.5°C-2.9°C by the end of the century. To keep temperature below 2°C, emissions by 2030 must be cut 28% and for 1.5°C, they need to be shaved by 42%. Despite many countries having promised to be 'net zero,' meaning no net carbon emissions, the report does not think these promises are 'credible' and even in the most optimistic scenarios, the likelihood of keeping emissions below 1.5°C are 14%.

However, it is not as if the PA has been infructuous. GHG emissions in 2030 based on policies in place were projected to increase by 16% at the time of the adoption of the PA. Today, the projected increase is 3%. To keep temperatures below 1.5°C, annual emissions must reduce every year, until 2030, by 8.7%. What the report says is that the world collectively emitted 57.4 billion tonnes in 2022, an increase of 1.2% over 2021. The pandemic saw 4.7% drop in emissions but the



projections for 2023 suggest that the globe is nearly back to pre-pandemic emission levels. The consequences of the globe's tardiness are writ large. As of October this year, 86 days were recorded with temperatures over 1.5°C above pre-industrial levels. September was the hottest recorded month ever, with global average temperatures 1.8°C above pre-industrial levels. In terms of solutions, the report repeats sage advice that has been offered for years: the richest countries and those historically responsible for gobbling sparse atmospheric capacity for carbon must commit to greater and faster reductions. While legalese and nit-picking have been characteristic of climate summits, precious little time remains for the world to get its act together.

COP 28: INDIA'S EQUITY DEMAND

There is an almost linear relationship between global warming and cumulative carbon dioxide (CO₂) emissions. The United Nations Framework Convention on Climate Change (UNFCCC) in 1992 noted that per capita emissions in developing countries are still "relatively low" and that their share in the global emissions will grow to meet their social and developmental needs.

The Convention recognises the 'common but differentiated responsibilities and respective capabilities' (CBDR-RC) principle. This means different States have different responsibilities and respective capabilities in tackling climate change. This principle has been reaffirmed in the Paris Agreement, whose main aim is to hold "the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels".

According to the Intergovernmental Panel on Climate Change's Sixth Assessment Report (IPCC AR6), every 1,000 billion tonnes of CO₂ in emissions causes an estimated 0.45 degrees Celsius rise in the global surface temperature. Axiomatically, limiting the rise in global temperature to a specific level means limiting cumulative carbon dioxide emission to within a carbon budget.

What is the global carbon budget?

The term 'global carbon budget' refers to the maximum cumulative global anthropogenic CO₂ emissions – from the pre-industrial era to when such emissions reach net-zero, resulting in limiting global warming to a given level with a given probability. The remaining carbon budget indicates how much CO₂ could still be emitted, from a specified time after the pre-industrial period, while keeping temperature rise to the specified limit.

The IPCC AR6 has shown that the world warmed by a staggering 1.07 degrees Celsius until 2019 from pre-industrial levels, so almost four-fifths of the global carbon budget stands depleted. Only a fifth remains to meet the target set in the Paris Agreement.

For a 50% chance of limiting warming to 1.5 degrees Celsius, the U.S. would have to reach net-zero in 2025, rather than 2050; Germany by 2030 instead of 2045; and the EU-28 bloc by 2031 instead of 2050.

Who's responsible for cumulative global emissions?

According to the IPCC AR6, the developed countries have appropriated a disproportionately larger share of the global carbon budget to date.

The contribution of South Asia — which includes India — to historical cumulative emissions is only around 4% despite having almost 24% of the entire world population. The per capita CO₂-



FFI (fossil fuel and industry) emissions of South Asia was just 1.7 tonnes CO₂-equivalent per capita, far below North America (15.4 tonnes CO₂-eq. per capita) and also significantly lower than the world average (6.6 tonnes CO₂-eq. per capita).

How does the carbon budget matter for India?

The global carbon budget for a given temperature limit is a global resource, common to the entire world, but is exhaustible and limited and with only equitable methods of sharing it, consistent with the foundational principles of the UNFCCC. India must recognise a 'fair share of the carbon budget' as a strategic national resource whose reserves are depleting rapidly due to over-exploitation by developed countries.

In a rapidly depleting global carbon budget, if we fail to deploy resources at our command to forcefully use it as a strategic national resource, we will be short changed by new colonial techniques of developed countries.

In almost all the emissions scenarios estimated by the IPCC, the world breaches an increase of 1.5 degrees Celsius from pre-industrial levels in the early 2030s. In 2022, oil, coal and gas accounted for 30%, 27% and 23% of the world's total energy, while solar and wind energy together contributed only 2.4%. The world is still largely powered by non-renewable energy.

Developed countries have tried to browbeat developing countries into accepting rapid, economy-wide changes. At the COP 26 talks in Glasgow, they forced the issue of phasing down the use of coal but then backtracked by reopening coal plants across Europe after the Russia-Ukraine war created an energy crisis.

This has illustrated that the immediate phaseout of fossil fuels is infeasible in the face of shocks and also limits developing countries' access to their 'room to grow'. The developed countries have stretched the argument further by calling gas "green" and a "bridge fuel" towards their own decarbonisation efforts.

What should India's stance be at COP 28?

According to the NITI Aayog-U.N. Development Programme's Multidimensional Poverty Index Report 2023 review, India has been able to lift more than 135 million poor out of poverty in less than five years (2015-2021). India has also just extended food security welfare measures to more than 800 million people in the country, under the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY), highlighting the magnitude of the challenge of poverty eradication after COVID-19.

Development is the first defence against climate change. How long will developing countries have to divert their scarce resources, manpower, and attention to meeting global problems created by developed countries?

Until developed countries themselves undertake mitigation efforts in their own backyard, the exercise will be a hogwash. It is imperative that developing countries receive a fair and equitable share of their carbon budget alongside stronger and more fruitful commitments from developed countries – including the promised but unmet climate-specific new and additional finance. The Indian government has led from the front to foster international consensus to tackle climate change.

To this end, India has set up the International Solar Alliance, the Coalition for Disaster Resilient Infrastructure, and the Global Biofuel Alliance. Through the 'Lifestyle for Environment' (LiFE)



mission, the Indian government also aims to spread awareness of good lifestyle practices and establish that sustainable lifestyles are the best way forward.

At COP 28, India must demand a fair share of its carbon budget or equivalent reparations to bring about fairness within the global order. Only development brings with it an assurance to tide over the roller coasters of climate change. Scientists estimate that at a conservative price of \$50/tCO₂-eq, developed countries' carbon debt to the world is pegged at over \$51 trillion.

Based on India's historical emissions (1850-2019), it has a carbon credit equivalent of 338 GtCO₂-eq., equal to around \$17 trillion at \$50/tCO₂-eq. Without finance and technology as promised in 1992 at the Rio Earth Summit, developing countries stare at an even more unfair world.

The cover decision of the Glasgow Climate Pact recorded an unprecedented "regret" on the failure of the developed countries to provide US \$100 billion dollars a year, as promised at the COP 15 talks in Copenhagen in 2009. We need more finance and less rhetoric from developed countries. For far too long, developed countries have had a free pass, and it is time for a new India to take them on.

COP28 TURNS ATTENTION TO POTENT METHANE EMISSIONS

Atmospheric methane (CH₄) occurs abundantly in nature as the primary component of natural gas. It is the second largest contributor to climate change, accounting for around 16% of the warming effect. Methane remains in the atmosphere for only about 10 years, but has a much more powerful warming impact than CO₂. Its warming effect is 28-times greater than CO₂ over a 100-year timescale.

Exactly how much methane is released in the atmosphere remains subject to "significant uncertainty", according to the International Energy Agency (IEA), despite progress in the monitoring of emissions through the use of satellites. Scientists are also puzzling over a steady increase of methane in the atmosphere, with concentrations currently over two-and-a-half times greater than pre-industrial levels.

Around 60% of methane emissions are linked to human activity, the IEA says, while most of the remainder is from wetlands. Agriculture is the biggest culprit, responsible for roughly a quarter of emissions. Most of that is from livestock (cows and sheep release methane during digestion and in their manure) and rice cultivation, where flooded fields create ideal conditions for methane-emitting bacteria. The energy sector - coal, oil, and gas - is the second largest source of human caused methane emissions. Methane leaks from energy infrastructure, such as gas pipelines, and from deliberate releases during maintenance.

Discarded household waste also releases large quantities of methane when it decomposes, if left to rot in landfills. A recent IEA report estimates that rapid cuts in methane emissions linked to the fossil fuel sector could prevent up to 0.1 degrees Celsius of warming by mid-century. That might sound like a modest reduction, but such a reduction would have an impact greater than "immediately taking all cars and trucks in the world off the road," the report's authors said.

It could be achieved by repairing leaky infrastructure and eliminating routine flaring and venting during maintenance. In agriculture, it's possible to modify animal diets by, for example, adding a compound to improve their health. For rice fields, changes to water management are the "most promising" way to reduce emissions, according to a FAO report.



COAL ISN'T EASY TO EXCLUDE FROM SUSTAINABLE DEVELOPMENT

Fossil fuels produce 80% of the total energy supplied worldwide. In 2022, oil, coal, and gas accounted for 30%, 27%, and 23% of the world's total energy, while solar and wind energy sources together contributed only 2.4%. The per capita energy supplied in India in 2022 was 37% of the global average, and only 26% of that of China. Therefore, India's energy needs will continue to grow.

Electricity security is achieved only by having a reliable and stable supply of electricity that can always match the demand at an affordable price. Only 11.5% of the electricity generated in India is produced by variable renewable energy (VRE) sources, and coal-fired thermal power plants (TPPs) generated 74.3% of India's electricity during FY 2022-2023 and continue to increase their share. The coal sector plays a vital role in infrastructure development and in the core sector industries which employ millions of people.

Further, India's cumulative emissions from fossil fuels and industry between 1750 and 2021 are only 3.3% of the global total, behind those of Europe (31%), the U.S. (24.3%), and China (14.4%). Fulfilling the development needs of 17% of the world's population, in India, is also a fundamental duty to which we must attend, or 'sustainable' development would be an empty catchphrase.

Against this backdrop, India must focus on increasing the efficiency of its TPPs to reduce emissions while ramping up nuclear energy and enhancing pumped storage to integrate more VRE sources into the grid.

What is coal's place?

According to Central Electricity Authority (CEA) projections for FY32, India's national grid can absorb 924 TWh of electricity from renewable energy sources by adding 47 GW of battery storage capacity and 27 GW of pumped storage projects.

Batteries will become cost-effective only after 2030, and the tariffs of pithead TPPs are only 40% of the round-the-clock tariffs for solar plants backed by battery storage in India today. Further, any increase in battery storage capacity in India will require the import of critical minerals like lithium, cobalt, nickel, and graphite, which are controlled by other countries (mainly, China), posing significant risks to India's energy security.

Ninety-six percent of the coal used by TPPs in India comes from domestic mines and is key to keeping electricity affordable in India. So the CEA projects that TPP capacity in India will reach 259-262 GW by FY32, from 212 GW in FY23.

Recent projections indicate that only 19 GW of pumped storage projects and 18 GW battery storage capacity additions are expected by FY32, which will require a further 23 GW of TPP capacity to be added to the grid by then.

To balance this with India's long-term goal of reaching net-zero by 2070, the country must continue to implement more efficient clean coal technologies.

Improving coal transport

Coal deposits in India contain high levels of ash (35-50%) compared to those mined in other coal-mining countries. Burning coal with more ash erodes boiler tubes and other components, affecting the plant's availability, efficiency, and performance.



The transport of unwashed raw coal to TPPs located more than 500 km from the mines also means transporting millions of tonnes of ash-producing non-coal material, congesting India's roads and rail transportation systems.

The practice in all major coal-producing countries is that the miner washes the high-ash coal at the pithead and dumps the rejects in the mine before dispatching the washed coal to consumers.

So the government can mandate miners to supply only washed coal to all TPPs located more than 500 km from mines to reduce emissions and pollution. The coal-washing cost can be fixed by the electricity regulator as a part of the tariff determination process.

The issue with desulphurisers

Indian coals generally have less sulphur than that mined in other coal-rich countries. TPPs in India have tall stacks, and the flue gas' exit velocity plus favourable weather conditions means sulphur dioxide emissions are widely dispersed. Historical sulphur dioxide emissions have created a cooling effect by masking global temperature rise by 0.5 degrees Celsius.

Retrofitting existing TPPs with flue-gas desulphurisers (FGDs), increases their specific coal consumption by 1.5-1.7%, leading to lower efficiency and higher emissions. FGDs require large capital investments leading to tariff hikes.

India can therefore reduce particulate emissions by more than 99.97% by installing low-cost, high-performance electrostatic precipitators and reserve FGDs for TPPs near urban areas.

Other development strategies

Some 30% of the current TPP capacity in India is from supercritical or ultra-supercritical technologies. The advanced ultra-supercritical technology (AUSC), with a proven efficiency of 46%, could further reduce carbon dioxide emissions by 15% compared to supercritical technologies.

Integrated gasification combined cycle (IGCC) power plants also have efficiencies of 46-48% and can capture carbon dioxide. So the Government of India can incentivise deployment of IGCC or AUSC technologies at scale.

It can also repurpose some TPP sites to install small modular nuclear reactors under international safeguards to enhance zero-carbon electricity generation.

Where does this leave coal?

Global warming is the result of the combustion of all fossil fuels, not just coal. The efficient operation of TPPs is critical for India since they ensure that peak and off-peak demands are met continuously, at affordable costs.

For India, low-carbon development is not a choice but a necessity, and the steps to achieve this are reflected in its 'Long-term Low-Emissions Development Strategy'.

It is hoped that developed countries will take the lead in combating climate change and provide new and additional climate-specific financial resources and technology transfer to developing countries as per the UNFCCC and its Paris Agreement.



PERIODICITY OF ECLIPSES

Q: If eclipses occur when the sun, the moon, and the earth lie on a straight line, why do they not occur on every new moon and full moon day?

A: The eclipses of the sun and the moon occur during a new moon and full moon respectively. A solar eclipse does not occur at every new moon, because the moon orbits in a plane that is inclined to the ecliptic, which is the plane of orbit of the earth around the sun. The angle between the planes is about five degrees. As a result, the moon can pass well above or below the sun.

The line of intersection of the planes is called the line of nodes. There are only two points where the moon's orbit intersects the ecliptic plane. The nodes move along the orbit from west to east, going completely around the ecliptic in about 19 years.

For an eclipse to occur, the moon has to be near one of the nodes. This does not happen on all new moon and full moon days. So eclipses do not occur on every new moon and full moon days.

BITTER TASTE

Can sharks taste bitter substances?

Researchers have discovered a receptor for bitter taste in 12 different cartilaginous fish (sharks and rays). The receptor belongs to the so-called taste receptors type 2 (T2R), which also makes humans perceive bitter and potentially toxic foods. Until now, it was assumed that such receptors only occur in bony vertebrates. Twelve out of 17 cartilaginous fish genomes studied contained genes for the taste receptors type 2, with only one T2R gene present in each species (Proceedings of the National Academy of Sciences). The researchers named this single gene T2R1. The fact that only a single T2R gene was found suggests that it is the original form of these bitter taste receptors, which was not altered by gene duplication and different specialisation of the resulting receptors. The results showed that both bamboo shark and the catshark can taste bitter substances also perceived by humans, such as colchicine or bile acid. A screening of 94 human bitter substances identified 11 substances that could also activate the sharks' receptors.

'LOWER OXYGEN AT HIGH ALTITUDES INCREASES LIFESPAN IN AGEING MICE'

In addition to its tranquil quality and a sense of peace, the fresh, crisp, pollutant-free mountain air could help some animals live longer.

Specifically, the lower oxygen content at high altitudes increases lifespan significantly in ageing mice, according to a study published in PLOS Biology on May 23, 2023.

Why study hypoxia?

The researchers have noted that theirs is the first study to demonstrate that oxygen restriction, or continuous hypoxia, can extend lifespan in an ageing mammal. Previous reports on oxygen restriction lengthening lifespan have come from mammalian cells grown in Petri dishes, yeast, and in less complex lab animals such as roundworms and fruit flies.

This line of research has been encouraged at least in part, by the naked mole rat: a rodent that spends most of its life in an oxygen-deficient burrow with a lifespan much longer than scientists have been able to predict based on its size or evolutionary history.



“Because of several observations about the effects of hypoxia in other organisms, we were motivated to assess the effect of chronic continuous hypoxia in a mammalian ageing model,” Vamsi Mootha, a researcher at the Howard Hughes Medical Institute, Maryland, and professor at Harvard Medical School, whose team made the discovery, told The Hindu.

What was the study design?

For its experiments, the team worked with a strain of mutant mice that age prematurely and have a shorter lifespan, of fewer than six months. “Wild type mice (without the mutations causing a shortened lifespan) can live over three years, which would have been a very long first experiment to assess survival, so we chose a mouse model of accelerated ageing,” said Dr. Mootha.

The strains they used “also responds powerfully to the best-known intervention to extend lifespan across organisms – caloric restriction.” Caloric restriction, or dietary restriction without malnutrition, first described in 1935, is the gold-standard for increasing lifespan in diverse species like yeast, roundworms, fruit flies, mice, and rats.

To test the effect of low oxygen level on these mice, the researchers housed them in hypoxic chambers with an oxygen concentration of 11%, similar to that at the base camp of Mt. Everest. They achieved hypoxic conditions by diluting the air with nitrogen.

The median lifespan of mice living with normal oxygen – at 21% of the atmosphere, a.k.a. normoxia – was about 16 weeks. But mice living in hypoxic conditions had a median lifespan of 24 weeks, or 50% longer.

“We were pleasantly surprised by the results,” Dr. Mootha said. “We have long been excited by the possibility that hypoxia could be beneficial in an ageing model and wanted to rigorously test this hypothesis, but we had no assumptions that it would actually have a significant effect.”

The animals housed in hypoxic conditions also displayed better neurologic function than their counterparts living in normoxic conditions. Sixteen-week-old mice living in normoxia had neurologic debility, measured by a motor performance test, while mice maintained in hypoxic conditions performed the test significantly better.

How does hypoxia work?

Next, the researchers tried to understand how hypoxia affected the body, leading to longer lifespan, but with little success. They examined whether hypoxia prompted the mice to restrict their diets. But they found that the hypoxic mice ate slightly more food than those living in normoxia, ruling out dietary restriction as the fundamental underlying mechanism.

Looking for differently expressed genes, DNA damage repair, and changes in signalling pathways didn’t provide any definitive clues either.

Do the findings apply to humans?

Dr. Singh agreed: “Caution should be exercised in directly translating these findings to human populations, as more work is required to establish their applicability and to address limitations, including variations in species, environmental conditions, and broader health outcomes.”

“It’s very premature to extrapolate our findings to humans or to make any recommendations for human health based on our current findings,” Dr. Mootha also said. “To my knowledge, there is no



evidence that people living at high altitude have a longer maximal lifespan, but there are some clues that median lifespan might be increased at higher altitude, and the most interesting epidemiological clue about the human health effects of living at altitude is actually provided by modern Indian history.”

He was referring to a study published in 1977, in which physicians of the Indian Army compared the health outcomes of 1.3 lakh soldiers stationed on plains and their 20,000 comrades stationed at 3,700-5,600 metres above sea level, over three years. They found that the incidence of common age-related disorders like diabetes, hypertension, and heart disease was lower among soldiers at the high altitudes than those at sea level.

Dr. Mootha said a lot more work is required to understand the effect of hypoxia on ageing in people and the molecular mechanisms through which it might be beneficial. “We view this initial report as laying the foundation for this important line of future research.”

CHIMAERAS – HOSTS TO MULTIPLE GENOTYPES, AND MAYBE HUMAN ORGANS

At present, more than 3 lakh people are waiting for an organ transplant in India alone; the global number is far higher, with no respite in sight. There is an alarming disparity in the number of organ donors and the number of recipients – and animals have played an important part in filling this gap.

The successful application of animal insulin and the more recent use of animal heart valves in human surgeries have saved human lives. Researchers have also made attempts to grow full human organs inside the bodies of animals using advancements in induced pluripotent stem cells (iPSCs) technology.

At the same time, controversy continues to beset this field, most of it centred on the use of human iPSCs in animal embryos and the creation of chimeric animals, the results of which we are yet to fully comprehend. However, humans are not new to the concept of chimaeras. Mythology abounds with a rich collection of these beguiling beings.

Chimaeras in nature

A genetic chimaera is a single organism composed of cells of more than one distinct genotype (or genetic makeup). The animal kingdom has several examples of varying degrees of chimerism. The half-sider budgerigar, a type of common parakeet widely adopted as pets, has different colours on either side of its body due to chimerism. The anglerfish displays an extreme degree of symbiotic chimerism in which the male fish fuses with and is eventually absorbed into the female fish, mixing their genetic makeups into a single animal. Marine sponges are known to have up to four distinct genotypes in a single organism.

Natural chimaeras among humans are well documented in the medical literature.

They occur when the genetic material in one cell changes and gives rise to a clonal population of cells different from all the other cells.

The fusion of two fertilised zygotes early in the embryonic stage can also lead to a condition in which two genetic makeups coexist in a single individual. Chimerism can also result from twin or multiple pregnancies evolving into a single foetus or a twin foetus being absorbed into a singleton.



Researchers have also documented individuals living with two blood types. In fact, blood-group chimerism during multiple births is relatively common. Most chimaeras are detected during routine blood tests in hospitals or when family members undergo tests ahead of an organ transplant. Pregnant women have been known to harbour the genetic material of her foetus in the bloodstream during the pregnancy. (Such foetal DNA can be used to screen for genetic defects and congenital abnormalities using non-invasive prenatal testing.)

Studies have also recorded a phenomenon called microchimerism, in which traces of the foetus's genetic material are observed in mothers' tissues many years after childbirth, resulting in two different genetic materials in a single person.

Individuals undergoing treatments like bone marrow transplants usually have their bone marrow destroyed and replaced by that from a suitable donor. Since the donor's bone marrow contains stem cells, they will produce blood cells that will subsequently repopulate the recipient's blood-cell repertoire. Eventually, the recipient will have blood cells that resemble the donor's and will be different from the genetic makeup of the recipient's other tissues – resulting in a chimeric individual.

Solid organ transplants in humans are bound to produce individuals with two unique genetic makeups as well.

The makeup of the donor's organs will be significantly different from that of the recipient's other tissues, also resulting in chimerism.

Chimaeras in non-human primates

Previously, chimaeras have been induced in laboratory settings, of rat-mouse, human-pig, and human-cow. These were in a bid to develop model systems that could 'generate' human organs of a suitable size, anatomy, and physiology. While rat-mouse chimerics had a near-normal lifespan, human-pig chimaeras had to be terminated in three to four weeks. While such studies have shown promise for growing organs destined for transplant, they are also limited by the fact that rats, mice, pigs and cows are evolutionarily distant from humans, and will pose biological and technical challenges when being used to grow human organs.

In a recent landmark study published in the journal *Cell*, scientists reported the successful generation of a live chimaera in non-human primates – species that are actually evolutionarily close to humans. This is the first time scientists have succeeded in producing a live infant chimeric monkey.

In studies with *Cynomolgus* monkeys, a.k.a. long-tailed macaques (*Macaca fascicularis*), researchers extracted embryonic stem cells from one-week-old embryos. They modified the DNA in these cells to include a green fluorescent protein (GFP).

These GFP-marked embryonic stem cells were then injected into recipient embryos that were implanted into surrogate female monkeys, which delivered six full-term offspring. Using detectors, the researchers located the GFP signal in the tissues of one aborted male foetus and in one live-birth male. The latter signal originated from the donor cells that had been injected into the recipient's embryo.

The chimeric monkey had to be euthanised after ten days for health reasons. Extensive genome-sequencing investigations conducted with its cells showed a high degree of chimerism in its tissues, including eyes, fingernails, brain, heart, kidney, liver, gonads, and placenta.



As such, this study opens new doors for scientists to use non-human primates to create chimaeras that could become models for basic and translational biomedical applications in the near future. Just like other advances in science, this study wasn't without limitations and ethical quandaries – and which we must address before thinking about the human biomedical applications.

FOR SICKLE-CELL ANAEMIA, A NEW CURE — FOR MILLIONS, A NEW HOPE

A revolutionary gene-editing therapy holds out hope for millions of sickle cell anaemia patients across the world, including in India, where about 30,000 to 40,000 children are born with the disorder every year. Last week, the UK became the first country to approve the use of Casgevy, which uses the gene-editing tool CRISPR-Cas 9.

The current remedy for the disease involves chemotherapy, hydroxyurea, which reduces the frequency of complications in patients. The UK regulator's decision was based on Casgevy's impressive ability to eliminate painful inflammatory attacks in more than 90 per cent of trial participants. The green light could pave the way for approvals by the US FDA — it's slated to take a decision on December 8 — and other regulatory bodies.

However, much needs to be done before the therapy becomes accessible to all. Making room for edited cells in the body is a complicated procedure. Vertex, the company that manufactures Casgevy, hasn't quoted a price for the therapy, but estimates from the UK and the US have pegged treatment costs for an individual patient at about \$2 million.

In sickle cell disease, the oxygen-carrying protein in red blood cells, haemoglobin, is compromised. Red blood cells with normal haemoglobin are disk-shaped and flexible. They move through the blood vessels easily. The haemoglobin-deficient cells are an almost exact contrast. When they lose their oxygen, these cells assume a crescent shape. They die much more rapidly than their normal counterparts. Their shape makes the sickle cells stick to blood vessels, blocking the movement of oxygen-carrying blood and leading to life-threatening conditions.

With less healthy red blood cells circulating in their body, patients become chronically anaemic. The disorder is genetic. Casgevy does not remove the mutation that is at the root of the disease. But it's designed to compensate for the haemoglobin by reviving the fetal haemoglobin, which gets switched off shortly after birth.

India has the second highest burden of sickle cell disease, which predominantly affects the country's tribal population. The Union Budget 2023 introduced the National Sickle Cell Anaemia Elimination Programme to address the challenges posed by the disorder. The programme — envisaged when preliminary results on the gene therapy were trickling in — aims to eliminate the disease by 2047. At current costs, Casgevy seems prohibitive for the country. However, research institutions should explore the possibilities offered by gene editing to develop affordable therapies.

Gene research institutions played a significant role in the management of Covid. But research on cell editing therapy is, by all accounts, at a relatively nascent stage in India. Casgevy's success should spur investments in this field.

U.S. DATA UNDERSCORE BENEFITS OF CHICKENPOX VACCINATION

On November 14, the U.K. government announced that the Joint Committee on Vaccination and Immunisation (JCVI) had recommended a vaccine against chickenpox (varicella) should be added

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to routine childhood immunisation programme. The vaccine is to be offered to all children in two doses, at 12 and 18 months of age. A final decision to introduce the vaccine has not been taken yet.

JCVI's recommendation comes nearly three decades after the U.S. introduced it in 1996, and a body of evidence emphasising the benefits of varicella vaccination. While chickenpox in children is most often relatively mild, some can develop complications, including bacterial infections, and in rare cases can cause encephalitis, lung inflammation, and even stroke; it can also rarely cause deaths.

Even when the disease clears, the virus stays dormant in the body and can get reactivated to cause herpes zoster (shingles), especially in adults. Exposure to the virus through children with chickenpox was expected to boost the immunity in adults and thus reduce the risk of shingles. It was theorised that vaccination of children will lead to loss of natural immunity boosting in adults, thus leading to significant increase in shingles cases. This was one of the reasons why routine administration of the vaccine in children did not begin in the U.K. earlier.

Evidence did not support the assumption of increased shingles in adults in countries that have introduced chickenpox vaccination. While a 2019 paper showed that varicella vaccination did not increase shingles incidence in adults, another study published in 2020 found that 10-20 years after adults were exposed to infected children, the protective effect against shingles was just 27%. A 2022 paper based on 25 years of data (1995-2019) from the U.S. showed a sharp drop in the incidence of chickenpox and shingles in children. In adults, shingles cases did not increase as feared. Rather, the rate of shingles in adults is expected to decline as vaccinated children become old, the study says. Unpublished results from a modelling study by the University of Cambridge found that the duration of protection from shingles was not 20 years as assumed but "likely to be around three years", JCVI said on November 14.

Since its introduction in the U.S., the vaccine has prevented over 91 million chickenpox cases, 2,38,000 hospitalisations, and almost 2,000 deaths.

"The evidence in favour of the chickenpox vaccine has been amply clear for a while. Once again, JCVI seems to have followed an ideology of infection being beneficial for children and at population level," Dr. Deepti Gurdasani, a clinical epidemiologist at the Queen Mary University of London told The Hindu by email. "The thinking behind not recommending the vaccine prior to now was that this may lead to an increase in shingles incidence because of lack of 'boosting' of the population by infected children. This has not come to pass. In fact, vaccination has been associated with a lower chance of reactivation and shingles compared to infection so far." As per an unpublished study by the University of Bristol, "complications from severe varicella were common, costly and placed a burden on health services. Uncomplicated varicella can also cause hospitalisation in very young children." The JCVI statement admits that the true extent of hospitalisation due to varicella was "underestimated". The reason: hospitalisations were "frequently due to secondary complications" arising from infection and also childhood stroke, which were "not always recorded".

"There are several hundreds of thousands of cases of varicella each year in the U.K., most happening in under five-year-olds. While death is rare, hospitalisations do occur, with up to 4,000 admissions per year and £6.8 million in hospitalisation costs, and much greater costs associated with children being ill," Dr. Gurdasani says.

India is yet to include varicella vaccine in the universal immunisation programme.



“As per the NFHS-5 data for childhood vaccination, the coverage for severe diseases such as diphtheria and pertussis has only reached 76.6%. Expanding this program remains an immediate priority,” says Dr. Rajeev Jayadevan, Member, Public Health Advisory Panel, Kerala State IMA. The actual disease burden of chickenpox and shingles, and hospitalisation costs in India are not known. As a result, the cost-benefit analysis of varicella vaccination has not been done. “Published studies from Asia estimate 5 cases of shingles per 1,000 person-years, the risk increasing to 7.4-13.8 per 1,000 person-years in people over 50 years,” Dr. Jayadevan says. “Experts at the Indian Academy of Pediatrics believe the risk of shingles may be lower.”

HOW FREE CANCER CARE ALONE WON'T HELP THE FIGHT AGAINST CANCER IN INDIA

By 2040, according to one estimate, 20 lakh people a year will be diagnosed with cancer in India. Cancer is already the third leading cause of death in India. In the coming years, it is expected to take over heart disease and infections as well. The Indian health system has tried adjusting to these changing health needs, but there is one particularly pressing issue. The money spent by a patient on an ailment is the highest for cancer. The Pradhan Mantri Jan Arogya Yojana (PMJAY) has offered some respite by providing health insurance of ₹5 lakh per family per year.

However, despite this support, people are financially destroyed by cancer and its treatment. A June 2023 study reported that even among patients availing of the PMJAY or other state-sponsored health insurance coverage, cancer treatment rendered catastrophic health expenses in more than 80% and impoverishment in more than 60% of people.

Where do the expenses arise?

The government provides free cancer care. These devastating costs arise in the private sector. Ideally, one's out-of-pocket expenditure (OOPE) for health should be zero. But the sheer burden of the disease plus an underfunded public health system forces people to access care in the private healthcare system in India. This worsens the financial burden by adding to the direct and/or indirect OOPE. Direct medical OOPE includes doctor's consultation fees, cost of medicines, and medical tests, and direct non-medical OOPE includes costs of transport, accommodation, and food for people travelling to larger cities for treatment. Indirect OOPE accounts for loss of productive hours and/or income.

The Pradhan Mantri Jan Arogya Yojana (PMJAY) offers health insurance, but a June 2023 study reveals that even with insurance coverage, more than 80% of patients face catastrophic health expenses, and over 60% experience impoverishment.

While some state governments have initiated efforts to alleviate these issues, such as free transportation and concessions on travel tickets, the article suggests that a permanent solution would involve establishing publicly funded cancer care centers across India. However, the implementation of such a solution is deemed challenging and time-consuming. Until then, providing financial support to those affected by cancer, directly or indirectly, remains crucial, emphasizing that free cancer care alone may not be sufficient to prevent people from falling into poverty. The author advocates for continued financial assistance until cancer care becomes as accessible as care for other chronic conditions like diabetes or hypertension.



FALSE ALARM

Nearly four years after the novel SARS-CoV-2 coronavirus emerged in Wuhan, the capital of the Hubei Province in China, resulting in the deadliest pandemic that the world has faced in 100 years, the news of an outbreak of influenza-like illness in Beijing, Liaoning, and other places in China since mid-October has raised concerns about the emergence of yet another new virus. In what appears to be a replay of the early days of the COVID-19 pandemic when China showed little interest in alerting the WHO quickly, China's National Health Commission failed to report to the WHO the large number of undiagnosed pneumonia cases among children. The other striking similarities to the 2019 outbreak are the reportage of the clusters in local media and ProMED, a publicly available surveillance system for infectious diseases outbreaks, more than a month after the respiratory illnesses spiked, and the WHO becoming aware of the issue only through media reports. Finally, like in 2019, the WHO was forced to request China for detailed epidemiologic and clinical information, as well as laboratory results of pneumonia cases in children. One reason for China's reluctance to keep the global health body informed could be that the surge in respiratory illness was driven by known pathogens, including influenza and common bacterial and viral infections. On November 23, the details shared with the WHO by China indicated that the spike in cases and hospitalisations among children were due to *Mycoplasma pneumoniae pneumoniae* since May, and RSV, adenovirus and influenza virus since October. While the multiple pathogens that caused illnesses in children this year are not novel nor the clinical presentations unusual, the surge in cases has occurred "earlier in the season than historically experienced". This could be because it is China's first full winter season after COVID-19 restrictions were removed in December last year.

China has claimed that the increased detection and reporting of respiratory illness in children was primarily due to enhanced outpatient and inpatient surveillance for respiratory illnesses covering a large variety of viruses and bacteria, including *Mycoplasma pneumoniae*. But this does not explain its failure to voluntarily keep the WHO informed about the unusually high number of cases last month. While China had reported a *Mycoplasma pneumoniae pneumoniae* surge in October, the reasons for the current outbreaks were less clear till the WHO requested for information. China is duty-bound to keep the WHO informed in time without being asked.

COVID-19: BRAIN DAMAGE MECHANISM UNCOVERED

While COVID-19 continues to be active in several western countries, its severity has diminished. A vexing issue however is Long COVID, a set of long-term health problems that linger for several months following recovery from the infection.

A recent Harvard study comparing infected and non-infected individuals, reported a 10% risk of getting Long COVID.

A prominent Long COVID symptom is brain fog, which involves difficulty focusing, memory impairment and challenges in decision-making.

Shrinking parts

A recent study from Stony Brook University in the U.S., utilising cognitive assessment tests, identified a significant intellectual decline following COVID. This was particularly pronounced among those with Long COVID. The exact mechanism remains unclear, but U.K. Biobank MRI studies had demonstrated shrinking of parts of the brain following COVID-19.



In this context, researchers from the University of Queensland and Macquarie University of Australia, in collaboration with the University of Helsinki recently made some startling discoveries. The results were published in the journal Science Advances.

Using specialised laboratory cells that mimic the human brain they found that infection by the SARS-CoV-2 virus resulted in individual brain cells fusing together as one. This could happen between two neurons, two glial cells or between a neuron and a glial cell. It could also involve more than two cells.

Process of fusion

By measuring the inflow of calcium ions into the cell, they further demonstrated that the process of fusion also affected their function. Instead of firing individually, the fused neurons fired all at once. This could disrupt communication between nerve cells. Interestingly, the cells did not die.

In effect, they discovered a new disease state of the brain in COVID-19, where the cells are structurally and functionally altered, yet remain alive. This is distinct from the previously known outcomes of viral infection of the brain, which are cell death and inflammation. Apart from SARS-CoV-2, which is known to enter the brain by disrupting the blood-brain barrier, viruses such as rabies, HIV and Nipah are also capable of infecting the brain.

The scientists then went on to study the mechanism of cell fusion. When the virus infects a cell, it causes fusion proteins to be expressed on the surface of cells. These proteins latch on to a neighbouring cell, eventually the two cells becoming one.

Fusion of brain cells not only alters the structure of the complex, but also makes the cells dysfunctional. This process is called syncytium formation, wherein the components of one cell freely flow into others.

Viruses use this as a clever method for cell-to-cell spread, while staying out of reach of antibodies that lurk outside the cells. COVID-19 is known to induce the same effect in lung cells.

The SARS-CoV-2 virus uses its spike protein for cell fusion. However, the spike protein used in the vaccine, being an altered version of the original, is not fusogenic. Therefore, there is no concern of such a thing happening after vaccination.

The prognosis of Long COVID is being studied. While some individuals recover after several months, the outlook has been less optimistic for a substantial number of people. Being an all-new disease previously unknown to man, knowledge about COVID-19 will continue to evolve.

A SMALL WIN OVER A BIG SENSORY DEFICIT POST COVID-19

Individuals suffering from long-term loss of smell and taste, known as anosmia and parosmia, following a COVID-19 infection. The Radiological Society of America notes a 10-minute minimally invasive procedure that could restore the sense of smell in such patients. The study's lead author, Dr. Adam C. Zoga, mentions that post-COVID parosmia, where pleasant smells turn foul, is increasingly recognized, leading to a distaste for previously enjoyed foods and drinks.

The procedure involves a stellate ganglion block, targeting nerves on each side of the neck that are part of the autonomic nervous system. This system regulates involuntary processes like heart rate, blood pressure, and digestion. The stellate ganglion block has been used for various conditions, and the study reports positive outcomes in treating post-COVID parosmia.

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The study included 54 patients referred after at least six months of post-COVID parosmia that did not respond to drugs or topical therapies. The initial patient showed immediate improvement, with symptoms resolving within four weeks. One week after the procedure, 59% of patients reported improvement, and 82% experienced significant progressive improvement by one month. At three months post-procedure, there was a mean 49% improvement in symptoms among the 22 patients.

This research offers hope for individuals grappling with persistent loss of smell and taste after a COVID-19 infection, potentially addressing mood disorders, weight loss, and decreased quality of life associated with these long-term effects.

WORLD DIABETES DAY: CAN SEVERE AIR QUALITY TRIGGER BLOOD SUGAR LEVELS, INSULIN RESISTANCE?

India continues to hold the dubious distinction of having some of the most polluted cities in the world, led by the capital, Delhi. This phenomenon peaks in the winter months, but air quality is substandard throughout the year. Air pollution can cause an increase in numerous diseases- the most obvious being lung disorders like asthma, bronchitis, and pneumonia. However, air pollution also increases the risk of heart disease, stroke, cancer, and kidney disease, and is a major reason for vitamin D deficiency.

Recent research shows that diabetes may also be linked to air pollution. One of the striking features of diabetes in India is the rural-urban divide. Diabetes prevalence rates in metros are more than double those in rural areas. While this has been attributed to reduced physical activity and dietary changes, there has always been a concern that other factors could be contributing to this staggering increase in diabetes overall, and in particular, the rural-urban differences. One of the factors responsible for the increase in diabetes could well be air pollution.

Air quality or outdoor air pollution is represented by the annual mean concentration of particulate matter, PM10 (particles smaller than 10 microns) and PM2.5 (smaller than 2.5 microns), which are about 25 to 100 times thinner than human hair. In a landmark study published in 2018 in the Lancet ('Planetary Health') researchers followed 1.7 million veterans with no prior history of diabetes for 8.5 years. Increasing PM 2.5 levels were found to be associated with rising diabetes. This association was evident even at levels of particulate matter normally considered safe. As particulate matter crossed 12 mcg (the recommended upper limit), 24 per cent of people developed diabetes.

Overall, it was estimated that 14 per cent (3.2 million) of all new cases of diabetes worldwide in one year could be attributed to air pollution. Highly polluted countries like India and Afghanistan are the worst sufferers. It is worth recalling that the average level of particulate matter (PM2.5) in Delhi is typically above 200 mcg/m³, which is over ten-fold higher than the WHO recommendation of 15 mcg/m³. During November, the level often crosses 400 or even 500 mcg/m³.

In a recent study from India published in the British Medical Journal (2023), the researchers followed a cohort of 12,000 men and women in Delhi and Chennai from 2010 to 2017. Even one month of exposure to PM2.5 led to elevated levels of blood sugar. Being exposed for over a year



led to an increased risk of diabetes. For every $10\mu\text{g}/\text{m}^3$ increase in annual average PM_{2.5} level in the two cities, the risk for diabetes increased by 22%. Besides this, with increasing pollution, the risk of high blood pressure (hypertension) increases too. This study also opens up the possibility that reducing pollution may reduce diabetes rates in countries like India.

How does air pollution increase the risk of diabetes?

Tiny particulate matter (PM_{2.5}) enters our bloodstream via our lungs. PM_{2.5} contains sulphates, nitrates, heavy metals, and black carbon that can damage the lining of blood vessels and increase blood pressure. These particles can cause oxidative stress and excite inflammation in fat tissue, leading to insulin resistance. Besides, they may also reduce insulin production. The particles can also attack the heart muscle directly. Outdoor air pollution can affect diabetes in less direct ways too. Polluted environments are often a reason for people to avoid outdoor activity, including walking. Reduced physical activity plays a major role, both in increasing diabetes rates and aggravating complications. The stress produced by living in polluted environments may by itself aggravate the risk of diabetes.

How can we keep ourselves safe?

One of the chief ways to combat pollution is to reduce the use of emission-producing modes of transport like cars, the main emitters of PM_{2.5}. This will necessarily increase walking or cycling. If people are reluctant to walk or cycle because of the poor quality of air, there will be greater use of cars, increasing pollution and further deterring people from walking. During peak pollution in winter, it may be prudent to wear a mask and avoid early morning outdoor activity. Exercise in the middle of the day, away from the main roads, is preferable but may be impossible, given the professional demands and hectic lifestyles of most city dwellers. Instead, indoor exercises may have to be resorted to. Treadmill, static cycling, or other forms of aerobics, along with yoga and some breathing exercises like anulom- vilom will help you obtain your daily quota of exercise and will help calm you down during the grey winter months.

There is an urgent need for effective long-term policies to reduce pollution. In India, it may mean abolishing crop burning, reducing the use of cars, relocating polluting industries, and imposing stricter norms on construction, among other measures. The addition of diabetes to the ever-growing list of pollution-associated health disorders gives us an additional reason to focus on this public health emergency.

A NEW TREATMENT CAN CUT BAD CHOLESTEROL BY HALF: WHY THE FINDINGS OF THE NEW STUDY ARE SIGNIFICANT

Keeping your heart healthy means watching your cholesterol, and the same goes for those with familial hypercholesterolemia, a genetic disorder that can trigger your bad cholesterol to dangerously high levels.

Researchers are on the brink of developing a single-dose, gene-edited therapy to control extremely high LDL levels in those with this genetic disorder, who face an increased risk of heart disease and early heart attacks.

However, researchers are now close to developing a single-dose, gene-edited therapy to control the extremely high levels of bad cholesterol or LDL in people with this genetic disorder, who have a higher risk of heart disease and a greater risk of early heart attack.



Verve Therapeutics, a clinical-stage genetic medicines company, reported a significant up to 55% reduction in bad cholesterol levels with their investigational medicine, VERVE-101, after a single infusion in the initial stage of its clinical trial.

Why are the initial results significant?

The initial results are deemed significant as they represent the first human data supporting the potential of in vivo gene editing as a treatment for individuals with familial hypercholesterolemia. Andrew Bellinger, Verve's chief scientific officer, highlights that the data confirms the hypothesis that a single-course gene editing medicine could induce "meaningful and durable reductions" in LDL when administered at therapeutic doses.

Dr. V Mohan, Chairman of Dr. Mohan's Diabetes Specialities Centre, suggests that this breakthrough holds promise for addressing high cholesterol levels. This is particularly significant as existing treatments often fail to normalize elevated levels of bad cholesterol in individuals with a genetic predisposition to the disorder.

"Statins that are a mainstay for treating high cholesterol levels are ineffective for individuals with familial hypercholesterolemia. Even the newer injectable therapy called PCSK9 inhibitor, which is much more effective than statins, does not bring down their cholesterol levels to normal. The normal LDL level should be around 70, for those with the genetic condition it can shoot up to 300, 400, or even 500," said Dr V Mohan.

How does the therapy work?

Using CRISPR-based gene-editing researchers from Verve Therapeutics in Boston have created an infusion that can "turn-off" the PCSK9 gene. The gene is responsible for regulating the number of LDL receptors. These receptors can bind with LDL and remove it from the bloodstream.

These receptors are mainly found on the surface of the liver cells and the abundance of these cells determines how quickly the organ removes the bad cholesterol from the blood. The PCSK9 protein destroys these receptors before they reach the cell surface, resulting in high levels of bad cholesterol in the blood.

The PCSK9 inhibitor also works on the same principle, however, it just inhibits the action of the gene whereas VERVE-101 switches off the gene completely. "The PCSK9 inhibitor is something that has to be taken every few weeks, whereas the new therapy may be needed only once," said Dr Mohan.

To lower cholesterol levels in the people with the condition, scientists have also tried a method called plasmapheresis. "It is like dialysis, but for the blood. The bad cholesterol in the blood is filtered out. However, this process also has to be repeated every week or a couple of times a week. So, the new therapy is a breakthrough," he said.

What does research show?

A one-year animal study, published earlier this year, shows that the therapy called VERVE-101 lowered cholesterol levels by 49% to 69% depending on the dose. With the effects of a single-dose of the therapy lasting for 2.5 years, the researchers suspect "VERVE-101 may potentially be an effective long-term or permanent treatment for high LDL."



The findings of the first study in humans, underway in New Zealand and the United Kingdom, were presented recently at the American Heart Association's scientific session. It shows that the therapy reduced LDL levels by 39% and 48% in two participants receiving 0.45 mg/ kg dose and 55% in the one person receiving 0.6mg/ kg. These results were seen in only those who were given the two higher doses. In total, there were nine participants in the study.

While the therapy will have to be studied in a larger number of people, including Indians, Dr Mohan said, "The science is exciting. This is the first gene-edited therapy for non-communicable diseases like cholesterol. However, more research, the cost of the therapy, side effects, and availability will all play a role in determining the clinical use of the therapy." He said that the cost is likely to be prohibitive, but for those with familial hypercholesterolemia who would otherwise die, the therapy could become an option.



DreamIAS