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INTERNATIONAL

WHAT ARE THE CHALLENGES FOR THE NEW POLISH GOVERNMENT?

The story so far:

The people of Poland handed a resounding majority to a multi-party Opposition coalition in the parliament's lower house (Sejm) on October 15, in a record 74.4% turnout. Voters also gave the combine a handsome majority in the upper house, or the Senate. The ruling ultra-conservative Law and Justice (PiS) party led coalition was defeated after its retrograde eight-year record in office.

What went wrong under PiS?

The hallmark of PiS rule has been to deploy its electoral majority to redefine the Polish nation in its own radically right-wing and populist image. Early in its tenure, the government rolled out generous welfare benefits, especially targeted at children and young mothers, although their long-term sustainability had been questioned by many economists. In 2016, the government piloted a contentious legislation to impose a total ban on abortions, forcing thousands on to the streets in protest. The public outcry pushed the government to back down, but only momentarily. In 2020, the constitutional tribunal set aside provisions of a 1993 law that allowed abortions in case of foetal disabilities, triggering further protests. The tribunal tightened the existing law by providing exemptions to the termination of pregnancies only involving rape, incest and risk to the mother's health. PiS has also attacked the LGBT community as an affront to the country's traditional family values.

The government also legislated sweeping provisions to empower politicians to control lower courts, the constitutional tribunal and the body that appoints judges. A brazen move in 2018 saw one-third of Supreme Court judges being forcibly retired. By the time the move was rescinded under pressure from the European Court of Justice (ECJ), the body had been packed with PiS loyalists. In 2021, the ECJ slapped a fine of one million euros per day when the government defied an order to revoke measures designed to withdraw immunity of judges from prosecution deemed inconvenient. Despite repeatedly falling fowl of Europe's top court, Poland's constitutional tribunal ruled, in a case brought by the Prime Minister Mateusz Morawieki, that parts of the EU law were not compatible with the constitution. The verdict was at variance with the principle of the primacy of EU law over national legislation and the binding nature of ECJ rulings on member states. Brussels dubbed the ruling a breach of European values and has withheld Warsaw's application for COVID-19 recovery money, worth billions of euros, and equally large regional development funds.

What happens now?

As the single largest party in the new parliament, PiS would be invited to form a government by President Andrzej Duda, but few expect it to muster a majority. The baton would then pass on to Donald Tusk, Poland's former prime minister and co-founder of the centre-right Civic Platform, the principal constituent in the victorious opposition civic coalition. The others in this grouping are the Third Way alliance of centrist and agrarian parties and the leftist Lewika. All of these parties are united in their pro-EU stance. The new government is not expected to be sworn in before December.

What are the government's priorities?

Foremost, the government under Mr. Tusk has to brace itself to navigate a political landscape that has been seriously vitiated by the policies of the past eight years. PiS commands a not inconsiderable vote share of 35% in the lower house of the incoming parliament. Conversely, tackling issues on the EU stage appears less daunting for the new government. To begin with, Mr. Tusk is a familiar face in Brussels, where he had until 2019 ably headed the EU Council, the forum that gathers the heads of governments of the 27-member bloc. Within days of the October elections, the putative premier was in Brussels to unblock billions of euros of Poland's EU development funds that were frozen consequent to Warsaw's conflict over compliance with the EU's rule of law procedures.

THE MASSIVE DISPLACEMENT IN CONGO

The story so far:

On October 30, the UN International Organization of Migration (IOM) reported that the number of people who have been internally displaced in the Democratic Republic of Congo (DRC) has risen to 6.9 million. In the eastern province of North Kivu, nearly a million people have been displaced due to the ongoing conflict with the rebel group, Mouvement du 23 Mars (M23).

What is the conflict in the DRC?

The conflict in the DRC dates back to the 1990s when it went through two civil wars in 1996 and 1998. The conflict erupted in the wake of the Rwandan genocide in 1994 where ethnic Hutu extremists killed nearly one million minority ethnic Tutsis and non-extremist Hutus. Since then, the eastern DRC, bordering Rwanda, has been facing insurgency perpetrated by several rebel militant groups. According to the UN, besides M23, more than 120 insurgent groups are active in the eastern provinces of North Kivu, South Kivu, Ituri and Tanganyika. Violence by several militant groups over territory and natural resources, extrajudicial killings by security forces and rising tensions with neighbouring countries have killed thousands. Tensions between the DRC and neighbouring Rwanda continue to increase as both countries accuse each other of supporting ethnic Tutsi and Hutu-led rebel groups respectively.

The resurfacing of the Tutsi-led led-M23 rebel campaign in November 2021 worsened the security situation in the eastern provinces of DRC. The group carries out frequent attacks and has taken control of several towns. In November 2022, a ceasefire was mediated between the DRC and Rwanda; however, it failed after the M23 rebels announced non-compliance. The East African Force and the UN peacekeeping force which were deployed to oversee the withdrawal of the rebel groups failed to achieve their objectives. Since January 2023, M23 has been advancing in the region.

CEASE FIRE

Israel's bombing of Gaza is entering its second month, and the tiny Mediterranean strip of 2.3 million people has been turned into what the UN has called a "graveyard for thousands of children" and "a living hell for everyone else". According to the Gaza Health Ministry, at least 10,000 people, many of them women and children, have been killed in Israel's onslaught, which began after Hamas's October 7 cross-border raid, killing at least 1,400 Israelis. Israel's attack has also displaced some 1.5 million people. Israel ordered more than a million Gazans to move south and

then continued to bomb the enclave. High-rises have been levelled and northern Gaza's neighbourhoods turned into rubble. Refugee camps, schools, hospitals and ambulances are not being spared, which led to frantic calls from the UN Secretary-General António Guterres for a ceasefire and respect for international humanitarian laws. According to the UN, 89 UN aid workers were among those killed in Gaza in four weeks, the highest "in any comparable period in the history of our organisation". The war has also triggered massive protests across the world, especially in the Arab street. But Israel's Prime Minister, Benjamin Netanyahu, has rejected calls for even a humanitarian pause, let alone a ceasefire.

Israeli troops have now encircled Gaza city, a densely populated Hamas stronghold, and are involved in street battles with militants. The objective appears to be to topple the Hamas government, kill its commanders, destroy its military infrastructure and rescue the hostages seized by Hamas on October 7. In the past, Israel had taken quick victories against conventional armies in the region, but its track record in asymmetric wars is mixed. It has lost at least 30 soldiers, and once the fighting enters Gaza city, it is expected to be bloodier. If Israel presses on, turning the rest of Gaza into an open prison on fire, it can have disastrous consequences for West Asia. Yemen's Houthis have already launched attacks against Israel. The Israeli-Lebanese border remains tense with Hezbollah saying all "options are open". The only country that can rein Israel in is its patron, the U.S. But unfortunately, the Biden administration, despite all its rhetoric about rights and a rules-based order, is yet to act. This is an opportunity for the U.S. to show the moral leadership which it always preaches about. It should tell Israel, and use pressure if needed, that it cannot continue to kill Palestinian civilians in the name of its right to defend itself. Israel must be made to cease fire immediately.

HOW DID THE WATERMELON BECOME A SYMBOL OF THE PALESTINE CAUSE? DEPENDS ON WHOM YOU ASK

In the many posts showing support for Palestine on social media, a popular symbol is the watermelon. Pictures and emojis of the sliced fruit, as well as artwork featuring it, are often used to express solidarity with the people of Palestine.

While the reason for why a watermelon is considered a symbol of the Palestinian struggle is simple enough, the history of its use is more complicated.

Why a watermelon

A watermelon when sliced shows the colours of the Palestinian flag — red, green, black, and white. As carrying and displaying the Palestinian flag has often been barred by Israeli authorities, a watermelon is used to symbolise it instead. On social media, many claim that posts with overt Palestinian symbols are restricted by the US-headquartered bigger platforms, and hence, the sliced watermelon comes in useful here too.

The watermelon is also widely cultivated in Palestine, from the West Bank to Gaza, and features prominently in Palestinian cuisine.

NATION

WHY DID INDIA ABSTAIN FROM THE CALL FOR TRUCE?

The story so far:

On October 26, nearly three weeks after the terror strikes by Hamas on Israel, the United Nations General Assembly (UNGA) voted on a resolution calling for an "immediate, durable and sustained humanitarian truce" in the hostilities, that was voted for by 120 member countries, while 14 countries voted against it. India was amongst 45 countries that abstained, a vote for which the government has received criticism from the Opposition, with many calling India's vote a "break from the past". Israel, that has conducted an incessant bombardment of the Gaza Strip over the past month, where two million civilians are trapped, rejected the UNGA vote, calling it "despicable".

Why did the government abstain?

Explaining India's vote this week, External Affairs Minister S. Jaishankar said that India's vote was consistent with its stand on terrorism, adding that India takes a strong position on it because Indians are "big victims of terrorism". In particular, government sources said that UNGA resolution (A/ES-10/L.25) lacked an "explicit condemnation" of the October 7 terror attacks by Hamas, in which 1,405 Israelis were killed, and about 240 were taken as hostages by Hamas militants. The UNGA resolution did condemn acts of violence against Palestinian and Israeli civilians "including terrorism", and also called for the immediate unconditional release of the hostages. However, India had wanted more, voting in favour of an amendment authored by Canada, that would have inserted more specific references, that was not passed by the UNGA.

Significantly, none of the government's own formal statements since October 7, including India's "Explanation of Vote" delivered after the resolution was passed, have named Hamas directly, nor have readouts of Prime Minister Narendra Modi's conversations with foreign leaders since the attacks referred to Hamas. New Delhi has also not as of yet designated Hamas a terror group, something Israeli Ambassador to India Naor Gilon has demanded.

Is India's vote a break from the past?

India's vote on the UNGA resolution is no doubt a break from its past voting record at the United Nations. Historically, India voted against the partition of Palestine and the creation of a separate state of Israel in 1948, and was the first non-Arab state to recognise the Palestine Liberation Organisation (PLO) as the representative of the people, and to recognise Palestine in 1988, and consistently voted against Israel at the United Nations. However, in the 1990s, especially once India established full diplomatic ties with Israel, its votes at the UN grew more nuanced, abstaining on many votes that directly criticised Israel, or called for international tribunals on its treatment of Palestinians in the Occupied Territories of West Bank and Gaza.

In December 1991, just weeks before India and Israel opened their embassies, India was part of a majority that voted at the UNGA to revoke an earlier resolution that equated Zionism with "racism and racial discrimination". In subsequent decades, India continued to condemn Israeli bombardment and its blockade of Gaza during UN resolutions, but tempered its votes on other anti-Israel resolutions, especially at other forums. After 2014, and more perceptibly post 2019, a more pointed shift has followed, where on resolutions critical of Israel where India would have in

the past voted "for", it now began to "abstain", and to even vote against them, if they involved more intrusive international enquiries. The rule however seemed to be to stand with Palestine on all votes relating to Palestinian rights against the occupation and Israeli bombardment. India even raised its annual contribution to the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) from a million dollars each year to five million dollars a year. As a result, India voted against the U.S.'s decision to recognise Jerusalem as the Israeli capital and move its embassy there at the UNGA, but abstained from voting on a UN Human Rights Council (UNHRC) resolution in 2015 on a report that held more criticism of Israel than Hamas for violence in Gaza. In 2016, India even voted against a UNHRC resolution that called for an International Criminal Court (ICC) investigation into Israeli war crimes, and voted with Israel at the United Nations Economic and Social Council in 2019 in stopping a Hamas-linked NGO from receiving observer status.

Given the wide breadth of these issues, India's record may seem like comparing "apples and oranges". The present shift is therefore best seen by comparing India's vote at the UNGA last month during the 10th emergency special session on Israeli actions, with India's vote at the UNGA at the 9th emergency special session in 2018, where India voted in favour of a resolution that deplored "the use of any excessive, disproportionate and indiscriminate force by the Israeli forces against Palestinian civilians in the Occupied Palestinian Territory, including East Jerusalem, and particularly in the Gaza Strip". At the time, Israeli bombardment of Gaza had left more than 220 dead. Now, with more than 9,000 dead, including 3,000 children, with Israeli forces bombing hospitals and refugee camps alike in their search for Hamas leaders and Israeli hostages, India has chosen to abstain.

What does India's stand signify?

India's abstention at the UNGA was welcomed by Israel, whose foreign ministry spokesperson said that although they would have wanted India to vote against the resolution, as U.S., the U.K., and other Israeli allies did, it appreciated the "support". Among countries that abstained were India's other Quad partners Australia and South Korea, and NATO members, including Canada and European countries. However, among the large majority of 120 countries that voted for the resolution were India's South Asian neighbours, including Bhutan, ASEAN countries (except Philippines, that abstained), all other 11-members of the newly extended BRICS grouping, the entire Arab world (except Tunisia) and most countries of the 'Global South'. If India's abstention is a signal of a decided shift in favour of Israel for future votes, it is clear which groupings India would find itself closer to. On the other hand, some have pointed out that India's abstention is not as much a sign of its commitments to any policy, but in line with a growing desire to equivocate on global issues, in order to keep a "tightrope balance" between conflicting sides, both of which India has close ties to. In that sense over the past decade, India has consistently abstained from all resolutions critical of Russia's operations in Ukraine both in 2014 and 2022, a 2016 resolution calling for a ceasefire by Syria, all resolutions from 2017-2022 that condemned the Myanmar military junta for the expulsion of Rohingya and its coup toppling the elected government. This would explain India's stand last month at the UNGA as more of a decision not to antagonise either side in an increasingly polarised world.

THE AGARTALA-AKHAURA RAIL LINK

The story so far:

On November 1, Prime Minister Narendra Modi and his Bangladeshi counterpart Sheikh Hasina virtually inaugurated the rail link between Agartala and Akhaura (in Bangladesh). It serves to re-

establish connectivity between Bangladesh and India's northeast through Tripura. "Through this link, States of northeast India can also be connected to ports of Bangladesh," Mr Modi stated. Bangladeshi PM Ms. Hasina too highlighted that the long-awaited project would help energise connectivity and commerce in India's northeast and Bangladesh.

What is the rail link about?

The 12.24 km long rail line constituting of about 6.78 km dual gauge rail line in Bangladesh and 5.46 km in Tripura, would link the latter to Akhaura in its immediate neighbourhood and thereby, its broader rail network. Nischintapur in West Tripura would serve as the international immigration station, that is, provide facilities to process immigration-related scrutiny for passengers. Additionally, in September, the Central Board of Indirect Taxes and Customs (CBIC) had declared Nischintapur as a Land Customs Station (LCS). It refers to any notified place meant for the clearance of goods imported or to be exported by land or inland water.

Other than the international transit, once completely operational, the project would also reduce the travel time between Agartala and Kolkata from about 31 hours at present to 10 hours. The existing commute distance between the two cities is 1,581 km and a requires a re-route via Guwahati and Lumding in Assam. This would be curtailed to 460 km.

"The Akhaura-Agartala rail link which will reduce the travel time and distance between India's Northeastern States and Kolkata by providing connectivity through Bangladesh, helps realise the potential of this physical continuity," Sohini Bose, Associate Fellow for Neighbourhood Studies at the Strategic Studies Programme of the Observer Research Foundation (ORF) in Kolkata told The Hindu. Furthermore, she states, "it will also help India to access the Port of Chattogram in Bangladesh through shorter routes and thus benefit overseas trade."

The project also is in continued adherence to the Central government's 'Act East Policy' and 'Neighbourhood First Policy'. As was pointed out by the Northeast Frontier Railway (NFR) earlier, it would help the growth of small-scale industries in the border area, boost tourism in Northeast India and more importantly, help local producers with quicker import and export of items.

In June, NFR had anticipated the project would be completed at a total cost of ₹862.58 crore on the Indian side. Ministry for the Development of the Northeast Region provided the funds. In addition to this, India's Ministry of External Affairs (MEA) provided the Bangladeshi government an assistance of ₹392.52 crore for work on the other side. The construction on the Indian side was done by public sector enterprise Indian Railways Construction International Ltd with Texmaco Rail and Engineering working on the Bangladeshi side.

How many connectivity routes are operational now?

As of now, five broad gauge connectivity routes are operational entailing links with Bangladesh – all of them from West Bengal. These include Gede railway station (West Bengal) to Darsana (Bangladesh), Benapole to Petrapole (West Bengal), Singhabad (West Bengal) to Rohanpur, Radhikapur (West Bengal) to Birol and Haldibari (West Bengal) to Chilahati. Work is underway to connect Mahihasan railway station in Assam to Shahbazpur in Bangladesh.

The memorandum of understanding for the Agartala-Akhaura rail link was signed in 2010 during Ms. Hasina's visit to India. In fact, ORF in a 2015 report on India-Bangladesh connectivity, had observed that past records revealed the rail link was suggested as far back as 1974 with the signing of a protocol between the two countries for cross-traffic movement. "The idea then

became dormant and would only be revived many years later, during Trade Review Talks between India and Bangladesh in December 1998," the report held.

Trade between the two countries have been on a consistent growth trajectory. There is an interchange of close to 100 cargo trains per month and approximately 2.66 metric tonnes were sent to Bangladesh in the previous financial year. The major commodities of export include stone, food grains, China clay, gypsum, maize, onion and other essential items, as and when required, from India.

As for people-to-people ties, it is facilitated by three passenger trains, namely, Kolkata-Dhaka Maitree Express, Kolkata-Khulna Bandhan Express and New Jalpaiguri-Dhaka Mitali Express.

Is there a particular focus on rail connectivity?

India's MEA had observed in a November 2022 note, that during the COVID-19 pandemic, the two countries stepped up their rail cooperation. This was because trade via land border faced abnormal disruption. Therefore, rail emerged as a "preferred, cost-effective and environment-friendly mode for cross-border transportation of essential commodities".

Furthermore, the Asian Development Bank Institute in a blog (July 2022) while enumerating developments in cross-border rail logistics, observed that following the success of movement of goods by rail, a parcel train service was introduced between India and Bangladesh. The low carrying capacity of these trains opened opportunities for export of smaller quantities of goods such as chemicals and textiles, among other things. The container train services and automobile cargo movement were also initiated.

According to Ms. Bose, the pandemic has taught countries "a lesson on the importance of supply chains". "It has consequently added fresh vigour to connectivity projects between India and Bangladesh of which railways are an important sector. Advancing Port and Road connectivity is also important for both countries and efforts to improve both are underway along with the railway initiatives," she said.

CLOSER TOGETHER

The decision by India and Bhutan to focus on infrastructure and connectivity during talks between Prime Minister Narendra Modi and Bhutan's fifth King Jigme Khesar Namgyel Wangchuck is an important marker towards more bilaterally driven regional initiatives. A joint statement speaks of completing surveys for the Kokrajhar-Gelephu rail link that connects Bhutan to Assam, and beginning discussions on another Bhutan to West Bengal rail link, while also facilitating Bhutan-Bangladesh trade, with yet another rail link, and upgrading checkpoints along the India-Bhutan border. These plans foretell a future that could well change the development story of the region, including West Bengal and the northeast, Bhutan's south and east dzongkhags (districts), as well as Northern Bangladesh. Bhutan's economy has been dependent on hydropower and tourism revenues, and has been particularly hit by the COVID-19 pandemic as well as worries over global warming. A lack of opportunities has also led to emigration by educated youth and professionals. The new project proposed by the king, to build a Special Economic Zone at Bhutan's southern border with Assam, and an airport at Gelephu, are expected to drive growth and investment to the kingdom. In addition, Bangladesh's signing of a Preferential Trade Agreement with Bhutan in 2020 could increase Bhutanese export of local produce and build more markets for Indian and Bangladeshi producers in the sub-region. India's "energy exchange", which is bringing more

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Bhutanese and Nepali hydropower suppliers online, while planning to distribute energy to Bangladesh and Sri Lanka, will drive intra-regional growth and revenues. This would also power New Delhi's attempt at bridging the economic gap with the northeast, while drawing development partners like the World Bank and donor countries like Japan into the creation of a "sub-regional hub".

Efficient and time-bound execution is, therefore, key to such ambitious plans. Given India's problems with Pakistan and sanctions on Myanmar for the 2021 coup blocking the path for trade and land connectivity to the East, working with other countries on India's periphery to build connectivity, markets and energy links is the most sustainable way forward. In the longer term, geopolitical conflicts and anti-globalisation trends are forcing regional groupings to be more cohesive, something South Asia has not been able to achieve as yet. As India worries about China's push into South Asian trade, infrastructure projects and strategic ties, including concerns over a Bhutan-China boundary agreement's overhang over Doklam and India's "Chicken Neck" (Siliguri Corridor) route, these are ideas which will offer more security and prosperity for the countries involved, with particular benefits for Bhutan, India's traditionally trusted partner in the region.

U.S. TO INVEST $553 MN. IN ADANI'S SRI LANKA PORT TERMINAL PROJECT

The U.S. International Development Finance Corporation (DFC) has agreed to invest $553 million in the Adani Ports-led container terminal project in Colombo, less than a year after U.S. investment research firm Hindenburg Research accused the Adani Group of pulling the "largest con in corporate history".

The DFC seeks to drive private-sector investments that "advance development and economic growth while strengthening the strategic positions of our partners," CEO Scott Nathan said at a media conference in Colombo on Wednesday.

The investment in the West Container Terminal, which Mr. Nathan termed as "impressive" after a visit to the facility, is aimed at catering to growing economies in the region, by taking advantage of Sri Lanka's prime location along major shipping routes, according to U.S. officials.

'Compromise deal'

Adani Ports signed a $700-million deal with the Sri Lanka Ports Authority (SLPA) and Sri Lankan conglomerate John Keells Holdings in September 2021 to jointly develop the terminal. The move followed an abrupt decision by former President Gotabaya Rajapaksa — he was ousted from power by a people's uprising during last year's economic meltdown — to eject the governments of India and Japan out of the East Container Terminal project at the same port. His government had said the West terminal was offered to India as "a compromise", and that Adani Ports was brought in as New Delhi's "nominee".

Subsequently, the Colombo West International Terminal Pvt. Ltd. was set up as a consortium comprising Adani Ports (51% stake), John Keells and SLPA to execute the project on a Build-Operate-Transfer basis spanning 35 years.

Asked about the DFC's decision to invest in a project led by the Adani Group, which is facing a regulatory probe in the wake of Hindenburg Research's allegations of accounting fraud and stock price manipulation, Mr. Nathan sought to underplay the allegations.

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'Unit not implicated'

"I don't think Adani Ports, the subsidiary, was implicated in any of the allegations you mention," Mr. Nathan told a group of foreign correspondents on the sidelines of the event.

The U.S. and the DFC were "committed to high standards that includes transparency and due diligence of partners," the U.S. official asserted.

"We are highly focused on anti-corruption and sustainability," he said, adding that he was "very glad" that a consortium, which included the Government of Sri Lanka, was executing the Colombo terminal project.

EXPERT EXPLAINS: WHAT IS A NATIONAL SECURITY STRATEGY AND WHY INDIA MUST HAVE ONE

A long wait is said to be coming to an end as the National Security Council Secretariat (NSCS) sets about drafting India's first written National Security Strategy (NSS), according to a report published in The Indian Express on November 4. India has never had such a document — and the debate on whether one is needed is of fairly recent origin, spanning the last two decades or so.

Should India have a publicly articulated National Security Strategy?

In other words, does the public need to know how the Indian government plans to handle national security in all its dimensions? Of course, they must know.

It is basic to their existence and well-being as a body of people that is called the nation. In the absence of a publicly articulated National Security Strategy, there would be a lack of cohesion and common understanding, and diverse interpretations of what may be in the interest of national security.

It is entirely possible that we do not have one so far because we did not, till now, have the strategic maturity and confidence to articulate such a strategy. The growing maturity of our military and strategic communities and changes in our apex security management structure are recent phenomena. This is one of the main reasons why we have now mustered the courage to draft a National Security Strategy.

ELECTORAL BONDS AND ELECTORAL TRUSTS: WHAT ARE THEY, AND HOW DO THEY DIFFER?

Electoral Bonds, now under challenge before the Supreme Court, have become the primary route of political funding since they were launched in 2018. The key difference between the Trusts and Bonds is in the degrees of transparency they offer, and the Bonds Scheme's focus on the anonymity of donors

After a three-day hearing, the Supreme Court on November 3 reserved its judgment on the challenge to the central government's Electoral Bonds Scheme.

Before the controversial Electoral Bonds (EB) Scheme was introduced in 2018, there was something called an Electoral Trusts (ET) Scheme, which was introduced by the UPA government in 2013.

Both schemes were meant to facilitate donations to political parties by corporates and individuals. But while the EB scheme seeks to ensure anonymity for the donor, the electoral trusts under the previous scheme were required to submit to the Election Commission of India a report on contributions from individuals and companies, and their donations to parties every year.

This is how the two schemes have worked so far.

First, what are electoral trusts?

Under the scheme notified by the UPA-2 government on January 31, 2013, any company registered under Section 25 of the Companies Act, 1956, can form an electoral trust.

Under Section 17CA of the Income-tax Act, 1961, any citizen of India, a company registered in India, or a firm or Hindu Undivided Family or association of persons living in India, can donate to an electoral trust.

The electoral trusts have to apply for renewal every three financial years. They must donate 95% of contributions received in a financial year to political parties registered under the Representation of the People Act, 1951. The contributors' PAN (in case of a resident) or passport number (in case of an NRI) is required at the time of making contributions.

The number of registered trusts has ranged from three in 2013 to 17 in 2021-22, but only a few of them actually make donations every financial year.

And how does the working of this scheme differ from that of the EB Scheme?

The electoral trusts route is transparent on contributors and beneficiaries. Where there is only one contributor and one beneficiary of a particular trust, the public can know for sure who is funding whom. For instance, in 2018-19, the Janhit Electoral Trust had just one contribution of Rs.2.5 crore from Vedanta, and the entire amount was donated to the BJP, as per the trust's annual contribution report.

However, if there are multiple contributors and recipients of donations, it cannot be specified which company is funding which party. So, Prudent Electoral Trust, which was known as Satya Electoral Trust before 2017, received contributions from a host of companies such as DLF, GMR, and Bharti Airtel, as well as several individuals, and donated to a range of national and regional parties. But it is difficult to pinpoint which donor gave to which party.

In fact, Prudent is the only trust that has given every year since the scheme started, with total donations adding up to more than Rs 1,891 crore from 2013-2014 to 2021-2022, which is the latest financial year for which reports are available. About 75% of total donations (Rs 1,430 crore) went to the BJP, and about 8.4% (Rs 160 crore) went to the Congress.

Electoral bonds, on the other hand, are exempt from disclosure requirements. Parties inform the ECI of the aggregate donations received through EBs, but give no details of the donors, which they are required to do in case of donations in cash or by cheque or bank transactions over Rs.20,000 each.

The government argues that this lack of transparency in donations through EBs is to maintain the privacy of donors.

How do donations through electoral trusts stack up against donations made through EBs?

Data from nine financial years (2013-14 to 2021-22) show that political funding through the two government schemes shot up after the introduction of EBs, with the bulk of donations coming through the newer scheme.

Over this entire nine-year period, a total Rs 2,269 crore was routed to parties though the ETs, from Rs 85.37 crore in 2013-14 to Rs 464.81 crore in 2021-22.

During the period 2017-18 — the financial year in which EBs were first made available — to 2021-22, however, the money donated through EBs was more than five times the amount that came through the Electoral Trusts. Thus, between 2017-18 and 2021-22, political parties got a total Rs 1,631 crore through ETs, while Rs 9,208 crore was donated through EBs.

In the six and a half years from the opening of the first sale window in March 2018 to the 10-day window that closed on October 13 this year, electoral bonds worth more than Rs 14,000 crore were sold by the State Bank of India, the only bank authorised to sell them, replies by the bank to questions asked under the Right to Information (RTI) Act, 2005, show.

A new window for the sale of EBs opened on November 6.

Which parties have received how much from electoral trusts?

The BJP got 72% of the total Rs 2,269 crore donated through electoral trusts from 2013-14 to 2021-22. This was higher than the share of the funding the BJP has got through electoral bonds (57%). However, the total EB corpus being much bigger than total ET donations, the actual amount the BJP got is much more than what it got through ETs.

The Congress got 10% of the total EB funding from March 2018 to October 2023, and 9.7% of the ET donations from 2013-14 to 2021-22.

The Trinamool Congress was the third biggest recipient of EBs (8.3%), though it got only 0.11% of ET funds. The Biju Janata Dal (BJD) was the third biggest beneficiary of donations through ETs after the BJP and Congress, and got about 1% of the total funds given by the trusts.

A report by the Association for Democratic Reforms (ADR) earlier this year found that more than 55% of the funding for political parties came through electoral bonds. In fact, for some parties, these bonds have become the only source of contributions — the BJD declared to the ECI that its entire income from "grants, donations and contributions" in 2021-22 came from EBs.

STATES IN COURT AGAINST THEIR GOVERNORS

A battery of non-BJP ruled States have approached the Supreme Court accusing their Governors of using a non-existent discretion to unreasonably delay the passing of crucial Bills into law. The Bills in limbo cover sectors such as public health, higher education, Lokayukta and cooperative societies.

The accusations

Tamil Nadu has accused Governor R.N. Ravi of toying with the citizens' mandate by sitting on the Bills by neither assenting nor returning them. It said the Governor has positioned himself as a "political rival" who has caused a "constitutional deadlock" by simply sitting on the Bills for

months together. Kerala, in its separate petition, said that eight proposed laws passed by its Legislative Assembly were pending with the Governor, not for months, but years. Of the eight, three Bills were waiting for the Governor's word for over two years.

Punjab complained that seven of its Bills were stuck with the Governor since June, threatening to bring the administration to a "grinding halt".

The Supreme Court had to intervene in April for the Telangana Governor to clear Bills pending since September 2022, compelling advocate Dushyant Dave, appearing for the State, to submit that legislatures in Opposition-ruled States were at the mercy of the Governors, who had become a law unto themselves.

The process of granting assent

Article 200 of the Constitution covers the options before the Governor when a Bill passed by both Houses of the Legislature is presented to him. The first proviso to the Article says the Governor could either declare his assent to the Bill or withhold the assent if it is not a Money Bill or reserve the law for the consideration of the President if he thinks the Bill derogates from or endangers the power of judicial review of the High Court.

In case the Governor chooses to withhold assent, he should return the Bill "as soon as possible" with a message requesting the Legislative Assembly to reconsider the proposed law or any specified provisions or suggest amendments. The Assembly would reconsider and pass the Bill, and this time, the Governor should not withhold his assent. In short, the constitutional head of the State would bow to the considered decision of the elected representatives of the people.

Do Governors have discretion?

Governors did have a discretion to return Bills before the first proviso in the draft Article 175 (now Article 200). This was amended by the Constituent Assembly in 1949. Though it was thought that the Governor's exercise of discretion would act as a "potential check on disruptive legislative tendencies" by States, Dr. B. R. Ambedkar, while introducing the amended proviso, said "in a responsible government there can be no room for the Governor acting on discretion".

T. T. Krishnamachari, a Constituent Assembly member from Madras and later Finance Minister, approved of the amendment, saying "the Governor cannot act on his own, he can only act on the advice of the Ministry... When a Governor sends a Bill back for further consideration, he does so expressly on the advice of his Council of Ministers". Mr. Krishnamachari explained that if the Bill passed by the Legislative Assembly needs modification or has garnered adverse public opinion, the government uses the Governor to return the Bill to the Lower House as quickly as possible for re-legislation. The first proviso to Article 200 is thus a "saving clause" and retains the discretion over the fate of the Bill solely in the hands of the State Cabinet.

Article 163 makes it clear the Governor is not expected to act independently. The top court in the Shamsher Singh case verdict has held that as a formal head of the State a "Governor exercises all his powers and functions conferred on him by or under the Constitution on the aid and advice of his Council of Ministers save in spheres where the Governor is required by or under the Constitution to exercise his functions in his discretion." The assent or return of the Bill does not involve the discretion of individuals occupying the Governor's post.

By when should Bills be returned?

The first proviso of Article 200 says it should be "as soon as possible". The Constitution is silent on what exactly this phrase means. The Supreme Court has interpreted "as soon as possible" in the proviso to mean "as early as practicable without avoidable delay" in its 1972 judgment in Durga Pada Ghosh versus State of West Bengal. Justice (now retired) Rohinton F. Nariman, in his 2020 judgment in the Keisham Megha Chandra Singh case, said a 'reasonable time' would mean three months.

The States have urged the court to interpret the phrase in the proviso and fix a time limit by which Governors should assent or return a Bill. The 1988 Sarkaria Commission report on Centre-State relations had suggested consultation with the Governor while drafting the Bill and fixing a deadline for its disposal.

Kerala has asked the Supreme Court to form a seven-judge Bench to review a five-judge Bench judgment in the 1962 Purushothaman Nambudiri versus State of Kerala case which held the view that Article 200 did not provide "for a time limit within which the Governor..... should come to a decision on the Bill referred to him for his assent". The State said that, at the time, the court did not consider the possibility of Governors holding back Bills for an indefinite time.

IT'S NOT EASY FOR WOMEN TO SEEK JUSTICE — A STUDY OF HARYANA PROVES IT

In discussions about how violence against women can be effectively addressed, a frequently recommended nostrum is that women should be encouraged to speak up and take the first step by making an official complaint. The implication is that once the system is activated, justice is sure to be delivered. That the path of legal remedy is not so straightforward for women is demonstrated by a study of over 4 lakh FIRs in Haryana, published recently in the American Political Science Review. It has found that not only are cases of violence against women, in which women are the primary complainants, less likely to be registered and more likely to be dismissed in court or result in acquittals, a gender bias is visible even in other types of cases, from registration to prosecution, resulting in, what the researchers call, "multi-stage" discrimination.

The revelation that women complainants are at a greater disadvantage is, of course, not entirely surprising. Reports and anecdotal evidence have long shown that complaints by women — not just in Haryana, but across India — are less likely to be taken seriously at the level of the police station. Women are made to wait longer and are frequently "counselled" to withdraw complaints. The inequality persists at every level of the legal process, shored up by the sentiment, often publicly expressed, that women tend to exaggerate their complaints or misuse the law. Consider the recent comment by the Madhya Pradesh High Court in Rajan v. The State of Madhya Pradesh, about the "misuse" of Section 498A (cruelty to women) of the Indian Penal Code — wives these days file "a package of five cases" against their husbands and in-laws. Or the Calcutta High Court's observation in August in Swapan Kumar Das v State of West Bengal, that Section 498A is used by women to unleash "legal terrorism". As the data from the study shows, not only do such pronouncements have no basis in fact, they further discourage women from seeking justice.

That one half of the population faces such odds not only in the quest for justice, but simply to be heard should cause disquiet. It's not enough to find procedural solutions such as more all-women police stations and fast track courts. Increasing the number of women in the police force — presently at an abysmal 11.7 per cent, as shared by MoS for Home Affairs Nityanand Rai in the

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Rajya Sabha earlier this year — should be prioritised, as should greater sensitisation and training at every level of the system, from the thana to the bench.

POLL TIMING

The Union government's move to extend the free foodgrains scheme for the next five years is welcome as it will continue to provide food security to large sections of vulnerable people. Based on National Food Security Act (NFSA) entitlements, the scheme, the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY), benefits about 80.4 crore people, under the categories of Antyodaya Anna Yojana (poorest of the poor) and priority households. They will continue to receive five kg of rice or wheat or coarse grains a person every month. The provision of free foodgrains was introduced at the all-India level during the COVID-19 pandemic, though in vogue in States such as Tamil Nadu. At the time, the entitlements of NFSA beneficiaries were doubled and the nomenclature of PMGKAY was affixed. Between April 2020 and December 2022, 1,015 lakh tonnes were distributed at a subsidy of ₹3.45 lakh crore. At the end of 2022, the Centre announced free grains under the normal entitlements to States and Union Territories for a year while discontinuing the enhanced entitlement.

On the flip side, the way in which the latest move is sought to be implemented raises questions. At an election rally last week in Durg, Chhattisgarh, Prime Minister Narendra Modi made the announcement, which should be viewed as a violation of the model code of conduct as Mr. Modi used his official position to talk about the extension of the scheme (due to lapse at the end of next month). There was no urgency on his part to have made the announcement then, and in an election rally, especially when there was sufficient time to do so even after the declaration of results, scheduled for December 3. The purpose seems to have been to impress voters, and reap political dividends. There is a view linking the PMGKAY's previous avatar to the Bharatiya Janata Party's victory in the 2022 Assembly election in Uttar Pradesh. Even the Congress, which criticised the announcement as an "indication of the continuing economic distress and growing inequalities," did not find anything amiss. The scheme is meant for the entire country and not just the five States facing elections — they account for roughly 17% of the total beneficiaries. On the fiscal front, the extension may not cause serious problems as the food subsidy bill is about 7.5% of the revenue receipts of the Union government. On an average, the economic cost of rice and wheat grew by 5.7% annually over the last seven years. Also, the extension will cost about ₹15,000 crore more each year, which is manageable. However, governments, Centre and States, should ensure the elimination of leakages in the Public Distribution System so that the benefits of the extension go to the deserving.

OVER THE TOP

The alacrity with which the Lok Sabha Ethics Committee went about recommending the expulsion of Trinamool Congress Member of Parliament (MP) Mahua Moitra from the lower House is certainly not a sign of any fidelity to ethics, or fairness. The recommendation is a brazenly partisan attempt to silence a critic of the government. It is also a warning shot meant to intimidate MPs from doing their job of holding the executive accountable. Neither the process nor the conclusions of the committee are grounded in any decipherable principle. The committee, with the help of the Ministry of Electronics and Information Technology found that the MP's credentials were used online from Dubai 47 times to access the Parliament portal. Parliamentary questions were submitted from abroad. As Opposition members in the committee have pointed out, the drafting and the submission of questions are routinely done by aides of MPs. And MPs raise questions in

Parliament based on representations from various constituents. To assume without solid evidence that any question is in exchange of material favours and then to expel an elected MP, is an assault on parliamentary democracy itself. The committee is calling upon the government to investigate the allegation of 'quid pro quo' raised by one of its members against Ms. Moitra, after holding her guilty, turning the principle of natural justice on its head.

If MPs are barred from sharing their login credentials with others, the rule must equally apply to one and all. Now that the committee has taken this extreme step of calling for the expulsion of an elected member from the House, thereby depriving the voters of her constituency representation, it should also investigate how other MPs prepare and submit parliamentary questions. The selective investigation of one MP, based on insinuations and conjectures, clearly comes out as what it is — intimidation. It is also in stark contrast with the tardy response of the Lok Sabha Committee of Privileges to a serious complaint against Bharatiya Janata Party MP Ramesh Bidhuri who used derogatory communal slurs against a fellow member in the Lok Sabha. That a member can abuse and threaten another member on the floor of the House is a matter of serious concern. That said, Ms. Moitra's act of allowing a person who is not employed by her to execute official work on her behalf betrays a lack of discretion and judgement. This should act as a lesson for all those who seek to hold the government accountable: to keep themselves beyond reproach.

REVIEWING FREEDOM

An ongoing case before the Kerala High Court on restricting negative reviews of films in the first few days of their release constitutes an interesting as well as challenging free speech issue. The court has taken on the task of distinguishing genuine film criticism from attempts to destroy a movie's prospects of success through malicious comments, or by threatening to post negative reviews with a view to extorting money. It appears that the court is aware of the implications of any move to restrict or curb disparaging reviews for free speech and freedom of expression, but it remains to be seen how it will be able to balance the commercial interests of film-makers and the freedom of reviewers. Film director Mubeen Rauf had approached the court for a direction to the Information and Broadcasting Ministry and the State Information Technology Department, among others, to ensure that social media influencers and film reviewing vloggers do not publish any reviews of his film Aromalinte Adyathe Pranayam in social media for at least seven days from the date of its release. Remarks and observations made so far in interlocutory orders suggest that the court's focus is mainly on those who either post anonymously or vloggers with unknown credentials who trash films within hours of their release with apparently malicious intent, and do not threaten the freedom of film reviewers with acknowledged expertise and experience.

In an order on October 25, Justice Devan Ramachandran directed that "a close watch on the online platforms shall be maintained, to ensure that anonymous mala fide content is not allowed to circulate; and necessary action under the provisions of the "IT Act" [Information Technology Act] shall be taken and implemented scrupulously without delay". Interestingly, the order also notes that apparently due to the very pendency of these proceedings, the film made by the petitioner had a good run at the box office as it was spared "review bombing", the term that has gained currency for the phenomenon of deliberate spoiling of a film's prospects. The Union government is expected to file its response soon, but a word of caution will be in order. The court's observation in its latest order that the freedom of those involved in making a film should not be sacrificed at the altar of the "unbridled freedom of expression" of those acting under the impression that they are not governed by any parameters or regulations should not lead to a verdict either curbing the

freedom to critically analyse a film or an attempt to restrict the art of criticism. After all, making and reviewing a film are both two aspects of the same right to free speech.

WHAT HAS LED TO THE MARATHA QUOTA AGITATION?

The story so far:

Since late August this year, 41-year-old Maratha quota activist Manoj Jarange-Patil hailing from Maharashtra's drought-prone Marathwada region, has brought the Eknath Shinde government to its knees by demanding a blanket reservation in education and government jobs for all Marathas in the State. Mr. Jarange-Patil withdrew his second hunger fast on November 2 after a government delegation convinced him to grant them more time (till January 2, 2024) to complete the process of granting reservation to the Marathas by giving them Other Backward Class (OBC) certificates and including them in the OBC Kunbi category.

How did it come about?

The immediate trigger for a renascent Maratha quota agitation was a violent fracas on September 1 between protesters and police in the Antarwali Sarati village in Jalna district (400 km from Mumbai), where Mr. Jarange-Patil, hitherto unknown, had been protesting since August 29. The police accused the protestors of starting the violence by pelting stones on security personnel while the agitators claimed that the police had carried out an unwarranted lathi-charge on them, causing grievous injuries.

The issue became swiftly politicised, and despite public apologies by Deputy Chief Minister Devendra Fadnavis and Mr. Shinde, Mr. Jarange-Patil went on an indefinite hunger strike, giving up even drinking water. The activist finally, after Mr. Shinde's repeated cajoling, called off the strike on September 14, by giving the government a 40-day deadline to complete the process for all Marathas to be treated as members of the OBC Kunbi community. The CM announced the setting up of a five-member committee under Justice (retd.) Sandeep Shinde to determine the Standard Operating Procedure (SOP) for giving OBC certificates to the Marathas.

However, on the expiry of the deadline on October 24, Mr. Jarange-Patil started his second hunger strike. He declared that all politicians be banned from entering villages until the Marathas got their quota.

WOMEN IN RED

Only in an 'unseeing' world would the judiciary need to set the government a deadline to do the obvious. The Supreme Court of India gave the Centre four weeks to finalise an optimum menstrual hygiene policy with focus on the distribution of sanitary napkins. The Chief Justice of India, D.Y. Chandrachud, further directed the government to set down a national model for the number of girls toilets per female population across government-aided and residential schools in the country. Menstruation is the reality for women of a particular age demographic, naturally involving a substantial percentage of half the population in the country. It is only now, over three quarters of a century after Independence, that India has come closest to even drawing up a menstrual hygiene policy. While advancements over the years, and expanding urbanisation, have brought menstrual hygiene products within reach of a larger group of young women, affordability is still an issue; access hurdles stand in the way of a wide swathe of women in semi-urban and rural areas. The evidence for this is apodictic: as per the latest National Family Health Survey-5

(NFHS), 73% of rural women and 90% of urban women use a hygienic method of menstrual protection. There was a significant improvement in the percentage of women aged 15-24 who use a hygienic method of protection during their menstrual cycle, this rose from 58% in NFHS-4 to 78% in NFHS-5, primarily sanitary napkins, cloth and locally prepared napkins. The survey also revealed the close link between education and preference for hygiene — women who have received 12 or more years of schooling are more than twice as likely to use a hygienic method compared to those with no schooling. An irrefutable link has been established between menstruation and dropping out of school, because of stigma, and patchy or no access to sanitation (in terms of access to products, toilets and water). That little has been done to address this all these years reeks of callousness.

The Centre told the Court that a draft policy had been circulated for comments from various stakeholders and that it would be ready in four weeks. A policy is only half a revolution; to complete the circle, it is crucial the government ensures access to affordable menstrual hygiene products for all menstruating girls, but also clean toilets and water wherever the women may need them. Besides, the policy should also cater to the entire lifecycle of menstruation, providing for the entire range of health and social sequelae that result from it. The government must see, cognise, and commit to serve India's women.

A HANDBOOK FOR NITISH KUMAR POPULATION CONTROL: WORTHY CAUSE, UNBECOMING WORDS

Bihar Chief Minister Nitish Kumar's remarks about population control on Tuesday, made while speaking about the caste survey report in the state Assembly, are a disheartening reminder that when it comes to gender rights, the Indian political space, even today, hasn't evolved the vocabulary for its discourse. No doubt the CM was making an important point when he drew a link between the education of women and their empowerment through reproductive autonomy as an important step towards population control. But the CM undermined his message by using crudely graphic language that, additionally, suggested an unscientific method of family planning and seemed to place the burden of responsibility on women. This from a leader, who through policies like the 2006 Mukhyamantri Balika Cycle Yojana — and even the controversial 2016 prohibition law that many women welcomed — is arguably one of the first Indian politicians to recognise that empowering women is the right thing to do — and it's also good politics.

Even as the national conversation on women's representation in the public space has made encouraging progress — evidenced, for example, in the near-unanimous support for the Women's Reservation Bill in the special session of Parliament in September — the continued use of sexist language in the political sphere is disheartening. Also disappointing is a tendency towards dismissiveness when objections are raised to such language — in the present instance, Bihar Deputy Chief Minister Tejashwi Yadav shrugged off the row as indicative of people's "hesitancy" over the topic of sex education. It reveals an insensitivity to issues of gender, adding to the hostility that women in politics already struggle against and undercuts efforts to level the playing field. Nothing blurs party lines like misogyny — as seen in the examples of women leaders, from J Jayalalitha to Renuka Chowdhury, Mamata Banerjee to Mayawati and Smriti Irani, who have been subjected to demeaning language, both inside and outside the House.

While he has apologised and retracted his remarks following an uproar, the Bihar CM needs to do more. Perhaps, he can start by asking his office to get a copy of the 30-page handbook on combating gender stereotypes issued by the Supreme Court. It has a rich range of examples of how

sexist and crude references to women are such a seamless part of daily discourse and why that needs to change. Because words matter and, as the handbook, issued by Chief Justice of India D Y Chandrachud, says, stereotypical language "may reinforce ideas contrary to our constitutional ethos" because words transmit the "ultimate intention of the lawmaker or the judge to the nation." That's why Nitish Kumar should reflect on his mistake and reframe his speech. That will be bold — and salutary.

UNENDING ORDEAL

Multiple pieces of legislation and regulations prohibiting ragging on campuses have failed to end the dehumanising ordeals junior students are subjected to by their sadistic seniors. Nearly three months after a 17-year-old boy died due to ragging in West Bengal's Jadavpur University, a second-year undergraduate student of the PSG College of Technology in Tamil Nadu has been left brutalised, physically and mentally, for refusing to yield to monetary extortion by his seniors. Both States were among the earliest to enact legislation banning ragging. That students undergo such traumatic experiences despite civil society being rudely awakened by spine-chilling cases of brutalisation and even the murder of victims of ragging, exposes the gaps in the system that allow a vicious cycle where victims one year become perpetrators the next. From bullying and harassing freshers to ensure subservience to seniors, acts of ragging have taken perverse and cruel forms, including through sexual abuse, intended to dehumanise victims. An act of indiscipline has evolved into one that involves elements of criminality. While unlike earlier, ragging is no longer a given on campuses, it is evident that victims are not just the freshers and the harassment extends beyond the initial months of a new academic year, as seen above.

The Supreme Court-appointed R.K. Raghavan Committee had captured the causes, and suggested actionable remedies, in its 2007 report, 'The Menace of Ragging in Educational Institutions and Measures to Curb It'. The panel rightly categorised ragging as a form of "psychopathic behaviour and a reflection of deviant personalities". In 1999, a University Grants Commission (UGC) Committee had recommended a "Prohibition, Prevention and Punishment" approach to curb ragging. Yet, as the Raghavan Committee pointed out, many State laws only seek to prohibit, and not prevent, ragging. In its words, "while prevention must lead to prohibition, the reverse need not be true." Despite 'The UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions 2009', except for formalities such as conducting freshers' parties, mandating undertakings from students and parents against indulging in ragging, and putting up 'no-ragging' notices, the stakeholders have done little to prevent it. Institutions must create an encouraging atmosphere where teachers and hostel wardens, and not parents living in a distant place, are the first point of contact for victims. There must be greater accountability by educational institutions to prevent ragging. As the Raghavan panel recommended, regulatory authorities must ensure a ragging-free campus. This has a direct bearing on the maintenance of academic standards in individual institutions. Governments too must be earnest in implementing regulations, failing which campuses would not be safe for students.

WHO GOES TO KOTA'S COACHING CLASSES AND WHY

It is a sad comment on India's education system and its employment scene that there are more and more coaching centres than colleges and universities nowadays. Some cities, such as Kota in Rajasthan, are in fact synonymous with their coaching centres, which are known to ensure that their students perform well in the various entrance examinations for professional courses.

However, of late, Kota has been in the headlines for the wrong reasons as rising student suicides have shifted focus to the mismatch between aspirations and opportunities. While Kota is not the only city known for its coaching centre, we attempt in this study to look at it as a case study to throw light on the question of why students choose to go to such centres and what they negotiate during their preparations for various exams.

With this objective, Lokniti-Centre for the Study of Developing Societies (CSDS) conducted a survey of more than 1,000 students between the first and second week of October 2023. Thirty per cent of the sample consisted of girl students. The survey was conducted face-to-face using a structured questionnaire in Hindi. Each interview took 15-20 minutes to be completed. This is the first data point of a three-part series on Kota.

A majority of students who study in Kota's coaching centres come from Bihar (32%), Uttar Pradesh (23%), Rajasthan (18%), and Madhya Pradesh (11%). Nearly half of them belong to cities and small towns; only 14% come from villages. Mostly, they have a middle class background. The primary earners of their families are engaged mainly in government service (27%), business (21%), and agriculture (14%).

Thirteen per cent of the students studying in Kota have immediate family members who studied in Kota, while 28% have extended relatives who did so. These students mainly heard of Kota from these relatives. More than half the students (53%) do not have relatives who studied in Kota earlier. Forty-four per cent of the students said that they came to know about the town's institutes through social media. Nearly half the students (46%) moved to Kota because of the reputation of its coaching centres, 39% moved to the town on the insistence of their parents, and 10% were influenced by friends who were going to Kota.

The majority of students at Kota are boys, only 37% are girls. Given that students are usually expected to appear for entrance exams after higher secondary education, most students are aged 15-19 years.

NEET, the entrance test for admission to medical colleges, appears to have the most takers among Kota's students with 59% going to coaching centres in the town to prepare for it. Of them, 76% are girls. The other popular choice is JEE, the test for admission into engineering programmes, with 35% preparing for it. This test is more popular among the boys with 46% preparing for it compared with 16% girls.

Most students who do not manage to clear JEE or NEET in their first attempt move out. Close to half the students (49%) will be appearing in these entrance exams for the first time. In contrast, 26% continue to be in Kota after their first attempt. That number comes down further to 13% with regard to those who have already made two attempts.

A good number of students (29%) were also enrolled in other coaching centres before deciding to move to Kota. It is safe to say that students often choose to move because they were not satisfied with their exam performance. Among those who will be making their first attempt, only 23% undertook coaching elsewhere before moving to Kota. That figure climbs to 39% with regard to those who have already sat for the exam twice.

Besides preparing for these exams at coaching centres, students also need to be enrolled in a school to clear their board examinations. Clearing the board exam is a mandatory condition for becoming eligible to appear in entrance exams. Among those who are enrolled, only 16% go to regular school. A staggering 81% of coaching centre students are instead enrolled in 'dummy

schools'. These 'schools' do not require them to attend regular classes; they merely enable them to satisfy the requirement of sitting for board examinations.

While carrying out their exam preparation in Kota, a majority (49%) of the students live in hostels and 30% live as paying guests. While these are the most common choices of accommodation among students, a smaller number of them (17%) also rent apartments. Living conditions in these accommodations vary. With regard to the quality of food served in hostels and paying guest accommodations across Kota, only 12% students said it is very good; 27% said they do not like it and 57% said the food was passable.

Despite all these challenges, year after year, a large number of students move to Kota, join one of its many coaching centres, enrol in 'dummy schools', and find accommodation. Most of them often put up with barely passable living conditions. What makes them go through all this is? The majority of the students (65%) consider clearing JEE or NEET exams to be extremely important. They see these exams as a means to a better life. Thirty-five per cent feel that clearing JEE or NEET will help them settle down well in life, 22% believe that their respect in society will increase, and 16% hope that their economic condition will improve.

THE STRESSFUL LIVES OF STUDENTS IN KOTA

A typical image that people have of Kota is of students preparing for various entrance exams at one of its many coaching centres. Many think that the mentoring provided by these institutes goes a long way in helping students secure a place in top ranking engineering and medical colleges. It is perhaps because of this expectation and hope that an overwhelming 85% of students studying in Kota spend as long as six to seven hours in coaching centres every day. This was one of the findings of a study conducted by Lokniti-Centre for the Study of Developing Societies (CSDS) to understand the rigours of student life in Kota. This is the second data point of a three-part series. The first, titled 'Who goes to Kota's coaching classes and why', was published on November 6.

The amount of time that students spend in coaching centres appears to be determined by the exam for which they are preparing. Among students appearing for JEE and NEET, over 80% reported that they spend six to seven hours daily at the coaching centre. Compare this to the 63% of students who spent as many hours studying for other exams.

Apart from attending classes, students also need to go to their coaching centres in order to appear for tests that are frequently conducted. With the goal of tracking students' performance, most coaching centres hold at least one test every week. This has the potential of putting further pressure on them. However, more than half (54%) of the students in Kota said that these weekly tests are helpful for their preparations. One of every 10 students said they find weekly tests stressful and three of every 10 said that the time between tests should be longer than seven days. To get some respite from such a hectic schedule, more than eight of every 10 students therefore felt that coaching centres should set one day every week for leisure activities.

For those studying in Kota's coaching centres, the continuous cycle of classes and tests becomes a part of their life for an extensive period of time. At the time of this study, one-third of the students had been in Kota for about a year while another one-fourth for two years. A little over one-third of them said that they feel homesick often, while close to half said that they feel homesick from time to time. Along with this, 19% of students admitted that they do not have friends in Kota with whom they can share their feelings when they feel low or demotivated. What is nonetheless heartening is that the majority of them have managed to find close friends after shifting to Kota.

During their time in Kota, only two of every 10 students said that they share accommodation with friends. An even lower number said that they stay with parents or siblings. Close to two-thirds of students live alone. The choice of living alone is most likely driven by a desire to have an environment where they can study with few distractions. Students who need to attempt more than once to clear their exams perhaps feel the need to have such a living space even more acutely. This could be the reason why among those who already sat for the exam once, 67% live alone. That figure climbs to 71% with regard to students who have made two attempts. In comparison, 63% live alone from among students who are yet to sit for the exam.

Beside living alone and following a tight academic schedule, students also face discrimination of various kinds. This can significantly add to the pressure that students already feel owing to the expectation and desire to perform well. A considerable number of them complained about improper behaviour meted out to them due to their caste (21%) and economic situation (26%). Religious identity has been a source of discrimination for 17% of students. Out of them, just over one in five are Hindus while 34% are Muslims. What is more alarming is that nearly half the students (47%) said that they face discrimination over their academic performance.

In order to divert their attention from the daily pressure of classes and exams, the majority of the students (68%) talk to their families. Many tend to use social media or meet friends. Less than half (46%) said that they watch movies or listen to music every day. Only 26% turn to mediation or physical exercise to balance their daily study routine. An even smaller number take to reading that is not related to their syllabus. Fewer students are indulging in these activities not because they are disinterested, but perhaps because they just do not find the time.

Living for long under such a strict regime brings about significant lifestyle changes. Given the routine that they have to follow, the majority of students (50%) have started going to bed later since moving to Kota. At the same time, 32% said that they have started waking up earlier than they used to. They use the time gained from sleeping less to study more. Fifty-nine per cent of students now dedicate more time for self-study than they did before. As opposed to 23% whose meal intake has increased, nearly half the students (47%) said that they have started eating less after shifting to Kota. Thus, life at Kota is stressful and marked by considerable loneliness.

ONLY 3% OF KOTA'S STUDENTS HAVE VISITED A MENTAL HEALTH PROFESSIONAL

According to the National Crime Records Bureau, the share of students who died by suicide in India in 2021 was 8% of the total number of deaths by suicide. While a number of reasons push students towards this extreme step, one major reason is academic pressure.

It is relevant to record that 25 students have already taken their lives this year in Kota, one of India's largest coaching hubs, which prepares students for the NEET and JEE exams. This is the highest number of student suicides that the town in Rajasthan has seen. What is also deeply concerning is that among those who are currently studying in Kota, 7% have considered ending their life at least once. This was one of the findings of a study conducted recently by Lokniti-CSDS to understand, among other things, the impact of students' anxieties on their mental health. This is the final data point of the three-part sseries on students in Kota.

Different kinds of pressures

According to our findings, many students think that clearing the NEET or JEE exams is crucial for securing a better life. While this belief pushes aspirants to study hard, the possibility of their not

clearing these exams does impact their mental health. This is perhaps why close to two in every 10 students studying in Kota often suffer from thoughts linked to the potential consequences of under-performing in exams. Over one-third experience such thoughts sometimes, while two of every 10 said that they do so rarely.

Those around these students also contribute to such anxieties. Nearly one in 10 students experiences parental pressure often while in Kota. Another one-fourth go through this from time to time. The number of girls who experience this pressure is slightly higher than the number of boys. Students with immediate family members who studied in Kota before them also face this pressure more: 9% said that they are often subjected to such pressures and 29% said that they experience it sometimes. Among those who do not have such relatives, 6% often face family pressure and one-fourth face it sometimes.

Finances can be a source of stress too: 6% often feel financial pressure while another one-fourth feel the pressure sometimes. A heightened sense of competition also affects students at times: 4% said that they often experience peer pressure and another two in every 10 said that they experience it from time to time.

With all these pressures, students may feel that the people around them are unable to relate to them. This could push them to retreat into a shell. This perhaps explains why 53% of students in Kota experience loneliness from time to time.

All these pressures take a heavy toll on students. Nearly half (46%) of them feel stressed from time to time while 12% reported feeling stressed often.

Coping mechanisms

Students try to cope with these pressures in various ways. Nearly half of them (49%) talk to their family and friends when they are extremely stressed. This shows that family and friends can very well be a source of comfort to students. Four in 10 watch online videos, television, or listen to music to relax. Over three in 10 take a stroll, exercise, or meditate to combat stress. Close to half the students (46%) choose to sleep when they feel stressed. However, there is more to this habit: of them, 16% use sleep-related medication from time to time.

Some students also try to cope with stress in ways which can prove detrimental. Among them, 13% resume studying when they are stressed. While this might help them deal with the immediate anxiety of being unprepared for an exam, it could be counterproductive in the long run. There are also 5% who turn to smoking and 2% who drink to fight stress.

Impact on mental health

All this shows that the conditions in Kota do not seem favourable for the well-being of students. Close to three in 10 feel that their mental health has deteriorated after starting coaching classes. More than four in every 10 feel more fatigued after moving to Kota to study. Of them, 45% are girls. Around three in 10 feel that they are more nervous, lonely, moody and depressed in recent times. Three in every ten (29%) feel that their anger has increased and a little over one-fourth (26%) said that they experience various types of body pain. Around two in every 10 also feel that they are more frustrated, fearful and sad after shifting to Kota. It is also noteworthy that compared to boys, a much higher number of girls said that they have experienced a rise in a majority of these symptoms.

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Despite exhibiting symptoms of poor mental well-being, only 3% of students said that they have visited a mental health professional. Close to half (48%) do not even feel the need to undertake such a visit. This indicates that more proactive efforts are needed to make young people understand the importance of going to a mental health specialist.

These data underline the need to have a more institutionalised counselling mechanism in coaching centres specifically and in Kota more generally.

WAITING FOR 'GOD'S KINGDOM'

The members of the Jehovah's Witnesses group say they do their best to "imitate" Jesus Christ and is proud to be called Christians. They worship the creator, "whose name is Jehovah" and recognise the Bible as "God's inspired message to humans". However, they do not venerate the cross or any other images. According to the official website of the sect, they are known as Jehovah's Witnesses as they "witness, or talk, about Jehovah God and his Kingdom". The sect has come under the lens of several governments for their refusal to abide by certain laws.

Though the group say it respected governments and their national symbols, it stayed away from participating in such ceremonies on biblical grounds. They do not accept blood transfusions stating that "both the Old and New Testaments clearly command us to abstain from blood". The Witnesses believe that Armageddon is imminent and early establishment of God's kingdom will prevail soon.

Evangelical work

Various Christian denominations do not consider them as a Christian sect while mostly terming them a "cult" aligned closer to the Jewish faith. The group does not approve of traditional priesthood. They do not celebrate Christmas because of its "pagan origins". They are best known for their door-to-door evangelical work and they have no political affiliations. The Jehovah's Witnesses had faced persecution under the Nazis.

The group's practice of abstaining from singing the National Anthem had its reverberations in Kerala when the management of a school in Kidangoor, Kottayam district expelled three children on July 26, 1986 on the ground that they refused to recite the National Anthem during the morning assemblies. The late V.J. Immanuel, their father and a retired college teacher, who was an ardent preacher of the sect, challenged the decision before the Supreme Court, which found that their expulsion was in violation Articles 19 and 25 of the Constitution. In India, Jehovah's Witnesses has been present since 1905. Though it established an office in 1926 in Mumbai, the legal registration was obtained only in 1978.

The group, which has its headquarters in Warwick, New York, says it has around 8.6 million followers worldwide. In India, there are over 57,000 members, while the headcount of followers in Kerala is around 15,000. It had hit the headlines in March this year after a 35-year-old suspect, believed to be a former member, opened fire at a Jehovah's centre in Hamburg, Germany killing seven people. The members say they do not engage in forcible conversion as every individual has the right to accept their message or reject it. They have left it to the public to decide on what they called allegations by persons, who have no remorse in killing innocent people over their teachings and practices.

HOW THE PERSONAL DATA OF 815 MILLION INDIANS GOT BREACHED

The story so far:

On October 15, Resecurity, an American cyber security company, said that personally identifiable information of 815 million Indian citizens, including Aadhaar numbers and passport details, were being sold on the dark web. Threat actors were willing to sell the data for $80,000, the company said in a blog post. It further said that the data on sale was found to be valid. The threat actors selling the data claimed it was sourced from the Indian Council of Medical Research (ICMR), which has been subjected to numerous cyber-attack attempts with 6,000 incidents being reported last year alone.

What is the nature of the Personally Identifiable Information?

Personally Identifiable Information or PII is information that when used alone or with other relevant data, can identify an individual. PII may be direct identifiers like passport information or quasi-identifiers that can be combined with other information to successfully recognise an individual. The data being sold on the dark web included one's Aadhaar number, a unique 12-digit individual identification number issued by the Unique Identification Authority of India (UIDAI) on behalf of the Indian government. This data was being sold by a threat actor going by the name pwn0001.

However, another threat actor by the name of "Lucius" also claimed to have access to a more extensive array of PII data which included voter IDs and driving licence records.

How did such actors gain access to sensitive data?

Threat actors selling stolen data on the dark web declined to specify how they obtained the data without which any effort to identify the source of the data leak would be speculative. Lucius, the second threat actor found selling data online claimed to have access to a 1.8 terabyte data leak impacting an unnamed "India internal law enforcement agency". However, the claim is yet to be authenticated.

India's junior IT minister Rajeev Chandrasekhar shared that the country's Computer Emergency Response Team is investigating reports of the data leak, and that the government is still working on moving massive amounts of data, including legacy data collected over the past decades, to a safe storage. However, he did not confirm or comment on the size of the alleged leak.

Data samples observed by researchers contain multiple references to UIDAI and Aadhaar cards, as well as voter ID cards. It is also possible that threat actors successfully breached a third-party aggregating these details.

How secure is our PII data?

While the government of India has often denied allegations of biometric data leak from Aadhaar in the past, Mr. Chandrasekhar said the government ecosystem will take time to transition to a bullet proof set-up, one which manages data and keeps it in a safe and responsible manner. He further said that Aadhaar data leaks were also reported in 2018, 2019, and 2022, with three instances of large-scale leaks being reported, including one in which farmer's data stored on the PM Kisan website was made available on the dark web.

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Earlier this year, reports emerged that a bot on the messaging platform Telegram was returning personal data of Indian citizens who registered with the COVID-19 vaccine intelligence network (CoWIN) portal.

At the time, the Health Ministry denied reports of a data breach and said that allegations were "mischievous in nature and that CERT-In was reviewing the existing security infrastructure of the portal."

However, UIDAI on its website says all Aadhaar holders' data is safe and secure in the Central Identities Data Repository (CIDR) of UIDAI and that they have never been breached in all its years of existence. It further adds that UIDAI uses advanced security technologies to keep data safe and keeps upgrading them to meet emerging security threats and challenges.

What are the threats arising from the leaked information?

India being one of the fastest growing economies of the world, ranked fourth globally in all malware detection in the first half of 2023, according to a survey from Resecurity. A separate vendor survey of 200 Indian IT decision makers published in September produced similar findings where 45% of Indian businesses said they experienced more than a 50% rise in disruptive cyberattacks last year. The report also found that 67% of Indian government and essential services organisations experienced over a 50% increase in disruptive cyberattacks.

The unrest in West Asia and increase in attacks by threat actors capitalising on the chaos exposed personally identifiable data significantly, increasing the risk of digital identity theft. Threat actors leverage stolen identity information to commit online-banking theft, tax frauds, and other cyber-enabled financial crimes.

A significant spike in incidents involving Aadhaar IDs and their leakage on underground cybercriminal forums by threat actors are looking to harm Indian national and residents, Resecurity said in a blog post.

What can users do to safeguard their personal information?

Users should try to ascertain if their information was leaked in the data leak. Users should also be alert and approach emails for unknown sources with caution as stolen information may be used to target users in phishing campaigns.

It is also advised to change existing user IDs and passwords to ensure that stolen data cannot be used for launching brute force attacks.

Users should also implement two-factor authentication for all their accounts and inform the concerned authorities in case they notice any suspicious activity in their online accounts.

A TELCO DOUBLE DIP ATTEMPT THAT THREATENS NET NEUTRALITY

In July this year, the Telecom Regulatory Authority of India (TRAI), at the request of the government, invited a comprehensive consultation on the need and possible mechanisms for regulation of Over-The-Top (OTT) services. It seems to have stirred up a hornet's nest.

For more than a decade now, telecom companies have seen revenue from traditional streams such as voice calls and Short Message Service (SMS) come under pressure, as competing OTT services are often free. At the same time, they have had to invest heavily in upgrading their infrastructure

to handle increased data traffic, without necessarily seeing an equivalent rise in revenue. It is also their lament that OTT services are not subject to the same level of taxation and licensing fees, leading to an uneven playing field.

On the flip side, the use of OTT services has led to a surge in data consumption, which is a growing revenue stream for telecom companies.

Flawed argument that affects net neutrality

The OTT consultation has renewed the clamour from the telecom companies that content providers such as Netflix, Amazon Prime, and Disney+ Hotstar be asked to share in the costs of bandwidth. They argue that streaming platforms are free riders, benefiting from the infrastructure built and maintained by the telecom companies. However, this argument is fundamentally flawed and sets a dangerous precedent that undermines the principle of net neutrality.

Telecom companies do not own the Internet; rather, they provide access to it. Consumers pay the telcos for access services by purchasing data plans. By offering services that consumers desire, OTT platforms generate demand for Internet access. They also pay for the content delivery networks (CDNs) to create pathways that substantially augment the capacity of the internet to deliver their content.

Telecom companies capitalise on this demand (and the availability of OTT content) by providing connectivity to the Internet and charging subscribers for it. If they fail to cover costs, telecom companies are at liberty to increase their prices, which should go towards maintaining and upgrading their infrastructure.

One of the requirements for the operation of a fair market is that the costs and benefits of a transaction are fully accounted for in the exchange price. Therefore, any attempt to seek cross-subsidies instead of fully accounting for the costs could warrant scrutiny from the Competition Commission.

OTT services compete in their own market on the basis of variety and quality of content, the quality of streaming (such as, support for HD or better resolution or 5.1 surround sound), ease in navigation and discovery of content, and its availability on multiple devices. The consumers pay the price for these benefits as compared to the alternatives.

Similarly, in the marketplace for Internet access, the consumers are free to choose the provider that offers them the highest bandwidth, data volume, and reliability at an affordable price. These are distinct markets because services from one are not substitutable for services in the other. Therefore, it is logical to maintain a separation of costs between these two markets.

The attempt of telcos to double dip by charging both consumers and content providers is not only avaricious but also undermines net neutrality, as stated above. To better comprehend the fallacy in telcos' demand, let us employ an analogy.

Imagine a toll plaza where specific brands or models of vehicles are charged an additional tax, directly payable by the manufacturers, because they make "popular vehicles that tend to cause congestion". If owners of all vehicles pay the regular toll, the more popular vehicles as a category contribute a proportionally higher amount. There is no need for their manufacturers to contribute extra. On the other hand, an additional toll directly collected from the manufacturers would push up the price of popular cars for their buyers, making them less attractive.

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Likewise, if OTT platforms were to acquiesce to the demands of the telcos, the incurred costs would trickle down to subscribers, either through increased subscription fees or degraded service quality for those platforms unwilling or unable to pay the toll. This outcome can only be detrimental to consumers who have come to rely on OTT services for entertainment, education, and professional pursuits.

The principle

Net neutrality is the principle that Internet access providers must treat all traffic originating from and terminating to the Internet in the same way. The idea has been developed over time, but its modern articulation may be largely credited to Columbia Law School professor Tim Wu, who coined the term "net neutrality" in a 2003 paper titled "Network Neutrality, Broadband Discrimination." Here, Wu proposed the concept of net neutrality to promote an even playing field on the Internet, ensuring that all data is treated equally without discrimination by Internet service providers (ISPs).

Net neutrality draws from earlier notions and principles concerning common carriage, which posit that service to all customers must be provided on a non-discriminatory basis. The application of these principles to the modern Internet, with its unique technical and economic characteristics, required fresh legal and policy analysis, which Wu and others provided.

This principle that has been examined by economists (from the perspective of market competition, consumer welfare, and innovation); by legal experts (for the regulatory frameworks that govern net neutrality, and how these laws impact the rights and obligations of Internet service providers, content providers, and consumers); computer scientists and engineers (for detection and enforcement mechanisms that are technology based); and other policy analysts on how it affects different social groups, their political expression, and how it impacts fairness, justice, and equality.

Basis of TRAI regulation

Net neutrality formed the basis of TRAI's regulation on prohibition of discriminatory tariffs for data services brought out on February 8, 2016. The regulator's action forced the withdrawal of Facebook's Free Basics platform and some other offerings in India. Later, on November 28, 2017, TRAI released its comprehensive recommendations, which have largely guided the adoption of this principle in India.

These steps taken by TRAI were noted elsewhere in the world. The Body of European Regulators for Electronic Communications (BEREC) and TRAI adopted a Joint Statement for an Open Internet on June 14, 2018, later reaffirmed in 2020. The two organisations agreed through this memorandum of understanding to cooperate in developing technological and policy initiatives for net neutrality. Many other countries have also adopted net neutrality, thereafter.

It is imperative for all stakeholders, including policymakers, to recognise the long-term ramifications of acquiescing to the short-sighted demands of telecom companies. Upholding the principles of net neutrality is not merely about preserving the ethos of an open Internet but is also intrinsic to fostering a conducive environment for innovation, competition, and consumer welfare, especially countries such as India where the Internet is going to be the carrier of all Digital Public Infrastructure (DPI).

AADHAAR AUTHENTICATION CONTINUES TO FACE GLITCHES

In 2023, Aadhaar authentication services, vital to the world's largest identity platform, experienced significant disruptions totalling over 54 hours. These interruptions were revealed in a Right to Information (RTI) response to The Hindu by the Unique Identification Authority of India (UIDAI). Users faced delays in receiving one-time passcodes (OTPs) via SMS and encountered intermittent and minor fluctuations in authentication services.

Aadhaar, a 12-digit identifier issued to Indian residents, is essential for accessing various services, including ration items and government services. Authentication typically requires a fingerprint scan or an SMS passcode. Despite its critical role, the UIDAI did not provide specific responses regarding the server downtimes.

The system's reliance on UIDAI-administered servers and telecom operator linkages contributes to these technical uncertainties. Such prolonged and repeated outages raise concerns about the reliability of Aadhaar services, particularly since over 100 billion authentications have been processed since its inception in 2009.

Reetika Khera, an economics professor at IIT Delhi, emphasized that technical failures and lack of transparency have been persistent issues with Aadhaar. Based on her research and fieldwork, she highlighted that technical glitches are a systemic problem, leading to people being deprived of their entitlements due to UIDAI's inadequacies. Khera advocates for the UIDAI to publish outage details on its website for public awareness, noting that currently, such information is only shared with specific agencies during disruptions.

WHY HAS THE GOVT. ISSUED A DIRECTIVE ON DEEPFAKES?

The story so far:

On 8 November, the Indian government instructed "social media intermediaries" to remove morphed videos or deepfakes from their platforms within 24 hours of a complaint being filed, in accordance with a requirement outlined in the IT Rules 2021. The instructions came as deepfake videos of actors Rashmika Mandanna and Katrina Kaif surfaced online within the span of one week.

What are deepfakes?

Deepfakes have been around since 2017 and refer to videos, audios or images created using a form of artificial intelligence called deep learning. The term became popular when a Reddit contributor used publicly available AI-driven software to impose the faces of celebrities onto the bodies of people in pornographic videos. Fast forward to 2023, deepfake tech, with the help of AI tools, allows semi and unskilled individuals to create fake content with morphed audio-visual clips and images. Researchers have observed a 230% increase in deepfake usage by cybercriminals and scammers, and have predicted the technology would replace phishing in a couple of years, Cyfirma, a cybersecurity company said.

How does deepfake technology work?

The technology involves modifying or creating images and videos using a machine learning technique called generative adversarial network (GAN). The AI-driven software detects and learns the subjects' movements and facial expressions from the source material and then

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

Telegram: http://t.me/DreamIAS_Jamshedpur

duplicates these in another video or image. To ensure that the deepfake created is as close to real as possible, creators use a large database of source images. This is why more deepfake videos are created of public figures, celebrities and politicians. The dataset is then used by one software to create a fake video, while a second software is used to detect signs of forgery in it. Through the collaborative work of the two software, the fake video is rendered until the second software package can no longer detect the forgery. This is known as "unsupervised learning", when machine-language models teach themselves. The method makes it difficult for other software to identify deepfakes.

What do laws in India say about deepfakes?

India's IT Rules, 2021 require that all content reported to be fake or produced using deep fake be taken down by intermediary platforms within 36 hours.

The Indian IT ministry has also issued notices to social media platforms stating that impersonating online was illegal under Section 66D of the Information Technology Act of 2000. The IT Rules, 2021, also prohibit hosting any content that impersonates another person and requires social media firms to take down artificially morphed images when alerted.

Why do people create deepfake content?

The technology could potentially be used to incite political violence, sabotage elections, unsettle diplomatic relations, and spread misinformation. This technology can also be used to humiliate and blackmail people or attack organisations by presenting false evidence. However, deepfakes have positive usages as well. The technology has been used by the ALS Association in collaboration with a company to use voice-cloning technology to help people with ALS digitally recreate their voices in the future.

How have other countries reacted?

The EU has issued guidelines for the creation of an independent network of fact-checkers to help analyse the sources and processes of content creation. The U.S. has also introduced the bipartisan Deepfake Task Force Act to counter deepfake technology.

HOW ARE THE MIG-21 FIGHTER JETS BEING PHASED OUT?

The MiG-21 fighter jets, a cornerstone of the Indian Air Force (IAF) since 1963, are being phased out. On October 31, 2023, the No. 4 squadron 'Oorials' flew MiG-21s for the last time, marking the end of their nearly six-decade service. This squadron, along with others, will be re-equipped with Sukhoi-30 MKI aircraft. The IAF's current strength stands at 31 squadrons, short of the sanctioned 42.

The MiG-21s were India's first supersonic fighters and have been involved in major conflicts, including the Indo-Pak wars. Over 800 variants have been inducted, with the No. 51 squadron 'Swordarms', famous for its role in the 2019 Balakot airstrike, being phased out last year. Only two MiG-21 squadrons remain: No. 3 'Cobras' in Bikaner and No. 23 'Panthers' in Suratgarh, set to retire by 2025.

Air Chief Marshal Vivek Ram Chaudhari announced that the MiG-21s will be fully retired by 2025, to be replaced by indigenous Light Combat Aircraft (LCA)-Mk1A. This transition reflects a

significant shift in IAF's capabilities, as the MiG-21s have been a mainstay for over six decades, with an average service tenure of 33 years per aircraft.

During their service, MiG-21s have been pivotal in various conflicts, notably the 1971 Bangladesh War and the 1999 Kargil conflict. Despite their historical significance, the fleet faced over 400 accidents, resulting in approximately 200 pilot fatalities. The phase-out was delayed due to the slow induction of new aircraft like the LCA Tejas.

In recent years, the IAF has added two squadrons each of LCA Tejas and Rafale jets. A contract for 83 more LCA Mk1A jets was signed in January 2021, with deliveries starting in 2024. Additionally, plans are underway to procure 97 more LCA-Mk1A units, totalling 180 Mk1A variants, alongside development of the LCA-Mk2 and the fifth-generation Advanced Medium Combat Aircraft (AMCA). These new inductions signify a major modernization and capability enhancement for the IAF.

WHAT IS THE STATUS OF KAVACH INSTALLATIONS?

The story so far:

The deadly collision between two passenger trains in southern India's Vizianagaram district in Andhra Pradesh which killed 14 people and injured fifty persons could have been averted if Traffic Collision Avoidance Systems (TCAS) were in place. East Coast Railway officials indicated that the indigenously developed TCAS called 'Kavach,' was not installed on the route where the Visakhapatnam-Palasa and Visakhapatnam-Rayagada trains collided.

What is TCAS - Kavach?

Kavach is a cab signalling train control system with anti-collision features. Simply put, it plays the role of a watchdog over the existing signalling system. It was developed over a period of 10 years, starting in 2012, by the Indian Railways Research Designs and Standards Organisation (RDSO). Kavach is designed to give out warnings to the loco pilot in case he does not notice the 'red signal,' and instead of stopping, is going to overshoot the signal. After giving warnings on the locopilot's display, if the pilot does not slow down below 15 kilometres per hour, the Kavach system automatically applies brakes to bring the train to a halt.

How is the Kavach system deployed?

In the Kavach set-up, the railway stations along the route where this tech is sanctioned to be deployed are provided with three components. First is Radio Frequency Identification (RFID) technology in the tracks. RFID tech uses radio waves to identify people or objects. It uses electromagnetic fields to automatically identify and read information contained in a wireless device from a distance without making physical contact or requiring a line of sight. Secondly, the locomotive, which is the driver's cabin, is provided with RFID readers, computer, and brake interface equipment. And finally, radio infrastructure which are towers and modems are installed at railway stations.

How does Kavach infrastructure work?

The three components of Kavach on rail tracks, locomotives and at railway stations are communicating with each other to monitor train movements, and transmit signals ahead to locomotives. Their function is not affected by visual interferences like hilly geography or haze. There is direct loco-to-loco communication and information regarding location and track IDs are

exchanged, in case it is noted that both trains are on the same line. The locomotives have antennas which communicate with towers on railway stations and display warnings to the driver on his monitor.

On February 19, four months before the deadly Balasore accident, Union Railway Minister Ashwini Vaishnaw claimed to have put his life 'at stake,' during a test ride of Kavach where two trains were moving towards each other on the same track at high speed, but were eventually stopped a 400 meters short of each other as Kavach applied automatic brakes.

Why did the A.P. train accident occur?

The Railways Ministry attributed the cause of the Andhra Pradesh accident to the deceased loco pilot, saying it was likely caused by a 'human error.' Railway officials said that the loco pilot of the Visakhapatnam-Palasa train did not stop or slow down the train despite a red signal given in the block section. Experts say that if the Kavach system was in place it could have helped avoid this accident. "The system would have warned the loco pilot that he was overshooting the red signal, and would have automatically applied the emergency brakes," says Sudhanshu Mani, creator of Vande Bharat Express.

How much does the Kavach system cost?

Deploying Kavach costs ₹50 lakh per kilometre for the Indian Railways. Experts say present coverage for Kavach is only 1,500 km and at this rate, it may take many years to ensure Kavach even on high-density routes as Railways has a total route length of 68,000 kms. "Current Kavach coverage includes the 1,400 km stretch in South Central Railway and 200 to 250 km routes from Delhi to Mumbai and Delhi to Kolkata where it is still under testing in patches, installed in 100 kms here and there, not in continuous sections and not operational," said Mahesh Mangal, former Additional Member, Railway Board and ex-senior executive director at RDSO. Currently the Indian Railways has allotted ₹4,000 crore under the Signalling and Telecom budget head which includes ₹2,000 crore under the Rashtriya Rail Sanraksha Kosh (RRSK) fund which implements Kavach. "From this RRSK head, fund allotment for Kavach may be around ₹1,500 crore for FY23-24. From this, we may be able to implement only about 2,500 to 3,000 km of installation during this year," Mr. Mangal further said.

ALARMING RISE OF SCIENTIFIC MISCONDUCT RECORDED IN INDIA

On the surface, Indian research has never been better. India recently became the third largest producer of scientific articles in the world, a notable achievement for the world's fifth largest economy. But behind the barrage of research papers lies a telling statistic that should be a considerable cause for concern to Indian academia: the number of retractions. Published papers are retracted when they are found to have mistakes, and retractions remove them from the scientific literature. In many instances, papers are also retracted when they are found to contain data or claims produced as a result of misconduct. Historically, a very small fraction of scientific misconduct has been caught.

As such, retractions are the tip of the misconduct iceberg. The Retraction Watch database lists 109 reasons for which papers have been retracted. For simplicity, the reasons can be grouped into three categories: grave reasons (constituting serious breach of academic and scientific integrity), including criminal proceedings, hoax papers, and plagiarism; misconduct (wherein the author knowingly indulged in misconduct), including civil proceedings, conflict of interest, and

manipulation of results using computer-generated content; and errors (errors in the article, which can also indicate hasty publication), including concerns/error in data, images, results, etc., requiring correction.

The data show that the number of retractions in India rose dramatically in 2020-2022, mainly for misconduct. As such, India seems to be following in China's footsteps, but could benefit from following in Japan's instead.

To understand the effects of a higher research output on the number of retractions, consider the ratio of the former to the latter. As a proxy for quality, it indicates an alarming drop in the country – almost halving.

As for the domains of retractions, engineering accounts for almost 48% of all cases, up from 36% in 2017-2019, while the humanities grew by 567%.

Science itself appears to be relatively untouched by this phenomenon. It is difficult to ascertain the major reasons for the rise given the number of factors at play, although the opinion of the research community itself could give us some insights. For example, in a small survey conducted by India Research Watchdog with 364 respondents. A little more than half believe that university ranking parameters are behind the rise. Another 35% attributed it to unethical researchers, while 10% pointed to the minimal action taken when an allegation is reported or when an offender is 'caught'. There are other factors as well, including making it compulsory for PhD students to publish papers (a change instituted in 2017), as a result forcing those unable to do so to resort to low-quality publications, and the proliferation of predatory journals.

While more investigation is required, the sudden rise is not, as some have claimed, an artefact of the COVID-19 period for two reasons: such an effect was not observed in any other country and the number of papers published/uploaded during the pandemic was only marginally higher, whereas the number of retractions grew by a factor of 2.5.

The data should be an urgent call to action to scrutinise research malpractice in Indian academia. It affects research and teaching. If we don't take a closer look now, we will waste our great potential on producing bogus research.

ISRO CHIEF WITHDRAWS MEMOIR AFTER CONTROVERSY

S. Somanath, the Chairman of the Indian Space Research Organisation (ISRO), announced the withdrawal of his Malayalam memoir "Nilavu Kudicha Simhangal" (translated as 'The Lions that Drank the Moonlight') following controversy. The controversy arose from a report by Malayala Manorama, which quoted excerpts from the book implying that K. Sivan, the previous ISRO Chairman, may have obstructed Somanath's career advancement. Somanath clarified to The Hindu that he never accused Sivan of preventing his rise to chairman, but noted that his chances were reduced when a director from another ISRO center was appointed to the Space Commission, a traditional precursor to the chairmanship.

The memoir was intended as a motivational story about Somanath's journey as a space technologist and his role in the Chandrayaan missions, not to create controversy. It also revealed his discomfort with how the Chandrayaan-2 mission's failure, initially attributed to communication issues with the lander, was communicated to the public. Somanath believed the real cause, a software glitch, should have been transparently communicated, though he clarified that he wasn't criticizing Dr. Sivan. Despite these issues, Somanath remains in contact with Sivan,

who continues to advise ISRO. Following the controversy, the book's publisher, Lipi Books, confirmed the withdrawal of the publication.

HEERALAL SAMARIYA IS CHIEF INFORMATION COMMISSIONER

Information Commissioner Heeralal Samariya was on Monday sworn in as the Chief Information Commissioner (CIC) by President Droupadi Murmu. He is the first person from the Dalit community to hold the post.

The 63-year-old retired IAS officer of the 1985 batch was born in the remote village of Pahadi in Bharatpur district of Rajasthan. Mr. Samariya has held positions as Secretary in the Ministry of Labour and Employment, Joint Secretary in the Ministry of Chemicals and Fertilizers, and Commissioner of Commercial Taxes, Telangana. He was sworn in as an Information Commissioner in the Central Information Commission on November 7, 2020.

The post of the CIC had been lying vacant since October 3 following the completion of Y.K. Sinha's tenure. On October 30, the Supreme Court asked both the Centre and the State governments to take steps to fill vacant posts in the CIC and the State Information Commissions.

After taking charge, Mr. Samariya administered the oath of office to two Information Commissioners — Anandi Ramalingam and Vinod Kumar Tiwari — at the Central Information Commission.

TIDING OVER

Delhi and parts of the surrounding States of Punjab, Haryana and Uttar Pradesh encounter their annual air quality inflection point. This is the time when the southwest monsoon has receded and with it, the great drafts in the upper atmosphere that normally flush out pollutants from the gamut of anthropogenic activities such as construction, driving, power generation and the burning of agricultural residue. Through the years, there have been studies commissioned and executive action initiated to study, acknowledge and address the crisis. The science is also fairly clear on the relative contribution of pollutants and the limits of corrective intervention in the face of adverse meteorology and the disruption to economic life that this can entail. The consequence of this is that the air pollution crisis has now devolved into a stalemate. The Commission for Air Quality Management (CAQM), which is tasked with addressing the causes of air pollution in Delhi and the adjoining States, is now a body packed with expertise but whose powers are limited to evoking and recommending grades of measures depending on the degree of deterioration in air quality.

While the CAQM pointed out, as recently as October 31, that the daily average air quality in Delhi from January to October of this year was the best in the last six years, it elides the fact that the number of days in November when air quality becomes 'severe' (over 450 AQI) has remained roughly the same. Thus, in 2022, the AQI was in the severe category in the first fortnight of November for three days, the same as in 2021, 2020 and 2019. While there is greater awareness and action to curb the sources of pollution, November, which has in recent years emerged as the critical month for pollution, remains to be tamed. Incidents of stubble burning in Punjab, Haryana and Uttar Pradesh this year have been roughly half that when compared to previous years, though the weeks ahead are expected to see more such activity. While the measures earlier have seen an institutionalised response to tackle air pollution, it is now time for a concerted approach to address these challenges of November. Beyond stubble burning, this means addressing the more daunting challenges of vehicular pollution and construction dust. While urban Delhi could have

always blamed the distant farm fires for the pollution crisis, tackling November may mean hard measures and greater inconvenience. Bodies such as the CAQM have to assert their independent credentials and ensure greater coordination and compliance within Delhi and the surrounding States to address the challenge.

HOW BALER MACHINES HELP MANAGE STUBBLE?

With the problem of farm fires being taken up by the Supreme Court, a machine that facilitates ex situ (off site) stubble management has been in demand in Punjab.

'Baler' machines have been around for a decade, and currently around 2,000 of them operate in Punjab. Of these 1,268 are highly subsidised (50-80%) under the Centre's Crop Residue Management (CRM) scheme.

Managing paddy stubble

Upon harvesting, the paddy crop leaves a stubble on the ground. Farmers need to get rid of this stubble before the next crop can be sown. Farmers burn the stubble, the smoke from which becomes one of the largest air pollutants around this time each year.

More environment-friendly methods include incorporation of the stubble into the soil using machines such as super seeders (in situ management). However, farmers say this leaves fields vulnerable to insect attacks, necessitating the use of toxic insecticides.

For many, ex situ management is preferable. This is where baler machines come in.

Compressing farm residue

Balers compress agricultural residue into manageable and transportable bales. Before using a baler machine, farmers cut the crop residue with a tractor-mounted cutter. After two days of drying, a rake arranges the stubble in straight lines. A tractor-mounted baler machine then compresses the stubble into compact bales using netting. These bales are transported to factories or dumping sites.

In fields where balers are used, farmers can immediately plough the field and sow the next crop. Most balers in Punjab create cylindrical or rectangle bales weighing 25-30 kg, though bigger machines are also available.

Not enough units currently

A single baler costs about Rs 14.5 lakh without subsidies — the costs of the rake and cutter are extra, around Rs 2.5-3 lakh. Each baler can cover 15-20 acres in a day. Weather permitting, they operate for around 45 days.

Currently, Punjab has around 32 lakh hectares of rice fields. Depending on how many days they operate, only 15-18% of this area can be covered by the available balers in the state.

After they were included under CRM, no units were sold in the first two years (2018, 2019). The next three years, however, saw a total of 768 balers sold under subsidy, with another 500 added this year. Around 700 non-subsidised balers currently operate in the state.

POSSIBLE ANSWER TO FARM FIRES: NEW RICE VARIETY CAN REPLACE PUSA-44

In its order on Tuesday (November 7) directing the Punjab, Haryana, Uttar Pradesh and Rajasthan governments to ensure that the burning of crop stubble be "stopped forthwith", the Supreme Court mentioned a "particular kind of paddy… grown mostly in Punjab". This variety and "the time period in which it is grown" were seen as major causes of stubble burning and the resultant pollution problems in the National Capital Region.

Though the order didn't name the variety, the reference was likely to Pusa-44. It's this variety that Punjab Chief Minister Bhagwant Singh Mann had said would be "banned" from next year.

Bred by the New Delhi-based Indian Agricultural Research Institute (IARI), Pusa-44 is a long-duration variety that takes 155-160 days to mature, from the time of nursery sowing of seeds to harvesting of grain. Thus, the crop that is transplanted in mid-June after nursery sowing a month earlier is ready for harvesting only towards late-October. And since that leaves very little time for field preparation to sow the next wheat crop, ideally before mid-November, farmers resort to burning the standing stubble and loose straw that remains after harvesting using combine machines.

The longer duration notwithstanding, what makes Pusa-44 an attractive option to farmers is that it is a high-yielding variety — 35-36 quintals an acre, with some farmers even harvesting 40 quintals an acre. It is the standing stubble from this variety that is largely being burnt since the start of November.

But IARI has now bred what it claims to be an improved version of Pusa-44 that yields just as much – and matures in only 120-125 days. Called Pusa-2090, it is a cross between Pusa-44 and CB-501, which is an early-maturing Japonica rice line. CB-501 was one of the 256-odd Japonica lines – these are extensively grown in East Asia, as opposed to the Indica subspecies in India and tropical areas – that IARI obtained from the International Rice Research Institute at Los Baños in the Philippines.

Punjab Pusa 2090 paddy Pusa 2090 paddy being grown at the trial field of Gurmeet Singh Sandhu, a farmer from Katianwali village of Sri Muktsar Sahib district of Punjab. (Express Photo)

IARI scientists led by Prolay Kumar Bhowmick identified CB-501 as a line that was not only early-maturing, but also contributed to stronger culm (rice stem) and produced more number of grains per panicle (grain-bearing ear-heads). The resultant cross, therefore, combined both the higher yields and grain attributes of Pusa-44 along with the lower duration of CB-501. If Pusa-2090 can yield 35-36 quintals or more, as claimed by IARI, it might well emerge as an alternative to the original Pusa-44.

"Pusa-2090 was tested at the All-India Coordinated Rice Improvement Project trials in the 2020, 2021 and 2022 season, besides farmer fields in the Delhi-NCR region in the last two seasons. The variety has officially been identified for cultivation in Delhi and Odisha," IARI's director A K Singh told The Indian Express.

"There is no reason why this variety should not be released in Punjab and Haryana. Pusa-44 is a high-yielding variety that our farmers like to plant. If we can get the same yields from Pusa-2090 with less duration, why should the government not approve its cultivation here," said Gurmeet Singh Sandhu, a farmer from Katianwali village in Malout tehsil of Punjab's Sri Muktsar Sahib district.

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Sandhu has test-planted Pusa-2090 on one kanal (one-eighth of an acre) this year and claims that the "yield results are very good".

In the current kharif season, Punjab farmers have planted 5.48 lakh hectares (lh) under Pusa-44, which is over 17 per cent of the state's total 31.99 lh area under paddy. The share is at 21 per cent-plus if one takes only the area under non-basmati varieties; the problem of stubble burning is less in basmati varieties that produce less (and softer) straw and have been grown in 5.96 lh area this year.

There is only one variety cultivated in more area in Punjab – at 9.42 lh this season – than Pusa-44. This variety, PR-126, has been bred by the Punjab Agricultural University. Although it takes just 125 days to mature (from seed-to-grain), paddy yields from PR-126 are just 30-32 quintals per acre, lower than the 35-36 quintals from Pusa-44. At the minimum support price of Rs 2,203/quintal for Grade 'A' paddy, 4 quintals of rice are worth Rs 8,812.

DELHI GOVT PLANS 'CLOUD SEEDING' TO INDUCE RAINS AMID POLLUTION: WHAT IS THIS PROCESS?

Even as Delhi-NCR witnessed light showers on Thursday night (November 9), the Delhi government had announced earlier this week that it was considering cloud seeding or 'artificial rain' to wash away pollutants in the air.

The now mooted proposal has been attempted previously in India but only in the monsoon season – when clouds with moisture are present – and pre-monsoon months. Besides, it has only been done before in the country with the purpose of bringing rainfall to drought-prone areas, and not to mitigate pollution.

What is cloud seeding?

Water vapour condenses around small particles to form the droplets that make up a cloud. These droplets collide and grow; as they get heavy and the cloud gets saturated, it rains.

With cloud seeding, clouds are usually injected with salts like silver iodide, potassium iodide, or sodium chloride, which is the 'seed'. These salts are expected to provide additional nuclei around which more cloud droplets can form. They are dispersed into the cloud either using aircraft or through generators on the ground.

"Seeding accelerates cloud microphysical processes. You need sufficiently large droplets that can reach the surface of the earth and not evaporate on the way," said Sachchida Nand Tripathi, Professor at IIT Kanpur and Steering Committee member, National Clean Air Programme.

Tripathi added: "The substance that is dispersed into the cloud needs to have cloud condensation nuclei and ice nuclei and these two come from two different salts." The cloud condensation nuclei help form cloud droplets, and ice nuclei help to form ice crystals. Ice crystals grow faster than drops, and they become large and fall.

What are the conditions required for cloud seeding to be done?

Firstly, cloud cover and clouds of a certain type are necessary.

M Rajeevan, former secretary of the Ministry of Earth Sciences, said, "Cloud seeding can only happen if there is a sufficient number of clouds and a particular depth to these clouds. Inside, there

needs to be an adequate number of cloud droplets. Cloud seeding is done to increase the radius of the cloud droplets so that they will grow bigger and because of gravity, they will come down as rainfall. But with a clear sky, you can't do it."

In winter, clouds form over Delhi when a western disturbance moves over the region. These are storms that originate in the Caspian or Mediterranean Sea and bring non-monsoonal rainfall to northwest India.

With a stable atmosphere in winter, clouds are expected to form when a western disturbance disturbs this stability of the atmosphere.

"In winter, you don't see the kind of clouds that are needed for seeding, but western disturbances are the way through which clouds form. Even if clouds are there, you need to see what their height is, what their liquid water content is," Tripathi said.

While the possibility of cloud formation can be determined in advance through radars, other conditions will have to be studied on the day seeding is likely to be done.

Has cloud seeding been done before in India, and has it been successful?

Seeding has mostly been attempted during the monsoon in India, in places such as Karnataka, Maharashtra and Tamil Nadu.

A more recent experiment, the fourth phase of the Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX-IV) that took place in the monsoon seasons of 2018 and 2019, was conducted in drought-prone Solapur in Maharashtra. It pointed to a relative enhancement of 18 per cent in rainfall.

"With that experiment, we have tried to understand more about cloud seeding, but still there are a lot of difficulties. Cloud microphysics is more complicated than we think. We can get some advantage from it in the monsoon season if there are enough clouds. When you seed, all clouds won't rain, and even without seeding clouds can rain. It is still a very complex and uncertain field of research," said Rajeevan, who was involved with the Solapur experiment.

IIT Kanpur attempted it in April and May of 2018, which are the pre-monsoon months, on their campus. It said five out of six trials resulted in rain.

In 2018, cloud seeding was floated as a proposal in Delhi but it didn't happen, with the many permissions that were required coming in the way, along with the absence of seeding equipment on IIT Kanpur's own aircraft.

Thara Prabhakaran, a scientist at the Indian Institute of Tropical Meteorology (IITM), who specialises in cloud microphysics and was also part of the experiment in Solapur, said, "In our experiment in Solapur, we have done statistical and physical experiments by registering what is happening inside the cloud before and after seeding and documenting the processes leading to precipitation."

"Rain forms in the cloud, but whether it reaches the surface or not is determined by several factors… it can even evaporate on its way down to the surface since we have tropical conditions. There are many uncertainties. In winter, it has not been tried. In winter, cloud systems are different. There will have to be further research to investigate this possibility," he said.

Is it expected to help with pollution levels?

In India so far, cloud seeding has not been tried with the purpose of reducing pollution, but only been tried to deal with drought-like conditions.

Prabhakaran said, "There are a few cases where China tried weather management options. In India, we don't have investigations done in this aspect (impact of cloud seeding on pollution). Our conditions are different, and we will need a dedicated study on this. Clouds and their processes are very complex, these are non-linear processes. If you do something, it is not known exactly that it is going to give you this much rain or not. Clouds are also able to rain naturally, so how do you separate natural rain from seeded rainfall?"

MORE LIGHT, LESS SOUND

The 'festival of lights' should not be allowed to degenerate into a festival of noise. Firecrackers are associated with joyous celebrations across the world; but, many are toxic, often too loud, and release noxious fumes when combusted. In 2018, the Council of Scientific and Industrial Research launched less noxious and less noisy 'green' crackers, whose use various statutory bodies have mandated. The Noise Pollution (Regulation and Control) Rules 2000 stipulate that firecrackers cannot be burst in 'silence zones', designated by State governments, and anywhere after 10 p.m. From 6 a.m. to 10 p.m. (i.e., 'daytime') and in industrial areas, firecracker noise cannot exceed 75 dB(A) Leq. The thresholds in commercial and residential areas are 65 dB(A) Leq and 55 dB(A) Leq, respectively. dB stands for decibel; A is a weight scale for human perception of loudness; and Leq means the figure is a time-average. The rules allow people to register a complaint if the noise overshoots by 10 dB(A) Leq during daytime.

Because dB is a logarithmic unit, an increase of 10 dB implies a tenfold increase in acoustic pressure, which is often beyond the point at which the sound becomes harmful. Research has found links between loud environs and sleep disorders, tinnitus, stress, anxiety, hearing loss, and cardiac health. More than 80 dB(A) in offices has been associated with hypertension whereas above 50 dB(A) at night, when the body is unaccustomed to loud noises, could increase cortisol levels. Traffic noise has burgeoned in cities where haphazard development has forced motorists to overuse horns. Many religious occasions have become synonymous with noisy celebrations irrespective of the hour. During Deepavali, firecrackers (even 'green' ones) routinely produce more than 90 dB of sound. If, say, people burst firecrackers at 90 dB for 10 seconds and the ambient noise is 50 dB for 50 seconds, and this pattern continues for four hours followed by 12 hours of 50 dB noise, the 16-hour Leq is 74.5 dB — which merits a complaint in residential areas but not in commercial ones, yet the noise is already harmful. Different loudness zones are also seldom publicly demarcated while some places are both residential and commercial. The rules are unclear about the sanctions to be meted out to offenders. Enforcement remains obscure. So, focusing on marginal improvements to firecrackers before every festival is becoming a red herring. India's noise is a public health crisis. If firecrackers are not to worsen matters, governments must prevent the production of violative firecrackers altogether and cities must improve public access to noise data and adopt noise mitigation targets.

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UNESCO DECLARES GWALIOR THE 'CITY OF MUSIC': A LOOK AT ITS ILLUSTRIOUS MUSICAL TRADITION

The city of Gwalior in Madhya Pradesh was added to UNESCO's Creative Cities Network (UCCN) on Wednesday (November 1) for its "strong commitment to harnessing culture and creativity". Kozikodhe from Kerala was also among the 55 new cities to join the network.

Story of a musical past

Indian music history would be incomplete without the mention of Gwalior and the gharana that stemmed from there. The city's illustrious past is dotted with patronage of music — many of its rulers were musicians themselves or took a keen interest in music. Gwalior also hosted well-known musicians, who were either born in the city or came there to learn from the masters.

Gwalior gharana, the oldest musical gharana and a significant chapter of Hindustani classical music's history flourished under the aegis of Raja Man Singh Tomar during the 15th century. Man Singh's great grandfather Dungarendra Singh Tomar, a musician himself, attempted a revival of Indian classical music through academic interest and patronage. He is known to have gifted two music treatises in Sanskrit – Sangeet Shiromani and Sangeet Choodamani – to his friend and Sultan of Kashmir Zain-ul-Abdin. The treatises comprised detailed discussions on music and musical instruments.

Dungarendra also composed Vishnupadas (songs in praise of Vishnu) with a unique style of singing that he passed down to Man Singh, who ascended the throne in 1486. It's also believed that Man Singh invented dhrupad, in a classical genre sense. His Horis and Dhamars also became quite popular. The king would take advice from Sufi saints, who were often musicians too. In an attempt to popularise Indian music, he replaced Sanskrit songs with those in simple Hindi.

Man Singh also wrote Manakutuhala (Quest for Learning), considered the first treatise of music in Hindi, helping a wider audience to understand high art performed in kings' courts. This made dhrupad more accessible, which now comprised Vishnupadas sung in ragas. The king also built huge music halls in his palace and held regular music sessions. His music was also popular among Sufis as well as Muslim Sultans.

The glory of the Gwalior gharana

Before Hindustani classical music was divided into various gharanas – musical ideologies and systems where the musicians identify with a style either by lineage or by learning and following this style – Gwalior emerged as the first proper gharana of music and evolved under the Mughal rule. The initial ustads of the gharana included Naththan Khan, Naththan Pir Baksh and his grandsons Haddu, Hassu, and Natthu Khan.

Khayal singing, as we know it today, emerged from dhrupad under the aegis of Gwalior gharana while incorporating the elements of qawwali. Ustad Naththan Pir Baksh was one of the early masters to create khayal — the orderly system of presenting a raga which became extremely popular in the 18th and 19th centuries and remains significant even today. What's interesting about Gwalior is the inclusion of Persian words in the pieces and concepts of bandish ki thumri (a more structured style of thumri or love song). Interestingly, every artist who emerged from Gwalior gharana sounded different and yet there was a certain unity in the style.

Tansen, Gwalior's crown musician

Mian Tansen born as Ramatanu to a poet and musician was one of Gwalior's early proteges. At the beginning of the 16th century, he trained under Swami Haridas, who practised dhrupad but the poetry was dedicated to Krishna instead of Vishnu. The famed Sufi saint Mohommad Ghous also had a huge impact on Tansen. While learning from Ghous, Tansen understood and honed the Gwalior gharana style and was the court musician for King Ram Chandra Singh of Rewa, Madhya Pradesh, for many years.

The story of his musical brilliance and knowledge travelled and Akbar invited Tansen to be a part of his court musicians in the Mughal court. A Vaishnava musician, he first refused, but after Ram Chandra insisted he go, he joined the court at the age of 60.

Abul Fazl's Ain-i-Akbari mentions 36 imperial musicians, out of which 15 were from Gwalior. Akbar's admiration for Tansen has found much place in popular culture and much of it comes from the writings about the musician.

The Bangash gharana and Ustadt Hafeez Ali Khan

Ustad Hafiz Ali Khan, son of sarod player Nanneh Khan, and one of the most significant and sought-after musicians who lived in Gwalior for many years, learned music under Ustad Wazir Khan of Rampur, who is considered a descendent of Mian Tansen.

Born in 1888, he was a court musician in Gwalior but in the early 20th century, when music conferences became popular, he was one of the most popular artistes to perform at these baithaks and was known for very fine musicianship. He trained many significant musicians, including his son and foremost disciple Ustad Amjad Ali Khan and Pt Bhimsen Joshi for a few months, among others. Ustad Amjad Ali also established sarod ghar in Gwalior, a museum that houses a collection of old and contemporary instruments besides a lot of archival material, photographs, books and audio-visual recordings.

Some notable names from the Gwalior gharana

For years people have continued to visit Tansen's mausoleum and eat leaves from a large tamarind tree planted by the musician in the 16th century. It's believed that anyone who would eat the leaves of this tree would be blessed with a melodious voice. Well-known singer KL Saigal, too, visited the tomb once and tasted the leaf, and was taken there by Krishnarao Pandit (classical vocalist LK Pandit's father and court musician to Madhavrao Scindia of Gwalior) a significant name in the story of Gwalior gharana.

Eventually, the number of people visiting the tomb rose up so much that there was nothing left of the roots either. A new tree was planted in place of it. Some of the well-known names from the gharana include Haddu Khan's son Bade Inayat Hussain Khan (1852-1922), Vasudeva Buwa Joshi, Balakrishnabuwa Ichalkaranjikar (1849–1926) who taught Vishnu Digambar Paluskar who later founded the Gandharva Mahavidyalaya which continues till today, famed educator BR Deodhar and Pakistani singer Farida Khanum among others.

The generation that came after included Pt Kumar Gandharv, Malini Rajurkar, Veena Sahasrabuddhe, and Dharwad-based Pt Venkatesh Kumar whose music also has distinct touches of Kirana gayaki among others. Interestingly, any student learning Hindustani classical music even today will find herself including the techniques and nuances invented and taught by Gwalior gharana.

TB IN INDIA: A FIGHT TO THE END

More than a fourth of the world's TB patients live in India, according to the WHO report released on Tuesday. The country recorded a staggering 28 lakh cases in 2022. Nevertheless, the report finds cause for optimism in the reduction in TB mortality and incidence in the past eight years. It also acknowledges the improvements made by the country's case detection system — remaining undiagnosed doesn't just delay treatment for those with bacterial disease but also puts their contacts at risk of infection. The positive score on TB reporting is reassuring, given that surveillance programmes had taken a hit during the Covid years — case detection levels have rebounded to 2019 levels. However, the global health agency has also put in a caveat — it has not ruled out the possibility of several "new cases" being actually undiagnosed patients from the pandemic years.

Medically, the greatest challenge is posed by the multi-drug resistant (MDR) variant of the disease. The WHO estimates that 1,19,000 new cases of this extremely virulent variety of TB emerge in India each year. However, the Indian TB programme manages to report a little over half of this. A growing body of scholarship testifies that inappropriate prescription, wrong dosage, poor quality of drugs and failure to complete the medications have precipitated India's MDR TB epidemic. In recent times, experts have advocated the use of molecular diagnostics to treat contagious diseases such as TB. These tests were extensively used for Covid detection and they can be repurposed for TB diagnostics. The WHO, too, recommends molecular tests. However, the latest India-TB report shows that the traditional sputum smear test continues to be the predominant testing method in most parts of the country. Microscopy can at best detect half of MDR TB cases — that explains the high percentage of patients falling under the radar in the country.

TB treatment is demanding on patients, their caregivers and physicians. The medication takes its toll on the already weak patient, with effects ranging from nausea and loss of appetite to jaundice. Treatment requires an assuring and caring physician to handhold the patient through the difficult period of therapy — a relative rarity in India's healthcare system. That's one reason that less than 68 per cent of MDR TB patients who began treatment in 2020 completed it a year later. Moreover, last year, less than 50 per cent of drug-resistant TB patients were put on bedaquiline, the shorter-duration drug recommended by the WHO since 2019. By all accounts, the country will miss its target of eliminating TB by 2025. Policymakers must take their cues from recent reports, including WHO's study.

WEAVES OF GRASS

The transformation of simple straw (dried grass) into a mat comfortable enough to lie down on is unparalleled. Known as korai paai in Tamil, such mats are a household object in the interiors of southern India. These mats are crafted from the dry grass cultivated along the banks of the Cauvery in Karur district of Tamil Nadu. Korai grass (Cyperus pangorei) is cultivated on more than 2,500 acres of land at Nerur, Paramathi, Vangal, Senappaadi and Unniyur in the district. Once the grass reaches its full height, it is cut down for making the mats.

At the time of harvest, farmers begin their day as early as 6 a.m. The grass is dried in the sun before dispatch to the market.

The harvested grass is purchased by weavers from the market. They weave the grass into mats after dyeing them in various colours and use fibre from aloe vera plants to hold it together. These are known as naar paai and in a day, only one mat can be woven by hand by a person. The entire

process from cultivating, harvesting, splitting, drying and then dyeing is labour-intensive, and, hence, only a handful of weavers in Viralipatti use the traditional method.

With the coming of technology, aloe vera fibres became replaced by cotton twine and the mats started to be woven in power looms. Nevertheless, this century-old traditional craft has been fading largely owing to a lack interest among the younger generation, and not enough incentive among the makers to sustainably make the business viable.

During summer, straw mats are cool to sleep on, and like many other natural objects, they turn comfortably warm to sleep on in cold weather.

The level of popularity of the mats is such that they are given as wedding gifts in the region. It is a common practice to gift the bride and groom a mat with their names as well with the wedding date woven into the design.

WHERE DO DOMESTICATED SILKWORM COCOONS GET THEIR WILD COLOURS FROM?

Silk, the queen of fibres, is drawn or reeled from cocoons of the silk moth (Bombyx mori). Humans domesticated it more than 5,000 years ago in China, from the wild moth (Bombyx mandarina). The ancestral moth is today found in China, the Korean Peninsula, Japan, and far eastern Russia, whereas the domesticated moth is reared all over the world, including in India. In fact, India is the world's second largest producer of raw silk after China.

Caterpillars, also known as silkworms, of both these species feed exclusively on leaves of mulberry plants (genus Morus).The domesticated moth is much larger than its wild progenitor, and thus extrudes a longer silk fibre to build its larger cocoon, up to 900 metres long. But it depends wholly on human care for its survival and reproduction. Since having been domesticated, it has lost the ability to fly, and since its need for camouflage no longer exists, it has also lost its caterpillar and adult-stage pigmentation.

Carotenoids and flavonoids

'Wild' silks – which include the muga, tasar, and eri silks – are obtained from other moth species: namely, Antheraea assama, Antheraea mylitta, and Samia cynthia ricini. These moths survive relatively independently of human care, and their caterpillars forage on a wider variety of trees. Non-mulberry silks comprise about 30% of all silk produced in India. These silks have shorter, coarser, and harder threads compared to the long, fine, and smooth threads of the mulberry silks.

The ancestral mulberry moth makes (boringly uniform) brown-yellow cocoons. In contrast, domesticated silk moth cocoons come in an eye-catching palette of yellow-red, gold, flesh, pink, pale green, deep green or white. Human handlers selected the differently coloured cocoons whenever they emerged, possibly in the hope of breeding for coloured silks. But they were disappointed: the pigments that coloured the cocoons are water-soluble, so they gradually fade away. The coloured silks we see in the market are instead produced by using acid dyes.

We know today that the cocoon's pigments are derived from chemical compounds called carotenoids and flavonoids, which are made by the mulberry leaves. Silkworms feed voraciously on the leaves, absorb the chemicals in their midgut, transport them via the hemolymph – arthropods' analogue of blood – to the silk glands, where they are taken up and bound to the silk protein. Mature caterpillars then spin out the silk proteins and associated pigment into a single fibre. The caterpillar wraps the fibre around itself to build the cocoon.

Mutant strains

The adult moth hatches (or ecloses) from the cocoon. In this process, the fibre is broken in many places. Superior quality silk however comes from an unbroken fibre, so unhatched cocoons are used for reeling. There is a contentious 'economics versus ethics' debate here about creating a species that depends wholly on humans (and whose unhatched cocoons we drown in hot water for better quality silk), but that is for another article.

The differently coloured cocoons arise from mutations in genes responsible for the uptake, transport, and modification of carotenoids and flavonoids. The mutant strains have become a valuable resource for scientists to study the molecular basis of how, in a relatively short span of 5,000 years, artificial selection generated such spectacular diversity.

Research on silk domestication has largely been conducted in China and Japan, although scientists from India (including from the Centre for DNA Fingerprinting and Diagnostics in Hyderabad, where this author worked), have also made some important contributions.

Combinations behind the colours

This said, earlier this year, researchers in Southwest University in Chongqing, China, proposed a model to explain how different combinations of mutations give rise to the different colours of the cocoons.

They found that the formation of a yellow-red cocoon requires the Y gene, which encodes a protein that transports the carotenoids from midgut to the silk glands. Other genes (C, F, Rc, and Pk) encode proteins that selectively absorb specific carotenoids. Mutations in one or more of these genes produce the yellow, flesh-coloured, rusty, and pink cocoons. If the Y gene is mutated, the flavonoids are absorbed but the carotenoids are not, resulting in green cocoons.

Further, whether the green is dark or light depends on whether genes for other proteins that enhance flavonoid uptake are normal or mutated. If both carotenoids and flavonoids are not taken up, the cocoons remain white. The researchers showed that a cluster of five closely related genes was responsible for the uptake of flavonoids.

The gene called apontic-like

Domesticated and ancestral mulberry silk moths can be interbred to produce hybrid offspring. Last year, researchers in the University of Tokyo and Columbia University in New York created such hybrid moths and then specifically mutated either their B. mori- or B. mandarina-derived copy of a gene called apontic-like.

The hybrid caterpillars, like their wild parent, made the pigment called melanin. But when the B. mandarina-derived copy of apontic-like was mutated, the hybrid failed to make melanin. (This didn't happen when the B. mori-derived copy was mutated, however.) The implication was that the domesticated silkworm's apontic-like gene had lost the ability to support melanin production.

Both versions of the apontic-like gene make the same protein. Therefore, the difference between them was attributable to differences in sequences that regulate when and where the gene was turned 'on' or 'off'.

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Gene by gene

Silk is an acme of domestication, comparable in its success to basmati rice, alphonso mangoes, and the golden retriever. Today, the tools are at hand for scientists to make and compare genetically identical hybrid silk moths that differ only in which of a gene's two parental versions is inactivated: domesticated or ancestral.

This paves the way for scientists to work out – gene by gene – all the key steps that led to silk moth domestication. Hopefully, someday soon, similar techniques will become available for us to analyse domestication in rice, mangoes, and dogs.

HOW A MOTORABLE ROAD REACHED THE AMARNATH SHRINE

Project Beacon of the Border Roads Organisation (BRO) has been actively involved in enhancing the road infrastructure to the Amarnath cave shrine in Kashmir's Lidder Valley. Recently, they announced the successful upgradation of the Baltal road, allowing motor vehicles to reach the shrine for the first time. This development follows Union Minister Nitin Gadkari's announcement of a new road plan to the shrine earlier in the year.

Traditionally, access to the Amarnath shrine, situated at 13,000 feet and famous for its ice lingam, was challenging. Pilgrims could approach via Pahalgam or Sonamarg. The Pahalgam route involved a mix of motorable roads and demanding trekking or pony rides, taking 3 to 5 days. The shorter Baltal route from Sonamarg usually required an eight-hour trek. Helicopter services were available but limited due to ecological concerns.

Gadkari's ambitious plan, with a budget of Rs 5,300 crore, includes a 34 km two-lane road linking Chandanwari and Baltal, incorporating a 10.8 km tunnel and a 5 km pedestrian track. Additionally, a 9 km ropeway from Baltal to the shrine is proposed, enhancing accessibility.

The BRO, taking over from the J&K government's Roads & Buildings department in September 2022, has widened the Baltal route to facilitate vehicle access, though currently, tourist vehicles are not permitted. This improvement is aimed at reducing congestion for trekking pilgrims.

'ENEMY PROPERTY' BUTLER PALACE TO TURN INTO A TOURIST HAVEN

Lucknow's once-grand three-storey Butler Palace, left deserted and in darkness for many decades, will see a facelift. Local people believe the house, built a century ago, in a mix of Rajasthani and Indo-Mughal styles, is 'haunted'. Neighbours say the palace has been stripped off its brass and other saleable parts by drug and alcohol addicts. But the police deny this.

The palace, originally built as the official residence of the Commissioner of Avadh, Harcourt Butler, in 1915, was owned by the royal family of Mahmudabad. By its own account, the family migrated to India in the 13th century and settled in erstwhile Avadh, current Lucknow, in the 16th century, and owed allegiance to the Mughals. Mohammed Amir Ahmad Khan, the king at the time of Independence, migrated to Pakistan, while his son Mohammad Amir Mohammad Khan, stayed on in India as a citizen, fighting a legal battle over several properties, including Butler Palace.

After the India-Pakistan war in 1965, Butler Palace was declared "enemy property" by the Government of India. The Enemy Property Act, 1968, which came later, made the stand more binding. This is one of the 361 "enemy properties" in Lucknow alone, say authorities, with many originally belonging to the Mahmudabad family. It was only last month, however, that the

Lucknow Development Authority (LDA) got the go-ahead to spruce up the place for tourism. "We have received the no-objection certificate from the Custodian of Enemy Property Department [under the Union government], three weeks ago. We will start the renovation of the building soon," Indramani Tripathi, Vice-Chairperson of the LDA, said.

The authorities are rejuvenating the Butler lake, for which the LDA already had the rights, by constructing pathways along the perimeter, landscaping, lighting, and starting a cafeteria for visitors. The authority plans to renovate and strengthen Butler House and construct a musical fountain in front. Up to ₹5 crore each has been allocated for work on the palace and the lake, he said. "We will complete the project in roughly four months. It will serve as a tourist place along with a heritage look," he added.

After being declared enemy property in the 1960s, the premises were handed over to the Uttar Pradesh government, who used it as a sales tax office. In the 1980s, it was given to the Indian Council of Philosophical Research, an organisation under the Union Human Resource Development Ministry.

Legal battle

Mohammad Amir Mohammad Khan died last month at the age of 80. The former MLA fought a more than four-decade-long court battle against the Union of India and got a brief respite in 2005, when the Supreme Court declared him a bona fide citizen and not an enemy as defined by the Act. However, in 2010, the Union government brought in an Ordinance to amend the Act, subsequently passed by Parliament in 2017, bringing successors within its ambit. The family is still fighting the case in the Supreme Court over properties that include Butler Palace.

"We have no comments to make, the matter is sub judice in the Supreme Court," said Ali Khan Mahmudabad, an heir of the former royal family.

The palace is hardly 5 km from Kalidas Marg, the Chief Minister's house. Pre-Independence, "The who's who of British India including Jawaharlal Nehru spent time here," said Amit Rai, a historian teaching at Shia P.G. College in Lucknow. After Independence, several political leaders have stayed there.

KRISHNENDU BOSE'S BAY OF BLOOD RECOUNTS CARNAGE OF PAKISTAN'S OPERATION SEARCHLIGHT ON BANGLADESH

On February 26, 1971, Raqibul Hasan, the benchwarmer for the Pakistan cricket team, was finally stepping out to bat against the Commonwealth side at Dhaka's Bangabandhu Stadium. All of 18, and the only player from East Pakistan in the team, he reached the striker's end, and with a glint in his eye, revealed a curious sticker on his bat — the words "Joy Bangla" written in Bengali. In a euphoric flash, the audience erupted in loud chants of the familiar war cry, resulting in disruptions to the game, which was cancelled. Little did Hasan know at the time that he would be "giving up the bat and picking up the Sten gun" to fight for the liberation of his country.

"Joy Bangla" was the war cry of the Mukti Bahini, a guerrilla resistance movement of military and civilian forces, fighting for the freedom of Bangladesh. Hasan narrates this story in Bay of Blood, a documentary by Delhi-based filmmaker Krishnendu Bose that was recently screened at the India Habitat Centre.

The Pakistani Armed Forces, under the command of the then-President General Yahya Khan, initiated Operation Searchlight in March 1971, a campaign of torture killings and rape to erase Bengali resistance. While the exact death toll is debated, independent researchers have pegged it at nearly three million people during the nine-month exercise. The operation was a result of years of cultural subjugation of the Bengali identity, including the Bengali language, and even discrediting a general election where the Awami League, a Bengali nationalist party of East Pakistan, led by Sheikh Mujibur Rahman, won by a majority. The film is a haunting retelling of the events leading up to West Pakistan's Operation Searchlight and the subsequent carnage and fight for independence.

A fatwa was issued during the Operation that declared women as "booty of war", which led to 200,000 cases of systematic rape, according to independent researchers. Pakistan Army soldiers captured numerous women and kept them as sex slaves. One of the rape survivors, who recalled the dreadful day in the film, says, "A Pakistan Army general was 'compassionate' for not capturing me and instead instructed his troops to commit the horrific act at my home. My infant son, who saw the act, died of shock on that day." The film was structured as a deposition, where each contributor walked into the studio, sat on the chair and told their story. "The sources were authenticated by triangulating information, and only then were the stories presented," says Bose.

This process is captured by stories of witnesses, Pakistani and Bangladeshi journalists, freedom fighters, writers, academics, defectors and American diplomats. In the film, Scott Butcher, ex-US Foreign Service, who worked in Dhaka in 1971, recalls the then American Consul General to Dhaka, Archer Blood's 'Blood Telegram', where the latter expressed his dissent in the way the White House responded to Pakistan's attack on Bangladesh. "What we were witnessing was definitely a genocide," says Butcher, in the film.

Bay of Blood uses archival footage, coupled with colour-treated shots of present-day Bangladesh and juxtaposed with the chilling narrations of the horrors of the atrocities, to bring to life the dark time that the country had to go through. Bose also got footage from international news agencies such as BBC and Associated Press, the Bangladesh Liberation War Museum and the National Film Development Corporation. The filmmaker says he had to brainstorm with his editor David Fairhead and the director of photography Jeremy Jeffs to come up with a linear objective narrative for the documentary.

Bose had earlier made several award-winning films on wildlife conservation and environmental justice. Visiting Kolkata as a boy of 10, Bose recalls witnessing a large influx of people coming from the neighbouring country. Like many Bengalis, he too learnt of the dark time through books, including Salil Tripathi's The Colonel Who Would Never Repent (2014), Garry Bass's The Blood Telegram (2013), and Srinath Raghavan's 1971 (2013). Fast forward to 2019, the filmmaker decided to revisit the past.

BUSINESS & ECONOMICS

REVENUE REBOUND

Gross Goods and Services Tax (GST) revenues hit their second highest monthly tally in October at a little over ₹1.72 lakh crore, breaking a few long- and short-term trends. To start with, they reflect a 13.4% uptick over last year's kitty, the highest so far in 2023. Moreover, it reverses a persistent deceleration in revenue growth seen through the second quarter of this financial year. From an average growth of 11.5% between April and June, the rise in GST revenues had slowed to 10.6% between July and September, with the last month seeing a 27-month low uptick of 10.2%. The Finance Ministry shall hope that this growth rate pick-up sustains so that its 2023-24 fiscal math gets some buffer from any possible spending or subsidy shocks, whether they arise from external risks such as fuel or urea prices or internal ones such as pre-election goodies like extending the free foodgrains programme. Seen over a broader timeframe, last month's mid-year indirect tax collections bely a pattern that the highest revenues are received in April as businesses close their books of accounts for the financial year. Year-end compliances had propped up this April's kitty to a record ₹1.87 lakh crore.

The entire bump up in October's revenues, stemming from transactions undertaken in September, may not be ascribed to a consumption spike at the onset of the festive season. Experts believe the Revenue Department's continuing crackdown on the non-compliant, and a September 30 deadline for settling any disputes that may have arisen since the GST regime's launch in 2017-18, also played a role. However, there is some indication of a recovery in domestic demand. While revenues from domestic transactions and services imports grew 13%, the revenue growth from imports that the Finance Ministry did not explicitly disclose, was sharper at 13.94%. This is not only the fastest uptick in at least nine months but also marks only the third time in seven months that goods import revenues have grown. Some of this must reflect a rebound in discretionary demand, even if this may be largely for premium or high-end goods rather than a broad-based bump. If this sustains through the festive season, revenues could hold up even if companies are reporting some weakening of demand growth in October in consumer goods, especially in rural areas. A new amnesty scheme to settle a limited set of GST demands, unveiled last week for taxpayers who failed to appeal them in time, may also bolster the kitty as it mandates firms to deposit an additional amount of the disputed levy for consideration. Anyone tracking the trajectory of GST as a high-frequency indicator to assess the economy's growth prospects must not lose sight of such factors.

INDIA FINANCE REPORT: A WARNING AGAINST REPEATING PAST MISTAKES

The first edition of the India Finance Report published by the Centre for Advanced Financial Research and Learning (CAFRAL), an independent body set up by the Reserve Bank of India, has taken stock of India's non-bank financial companies sector — commonly called the shadow banking sector — and pointed out both the ongoing improvements and emerging risks. On the positive side, the CAFRAL report finds that after the liquidity crisis of 2018 and the Covid pandemic, the NBFC sector has improved, along all dimensions — capital position, asset quality, and profitability. For instance, as against the stipulated norm of 15 per cent of the capital to risk-weighted assets ratio (CRAR), in 2022-23, NBFCs witnessed a notable improvement with the CRAR rising to 27.6 per cent from 22.9 per cent in 2019-2020. Similarly, gross and net non-performing asset (NPA) ratios continue trending downwards.

However, the study also points to some new risks. It notes that in the past few years, bank financing for NBFCs has begun to rise again. "This raises concerns about systemic contagion and underscores the need for tighter preventive measures to mitigate potential systemic fallout". Explaining the notion of systemic risks when several key parameters look benign, the CAFRAL report states: "Although current ratios post-2017 show lower liquidity risk, they are not a good gauge for systemic risk — the risk which arises due to externalities that individual firms do not take into account in their decision-making process, and an unravelling of which can have deleterious effects on the real economy." It underlines that systemic risks build up in periods of tranquil financial conditions due to increased risk-taking, and tend to aggravate the effect of a shock through negative spillovers such as fire sales across firms during a crisis.

There are two reasons both the RBI and the government should take this report's findings seriously. One, the global, as well as the Indian, economy has just witnessed two periods of stark contrast in terms of monetary policy. First, there was an extremely loose monetary policy, aimed at protecting economic growth and businesses during the pandemic. This was immediately followed by an equally sharp contraction in monetary stance following the sudden and sharp rise in inflation. The back-to-back monetary shocks are catching businesses off-guard. Two, the events of the past 15 years have shown that the health of India's NBFC sector is crucial to sustaining India's economic growth, especially through millions of MSMEs. In the decade after the Global Financial Crisis of 2008, the NBFCs acted like shock absorbers to the Indian economy — providing credit when formal banks were struggling with NPAs. Regulators must ensure that past mistakes are not repeated.

FROM WOMEN IN THE JOB MARKET, A DISTRESS CALL

According to a report in this newspaper from Lucknow, hundreds of women — who otherwise play the role of saviours as communication officers for Uttar Pradesh's Dial 112 emergency helpline — are protesting in distress. Simply put, their grievance is two-fold. One, they assert that Rs 11,400 for a month's work (that's Rs 380 per day) where a regular day involves handling at least 600 emergency calls (ranging from road accidents to crimes against women to harassment) is not adequate remuneration. What makes it worse is the fact that their salary hasn't increased while the world around them has gone through upheavals, including a global pandemic and historic inflation. The second complaint of the communication workers is about the lack of job security since they are employed by a private firm, and not by the government. On the face of it, this is just one local protest. However, seen in the broader context of India's employment data, this protest underlines a sobering reality, especially for women in India's labour force.

When the official employment data for India was released last month, there were four key takeaways. One, that most of the headline indices continued to improve. These included improving the labour force participation rate (implying more people were demanding jobs), falling unemployment rate (implying the ratio of those who looked for a job and failed to get one is falling) and rising workforce-population ratio (implying that overall the ratio of employed people and the total population was rising). Two, that most of these positive changes were happening due to women entering the workforce. Three, that most of the new jobs were of very poor quality — self-employment — where monthly incomes are much lower than regular wages. Four, all types of incomes — be it for regular wages, casual labour or self-employment — had remained largely stagnant over the past six years. Simply put, women were entering the job market driven by economic woes.

The distress call from the women workers in Lucknow provides a real-life example of the macro data. The workers claim that instead of listening to their complaints, the police lathicharged their protest march and booked them for rioting. The solutions, however, lie far away from the police's domain. What is required is broad-based economic growth: An economy that creates so many new and well-paying jobs that young women enter the workforce out of choice, not distress.

LIFE & SCIENCE

THE EARTH'S INTERIOR MAY HOLD RELICS OF MOON-FORMING MEGA IMPACT

These blobs may be relics from a cataclysm early in our planet's history hypothesised to have spawned the moon - the collision between primordial earth and a Mars-sized object called Theia, researchers have said.

This impact, which recent research determined occurred more than 4.46 billion years ago, blasted molten rock into space that orbited the earth and coalesced into the moon. But chunks of Theia may have remained inside the earth, sinking to a location just above our planet's super-hot core of iron and nickel.

The researchers ran computer simulations examining the impact event, geophysical properties of the material that likely made up Theia, and the evolution of the earth's mantle.

Based on these simulations, they proposed that most of Theia was absorbed into the earth, forming the blobs, while residual debris formed the moon.

"The bottoms of these blobs are 2,900 kilometres below our feet. The two blobs are about 2% of the earth's mass," said Caltech geophysicist Qian Yuan, lead author of the study published in Nature. "Each of the blobs are twice the mass of the whole moon."

If the study's conclusions are correct, the blobs would represent elusive evidence right here on the earth of the hypothesised moon-forming collision.

"There hasn't been much consensus on whether we can find evidence for this event not just in the moon but also in some observable property of the modern earth," Caltech geology and geochemistry professor and study co-author Paul Asimow said.

"It is incredible because we can uncover relics of another planet - Theia - if we dig deep enough in Earth's mantle," added planetary scientist and study co-author Hongping Deng of the Chinese Academy of Sciences' Shanghai Astronomical Observatory.

The increased density of the blobs is thought to arise from their high iron content.

"If our model is correct, the blobs should have isotopes that are similar to the lunar mantle rocks, which can be tested in future lunar missions," Yuan said.

Gaining a greater understanding of the hypothesised giant impact may provide insight concerning the evolution of the earth and other rocky planets in our solar system.

"The earth is still the only confirmed habitable planet, and we don't know why," Yuan said. "This collision likely set the initial condition of the earth's evolution. Studying its consequences may help us to figure out why [it] is different than other rocky planets.

IMPORTANCE OF 'LOSS AND DAMAGE' FUNDS

The story so far:

As the climate crisis intensifies, two terms are in sharp focus — adaptation and 'loss and damage' (L&D). Adaptation is the proactive response to climate change, the art of survival by which

communities and countries make deliberate choices to prepare for and cope with climate-related challenges. In contrast, L&D represents the irreversible consequences of climate change: impacts that can't be avoided or mitigated through adaptation efforts. They encompass the real losses that extend beyond monetary value and cut to the core of human rights and well-being. L&D includes economic losses, human casualties, and the degradation of ecosystems and cultural heritage.

What is the Loss and Damage fund?

The call for affluent nations to acknowledge their accountability for historic pollution is more than 30 years old. Historic pollution has elevated the world's average surface temperature by more than 1 degree Celsius and is currently inflicting damage worldwide, but especially in the poorest nations.

At the 19th Conference of the Parties (COP 19) to the United Nations Framework Convention on Climate Change (UNFCCC) in Warsaw, Poland, in 2013, representatives of member countries formally agreed to establish the L&D fund. It was being created to provide financial and technical assistance to economically developing nations that were incurring L&D due to climate change.

At COP 25, the Santiago Network for L&D was set up, but countries didn't commit any funds. Subsequently, at COP 26, the Glasgow Dialogue on finance for L&D was established to continue discussions over the next three years on the fund. Finally, at COP 27 in November 2022, after intense negotiations, representatives of the UNFCCC's member states agreed to set up the L&D fund and a Transitional Committee (TC) to figure out how the new funding mechanisms under the fund would operate. The TC was also to prepare recommendations that countries would consider, deliberate on, and potentially adopt by COP 28.

But so far, four meetings of the TC have concluded with no clear recommendations. And herein lies an important problem.

What has caused the impasse at the TC meetings?

The fourth meeting of the TC, or TC4, concluded on October 20, 2023, with no clear consensus on operationalising the L&D fund. The principal bones of contention had to do with hosting the fund at the World Bank, the foundational principle of common but differentiated responsibilities (CBDR), climate reparations, and the eligibility of all developing nations for the funds. The differences on these counts deepened the rift between developed and developing nations at the TC4 meeting.

An impromptu fifth meeting of the TC, that is TC5, in Abu Dhabi concluded a few days back, and a set of recommendations have been drafted and forwarded to COP 28. TC5 was not on the original agenda — a sign of how contested the L&D fund continues to be.

At the TC5 meeting, developing nations conceded to the fund being hosted by the World Bank Financial Intermediary Fund for an interim period of four years, serviced by a new dedicated and independent secretariat. While the World Bank is yet to confirm that it is willing, it is important to note that it charges an exorbitant overhead fee. Moreover, the developed nations, particularly the U.S., have remained non-committal about being primary donors to the fund and have rejected references to the CBDR, equity, and liability in the draft. The result is that their support is voluntary. This has watered down the spirit and intent of the L&D fund.

Further, there is currently no indication of the size of the fund because such a statement was quashed under pressure from the U.K. and Australia. The current draft simply urges and invites developed nations to provide money.

What are the implications of this outcome?

The TC5 outcome highlights a profound lack of trust between affluent and emerging economies regarding their historical responsibilities, creating a substantial divide between wealthy and impoverished nations, particularly concerning climate reparations.

The unwillingness of wealthy nations to fulfil intended commitments undermines faith in global climate negotiations and hampers the cooperative spirit necessary to address climate change. It represents a missed chance to take concrete steps to combat the escalating consequences of climate change on vulnerable communities and signifies a breakdown in diplomatic efforts, leading to doubts about nations' ability to collaborate effectively.

The discontent among developing nations stems from the perception that their concerns and needs are not adequately addressed by the international community, making the path to climate action — and indeed other global issues — even more complicated.

Beyond the immediate diplomatic and trust-related repercussions, the watering down of the L&D fund has wide-reaching implications. It threatens climate justice and exacerbates the suffering of vulnerable communities in developing nations. These communities have contributed minimally to global emissions but today bear the brunt of climate change. The watering down can also increase the number of humanitarian crises, including via food shortage, people displacement, and conflict, and force communities to cope independently with a worsening climate and its consequences.

The absence of support has economic consequences for both developing and developed nations; financial crises and economic downturns in one region can have extensive repercussions due to the interconnectedness of the global economy. Without adequate L&D funds, there will also be limited capacity to address environmental degradation and the loss of vital ecosystems, which will further worsen environmental crises, causing irreversible harm to the earth.

Finally, climate-change-induced instability can have security implications as well, as conflicts and tensions emerge in vulnerable nations and threaten to spill across borders.

How will L&D funds ensure climate justice?

As we strive to mitigate the worst impacts of climate change, we must remember that adaptation and L&D are not mutually exclusive concepts.

They exist on a continuum of climate resilience, and both have a place in our collective efforts to combat climate change.

A successful response to climate change requires us to balance the proactive measures of adaptation with the moral and financial responsibility of addressing the losses and damages that are — regrettably — an inescapable part of a climate-altered world.

The L&D fund was conceived as a critical component of global climate action, recognising that some of the consequences of climate change are irreversible and beyond the capacity of vulnerable nations to handle. So to achieve climate justice, rich countries must meet their

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obligations to reduce emissions and deliver finance in line with what is fair, and thus uphold the principles of equity, justice, and solidarity in the face of a changing climate.

Otherwise, global climate action will get derailed, putting more pressure on the already beleaguered COP 28 talks later this month.

WHATSAPP'S PREJUDICED STICKERS AGAINST PALESTINIANS: BIAS IN THE MACHINE

Meta's actions in May 2021 appear to have had an adverse human rights impact (in Palestine)." The report commissioned by Meta last year on how its policies harmed the rights of Palestinian Instagram and Facebook users during the attacks on Gaza in 2021 was damning. It also found "a lack of oversight at Meta that allowed content policy errors with significant consequences to occur". In 2023, though, it seems that the bias in the algorithm persists – it's now AI-powered.

An investigation by The Guardian has found that a new feature on WhatsApp – which, like Facebook and Instagram, is owned by Meta — that generates images in response to queries seems to promote anti-Palestinian bias, if not outright bigotry. Searches for "Palestinian" and "Palestinian boy" resulted in images of children holding guns. In contrast, searching for "Israeli boy" shows children playing sports or smiling, and even for "Israeli army" shows jolly, pious — and unarmed — people in uniform. The controversy around AI-generated stickers has not occurred in a vacuum. Meta's social media platforms have been accused of being biased against content from and in support of Palestinians.

For some time now, considerable work has been done around bias in artificial intelligence and machine learning (ML) models. Since the programs are amoral, they can reflect — perhaps even enhance — the prejudices in the data used to train them. Addressing the prejudices in the machine, then, requires active interventions and even regulation. This is easier said than done — large AI and ML models can, at scale, deploy even the smallest bias on a massive canvas. Governments and regulators have their own political ends, and self-regulation by Big Tech remains something of a chimaera. The ethical thing to do, though, is clear. No search should paint people, especially children from an entire community as inherently violent. For all it uses for human beings, AI should not be used to dehumanise so many of them.

HOLLYWOOD ACTORS AND WRITERS' STRIKE CALLED OFF: WHAT WE KNOW ABOUT THE DEAL SO FAR

The strike by Hollywood actors and writers, led by the Screen Actors Guild-American Federation of Television and Radio Artists (SAG-AFTRA) and the Writers Guild of America (WGA), has been called off after approximately four months, following a tentative deal with film studios and streaming services. This strike had halted new film and TV show productions and other related activities.

The strike, starting in May 2023 and joined by SAG-AFTRA in July, was one of the longest in nearly 60 years. It was driven by shifts in the entertainment industry towards streaming platforms, which affected traditional income streams and working conditions. Concerns included the lack of residual income from streaming services and the potential use of AI for scriptwriting and digital manipulation of actors' likenesses without consent or compensation.

Demands from the unions included higher minimum pay, residuals for streaming content, and better contributions to health and pension plans. The tentative agreement, valued at over one

billion dollars, reportedly includes significant compensation increases, groundbreaking provisions for consent and compensation related to AI, a streaming participation bonus, and improved health and pension benefits. There's also mention of better compensation for background performers and measures supporting diverse communities.

The full details of the deal will be revealed after review by the SAG-AFTRA National Board. Although a tentative agreement is in place, it's not final yet. The WGA leadership could vote against ending the strike, and union members might reject the deal in a ratification vote.

Despite the positive aspects of the deal, there are concerns that increased costs for pro-worker provisions might lead to hiring cutbacks and fewer shows and films being produced, especially as platforms like Netflix and Disney face investor pressure over profitability. Meanwhile, workers have criticized the bonuses awarded to top executives amidst cost-cutting claims.

The immediate impact of the strike's resolution includes the resumption of halted projects like 'Deadpool 3' and Ridley Scott's 'Gladiator' sequel. Other productions, such as 'Abbott Elementary' and 'The White Lotus,' are expected to return more quickly following an earlier tentative deal reached by the Writers' Guild in September.

LARGER-SCALE WARFARE MAY HAVE OCCURRED 1,000 YEARS EARLIER

A re-analysis of more than 300 sets of 5,000-year-old skeletal remains excavated from a site in Spain suggests that many of the individuals may have been casualties of the earliest period of warfare in Europe, occurring over 1,000 years before the previous earliest known larger-scale conflict in the region. The study, published in Scientific Reports, indicates that both the number of injured individuals and the disproportionately high percentage of males affected suggest that the injuries resulted from a period of conflict, potentially lasting at least months. Conflict during the European Neolithic period (about 9,000 to 4,000 years ago) remains poorly understood. Previous research has suggested that conflicts consisted of short raids lasting no more than a few days and involving small groups of up to 20-30 individuals, and it was therefore assumed that early societies lacked the logistical capabilities to support longer, larger-scale conflicts. The earliest such conflict in Europe was previously thought to have occurred during the Bronze Age (about 4,000 to 2,800 years ago). Teresa Fernández Crespo from Universidad de Valladolid, Valladolid, Spain and others re-examined the skeletal remains of 338 individuals for evidence of healed and unhealed injuries. All the remains were from a single mass burial site in a shallow cave in the Rioja Alavesa region of northern Spain, radiocarbon dated to between 5,400 and 5,000 years ago. Fifty-two flint arrowheads had also been discovered at the same site, with previous research finding that 36 of these had minor damage associated with hitting a target.

The authors found that 23.1% of the individuals had skeletal injuries, with 10.1% having unhealed injuries, substantially higher than estimated injury rates for the time (7-17% and 2-5%, respectively). They also found that 74.1% of the unhealed injuries and 70.0% of the healed injuries had occurred in adolescent or adult males, a significantly higher rate than in females, and a difference not seen in other European Neolithic mass-fatality sites.

"Adolescent and adult males are particularly affected (44.9% of the 107 identified), comprising 97.6% of unhealed trauma and 81.7% of healed trauma recorded in individuals whose sex could be estimated and showing higher frequencies of injuries per individual than other demographic subgroups," they write. The relatively high rate of healed injuries suggests that the conflict continued over several months, according to the authors.

RISE OF THE DAUGHTER

Her victory came after a spell of sharp media attention, criticism and allegations of nepotism. Born to a well-known political family in Bangladesh, Saima Wazed is now set to lead the World Health Organization (WHO) in South-East Asia as its regional director for five years.

She secured eight out of 10 votes against Shambhu Prasad Acharya, a senior WHO official proposed by Nepal, Bangladesh's neighbour. Ms. Wazed, who advocates mental health policy, will succeed Poonam Khetrapal Singh, an Indian national, who became the first woman to assume the office of WHO regional director for South-East Asia in 2014. In 2018, WHO member states elected Khetrapal Singh for a second five-year term.

After Bangladesh's proposal became public, some media outlets turned the spotlight on her raising questions of nepotism as her mother, Sheikh Hasina, is the Prime Minister of Bangladesh. But Ms. Wazed argued that those articles ignored her professional credentials. "The overt and intentional erasure of my experience, and the attendant reduction of me to being simply my mother's daughter, is sexism and must be called out as such," she said in an opinion piece in response to the media criticism.

Ms. Wazed also resists the perception that she has always lived a life of privilege. Despite being born in Bangladesh as the granddaughter of independence leader Sheikh Mujibur Rahman, she wrote on her website, "my earliest memories were that of growing up in India as a refugee". "Trauma, secrecy, heightened concerns with security while always being aware I was not like everyone else, were second nature to me."

Ms. Wazed portrayed herself as someone assimilating into diverse cultures, saying she spoke Hindi fluently as a child with neighbours and friends, spoke Bangla at home, and learnt English in school. "Celebrating Diwali and Holi with others, and watching my mother pray namaz were typical for us," she said.

Her young adult years were spent in Florida, living, learning, and working among what she said was a "melting pot" of European, Asian, Caribbean, and South American cultures that expanded my knowledge of family dynamics, religious, and socio-cultural norms and practices".

ENVIRONMENTAL FACTORS DETERMINE HEIGHT OF CHILDREN

In a significant finding, scientists have discovered that environmental factors play a greater role than genetic variants in determining the height of children in low- and middle-income countries (LMICs) in contrast to those from European nations, where genetic aspects predominate in regulating childhood height.

This was expounded in a study carried out by the Hyderabad-based Centre for Cellular and Molecular Biology (CSIR-CCMB) along with several other national and international institutions. The study was recently published in the journal Nature Communications.

While human height is strongly influenced by fixed genetic and variable environmental factors, the authors of the study noted that the contribution of modifiable epigenetic factors is under-explored. Epigenetic factors are external influences, including lifestyle, nutrition and environment that affect the way genes work. Epigenetic changes affect gene regulation and alter gene expression but not the DNA sequence.

Many environmental factors, including socio-economic status, nutrition and infection load are believed to influence childhood growth which plays a critical role in determining one's height. Quoting the World Health Organization, 2021 estimates which indicated that a large proportion of stunted children reside in LMIC, particularly in South Asia and sub-Saharan Africa where undernutrition and associated co-morbidities are more prevalent compared to high income countries (HICs), the study observed "this offers a potential explanation for the disparity in height variation attributed to non-genetic factors between LMIC and high-income countries".

Although the impact of environmental exposure during early childhood is believed to be quite significant with long-term consequences, there are no genome-wide epigenetic investigations on height in childhood especially in low and middle income countries. Epigenetic processes such as DNA methylation and histone modifications can influence gene expression. Methylation basically is chemical modification of DNA molecule used by cells to regulate gene expression. It can be influenced by environmental factors such as diet, drugs, stress, exposure to chemicals and toxins.

In this study, the scientists did an epigenome-wide association analysis and genome-wide association study to independently investigate links between DNA methylation and genetic variants with childhood height in five cohorts—three from India, one from Gambia and another one from the U.K. The scientists found a novel, robust association between methylation in the SOCS3 gene and height in children from low and middle income countries which was replicated in the HIC cohort but with a lower effect size. "Overall, our study provides strong evidence of genome-wide DNA methylation associations with height in children from LMIC", the study observed. Interestingly, the established 12,000 genetic variants were also associated with height in Indians but their effect was lower compared to the European and American counterparts.

According to Dr. Giriraj Chandak, Sir J C Bose Fellow at CCMB, the genetic risk variations are similar for Europeans and Indians, although the magnitude differs between the two ancestries. However, the genetic risk appears to have been modified due to environmental factors in children in LMIC. The environmental cues that trigger the epigenetic processes in children in low and middle income countries are different in Indians and thus not influencing the epigenetic regulation of height in Europeans, he added.

WATER EVAPORATION

Can light make water evaporate without heat?

Evaporation is happening all around us all the time. But our understanding of this process may have been missing a piece all this time. Researchers have been puzzled upon finding that water in their experiments, which was held in a sponge-like material known as a hydrogel, was evaporating at a higher rate than could be explained by the amount of heat, or thermal energy, that the water was receiving. After carrying out a series of new experiments and simulations, a team of researchers at MIT concluded: Under certain conditions, at the interface where water meets air, light can directly bring about evaporation without the need for heat, and it actually does so even more efficiently than heat. In this, the water was held in a hydrogel material, but the researchers suggest that the phenomenon may occur under other conditions as well. The phenomenon might play a role in the formation and evolution of fog and clouds, and thus would be important to incorporate into climate models to improve their accuracy, the researchers say.

COLOURS OF TUBELIGHTS

Q: Why are fluorescent lamps marked 6500 K (tube light)?

A: The value 6,500K marked on fluorescent lamps represents a parameter called correlated colour temperature. It means that the spectral, or light, colour distribution from that lamp is similar to that of a black body at that temperature.

Any black body when heated emits different colours at different temperatures: at 2,000K it emits red light; at 4,000K it is yellowish white; at 2,700K, it provides warm light; and at 6,500K, it gives the impression of cool daylight, according to illumination engineers.

Based on colour appearance, fluorescent tubes are classified into three types: daylight white (above 5,000K), neutral white (4,000K), and warm white (below 3,300K).

The colour of light depends on the fluorescent coating inside the tube. Three types of coatings are generally given: tri-phosphor, standard phosphor, and multi-phosphor.

Standard phosphor is used in ordinary tube lights. Tri-phosphor coated lamps, like incandescent lamps, emit yellow light similar to sunlight. Standard tube lights render a colour similar to daylight.

NICED MAKES QUICK DETECTION OF DRUG-RESISTANT H. PYLORI POSSIBLE

A two-step PCR-based assay of a small region of the Helicobacter pylori (H. pylori) bacteria can help detect H. pylori infection and also identify clarithromycin-resistant bacteria and those which are drug-sensitive in six-seven hours has been developed by a team of researchers from the National Institute of Cholera and Enteric Diseases (ICMR-NICED), Kolkata. Since H. pylori bacteria grow slowly, it takes about a week to culture the bacteria and a couple of more weeks to test for drug-sensitivity, which the new diagnostic assay bypasses. The molecular-based assay has been found to have 100% sensitivity and specificity. There is an increasing trend of clarithromycin-resistant H. pylori bacteria in India leading to a decreasing success rate in treating the infection.

Risk factors

Most of the infections caused by the bacterium H. pylori are asymptomatic, 10–15% of them develop peptic ulcer disorders or stomach cancer. In India, H. pylori infections affect 60-70% of the population. H. pylori infection is often acquired during childhood and remains in the stomach throughout life if not treated with antibiotics effectively. So, if someone suffers from gastroduodenal diseases along with the detection ofH. pyloriinfection, eradication of the bacteria provides the most effective treatment. Importantly, H. pylori infection is one of the robust known risk factors for gastric cancer. As it takes three-four weeks to culture the bacteria and carry out drug-sensitivity tests, drug-resistant studies of H. pylori are seldom carried out in India. So, the conventionally used empirical treatment using clarithromycin is routinely used without knowing the drug-sensitivity. The growing incidence of clarithromycin-resistant bacteria is a big concern and has to be addressed as it is the most important reason for treatment failure. The NICED researchers undertook the study to identify the root cause of resistance toward clarithromycin and to develop a molecular-based technique for rapidly detecting antibiotic resistance.

The team led by Dr. Asish Kumar Mukhopadhyay from NICED turned to genome sequencing to identify that the drug resistance was due to a point mutation (A to G mutation at 2143 position)

in the 23S ribosomal RNA (rRNA) gene of the bacteria. To confirm that the point mutation was indeed responsible for drug-resistance, the researchers isolated and amplified 617 base pairs that contained the point mutation and transferred the base pairs to drug-sensitive bacteria. "The drug-sensitive bacteria carrying the point mutation became resistant to the drug thus confirming that the point mutation was indeed responsible for developing resistance towards clarithromycin," Dr. Mukhopadhyay tells The Hindu. To further confirm the role of point mutation in drug resistance, the team sequenced the bacteria that had become drug-resistant after the base pairs were transferred and found that the point mutation was present in the bacteria. The results were published recently in the journal Gut Pathogens.

Bioinformatics study revealed that drug-resistant and drug-sensitive strains had very different binding affinity for the drug — the drug's binding affinity to the mutant was weaker compared with drug-sensitive bacteria. "Due to weak binding, less amount of the drug is able to get into the bacteria and so is unable to kill them. The point mutation is thus responsible for the clarithromycin resistance," he says.

THE ZIKA GENOME AND INSIGHTS INTO THE ERA OF EMERGING OUTBREAKS

The dengue virus and its equally infamous cousin, the Zika virus, together infect up to around 400 million people every year. The Zika virus and genomic studies of it have opened fascinating windows into our knowledge of the infectious disease and its relevance in the context of emerging outbreaks.

The Zika virus is a mosquito-borne flavivirus. Most infections in humans are asymptomatic or with mild symptoms, including fever, rash, and joint pain. The Zika virus became notorious during the 2015-2018 outbreak that swept through the Americas. The outbreak was characterised by an alarming increase in the number of microcephaly cases in new-borns, prompting the World Health Organisation to declare it a public health emergency of international concern in early 2016.

From Africa, the Zika virus has spread to Asia, Pacific islands, to the Americas, and beyond. The disease has of late been in the headlines with multiple outbreaks in the last few years in multiple Indian states, including, more recently, Kerala and Karnataka.

Researchers isolated the virus in 1947 from monkeys from the Zika forest in Uganda. The first human cases were detected in 1952 in Uganda and Tanzania. There have since been multiple outbreaks around the world, but largely confined to the tropics.

A significant number of insights have come from the Zika virus's genome. Researchers sequenced the complete genome first in 2007. It has more than 10,000 bases of single-stranded RNA. The genome is also peculiar: it encodes for a large polyprotein, which is further cleaved into capsid, membrane precursor (prM), envelope, and seven non-structural proteins.

The diagnosis of a Zika virus infection is mostly through genetic testing. An antibody-based test would be complicated because antibodies produced by the infection can cross-react with those of the dengue (DENV), yellow fever, and West Nile viruses.

Epidemiology and surveillance

The Zika virus has an RNA genome, and thus a very high potential to accumulate mutations. The tools, techniques, and modalities we've developed to track the evolution, genetic epidemiology,

and molecular underpinnings of transmission and pathogenesis could be extended to Zika virus outbreaks as well.

Genomic studies have suggested that the Zika virus has two lineages: African and Asian. (The lineage that wreaked havoc in the Americas is a sub-lineage with genomes similar to those of isolates from an outbreak in French Polynesia in 2013-2014.)

In a significant example of the usefulness of genetic surveillance plus sequencing, researchers in the U.S. used active surveillance of travellers to uncover a hidden outbreak in Cuba, and also established its time characteristics. The work was published in Cell in August 2019.

Zika and microcephaly

The small heads of children born to infected mothers has been one of the more alarming complications of a Zika virus infection.

Earlier, based on studies with mice, researchers had suggested that a mutation in one of the precursor membrane proteins, called prM, of the Zika virus was associated with microcephaly. Researchers also suspected that this mutation originated during the outbreak in French Polynesia in 2013 before breaking out in South America, causing microcephaly.

However, while the large outbreak in South America was caused by lineages of the virus with the specific mutation, only a subset of the relevant pregnancies resulted in microcephaly. Scientists have since been trying to understand the molecular mechanism that causes microcephaly only in some cases.

The Zika-microcephaly hypothesis also suffered when researchers recorded microcephaly in Thailand following infections of the Asian lineage of the Zika virus that lacked the mutation. Differences in the prevalence of microcephaly across geographical areas in Brazil also suggested that scientists' picture is incomplete.

This said, a study published recently in Science Translational Medicine, and conducted with primates, suggested that the foetal Zika virus infections were associated with heavy viral loads during pregnancy, and the viral load strongly influenced foetal growth. In another recent study in the same journal, researchers again used primate models to suggest that preexisting antibodies against DENV could worsen the severity of congenital Zika.

Taken together, the findings underscore the importance of the viral load and DENV infections for the occurrence of microcephaly.

Making it attractive

Zika virus and DENV infections are interesting in their own right. In a beautiful demonstration of the interplay between organisms with significant public health consequences, researchers in Tsinghua University, suggested in a recent study in Cell that infections of two viruses in primates encourage specific microbes to grow on the skin by suppressing an antimicrobial peptide, RELM, on the skin. These microbes produce acetophenones, which are volatile molecules that could provide a chemical cue to mosquitoes, attracting them towards the individual and supporting forward transmission of the viruses.

The researchers also reported that administering isotretinoin could upregulate RELM and reverse this phenomenon.

Zika virus and DENV interactions have also been an interesting area of research. A significant body of evidence suggests that a Zika virus infection can significantly increase the risk for severe dengue. Researchers exposed a large cohort of people in Nicaragua to both Zika and DENV one after the other, and found that while high levels of anti-DENV antibodies were protective, intermediate levels due to a prior Zika or DENV infection could significantly enhance the severity of dengue infections. This observation is of great public health significance because Zika and dengue circulate around the planet, and could inform the design of Zika vaccines.

As climate change helps drive the spread of vector borne diseases, and global warming brings environmental conditions that favour them to new places, our genomic technologies and such deep insights into the molecular pathogenesis of these viruses will be an important guiding light.

WOLBACHIA: AN UNLIKELY HERO

WHAT IS IT?

Wolbachia is a genus of bacteria that has evolved complex relationships with the many insects that can host it. It is named for the American pathologist Simeon Burt Wolbach, who identified it along with Marshall Hertig in 1924.

In 1971, researchers discovered that when male Culex mosquitoes infected by Wolbachia bacteria fertilised healthy eggs from a female, the eggs died. The bacteria modified the male's sperm cells in a way that only the bacteria could reverse. So if the female mosquito was uninfected, her egg cells would be damaged. But if the female was infected by Wolbachia, the eggs would be viable if the male was uninfected or infected by the same strain of Wolbachia. This means infected female mosquitoes gain a reproductive advantage over time as the amount of Wolbachia in the population increases.

Wolbachia can also reduce the rate at which chikungunya and yellow fever viruses multiply in infected mosquitoes. Scientists have also found that some Wolbachia species can strongly protect some mosquito species against the malaria parasite. So they are currently studying a way to have the right strain of Wolbachia rapidly spread in a particular mosquito population, in the right environmental conditions, such that the bacteria can suppress malaria transmission. If this is achieved, it will be a significant weapon in our millennia-long fight against mosquito-borne diseases.

CONSIDERING THE IMPACT OF DIABETES ON YOUR LIVER

November 14 will be observed across the world as Diabetes Day. A senior diabetologist delves into an emerging concern related to his field — the liver. The path ahead is to adopt a more wide, metabolic based care, he says

The prevalence of diabetes is growing rapidly all over the world and in India. According to a recent ICMR-INDIAB Study published by us in the Lancet Diabetes Endocrinology, the number of people with diabetes in India now stands at 101 million. In addition, there are 136 million people with prediabetes. It is well known that uncontrolled diabetes can lead to complications affecting the eye, kidney, heart, feet and nerves. However, the relationship between diabetes and the liver is not well appreciated and only recently has this link been emphasised.

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So, what is the connection between diabetes and the liver?

The liver is a store house or a factory for various products and one of them is glucose. When there is excess glucose in the body, it gets deposited in the liver as glycogen. Moreover, the excess fat in the blood circulation (triglycerides and free fatty acids) also gets deposited in the liver and this is called 'Fatty Liver'.

Epidemiological studies at the Madras Diabetes Research Foundation have shown that over 50% of people with type 2 diabetes have some degree of fatty liver. When there is excess fat in the liver, this leads to a condition called 'Hepatic Insulin Resistance'. What this means is that the body's insulin cannot function properly and that the action of insulin in the liver is considerably reduced. This leads to increased release of glucose from the liver, which is referred to as 'Hepatic Glucose Production'. The early morning increase in glucose levels i.e. increase in the fasting plasma glucose is mainly attributed to this increased hepatic glucose production.

The relationship between fatty liver and type 2 diabetes is bidirectional. Thus, fatty liver can lead to type 2 diabetes and type 2 diabetes can promote fatty liver. Our studies have shown that if both obesity and diabetes are present, over 80% of such individuals will have fatty liver. While fatty liver by itself is not dangerous, very often it leads to inflammation of the liver, a condition known as Non-alcoholic 'Steatohepatitis' or NASH. Up to this stage it is probably reversible. However, at the next stage, it can progress to cirrhosis of the liver which is irreversible and can be fatal. Some people with cirrhosis of the liver even go on to develop hepatocellular carcinoma (HCC). The link between diabetes, fatty liver, cirrhosis and HCC is being increasingly recognised.

Today non-alcoholic fatty liver (NAFLD) is recognised as a complication of diabetes and also as a cause of diabetes. Recently there is a shift in the treatment of diabetes from a glucose centric approach, to a wider metabolic based care. Indeed, 'diabetes care' is slowly evolving into 'metabolic care' with the liver taking centre stage, along with the heart and kidney. Thus, while choosing antidiabetic medications, those beneficial to the liver, heart and kidneys are preferred.

Recently the close association of metabolic syndrome (a term used to refer to a combination of diabetes, hypertension and central obesity) and NAFLD has been recognised and internationally, the term NALFD is being replaced with 'Metabolic dysfunction-associated fatty liver disease' (MAFLD).

How can we treat MAFLD?

The best way is lifestyle modification. A healthy diet consisting of less calories, carbohydrate and fat but more vegetable protein and fibre is a powerful tool to lose weight and treat excess fat in the liver. Adequate exercise (e.g. walking, jogging, swimming etc.) along with yoga can also help shed extra kilograms. It has been shown in research trials, that by profound calorie restriction (about 800 calories /day), excess fat in the liver can melt away even within a week! This can lead to reversal of diabetes and other metabolic abnormalities within a few days or weeks, even before significant weight loss is achieved.

Today, we also have specific medicines which can help reduce fatty liver and reverse liver changes even at the NASH stage. It is therefore important to identify early changes in the liver to prevent progression to its more advanced stages like cirrhosis or carcinoma. Apart from check ups for eyes, kidneys, heart, feet and nerves, the liver should also be included in the annual work up of all individuals with diabetes. This is my wish on the occasion of World Diabetes Day 2024.

DOES A DIET HIGH IN FIBRE HELP MANAGE BLOOD SUGAR LEVELS?

Reduce sugar is the catch phrase heard frequently to manage diabetes, so much so that as the festive season approaches, sweet shops are bringing out low-sugar delicacies. 'Natural', 'no sugar' and 'diabetic friendly' options abound -- a testament to the staggering numbers India is dealing with.

What happens though, when you add a significant quantity of fibre to your diet when you have diabetes? A survey attempted to find the answer.

'STAR'(Survey for Management of Diabetes with Fibre-rich Nutrition Drink), a pan-India survey, was conducted amongst 3,042 people with Type 2 diabetes, the results were published in the Indian Journal of Clinical Practice in August.

The survey categorised people with diabetes into two groups: one group that consumed medical-grade high-fibre supplement for a minimum of three months, and the other group that did not.

It found that people with diabetes who took the supplement, reported significantly lower HbA1C (blood sugar) levels and higher weight loss, along with feelings of satiety, compared to those who did not consume the supplement.

The survey was supported by Hindustan Unilever, a company that sells health food drinks.

Increasing the fibre in your diet to manage diabetes is nothing new: studies across the world have shown the role of fibre in not just controlling blood glucose, but also lowering cholesterol, and maintaining digestive health. Because the body cannot absorb and break down fibre, it helps with a slow, sustained release of energy, preventing a spike in blood sugar levels. It also helps your gut microbiome, and increases your feeling of being 'full.'

The problem is, says Sanjay Kalra, president, South Asian Federation of Endocrine Societies and lead author of the survey, most people with diabetes do not get the required amount of fibre.

The Research Society for Study of Diabetes in India (RSSDI), in its Clinical Practice Recommendations 2022 for medical nutrition therapy, states that fibre intake should be 25 to 40 grams per day, while carbohydrates should be limited to 50-60% of total calories.

However, in Indian diet, carbohydrates are 70 to 80%, says Dr Kalra. "This is was not an issue earlier, with traditional diets that relied on whole grains. Now fibre consumption has decreased while carbohydrate remains the same. What is concerning, is that a lot of the carbohydrates are from ultra-processed food."

What constitutes fibre?

According to an article on the Centers for Disease Control and Prevention's website, fibre is soluble and insoluble. Both have health benefits.

Soluble fibre dissolves in water and slows down digestion. It helps control blood sugar and cholesterol. It is found in fruits like apples, bananas and guavas, and in oats, peas, carrots, black beans, kidney beans and figs.

The other kind, insoluble fibre, does not dissolve, and typically remains whole as it passes through your stomach. It supports insulin sensitivity and helps keep your bowels healthy. It is found in whole wheat flour, nuts, seeds, lentil and vegetables like cauliflower.

The cost factor

Fruits, vegetables and nuts are more expensive compared to carbohydrates, points out Nihal Thomas, senior professor, department of endocrinology, diabetes and metabolism, Christian Medical College, Vellore.

This, he said, makes healthy diets unaffordable for a large number of people in the country who rely on cheaper, carb-heavy foods, thereby contributing to the diabetes burden -- 10.13 crore people in our country of 140 crore could potentially be diabetic, as per latest estimates.

Prof Thomas called for policy changes to make healthier foods more affordable.

Incorporating in the diet

25 to 40 grams of fibre per day may sound daunting, especially when you realise that one medium apple, with its skin, has only about 3 to 4 grams of fibre.

The idea, says the CDC, is to spread your fibre intake among different foods throughout the day. This may perhaps mean incorporating oats and nuts into your breakfast, opting for whole grains, choosing non-starchy vegetables and snacking on seeds. But it also cautions people to make this move slowly: too much fibre too soon, can lead to bloating and constipation. And remember, drink lots of water!

INDIA'S HYPERTENSION MAP: HOW DIFFERENT STATES, REGIONS FARE

There is a significant variation in the level of prevalence, diagnosis, treatment, and control of hypertension within Indian states, and even within districts in states, an analysis of the recent National Family Health Survey data published in the journal JAMA said.

The researchers said that the national mean values of hypertension "hide considerable" variation at the district level, and recommended "targeted, decentralised solutions."

What does the study tell us about hypertension care in India?

The national-level data shows what doctors across the country already know — a larger number of those with hypertension do not get diagnosed; among those who get diagnosed, many do not initiate treatment; and among those who do initiate treatment, few are able to control their blood pressure. Only one in three receives a diagnosis, one in five gets treated, and one in twelve achieves blood pressure control.

The interesting find is the inter-state and inter-district variability of the levels of continuum of care.

At state level

The study found that the prevalence of hypertension was similar among the southern states but it was higher than the national average — 29.9% of the population in the southern states as compared with 26.8% across India.

The proportion of people diagnosed with hypertension in the southern states was similar to the rest of India, but the proportion of people on treatment and under control was higher in these states, the study showed.

At district level

Not only at the state-level, there were significant variations within states as well. The researchers cited the example of two states to demonstrate this.

In Meghalaya, the prevalence of hypertension was similar in the districts of Garo Hills (21.8%), Jaintia Hills (19.8%), and Khasi Hills (23.1%). However, the proportion of those diagnosed was lower in Garo Hills at 18.6% as compared with 29.4% in Khasi Hills and 41.1% in Jaintia Hills.

In Karnataka, four districts — Chikmagalur, Shimoga, Udupi and Chitradurga — have a similar prevalence of hypertension, but the proportion of people who received treatment and successfully controlled it was higher in Chikmagalur and Udupi.

What's the impact of age, gender, and education?

Even at the national level, there were significant variations in the levels of continuum of care depending on the gender, age, socio-economic conditions, and education level of the person.

While it is well-known that men are more likely to have hypertension than women, surprisingly, the data show that women are much more likely to be diagnosed, be on treatment, and have their blood pressure under control.

The prevalence, diagnosis, treatment, and control were all higher among those over the age of 65 years when compared with youngsters. When it comes to socio-economic conditions, the prevalence, diagnosis, treatment, and control of hypertension were found to be highest among the wealthiest fifth of the population.

While the prevalence of hypertension was similar among those who had had no schooling and those who had passed Class 11, diagnosis, treatment, and control was higher among those who had completed schooling.

What needs to be done to control hypertension in India?

A recently released WHO report on hypertension said nearly 4.6 million deaths can be averted in India by 2040 if just half of the hypertensives are able to control their blood pressure. Towards this, the government this year launched an ambitious initiative to put 75 million people with hypertension or diabetes on treatment by 2025.

Controlling hypertension, however, would not merely require an increase in infrastructure, but also a focus on active screening of people, putting them on treatment, ensuring availability of medicine close to their homes, and ensuring follow-ups.

PSORIASIS PATIENTS CONTEND WITH LACK OF AWARENESS, BAD LIFESTYLE CHOICES AND POOR INSURANCE COVER

Psoriasis, a prevalent autoimmune disease, is often misunderstood and stigmatized, affecting millions worldwide. Characterized by skin rashes typically appearing on the face, elbows, and

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knees, psoriasis is more than just a skin condition; it's a complex interplay of genetic, environmental, and immunological factors.

The Many Faces of Psoriasis

The most common type, psoriasis vulgaris, presents as red, scaly patches on the skin. However, this condition can manifest in various forms, some of which are debilitating. Arthritic psoriasis, a form that involves joint pain and swelling, leaves the patient with gnarled fingers. It may be inherited and exacerbated by stress. This demonstrates the disease's unpredictable and challenging nature.

The Impact on Daily Life

Psoriasis significantly impacts patients' quality of life. Individuals face social stigma and isolation due to visible symptoms. Misconceptions like confusing psoriasis with skin cancer further alienate sufferers, adding emotional distress to their physical challenges.

The Role of Lifestyle and Diet

Medical experts emphasize the influence of lifestyle on psoriasis management. Dr. Muralidhar Rajagopalan, a senior dermatologist, notes that lifestyle changes, including diet and exercise, can mitigate symptoms. Obesity, alcohol, and smoking are known aggravators. Improved condition, upon adopting home-cooked meals, underscores the role of diet in controlling flare-ups.

The Medical Perspective

Psoriasis is driven by immune signals like interleukins and cytokines. Abdominal fat, producing substances like adipokines and TNF alpha, adversely affects psoriasis, making weight management crucial. The disease is also linked to serious health conditions like cardiovascular diseases and diabetes, necessitating a holistic approach to patient care.

Treatment Challenges

Access to treatment and its high cost pose significant hurdles. Expensive medications and injections, reflects the financial burden many patients face. In countries like India, where psoriasis is often not covered by insurance, these challenges are amplified.

The Need for Awareness and Support

Increased awareness and a supportive network are vital for managing psoriasis. As Dr. Muralidhar points out, making psoriasis a reportable disease and recognizing its associated disabilities could improve patient care and support. The role of healthcare professionals, in educating patients and the public about psoriasis, its triggers, and management strategies cannot be overstated.

Conclusion

Psoriasis is more than a skin condition; it's a life-altering autoimmune disease with far-reaching implications. Understanding its complexities, addressing the stigma, and providing adequate support and treatment options are crucial for improving the lives of those affected. As we continue to unravel the mysteries of this condition, empathy and education remain our most potent tools in the fight against psoriasis.