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INTERNATIONAL

SECOND INNINGS HOPES

U.S. President Joe Biden, 80, has announced that he will be seeking re-election in the 2024 presidential polls, a goal which, if he succeeds, will ensure that the Democrat breaks his own 2020 record of being the oldest ever U.S. President. With Vice-President Kamala Harris, of joint Indian-African heritage, throwing her hat in the ring again as Mr. Biden's running mate, and with former President, Republican Donald Trump, 76, already in the fray as the frontrunner conservative candidate, it is likely that the contest may revert to a scenario similar to the one seen in 2020. While that would not be an unprecedented outcome in U.S. political history — it happened before with Benjamin Harrison and Grover Cleveland in 1888 and 1892; William Bryan and William McKinley in 1896 and 1900; and with Adlai Stevenson and Dwight Eisenhower in 1952 and 1956 — this would only be the fourth such instance of repeat presidential candidates in the post-Civil War period. Such an eventuality would also raise the question of why, within the Democratic and Republican Parties, there appears to be a paucity of charismatic and capable leaders who could offer a fresh take on the myriad of policy issues that beset the country and have bitterly polarised the electorate.

It is significant that Mr. Biden's campaign announcement video began with visuals of the January 6, 2021 Capitol attack, indicating that the incumbent sees his second bid for the Oval Office as a projection of the alternative to Mr. Trump's MAGA vision and would seek to emphasise the very threat to democracy that the idea of the "stolen election" of 2020 poses. In truth — and this may be a lesson to the Biden campaign that becomes apparent as the coming 18 months before the next election roll by — Mr. Biden may have to do far more than simply be an alternative. Not only would he have to "finish the job" on matters such as levying higher tax on the wealthiest Americans, stabilising the social security system, tackling inflationary threats, keeping up the momentum on job creation and providing humane yet practical immigration policy solutions, but he would also have to reckon with the fact that the worst of the pandemic effects have passed and the Russian invasion of Ukraine has moved beyond the one-year mark. In this new reality, for whichever among the 46th and 45th Presidents prevails in 2024, there will be a pressing need for blue-sky thinking on profound questions regarding public health and biosecurity; on NATO's role in Europe and the challenges of coordinating between European powers to eventually end the war in Ukraine; and the eternal question of how to keep America at the forefront of technological innovation and jobs.

SUPREME COURT PRESERVES BROAD ACCESS TO ABORTION PILL

The U.S. Supreme Court on Friday blocked new restrictions set by lower courts on a widely used abortion pill, delivering a victory to President Joe Biden's administration as it defends broad access to the drug in the latest fierce legal battle over reproductive rights in the United States.

The justices, in a brief order, granted emergency requests by the Justice Department and the pill's manufacturer Danco Laboratories to put on hold an April 7 preliminary injunction issued by U.S. District Judge Matthew Kacsmaryk in Texas. The judge's order would greatly limit the availability of mifepristone while litigation proceeds in a challenge by anti-abortion groups to its federal regulatory approval.

Biden's administration is seeking to defend mifepristone in the face of mounting abortion bans and restrictions enacted by Republican-led states since the Supreme Court in June 2022 overturned the landmark 1973 Roe v. Wade decision that had legalized the procedure nationwide. Alito authored that ruling.

Mifepristone is taken with another drug called misoprostol to perform medication abortion, which accounts for more than half of all U.S. abortions. The drug also has other uses, such as the management of miscarriages.

The administration and Danco told the justices in their filings that mifepristone might not be available for months if the restrictions were allowed to take effect.

Anti-abortion groups led by the recently formed Alliance for Hippocratic Medicine and four anti-abortion doctors sued the FDA in November. The plaintiffs contend that the agency used an unlawful process to approve the drug, which they consider to be dangerous. The FDA has called mifepristone safe and effective as demonstrated over decades of use by millions of Americans, adding that adverse effects are exceedingly rare.

A former Christian legal activist, Kacsmaryk had a long track record of opposing abortion before the U.S. Senate confirmed him in 2019 to a life-tenured position as a federal judge.

Since last year's Supreme Court decision, 12 U.S. states have put in place outright bans while many others prohibit abortion after a certain length of pregnancy. The latest Republican-led move came in Florida, where Governor Ron DeSantis on April 13 signed a new law that bans most abortions after six weeks of pregnancy.

Kacsmaryk's decision conflicted with an order also issued on April 7 in a separate case from Washington state directing the FDA to keep mifepristone available in 17 states and the District of Columbia.

108 YEARS OF ARMENIAN 'GENOCIDE': WHAT HAPPENED, AND THE DEBATE AROUND WHAT TO CALL IT

On this day 108 years ago, on April 24, 1915, the Ottoman Empire (now Turkey) began rounding up Armenian political and cultural leaders in Constantinople, marking the beginning of what would come to be known as the Armenian genocide.

Over the next year or so, over a million Armenians would die — executed, murdered, or left to die of exhaustion and starvation. Many others would be exiled, losing their homeland forever.

In the century since, the term "genocide" is still not universally applied to the Armenian tragedy, though support for that is growing.

Turkey, meanwhile, insists what happened was not genocide, contests the number of victims, and punishes citizens who dispute the official version: Nobel Laureate Orhan Pamuk and Booker Prize nominee Elif Shafak, both of whom faced legal proceedings, are a case in point.

What exactly was done to the Armenians before World War I? What is the official definition of genocide, and what is the debate around whether or not the Armenian massacre can be called one?

What happened to the Armenians

Armenians are an ancient people, whose traditional homeland by the beginning of the 20th century was divided between the Russian and the Ottoman empires. In the Ottoman Empire, dominated by Muslims, Armenians were a Christian, well-off minority. On account of their religion, they faced discrimination, which they had been protesting against and demanding greater say in the government. This had led to resentment and attacks against the community.

By the beginning of the 1900s, the once vast and mighty Ottoman Empire was in the throes of a churn, territories at its far-flung borders breaking away and the ones at its heart restive for change.

In 1908, a revolution brought a group called the Young Turks to power, and paved the way for the Committee of Union and Progress (CUP), Ittihad ve Terakki Jemiyeti, forming the government. This regime wanted 'Turkification' of the empire and was hard on minorities.

In August 1914, World War I broke out, and the Ottoman Empire joined forces with Germany and Austria-Hungary against Russia, Great Britain and France. The war brought antipathy towards Armenians to a boil, especially as some Armenians were sympathetic to Russia and even willing to help it in the war. Soon, the Armenians as a whole were seen as a threat. On April 14, 1915, crackdown on the community began in earnest with the arrest of prominent citizens in Constantinople, many of whom were executed. The government then ordered forcible eviction of Armenians.

The US Holocaust Memorial Museum says on its website, "Fearing that invading enemy troops would induce Armenians to join them, in spring 1915 the Ottoman government began the deportation of the Armenian population from its northeastern border regions. In the months that followed, the Ottomans expanded deportations from almost all provinces regardless of distance from combat zones. The victims of the Armenian genocide include people killed in local massacres that began in spring 1915; others who died during deportations, under conditions of starvation, dehydration, exposure, and disease; and Armenians who died in or en route to the desert regions of the southern Empire [today: northern and eastern Syria, northern Saudi Arabia, and Iraq]. In addition, tens of thousands of Armenian children were forcibly removed from their families and converted to Islam."

Rouben Paul Adalian, the director of the Armenian National Institute in Washington, DC, writes on the museum's website, "A sizable portion of the deportees, including women and children, were indiscriminately killed in massacres along the deportation routes. The cruelty characterizing the killing process was heightened by the fact that it was frequently carried out by the sword in terrifying episodes of bloodshed...The government had made no provisions for the feeding of the deported population. Starvation took an enormous toll much as exhaustion felled the elderly, the weaker and the infirm. Deportees were denied food and water in a deliberate effort to hasten death. The survivors who reached northern Syria were collected at a number of concentration camps whence they were sent further south to die under the scorching sun of the desert."

What Turkey claims happened

Over the years, Turkey has expressed condolences over the deaths, but has stidently refused to accept that the Armenian massacre was a planned genocide. The website of its foreign ministry has a chapter dedicated to "The Armenian Allegation of Genocide: The issue and the facts".

The website says, "... during these waning days of the Ottoman Empire did millions die, Muslim, Jew, and Christian alike. Yet Armenian have attempted to extricate and isolate their history from the complex circumstances in which their ancestors were embroiled. In so doing, they describe a world populated only by white-hatted heroes and black-hatted villains. The heroes are always Christian and the villains are always Muslim."

The website goes on to say that "prior to World War I, fewer than 1.5 million Armenians lived in the entire Ottoman Empire. Thus, allegations that more than 1.5 million Armenians from eastern Anatolia died must be false"; "Armenian losses were few in comparison to the over 2.5 million Muslim dead from the same period"; " it was the Ottoman Armenians' violent political alliance with the Russian forces, not their ethnic or religious identity, which rendered them subject to the relocation"; that during the relocation, the government did try to protect the unpopular Armenians but the local populations attacked them; and that Armenian claims of torture and excesses depend on dubious historical sources.

What exactly is genocide?

According to the United Nations website, "The word 'genocide' was first coined by Polish lawyer Raphäel Lemkin in 1944 in his book Axis Rule in Occupied Europe. It consists of the Greek prefix genos, meaning race or tribe, and the Latin suffix cide, meaning killing."

While the term "genocide" is often used loosely in a variety of circumstances, the United Nations definition of the term is narrow and strict.

It says a crime of genocide includes two main elements, "a mental element: the intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such, and a physical element, which includes the following five acts, enumerated exhaustively: killing members of the group; causing serious bodily or mental harm to members of the group; deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part; imposing measures intended to prevent births within the group; forcibly transferring children of the group to another group."

The intent part here is crucial. Also, the members of the attacked group must have been attacked because they are members of the group, and not as individuals, for the crime to qualify as a genocide.

As the UN says, "The intent is the most difficult element to determine. To constitute genocide, there must be a proven intent on the part of perpetrators to physically destroy a national, ethnical, racial or religious group. Cultural destruction does not suffice, nor does an intention to simply disperse a group... the target of destruction must be the group, as such, and not its members as individuals."

Recognition of Armenian 'genocide'

As of today, 32 countries, including the US, France, Germany, recognise the Armenian genocide. India does not, nor does the UK. The US joined this group only in 2021, under President Joe Biden, and support from other countries too was slow in coming.

Turkey's geopolitical importance has meant that not a lot of governments want to pick issues with it on the Armenian issue. Although most countries have condemned the tragedy, the use of 'genocide' has been avoided, as the term was coined only in 1944 and because Turkey has always claimed that there is no proof the deaths were planned and targetted.

The modern state of Armenia has in the past sought better ties with Turkey, although the two are now locked in a tussle over the Nagorno-Karabakh region, an Armenian-dominated part of Azerbaijan where Turkey supports Azerbaijan.

On Sunday, about 10,000 people bearing torches marched through Armenia's capital, Yerevan. While the march was in the memory of the past tragedy, activists also burnt the flags of Turkey and Azerbaijan, as present tensions continue to simmer.

THE WAGNER GROUP'S ACTIONS IN AFRICA

The story so far:

After fighting erupted in Sudan's capital Khartoum on April 15, questions have been raised over the involvement of the Wagner group, which has been active in African countries for years.

What is the Wagner group?

The Wagner group is a Russian paramilitary organisation headed by Yevgeny Prigozhin. Though it has been reportedly engaged in counter-militancy operations in Africa, its involvement is believed to have a more extensive scope covering political, economic and military fields. There have also been reports of the group supplying arms and weapons, and training regional forces in fighting jihadist threats. Despite its involvement in the Russia-Ukraine war, the Wagner group's presence in Africa has continued. By siding with the domestic actors in a civil war situation, the group's actions have impacted the democratic process in Africa.

Additionally, the West has been raising concerns over human rights violations and abuse of civilians related to the Wagner group's presence in Africa.

How active is the Wagner group in Africa?

The Wagner group has been active in Sudan, Mali, the Central African Republic, Mozambique and Libya in Africa. The activities are related to providing direct support to authoritarian governments, supporting rival leadership engaged in internal wars, filling the void created by the withdrawal of the French military engagement, taking part in resource exploitation etc.

The Wagner group presents itself as a security provider to a few governments, mostly authoritarian ones in Africa. It has also been supporting rival leaders engaged in a civil war. In Sudan, it began deployments during former President Omar al-Bashir's rule in 2017. The group's ties with Sudan aimed at guarding mineral resources, notably gold mines, and therefore, supported Bashir's government against international opposition. It also played a direct role in suppressing the Sudanese uprising in 2019 that toppled Bashir's regime. In Sudan, Russia has recently forged a strong relationship with the Rapid Support Forces (RSP) and its commander, General Mohamed Hamadan Dagalo. The latter is a rival leader fighting against the Sudanese army. However, there are, as of now, only speculations on Wagner's involvement in the ongoing violence in Sudan. Besides, Russia is set to sign an agreement with Sudan to build a military base in Port Sudan on the Red Sea.

Interestingly, in the Central African Republic, the Wagner Group is active beyond being engaged in security-related activities. According to a German news source DW, which refers to a report of eleven European media on the group, Wagner makes profits importing timber, "the government in Bangui granted a subsidiary unrestricted logging rights across 1,87,000 hectares." The same

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source refers to a contract which gave access to Wagner subsidiaries to the Ndassima gold mine after withdrawing concessions from a Canadian mining company.

The Wagner group is also filling in the void created by anti-French sentiments which led to the withdrawal of the French forces from Africa. In Mali, the Wagner group trains local forces and provides security services in fighting extremist groups. Wagner's deployment in Mali was followed by a nose-dive in France-Mali relations and the end of France's Operation Barkhane.

A similar role of the Wagner group could be found in Burkina Faso. The country is reportedly involved with the Wagner group to deal with surging jihadist violence. After officially announcing the end of the French operation in November 2022, Burkina Faso turned towards Moscow taking similar steps as Mali did. In Libya, approximately 1,200 Wagner mercenaries are believed to have fought for rebel leader Khalifa Haftar. Libya witnessed a civil war for the entirety of the 2010s before a ceasefire which is holding tenuously.

What is the group's endgame in Africa?

The primary goal of the group is to gain access to natural resources. Numerous reports from CNN in the U.S. to Al Jazeera in West Asia have referred to Russia's objectives in securing access to Africa's rich natural resources. The Wagner group's presence and moves make up one of the strategiesis to achieve this objective for the country.

Secondly, Russia sees the Wagner group as an instrument of diplomacy in Africa. The Russian strategy in Africa comes with minimal cost economically but with heavy political returns. Moscow secured 15 abstentions from African countries in the UN's resolution condemning its aggression in Ukraine. Moreover, Eritrea and Mali sided with Russia voting against the resolution.

And finally, Russia's access to African mineral deposits is believed to be providing crucial financial support to continue the war in Ukraine. For Russia, strong ties with African countries mean a pipeline of influence for Russia's war in Ukraine.

What are the implications for Africa?

For African countries, increasing dependency on Wagner mercenaries implies more violence, intimidation and uncertainties. A UN report in June 2021 said that private military groups, "particularly the Wagner Group," have violently harassed people and committed sexual violence. France, the U.S. and international human rights organisations accuse the mercenaries of extrajudicial killings in the Central African Republic and Mali.

Secondly, the group posits a threat to democratic governance in Africa. The collapse of relations between the West and Sahel countries, especially Mali and Burkina Faso, paved the way for Russia to position itself as an alternative. In time, Russian gained leverage in Africa through its assistance without conditionalities. However, deepening relations between African leaders and Russian mercenaries pose a significant threat to democratic values. Increasing trends among African governments seeking Russian mercenary assistance for mounting security concerns indicate increasing authoritarian footprints across the continent.

What is the status of the Wagner group globally and inside Russia?

According to the UN's International Convention against the Recruitment, Use, Financing and Training of Mercenaries, the states should bear the responsibility for the activities of the mercenaries who violate principles of international law which threaten sovereign equality,

political independence, territorial integrity of states and self-determination of people. Legally, Wagner is not a Russia-based private military company though it works closely with the Russian security apparatus. Private mercenary groups are illegal in Russia. However, in 2018, Putin recognised the group saying that the Wagner group has the right to pursue its interests anywhere in the world as long as they do not break the Russian law. His statement read: "I repeat they are not breaking Russian law and have the right to work and promote their business interests wherever they like in the world." Most recently, after the group was reported engaging with the Russian Army fighting in Bakhmut, a statement from the Russian parliament said: "All those who defend our country — soldiers, volunteers, mobilised men, and members of PMC Wagner — are heroes."

RESCUE SERVICE

As India's "Operation Kaveri", launched to evacuate Indians stuck inside war-torn Sudan is underway, the government is making the most of a 72-hour ceasefire window to bring out about 3,000 civilians. The operation, which involves the Indian Air Force and the Indian Navy, is being coordinated by the Ministry of External Affairs. Given the heavy fighting in Khartoum between forces loyal to the head of the ruling council, General Abdel-Fattah al-Burhan, who also heads the Sudanese Armed Forces, and his former deputy, Gen. Mohammed "Hemeti" Hamdan Dagalo of the paramilitary group, RSF, most civilians are being brought by road to Port Sudan, a perilous journey, to be evacuated by air and sea. India has been coordinating efforts with other countries that have the most civilians and resources in Sudan, including the U.S., the U.K., the UAE and Saudi Arabia, on logistics, timing the evacuation operations, and even using Saudi and French planes. En route to the Caribbean for a scheduled visit, External Affairs Minister S. Jaishankar also met with the UN Secretary General in New York to seek help. It is clear that military personnel, officials and diplomats will have a difficult few days ahead given that even humanitarian workers and ambulances have been attacked. They have no doubt been assisted by the cumulative experience of similar operations over the decades, beginning with the largest such single civilian evacuation during the Gulf war, in 1991.

The Sudan evacuation brings once more into focus the particular challenges that India faces in any conflict. With about 14 million non-resident Indians and more than seven million tourists and travellers each year, there is practically no conflict today that does not affect an Indian citizen. Given that many work in the most dangerous environments — examples being students in Ukraine, nurses in Iraq or Yemen, or labourers in Libya, Syria and Lebanon — the responsibility of the government to help those without the means to return to safety is greater. As a result, a standard operating procedure, and even possibly a special force to deal with such crises — as recommended by the Parliamentary Standing Committee for External Affairs, in 2022 — must be considered by the government. It is also essential that such crises be devoid of political grand-standing or finger-pointing, and that unseemly public spats over the evacuation, or unnecessary controversies over garnering domestic political mileage be avoided. India is admired for its reputation and ability to harness all its resources in rescuing every single citizen in any corner of the world, every time they are in need. That reputation must remain intact.

HAKKI PIKKI: CAUGHT IN SUDAN'S CIVIL WAR

The story of how the Hakki Pikki — or bird catchers of Karnataka — got caught in a civil war in Sudan is a contemporary tale of migration, development, and the human desire to thrive.

Today, the tribe is scattered across the capital city Khartoum and in the Darfur region in west Sudan. A few stranded members of the community said their total number in the African country is likely to be around 300, including women and children. Out of them, approximately 250 are in Khartoum, while 33 are in Darfur, where a civil war has raged for many years.

Prabhu Dass, one of the 33, is now stranded in Al Fashir, the capital of North Darfur. With gunfire in the background, he speaks in a steady voice in Mysuru Hindi, the signal coming and going, explaining how and why members of the tribe made the journey to Darfur between 2021-22. "Bird catching is our traditional occupation. But now we don't have that kind of dense forest anymore and the birds have fled," he said, adding that raising a family was not possible with their small earnings.

The Hakki Pikki of India are the latest group to arrive in Al Fashir, a region that has witnessed an influx of people because of the Darfur crisis.

A nomadic tribe, the Hakki Pikki don't have ready access to education and vocational training; so they relied on their native wisdom to earn a living, Mr. Dass said. "We make herbal medicines from gathering forest produce," he added.

It was this traditional knowledge that found a place in the post-pandemic world. Africa has its own indigenous medicine and these herbal healers from India found ready acceptance.

Back in the forests around Mysuru, the men heard that there was a demand for non-western forms of healing in parts of Africa. "Elders who travelled abroad had told us about the business potential of Africa and we thought we could try our luck," he said, adding that they had oils for body and joint pain. An informal tribal collective that produces Neelambari Adivasi Herbal Hair Oil participates in prominent tribal fairs in India and has seen interest from international travellers. They have been sending their representatives to sell hair oil in Africa. "Apart from Sudan, our Hakki Pikki representatives have visited Gabon and Cameroon to promote our forest-based items," a person from the collective said, speaking from Pakshirajapura village, near Hunsur in Karnataka.

After reaching Sudan, they found a ready market. The Darfur conflict that left more than a million people displaced had wiped out basic amenities like hospitals. "Many parts of Sudan do not have hospitals and our herbal solutions became well known here in Al Fashir. It was a good opportunity to earn a few lakhs that we could never even imagine back home," Mr. Dass said.

Rukmini Rao, founder of Gramya Resource Center for Women in Hyderabad and who has worked extensively with the marginalised tribal communities of the Deccan, said the Hakki Pikki are one of the most vulnerable tribes of India. "Unlike the Banjaras who have managed to access some modern education, the Hakki Pikki have remained beyond the circle of education and public welfare. The erosion of their traditional life in the forest has pushed them to the bottom of the social pyramid of Indian tribes."

However, they do not feature on the list of India's particularly vulnerable tribal groups (PVTGs). They are like the Birhors of Jharkhand, as forests that sustained their lives have been taken over by 'development' or are simply dysfunctional, she pointed out.

For now, those members of the tribe stranded in Sudan have just one demand from the Government of India: "We have no food or water, and our homes here are being shot at. We urge the government to take us back or shift us to safety in neighbouring Chad or Ethiopia."

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Unfortunately, their plea has turned political. A social media message posted on April 18 by former Karnataka Chief Minister Siddaramaiah drew attention to them, urging Prime Minister Narendra Modi, External Affairs Minister S. Jaishankar and Home Minister Amit Shah to intervene.

GUM ARABIC: WHY SUDAN WAR COULD HIT YOUR FIZZY DRINKS AND CANDY

About 70% of the world's supply of gum arabic, for which there are few substitutes, comes from the acacia trees in the Sahel region that runs through Africa's third-largest country, which is being torn apart by fighting between the army and a paramilitary force.

Sudan's eruption into conflict has left international consumer goods makers racing to shore up supplies of gum arabic, one of the country's most sought-after products and a key ingredient in everything from fizzy drinks to candy and cosmetics.

Wary of Sudan's persistent insecurity, companies dependent on the product, such as Coca Cola and Pepsico, have long stockpiled supplies, some keeping between three-to-six-months worth to avoid being caught short, exporters and industry sources said. However, prior conflicts have tended to be focused in far-flung regions such as Darfur. This time, the capital Khartoum has been brought to a standstill in the fighting that broke out on April 15, paralysing the economy and disrupting basic communications.

In their manufacturing process, food and drink companies use a spray-dried version of the gum that is powder-like, industry sources said. While cosmetics and printing manufacturers may be able to use substitutes, there is no alternative to gum arabic in fizzy drinks, where it prevents ingredients from separating.

TACKLING THE THREAT

On the 70th anniversary of the U.S.-South Korea alliance, South Korean President Yoon Suk-yeol not only sang "American Pie" at the White House but also sealed an important cooperation agreement with his American counterpart Joe Biden to protect the Korean Peninsula from a nuclear attack by the likes of North Korea. Under the new pact, labelled the "Washington Declaration", U.S. strategic assets will be deployed around the Korean Peninsula and a joint Nuclear Consultative Group will share tactical information, engage in joint training, and coordinate military responses to any potentially hostile actions by North Korea. While Washington will remain the sole authority deciding on whether or not to carry out a nuclear response in any such eventuality, the Biden administration will step up its contribution to symbolic deterrence against the North by sending, for the first time in 40 years, nuclear-armed submarines to the region, though they are unlikely to be a permanent deployment. U.S. tactical nuclear weapons stationed in South Korea were withdrawn from the region in 1991. Mr. Biden also used strong words to corroborate the strategic support that Washington has lent to Seoul, when he said, "A nuclear attack by North Korea against the U.S., its allies or… partners is unacceptable and will result in the end of whatever regime were to take such an action" — language that was similar to what former U.S. President Donald Trump had used in a similar context.

The backdrop for this vote of nuclear confidence by the U.S. for its treaty ally is the steady growth of North Korea's nuclear arsenal, notwithstanding the short-lived hopes for a détente between Mr. Trump and North Korean leader Kim Jong Un after their summit meeting in Singapore in 2018. While during the early years after the North first tested a nuclear bomb in 2006 there was less

concern over Pyongyang launching a coordinated attack on South Korea or beyond, in recent years, including during the Trump and Biden administrations, North Korea has steadily added to its stock of ICBMs capable of reaching U.S. cities, most recently testing a solid-fuel ICBM and altering its nuclear doctrine to include the option to carry out pre-emptive strikes. While the "iron-clad" treaty between the U.S. and South Korea will strengthen the nuclear umbrella extended by Washington across the Korean Peninsula, the White House would be loath to risk any skirmish that could endanger U.S. citizens. However distant the prospect seems at the moment, the only way out of this dangerously unstable stalemate is for both sides to return to the negotiating table and find modalities to deescalate the situation on the ground and institutionalise peace-building initiatives in the longer term.

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EXPRESS VIEW ON INDIA-CHINA DEFENCE MINISTERS' TALKS: A FRAGILE PEACE

The meeting between Defence Minister Rajnath Singh and his Chinese counterpart Li Shangfu saw both sides reiterating their positions, highlighting the persisting gap in the respective perceptions about what went wrong in Ladakh in 2020, its resolution, and how to move forward peacefully from there. This was the first meet between the defence ministers of the two sides since September 2020 when Singh met Li's predecessor in Moscow. Singh's sternly worded message to Li was spelt out in a Ministry of Defence statement: He "categorically conveyed that development of relations between India and China is premised on prevalence of peace and tranquility at the borders"; "all issues at the LAC need to be resolved in accordance with existing bilateral agreements and commitments"; "the violation of [these agreements] has eroded the entire basis of bilateral relations"; "disengagement at the border will logically be followed with de-escalation". In tone and substance, it was a strong assertion of India's position that matters had not been resolved yet, that the resolution had to come through the comprehensive set of agreements on border management arrived at after painstaking negotiations that Beijing had signed on to but violated. It also made clear that unless there was de-escalation following disengagement — the deployment on the Chinese side is now at permanent levels with infrastructure and hybrid villages — the situation could not be normalised.

For his part, Li brought the message that as far as China was concerned, the situation at the LAC has been resolved and it is time to move on to normalise bilateral relations. According to a statement from the People's Liberation Army on the talks, the Chinese defence minister said "the situation on the China-India border is generally stable"; "the two sides are in communication via military and diplomatic channels"; they "should take a long-term view, place the border issue in an appropriate position in bilateral relations and promote the transition of the border situation to normalised management". Stable is not the word to describe the situation at the LAC, going by the continued barring of Indian patrols in the strategic Depsang Plains and in Demchok by China, its attempt to take territory in Tawang through a midnight raid last December, and its renaming exercise of places in Indian territory. "Fragile", as External Affairs Minister S Jaishankar described the situation recently, seems to be more appropriate.

It now seems that India-China positions on the border issue are frozen along these two irreconcilable positions. Delhi no longer uses the words "return to status quo April 20, 2020" in formal communication, but Beijing needs to realise that the creation of buffer zones at the so-called friction points in eastern Ladakh was not a resolution, but a step to prevent unintended consequences. India may be trading more with China than it has done in the past, but that should not be misunderstood by Beijing as "normalisation" of bilateral relations.

PAK MINISTER BILAWAL BHUTTO ZARDARI WILL BE IN INDIA SOON, BUT THERE ARE NO EXPECTATIONS FROM THE VISIT. WHY?

As Bilawal Bhutto Zardari, who has confirmed his participation in the meeting of the Shanghai Co-operation Organisation (SCO) Council of Foreign Ministers in Goa next week, prepares for the visit, both sides are keeping expectations low, framing the visit as a purely multilateral obligation. Zardari's visit is the first by a Pakistan foreign minister in more than six years. Sartaj Aziz, the de facto foreign minister in the Nawaz Sharif government, visited in 2016 for the Heart of Asia conference.

Earlier this week, in response to a question on Zardari's visit, External Affairs Minister S Jaishankar underlined that India was hosting a multilateral summit of which Pakistan was also a member.

Expectations are low

For New Delhi, extending an invitation to Zardari is in itself a significant move. It came days after Prime Minister Shehbaz Sharif made an outreach to India in January with an offer of talks (although it was caveated and diluted the very next day). A month earlier, at a press conference on the sidelines of a conference on terrorism at the UN Security Council, Jaishankar had dismissed Pakistan's allegations that Indian "agencies" were responsible for a blast outside the home of Jamaat-ud-Dawa chief Hafiz Saeed in Lahore in 2021.

If this was a pre-existing shadow over the visit, the Poonch ambush in which five soldiers were killed on the same day as Islamabad announced Zardari's participation in the SCO meeting, was a further spoiler. New Delhi has refrained from accusing Pakistan directly, but a proxy of the Pakistan-based Jaish-e-Muhammad called the People's Anti Fascist Force has claimed the attack. If a Jaishankar-Zardari bilateral meeting was in the works, the April 20 attack on the Army truck certainly sank its chances.

Also, the view in New Delhi seems to be that the political chaos in Pakistan does not provide a suitable atmosphere for bilateral engagement.

Political pressures in Islamabad

Islamabad has its own reasons to talk down any possibility of bilateral engagement. Other than the uncertainty over the government's continuance, the pressure on it to not engage with India is massive. Imran Khan, whose popularity the government seems to fear, recently said that as Prime Minister, he was pressured by the former chief (2016-22) of the Pakistan Army, General Qamar Javed Bajwa, to restore ties with India.

If the visit takes place as scheduled, Zardari, who takes pride in following the footsteps of his grandfather Zulfikar Ali Bhutto as Pakistan's "youngest foreign minister", and clearly nurses higher ambitions, may need to prove a point to those back home watching his performance on his first tour of India.

Unpredictability of multilaterals

Despite strenuous assertions on both sides that Zardari's in-person participation at Goa will do nothing to break the hostility between the two countries as no bilateral engagement is planned between him and Jaishankar, multilaterals have produced surprises in the past. The most famous of these was Gen Pervez Musharraf's handshake with Atal Bihari Vajpayee at the 2002 Kathmandu SAARC summit, which led to a six-year India-Pakistan thaw.

The opposite, a cold shoulder, could happen too, as Sartaj Aziz found at Amritsar. At this time though, it would be considered an achievement if both sides manage to get through Goa with ties remaining just as they are — no better, no worse.

DEMYSTIFYING KESAVANANDA BHARATI CASE, WEBPAGE DELVES DEEP INTO HISTORY

Chief Justice of India (CJI) D.Y. Chandrachud on Monday announced that the Supreme Court has created a special webpage for the Kesavananda Bharati case in which a 13-judge Bench, the largest

constituted in the court's history, through a wafer-thin majority of 7:6, held that Parliament cannot amend the "Basic Structure" of the Constitution.

The webpage, the CJI said, would host the complete submissions, petitions and judgments in the historic case, also called the Fundamental Rights case. The CJI had recently compared the "Basic Structure" of the Constitution to the "North Star", an unfailing guide which shows the way when the path appears convoluted.

The webpage dedicated to the 1973 case has been created in the face of recent criticism from high constitutional authorities that the Basic Structure doctrine diluted parliamentary sovereignty.

The Kesavananda Bharati judgment had cropped up during the government's recent criticism of the collegium system of judicial appointments. Law Minister Kiren Rijiju criticised the striking down of the 99th Constitutional Amendment and the National Judicial Appointments Commission (NJAC) Act in October 2015.

In the NJAC judgment, the Supreme Court upheld the collegium system and held that the NJAC was an encroachment on judicial independence, a part of the Basic Structure.

The Kesavananda Bharati judgment held that Parliament cannot use its constituent power to alter the essential features of the Constitution. The Basic Structure or framework of the Constitution was its living spirit, holding up the body of its text. Its existence cannot be pinpointed to any particular provision of the text. It was the "soul" of the Constitution.

As an aftermath of the judgment, Justice A.N. Ray, the fourth in line of seniority and who was part of the minority which upheld the unlimited power of Parliament to amend the Constitution, superseded Justices J.M. Shelat, K.S. Hegde and A.N. Grover to become the 14th Chief Justice of India. All three of his colleagues resigned.

A similar supersession followed when Justice H. R. Khanna, after his lone but historic dissent upholding the Fundamental Right to life and personal liberty in the habeas corpus case during the darkest days of Emergency, was overlooked for Chief Justiceship.

EXPRESS VIEW: THE NARODA GAM NO-ONE-IS-GUILTY VERDICT IS A TRAVESTY

The acquittal of all 67 persons accused in the killing of 11 Muslims at Naroda Gam, Ahmedabad during the 2002 Gujarat riots raises disturbing questions, particularly about the role of the prosecution. The Naroda Gam case was one of the nine major riot cases investigated by the Supreme Court-appointed Special Investigation Team (SIT) and heard by special courts. It is a travesty of justice when a court takes 21 years to pronounce its verdict in such a high-profile case. Further, the prosecution's failure to fix responsibility for the murders after this long drawn out trial casts a shadow over the criminal justice system.

The prosecution has a hard task on hand when the lines between the accused in riot cases and those holding powerful office are blurred. One of the accused in the Naroda Gam was Maya Kodnani, who became a minister in 2007, and among those who testified in her favour was now Union Minister of Home, Amit Shah. Kodnani, who served a prison term in the 2002 riots following her 2012 conviction by a special court in the Naroda Patiya massacre, was cleared in the Naroda Gam case on Thursday. In 2018, the Gujarat High Court overturned her conviction in Naroda Patiya, in which 97 Muslims had been killed. Riot/communal violence trials in India tend to drag on and convictions are hard won. The 2002 Gujarat riots cases promised to be different as the

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Supreme Court had intervened on behalf of the victims. The Court moved out some of the sensational cases out of Gujarat, instituted an SIT and even monitored the trials. This resulted in a few convictions. However, the Supreme Court ended its supervision of the cases in 2018. In June last year, the apex court dismissed a plea that alleged conspiracy at the highest levels of the administration in the riots and accused those who had filed the petition of trying "to create sensation ...to keep the pot boiling, obviously for ulterior design". The Court also held them of "abuse of process" and said they "need to be in the dock and proceeded with in accordance with law". However, the SC has been asking tough questions recently regarding the remission granted to the 11 convicts serving life in the Bilkis Bano case. Earlier this week, it berated the Gujarat government and the Centre for refusing to share files related to the remission.

The Naroda Gam verdict is set to be heard in the High Court. The challenge now is in proceeding with the case wherein the accused and those holding executive power seem to be on the same political side. The prosecution has its task cut out.

EXPRESS VIEW: GOVERNMENT HAS A LOT TO ANSWER FOR ITS INACTION ON HARASSMENT COMPLAINTS AGAINST WFI PRESIDENT

If this was a real bout, the government would have been penalised for — to use a wrestling expression — passivity. On January 23, as the wrestlers' protest against the Wrestling Federation of India (WFI) president Brij Bhushan Sharan Singh was gathering momentum, the sports ministry tried to diffuse the situation by sidelining the BJP MP and appointing a committee to probe all allegations, including sexual harassment. The panel, headed by boxer M C Mary Kom, was given four weeks to submit its findings. Exactly three months later, on April 23, the wrestlers hit the streets again, demanding to know the status of the report and seeking the arrest of Brij Bhushan. To find a resolution, the sports ministry has ordered the Indian Olympic Association to form another committee. But this time, the wrestlers aren't buying it. They remain steadfast in their demand for an FIR against Brij Bhushan and his arrest under the POCSO Act, stating that one complainant is a minor. But the Delhi Police, which is otherwise over-eager to lodge FIRs, has been conspicuously silent in this case despite seven women coming forward and giving details of the incidents of sexual harassment in their written complaints.

While the Supreme Court, which will hear the case on April 28, issued a notice to the Delhi Police on Tuesday, the sports ministry hasn't covered itself in glory in its handling of the situation. The ministry claims the seriousness of the allegations means it requires more time to "examine" the probe committee's report before initiating action. The argument would hold water if this was a one-off case. But there is a history of public authorities dragging their feet on complaints of sexual harassment, as an investigation into the cases of sexual harassment at government-run institutes by this newspaper had revealed. At the same time, when it chooses, the sports ministry has ensured swift action. This was evident in the case involving a cycling coach, whose contract was immediately terminated after an athlete complained of sexual harassment and an FIR was filed within days.

The law, of course, will take its own course but the government must ensure transparency by releasing the full contents of its committee's report and take action against the officials responsible. As Tokyo Olympics bronze medallist Bajrang Punia, while seeking Prime Minister Modi's intervention, underlined on Monday, "When players win medals, you stand with them. When they are on the road, then you are silent." The government must speak up.

WRESTLERS IN SC AGAINST DELHI POLICE: WHAT THE LAW SAYS ABOUT FILING OF FIR IN SEXUAL HARASSMENT CASES

The Supreme Court Tuesday issued notice to Delhi Police on a petition filed by seven wrestlers seeking an FIR against Brij Bhushan Sharan Singh, Wrestling Federation of India (WFI) president and BJP MP, on allegations of sexual harassment.

On Wednesday, Solicitor General Tushar Mehta submitted to the court that the Delhi police feels there is a need to conduct a 'preliminary inquiry' before registering the FIR.

What does the law say about registration of an FIR once a sexual harassment complaint is received by the police?

Section 154 (1) of the Code of Criminal Procedure enables the police to register an FIR after information is received about a cognizable offence. A cognizable offence/case is one in which a police officer may make an arrest without a warrant. Sections pertaining to sexual harassment and sexual assault of the Indian Penal Code fall within the category of cognizable offences.

The registration of an FIR is the first step towards the probe. It sets into motion the investigation and the police may seek custodial interrogation of the accused, file a chargesheet based on the evidence, or file a closure report if the probe reveals no merit in the allegations made in the FIR.

The law also has provision for the registration of a 'Zero FIR', where even if the alleged offence has not been committed within the jurisdiction of the police station approached, the police can file an FIR and transfer it to the police station concerned.

Is failure to register an FIR an offence?

The Report of the Committee on Amendments to Criminal Law, popularly known as the Justice J S Verma Committee, formed in the aftermath of the December 16, 2012 Delhi gangrape case, recommended insertion of a section where if an officer-in-charge of a police station refuses 'or without reasonable cause' fails to record information related to a cognizable offence, he shall be punished.

Based on the committee's recommendation, section 166A was inserted in the Criminal Law (Amendment) Act, 2013. The section states that if a public servant knowingly disobeys any direction of law including failing to record any information given to him in relation to a cognizable offence, rigorous imprisonment for a term of minimum six months and maximum two years can be given, and he shall also be liable to paying a fine.

Although this includes all cognizable offences, the provision particularly mentions certain sections of the IPC, including those related to sexual harassment, rape, and gangrape. These sections were specifically added to enhance safeguards to women, noting the increase in crimes against women.

On Tuesday, senior advocate Kapil Sibal, representing the wrestlers, mentioned this section while arguing before the Supreme Court. It was submitted that the complaints were given to the Delhi police on April 21 and no FIR was filed, following which they approached the court.

The Ministry of Home Affairs (MHA) has been issuing advisories on mandatory action by police in cases of crimes against women. On October 9, 2020, the MHA reissued an advisory stating the need to compulsorily register an FIR in cases of cognizable offences under section 154 (1) of the CrPc.

Since the complainants against Singh include a minor, what are the FIR provisions under Protection of Children from Sexual Offences (POCSO) Act?

The POCSO Act mandates reporting of sexual offences against children. Section 19 states that any person who has an apprehension that an offence under POCSO Act has been committed shall provide such information to the Special Juvenile Police Unit or the local police. The section also requires the registration of an FIR, ascribing information received with an entry number and a record in writing.

Section 21 of the Act even states that any failure to report the commission of an offence or failure to record such an offence shall be punished with imprisonment extending to six months or a fine or both. The Act, therefore, also makes it mandatory for a report to be filed on receiving a complaint, including from a child.

What are the other remedies if police refuse to file an FIR?

Section 154 (3) says that a person who has been aggrieved after a police in-charge refused to file an FIR can send the information to the Superintendent of Police. The SP, after verification that the information discloses the commission of an offence, shall either investigate the case herself or direct for a probe by any police officer subordinate to her.

The Supreme Court on Tuesday also said that a remedy under section 156 of the CrPC was available. If a person is aggrieved by the police's refusal to file an FIR, a complaint can be made before a magistrate under section 156 (3). The magistrate court can then order registration of a case at the police station. The complaint before the magistrate would be treated as an FIR and the police can initiate its investigation.

Can a preliminary inquiry be conducted before registration of an FIR?

Solicitor General Mehta told the Supreme Court on Wednesday that it wanted to conduct a preliminary inquiry first before filing an FIR. The court directed all material to be put before it during the next hearing on Friday.

Senior Advocate Sibal also raised the law under Lalita Kumari vs Govt of UP and ors. The main issue before the Supreme Court in this case decided in 2013 was whether the police officer is bound to file an FIR for information received of a cognizable offence or does the officer have the power to conduct a 'preliminary inquiry' to test the veracity of the information before registering an FIR.

The Constitution bench concluded that registration of an FIR under section 154 CrPC is mandatory if information of a cognizable offence is received. "… Other considerations are not relevant at the stage of registration of FIR, such as, whether the information is falsely given, whether the information is genuine, whether the information is credible etc," the court said.

It also said, "The scope of preliminary inquiry is not to verify the veracity or otherwise of the information received but only to ascertain whether the information reveals any cognizable offence."

It gave an illustrative list of categories of cases where such an inquiry can be made, including family disputes, commercial offences, medical negligence and corruption cases or cases where there is an abnormal delay in reporting the matter. The court said that an inquiry should not exceed seven days.

HOW CAN A JUVENILE BE TRIED AS AN ADULT IN COURT?

The story so far:

The National Commission for Protection of Children (NCPCR) has recently issued guidelines for conducting a preliminary assessment by the Juvenile Justice Board (JJB) under Section 15 of the Juvenile Justice Act, 2015 (JJ Act, 2015). This preliminary assessment is to ascertain whether a juvenile can be tried as an adult. Replacing the Juvenile Justice Act, 2000, the 2015 Act, for the first time, provided for trying juveniles in the age group of 16-18 as adults in cases of heinous offences.

How does a child get tried as adult?

The Act has categorised the offences committed by children into three categories — petty offences, serious offences, and heinous offences. Section 15 of the JJ Act provides that in case of a heinous offence alleged to have been committed by a child, who has completed or is above the age of sixteen years, the Board shall conduct a preliminary assessment regarding his mental and physical capacity to commit such offence, ability to understand the consequences of the offence and the circumstances in which he allegedly committed the offence. Section 18 (3) of the Act further suggests that, if the Board, after preliminary assessment under section 15 passes an order that there is a need for trial of the said child as an adult, then the Board may order the transfer of the case to the Children's Court having jurisdiction to try such offences. Thus, the sole objective of having such a preliminary assessment is to determine whether a child within the age group of 16-18 years should be tried as an adult in case of heinous offences.

What are the responsibilities of the Board?

The guidelines further make it clear that the JJB shall be responsible for the preliminary assessment and provide the child, the child's family, and their counsel a copy of the order. It further states that in case the JJB does not have at least one member who is a practising professional with a degree in child psychology or child psychiatry, the Board shall take the assistance of psychologists or experts who have the experience of working with children in difficult times. The child should also be provided with a legal aid counsel through the District Legal Services Authority who shall be present during the preliminary assessment. One of the important aspects of the guidelines is that it mandates experts, who have the required qualification to assist the JJB, to undergo training concerning Section 15 of the JJ Act, 2015

During the preliminary assessment, the Board and experts shall also analyse and take into consideration the Social Investigation Report (SIR), to be prepared by the Probation officer or Child Welfare Officer or any social worker, or a Social Background Report (SBR) to be prepared after interaction with the child or child's family.

What next?

The NCPCR is under a statutory obligation under Section 109 of the JJ Act, 2015 to monitor the proper implementation of the provisions of the Act. The guidelines have been made to remove any ambiguity and to clarify the steps that need to be followed while conducting the preliminary assessment. However, the major issue remains the implementation and absorption of these principles in the system, particularly to be followed by the JJB and the Children's Court. A lot of principles which have been made a part of the Act have not been given due prominence by the Board as well as by the Children's Court.

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THE RIGHT TO LITIGATE

The Central Bureau of Investigation (CBI) seems to have been overzealous in registering a case against environmental lawyer Ritwick Dutta and his organisation, Legal Initiative for Forest and Environment, for violating Foreign Contribution (Regulation) Act (FCRA) provisions. The gist of the allegations is their using foreign funds to encourage litigation that will stall existing and prospective coal-fired plants in India. While the sourcing of foreign funds and use is certainly something to keep an eye on, any criminalising of the act of opposition to coal plants, when pursued via legal means, is an absurd stance for a government to adopt. As a signatory to the UN Framework Convention on Climate Change and various key agreements, India has undertaken to gradually reduce its reliance on fossil fuel sources and be 'net zero', or source almost all power from non-fossil fuel sources by 2070. India has also consistently endorsed reports by the Intergovernmental Panel on Climate Change (IPCC) that speak of the urgency of ensuring global temperatures do not exceed 1.5°C of pre-industrial times, necessitating that global net anthropogenic CO2 emissions decline by about 45% from 2010 levels by 2030. However, under principles of 'Common and Differentiated Responsibility', India has maintained its right to rely on coal plants in the interim as it is still a developing economy. The true cost of renewable sources (solar, wind and nuclear) remains much more than that of fossil-fuel power. The industrialised West, while slowing its fossil fuel consumption, continues to be reliant on natural gas and keeps falling short on its commitments to transfer technology and finance to developing countries to accelerate clean energy adoption. Thus, coal is a necessary evil, but still evil, and seeing it any other way belies scientific evidence.

India has 28.5 GW of coal power capacity planned and 32 GW of plants are under construction. The commissioning of many has been delayed due to insufficient environment clearances, land acquisition, and redevelopment and rehabilitation-related problems. These, however, follow from rulings by the National Green Tribunal or from a lack of adherence to norms prescribed mainly under provisions of the Environment Protection and related legislation. Funding for new coal plants is increasingly difficult with multilateral funding agencies refusing to fund such plants. Many coal plants run inefficiently and rely on lenient environmental curbs as they are critical to India's power needs. Using legal remedies to limit the industrial exploitation of nature and ensuring just compensation is at the core of a civilised democracy; and efforts at undermining such a fundamental compact bodes ill for India.

NONE TOO SOON

The Supreme Court has given a timely reminder to Governors that the Constitution expects that a decision to return a Bill to the State Assembly for reconsideration should be made "as soon as possible". It has drawn attention to the phrase found in the first proviso to Article 200, seeking to convey a sense of immediacy in the matter of returning a Bill. "The expression 'as soon as possible' contains significant constitutional content and must be borne in mind by constitutional authorities," the Court observed. This effectively means it would be constitutionally impermissible for Governors to hold on to Bills indefinitely without communicating their decision to the House. The Telangana Governor, Dr. Tamilisai Soundararajan, against whose apparent inaction on several Bills the State had approached the Court, communicated to the Court that no Bills were pending with her, and that she had returned two Bills for reconsideration, while seeking further information from the government on a few others. Based on this, the Court disposed of the petition, but kept open questions that arose from the issue for consideration in an appropriate case. The Court's observation addresses the issue of delay, but it is only one aspect of the

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controversy. The issue of granting assent is seen in most parliamentary democracies as a formality, but the peculiar discretionary powers with which Governors are clothed in India have given much scope for controversy.

The Governor's power to withhold assent or return a Bill, with a message, for reconsideration is seen as discretionary. In the Constituent Assembly, it was explicitly clarified that returning a Bill was to be done only on advice, and that it was an enabling provision for a government to recall a pending Bill in case it had second thoughts on its advisability. There are three clear problems associated with Article 200, which deals with assent to Bills: the absence of a time limit for acting on Bills, the scope for reserving a Bill for the President's consideration against the express advice of the Cabinet and the claim that the Governor can kill any Bill by declining assent. The mischief lies in Article 163, which hedges the primary rule that the Governors function on the 'aid and advice' of the Cabinet, with a clause that prohibits any inquiry into whether a particular matter fell within their discretion or not. These provisions give abundant scope for conflict between the government and Raj Bhavan. There is no doubt that these ought to be changed, either by amending the Constitution or through an appropriate Supreme Court verdict, so that misuse of gubernatorial discretion can be kept in check.

DEFAMATION PERILS

A striking feature of the Surat district court's order declining to stay the conviction of Congress leader Rahul Gandhi is its unusual emphasis on his status as a Member of Parliament to justify his conviction and quantum of punishment. It is quite evident from a reading of 8th Additional Sessions Judge Robin P. Mogera's order that the court deems an offence to be worse if done by a legislator, that its impact on society is more deleterious than when it is committed by any other citizen, and that a harsher sentence than normally imposed is justified against a lawmaker. Yet, Mr. Gandhi's status as a parliamentarian matters little when it comes to the question whether his conviction ought to be stayed. His two-year prison term, awarded by a magistrate court in Surat for allegedly defaming the collective of people who have 'Modi' as their surname, has led to his disqualification from his membership of the Lok Sabha. While his sentence has been suspended till disposal of his appeal against his conviction, only a stay on the operation of his conviction could have restored his membership of the House. Judge Mogera has ruled that Mr. Gandhi failed to demonstrate that he will suffer irreversible and irrevocable damage if his conviction, which has also deprived him of the opportunity to contest elections, is not stayed. Selectively quoting from Supreme Court judgments, the judge has held that disqualification for being a legislator cannot be described as irreversible damage.

The order suffers from infirmities in reasoning and does not always adhere to precedents that do not prohibit treating disqualification from electoral contest as an exceptional circumstance warranting stay of conviction. The order holds that the complainant, being a former Minister, would have suffered harm to his reputation by Mr. Gandhi's remark. However, it fails to see that a conviction for defamation is itself quite rare, and a two-year punishment rarer. The judge justifies the maximum sentence by claiming that the words of a sitting Member of Parliament will have a larger impact on the public and that the sentence is "permissible in law". Criminal defamation is itself a questionable concept, as it can be invoked to silence criticism and harass opponents. It is inconceivable that political remarks made in an election campaign are used to secure a conviction for defamation and a jail term that precisely matches with the legal requirement to disqualify a person. Mr. Gandhi has further legal remedies, such as an appeal in the High Court, but it is

lamentable that in a democracy, a dodgy defamation case can be stretched to such absurd levels as to deprive the parliamentary opposition of a key figure.

WARLESS PUNJAB

The news, on April 23, of the arrest of Amritpal Singh, a self-appointed campaigner for a separate nation for the Sikhs, was received by the public of Punjab with a sense of relief. He had been on the run for weeks, and now faces charges under the National Security Act (NSA) as well as several first information reports. He has turned out to be a cipher — neither he nor his cause of Khalistan appears to have any significant support among Sikhs. The secessionist has been shifted to Dibrugarh jail in Assam, over 2,000 kilometres away from Punjab to avoid any potential turmoil. Taking over as the head, last year, of 'Waris Punjab De', a social organisation established by the late actor-turned-activist Deep Sidhu, Mr. Amritpal's rise to controversy and infamy was as intriguing as it was quick. He styled himself after Jarnail Singh Bhindranwale, the militant leader who was killed in 1984 after many years of bloodshed in the State. In February, Mr. Amritpal led a mob that had stormed a police station with swords and guns to free compatriots from custody, showing the State police and the government in a bad light. But then it was not entirely surprising. For months, he along with his supporters, flaunting swords, guns and sharp weapons, had moved across Punjab. The question still lingers as to how that was being allowed in Punjab, which has lived through an era of bloody secessionism through the 1980s and 1990s.

Though he comes across as self-styled, the Khalistan propagandist appears to have supporters and handlers within and outside India. The State of Punjab is on the border with Pakistan, that has sought to instigate a section of the population into violence for decades. The campaign for Khalistan is active among the Sikh diaspora too. The ruling Aam Aadmi Party (AAP) government in the State is now patting itself on the back for the arrest, but the situation should not have reached this point. Even the police operation to nab him turned out to be an embarrassment, as he managed to flee and remain on the loose. Though the instigator is now behind bars, his call for violence and brazen communalism, which went on with impunity for several months, triggered memories of the polarisation between Hindus and Sikhs caused by separatist terrorism that had pulverised Punjab for long. The ripple effects were felt even in other countries. The Centre and the State, under the Bharatiya Janata Party and AAP, respectively, should work closely to get their administrative actions and political messaging correct and effective to keep Punjab peaceful and insulated from the meaningless lure of secessionism.

EXPRESS VIEW: REMEMBERING PARKASH BADAL SINGH, A LEADER AND HEALER

Parkash Singh Badal towered over politics in Punjab for decades weathering many storms. His political career started at the time of Indian independence — he was elected a sarpanch at the age 20 in 1947. Over seven decades, he witnessed the battle for a Punjabi suba, the Green Revolution and agrarian prosperity, the Anandpur Sahib Declaration, the rise of Sikh militancy, healing and reconciliation within a divided society, peasant distress, migration of youth, flow of drugs and so on. In these years, he won numerous elections and was chief minister five times. His successes and failures influenced the course of political and social life in Punjab; the choices he made shaped the state. Yet, he was no mere regional politician. The Shiromani Akali Dal he helmed and helped transform from a Panthic party to a party of Punjabiyat was a regional force, but Badal, like the late DMK patriarch M Karunanidhi, transcended the limits of regionalism to articulate a politics that subsumed ethno-nationalist impulses under the rubric of a federal India. In that sense, Badal was more of a national leader than a provincial politician.

Like most successful politicians, Badal was a pragmatist. He could read the popular mood and would course correct. He was game for building coalitions even with ideological opposites; he would enter into an election alliance with the Jana Sangh even in the heyday of the Anandpur Sahib resolution, which the then Prime Minister Indira Gandhi had described as a secessionist document. Secular and liberal in his views, he steered the Akali Dal away from Sikh exclusionism and started to field members of the Hindu minority in elections. In the traumatic years of militancy, Badal was careful that the Akali Dal, the main voice of the Sikh peasantry, did not fall for the extremist line. His sober leadership helped to slowly heal the wounds of the violent 1980s and 90s, marked by the anti-Sikh massacre in the wake of Indira Gandhi assassination, targeted killings in the name of faith, bomb blasts, encounter killings, custodial tortures and so on. On the national plane, he continued to play a pivotal role in building a strong Opposition to the Congress. The Akali Dal stood with the forces that opposed the Emergency and Badal was jailed. It joined the Vajpayee-led National Democratic Alliance in 1998 and remained in the alliance until 2020, when it became untenable for the party to ally with the BJP due to the groundswell in Punjab against the contentious farm laws.

In fact, the farmer stir helped to highlight all that had gone wrong in Punjab. This mobilisation that forced the Modi government to backtrack on farm laws also exposed the hollowing out of the Akali Dal as a mass party. The Akali Dal in government had been blind to the agrarian crisis that was brewing in Punjab for years. Populist but lazy policy decisions cloaked as farmer welfare helped to postpone the onset of unemployment and its resultant consequences. Even as mafias and vested interests feasted on a political economy in a shambles, the political mainstream refused to course correct. The Akali Dal, now headed by Sukhbir Badal, finished with just three seats in the assembly elections last year. Now its light gone, Badal's party stares at an uncertain future. It needs to work hard, think hard to renew and refresh his enduring legacy.

KILLER MAFIA

The gruesome murder of Lourdhu Francis, a Village Administrative Officer (VAO) in Thoothukudi in Tamil Nadu, on Tuesday — he was in his office — is a reminder of the lengths to which the sand mafia will go to protect its lucrative activities involving illegal quarrying. The official had been informing the police and his superiors about mafia operations. This is not the first such case in Tamil Nadu. Five years ago, in neighbouring Tirunelveli, a 33-year-old police constable was brutally murdered by the sand mafia when he was about to arrest the culprits who had mined river sand from the Nambiyar. The State has had a long history of attacks on public servants who have sought to enforce the rules governing sand quarrying and book wrongdoers. Over 25 years ago, the then District Collector of Tiruvallur, Jayashree Raghunandan, nearly lost her life when leading a raid on illegal quarrying; the driver of a lorry was arrested on charges of attempting to kill her. The killing of a Deputy Tahsildar near Chengalpattu, in December 2004, is another case. Both the Madras High Court and the Southern Bench of the National Green Tribunal have, on many occasions, sought to address the issue of illegal sand quarrying and mining. In October 2013, after the High Court came down on the administration of Kancheepuram district (near Chennai), over alleged illegal quarrying, the State government went to the extent of suspending the Collector. Over the past five to six years, the government's launching of measures such as online system of booking of sand and payment (with plans to fine tune technology applications in this regard) as well as the unveiling of a policy document on "M-sand" (or manufactured sand, as an alternative to river sand), in March this year, are steps that have hardly stopped illegal sand quarrying.

What is critical is that the government should send a strong message: of its zero tolerance towards illegal sand quarrying. Unless this is done in unequivocal terms, any other move to tone up the system will fall short. Chief Minister M.K. Stalin ordering ₹1 crore as solatium and the appointment of a member of the VAO's family in government service on compassionate grounds should be of some comfort to the family, but the government should apprehend the killers and ensure their conviction expeditiously. At the same time, the government should ponder over the efficacy of the existing system concerning the sale and use of river sand. It also needs to strengthen the regulatory mechanism. The authorities would do well to promote research on the production and quality of M-sand. Regardless of any other steps it takes, the government should not give room for any more murderous violence in the State.

EXPRESS VIEW: LETTING DON ANAND MOHAN SINGH WALK STAINS NITISH KUMAR'S RECORD, INSULTS MEMORY OF THE MURDERED OFFICER

Anand Mohan Singh, a gangster turned politician who was serving life imprisonment for the murder of a young Dalit IAS officer, will soon walk free from a Bihar jail.

The remission of his life sentence was enabled by the state government, which, 10 days ago, amended the Bihar Police Jail Manuals, 2012. The amendment created a window for the state law department to step in and include Mohan in the list of convicts to be freed after having completed 14 years' life sentence in connection with murder and other heinous crimes. The remission has political appeasement — and injustice written all over. Singh, a former MP and leader of the Bihar People's Party, is an influential Rajput leader, who could affect poll outcomes even from jail. Both the ruling JD-U and RJD seem keen to include him in the Mahagathbandhan.

Anand Mohan may deliver votes to the Mahagathbandhan, of course. But at what cost? Can Sushasan Babu Nitish Kumar, henceforth, hold forth on his commitment to decriminalise governance? Anand Mohan was convicted for the murder of District Magistrate of Gopalganj, G Krishnaiah, who was lynched by a mob mourning the killing of a BPP leader and history-sheeter, Chhotan Shukla, in 1994. The Patna High Court sentenced Mohan to death for abetting the murder of Krishnaiah in 2007. The Supreme Court reduced the sentence to life, while the Bihar government pressed for the death penalty. Nitish Kumar should explain why his government has now gone out on a limb to free Anand Mohan, why did it drop "murder of a public servant on duty" from the category of heinous crimes that was kept outside the purview of remission. How does such deceit square with the moral high ground the Opposition has taken in the 2002 Bilkis Bano case in Gujarat? The Opposition has accused BJP governments in Gandhinagar and Delhi of favouring men convicted for murder and rape for political dividends and has demanded justice for the families of victims.

Kumar is now busy cobbling a Opposition coalition for 2024. His acquiescence to regressive caste lobbies to free a murder convict stains his record in governance. In fact, Kumar's loyal ally in his battles as CM to impose the rule of law and effect structural changes in Bihar was the bureaucracy. The bureaucrats were his eyes and ears as he fought an ambitious ally, the RJD, and sought to build institutions and infrastructure, take basic services to the people. Anand Mohan Singh's freedom, achieved through state-sponsored subversion of due process, is also a message to officers that the law will take the course of politics. Anand Mohan is no singular criminal politician, he is representative of an ecosystem wherein crime, caste and politics mingle to form a deadly cocktail. Nitish Kumar ought to have been the Nitish Kumar he once was.

MINDLESS VIOLENCE

Less than two years ago, the Union Home Minister Amit Shah had told leaders and representatives of various States that the influence of the Maoists had reduced from 96 districts in 10 States in 2010 to just 41 by late 2021. Close observers of the Maoist insurgency had warned that despite the Maoists' decline, they were still active in South Bastar, the Andhra-Odisha border or in some districts in Jharkhand. The killing on Wednesday of a District Reserve Guard team of the Chhattisgarh police in a powerful IED blast followed by gunfire is reflective of the threat still posed by Maoists in the south Bastar region. The fact that these 10 personnel were returning from a counter-insurgency operation that they had conducted after a tip-off indicates that the Maoist attacks could have been a trap and points to a possible intelligence failure. With the Maoists known to ramp up attacks on security forces before the onset of the monsoon season, the killings suggest a failure in anticipating such an attack. It is incumbent upon the government to investigate the incident, plug security loopholes, find out the Maoist cadre responsible for the attack and to bring them to justice. But it is a task that is easier said than done as this is tough terrain in a region which could be the last stronghold of the Maoists.

The inability of the Maoists to graduate beyond a violent guerrilla-based movement that utilises the remote and inaccessible forested terrain of central India, and home to tribal communities, is largely because of their incoherent and outdated ideology that has found few takers even among the most marginalised of communities. Diligent security actions have certainly curbed their presence outside their stronghold even as the responsiveness and penetration of the Indian state into areas where governmental sway was hitherto absent, has had a mitigatory effect. Yet, it is not just the terrain and topography that have acted as the obstacles in defeating the Maoists in south Bastar. The alienation of a section of tribals caught in the crossfire between security forces and the Maoists has allowed the Maoists to tap into discontent and to retain a presence in the area. In the years of counter-insurgency, hard-edged strategies of creating wedges among the tribal population to defeat the Maoists have been counter-productive. The government must continue to try to win the support and confidence of the tribal people of south Bastar as that is the surest way of defeating the Maoist movement. Any military action that is hastily put together for retribution and which could target innocent tribals will only exacerbate the problem.

WHAT IS THE ASSAM-ARUNACHAL PRADESH BORDER DISPUTE, OVER WHICH THE STATES' CHIEF MINISTERS SIGNED AN MOU?

On Thursday, Assam Chief Minister Himanta Biswa Sarma and his Arunachal Pradesh counterpart Pema Khandu signed a Memorandum of Understanding (MoU) over the long-standing border dispute between the two states, a development Home Minister Amit Shah described as a "historic occasion". The two states share a roughly 800-kilometre long border and the disputed areas the MoU deals with are 123 border villages, which span 12 districts of Arunachal Pradesh and 8 districts of Assam.

How old is the border dispute between Assam and Arunachal Pradesh?

Before North East Frontier Agency or NEFA (former name of what is now Arunachal Pradesh) was carved out of Assam in 1954, a sub-committee headed by then Assam Chief Minister Gopinath Bordoloi had made a set of recommendations in relation to the administration of NEFA and submitted a report in 1951. In line with the recommendations of this report, around 3,648 kilometres of the "plain" area of Balipara and Sadiya foothills were transferred from NEFA to

Assam's then Darrang and Lakhimpur districts. When Arunachal was made a Union Territory in 1972, it contended that several forested tracts in the plains that had traditionally belonged to hill tribal chiefs and communities were unilaterally transferred to Assam.

What were past efforts to resolve this issue?

In April 1979, a high-powered tripartite committee was constituted to delineate the boundary on the basis of Survey of India maps, as well as discussions with both sides. While around 489 km of the 800 km were demarcated by 1983-84, futher demarcation could not take place because Arunachal did not accept the recommendations and claimed several kilometres of the 3,648 sq km, which was transferred to Assam in line with the 1951 report.

Assam objected to this and filed a case in the Supreme Court in 1989, highlighting an "encroachment" made by Arunachal Pradesh.

To resolve the dispute between the states, the apex court appointed a local boundary commission in 2006, headed by a retired SC judge. In September 2014, the local commission submitted its report. Several recommendations were made (some of which suggested Arunachal Pradesh get back some of the territory which was transferred in 1951), and it was suggested that both states should arrive at a consensus through discussions. However, nothing came of it.

What was the process leading up to this MoU?

Assam CM Sarma and Arunachal CM Khandu commenced CM-level talks over this border issue on January 24, 2022. In their second meeting on April 20, 2022, they made some key decisions. The first was that the border issues between both the states would be confined to a list of 123 villages which Arunachal Pradesh had claimed before the Local Commission in 2007.

The second was that a boundary line delineated by the high powered tripartite committee in 1980 would be taken as the notified boundary and all realignment would be done in relation to it.

The third decision laid down how this resolution would take place. It was decided that both states would set up 12 regional committees covering the 12 districts of Arunachal Pradesh and the 8 counterpart districts of Assam for joint verification of the 123 villages. The committees were to make recommendations keeping in view "historical perspective, administrative convenience, contiguity and people's will".

To what extent has the issue been resolved?

The dispute over 37 of these 123 villages had been resolved on July 15, 2022, itself with the signing of the Namsai Declaration between the both CMs, where they "agreed in principle" over them. This effectively reduced the number of disputes to be resolved to 86.

Through the MoU, the dispute over another 34 villages has been "amicably resolved".

Of the 71 villages over which an understanding has been reached, the following has been decided:

- *One village in Arunachal Pradesh as per the notified boundary will be included in Assam

- *10 villages in Assam as per the notified boundary will remain with Assam

- *60 villages in Assam as per the notified boundary will be included in Arunachal Pradesh

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The village boundaries of 49 of the remaining villages are unresolved, and the MoU states that in these the Regional Committees will finalize the boundaries within a period of six months "through continuous dialogue".

Another three villages are located partially within the Indian Air Force's bombing area in Dullong. The MoU states that the matter regarding these three villages will be taken up by Arunachal Pradesh with the Government of India and the Indian Air Force.

According to the MoU, both the state governments agree that no new claim area or village will be added in the future beyond these 123 villages. It also states that both the state governments "agree to effectively prevent any new encroachment in the border areas" and that they agree that the MoU is "full and final" in respect to the 123 villages.

DESPITE COURT STAY, OTT PLATFORMS FACE PRESSURE ON CONTENT

OTT, or over-the-top, streaming services such as Netflix and Amazon Prime Video are facing pressure to comply with the Information Technology Rules, 2021, and to exercise further restraint in streaming mature content. This is despite the fact that two High Courts have stayed provisions of the IT Rules, which require them to appoint a grievance officer and take down content when ordered to do so by a self-regulatory body.

Two advisories

The Ministry of Information & Broadcasting (I&B) has issued two advisories on the issue: the first, in February 2022, told the platforms to ensure that a grievance officer's details are made publicly available on their websites.

The second advisory, issued on March 24 this year, warned streaming platforms to exercise "abundant precaution in ensuring that films and web-series... do not fall [a]foul of the... Code of Ethics" that is laid out in the IT Rules. "Given that the Code of Ethics under Rule 9(1) of the IT Rules, 2021 has been stayed by the Bombay and Madras High Courts, OTT platforms are not bound by the terms thereof," the Internet Freedom Foundation said in a statement to The Hindu.

Beyond the government advisories, a self-regulatory body that includes Netflix, Amazon Prime Video and ALTBalaji as members, issued its own internal advisory to streaming firms. The fact that some sites do not have grievance officers or monthly reports of grievances posted on their website does "not appear to be in strict conformity with the law", Justice (Retd.) A.K. Sikri, chairperson of the Digital Publisher Content Grievances Council's Grievance Redressal Board, said in an advisory to streaming platforms on April 10.

I&B Minister Anurag Thakur recently warned streaming services, which have largely stopped releasing mainstream series and shows with politically or religiously sensitive themes, that they should not make content that offends Indian cultural sensibilities. The Ministry did not respond to The Hindu's queries on the legal aspects of its advisories after the High Court stays.

As recently as Wednesday, Mr. Thakur said at an event, "There are multiple complaints about the kind of content that should not be on TV, that is shown on OTT."

This comes even though the redressal board received zero appeals on content complaints in February and March, and just one complaint each in the two months before that, according to disclosures on their website.

ISRO LAUNCHES PSLV-C55 WITH TWO SINGAPORE SATELLITES

The Indian Space Research Organisation's Polar Satellite Launch Vehicle (PSLV-C55) carrying two Singapore satellites, TeLEOS-2 as primary satellite and Lumelite-4 as co-passenger, took off from the Satish Dhawan Space Centre, Sriharikota, at 2.19 p.m. on Saturday.

According to details provided by ISRO, PSLV-C55 was a "dedicated commercial PSLV mission of NewSpace India Limited (NSIL), for an international satellite customer from Singapore". TeLEOS-2 carries a Synthetic Aperture Radar payload while Lumelite-4 is a technology demonstration nano-satellite. This is the 57th flight of PSLV and 16th mission using the PSLV Core Alone configuration (PSLV-CA).

After the lift-off, ISRO Chairman S. Somanath said the PSLV-C55/TeLEOS-2 mission was accomplished successfully and placed both satellites in the intended orbit.

The TeLEOS-2 was developed under a partnership between DSTA (representing the Government of Singapore) and ST Engineering, a Singapore firm. Once deployed and operational, it will be used to support the satellite imagery requirements of various agencies of Singapore. TeLEOS-2 will be able to provide all-weather day-and-night coverage, and capable of imaging at 1-metre full-polarimetric resolution, the ISRO said.

Lumelite-4 was co-developed by the Institute for Infocomm Research (I2R) of Agency for Science, Technology and Research (A*STAR) and Satellite Technology and Research Centre (STAR) of the National University of Singapore. It is an advanced 12U satellite developed for the technological demonstration of the High-Performance Space-borne VHF Data Exchange System (VDES). Using the VDES communication payload developed by I2R and STAR's scalable satellite bus platform, it aims to augment Singapore's e-navigation maritime safety and benefit the global shipping community.

Incidentally, PSLV-C55 mission will carry out in-orbit scientific experiments by using the spent PS4 stage as an orbital platform. This is the third time that PS4 will be used after satellite separations as a platform for experiments. There will be non-separable payloads mounted on MSA (multi satellite adapter). Payloads will be "powered on" by a command after all satellites are separated. The platform will have solar panels mounted around the PS4 tank which will be deployed after confirmation of the stage achieving stabilisation. The deployment of the solar panels will be through a ground command. The platform will ensure that the deployed solar panel points towards the sun optimally using appropriate sun-pointing mode, which will increase the power generation capability of the platform. The power will be provided to payloads and avionic packages based on their requirements, the ISRO said.

BENGALURU SEES ZERO SHADOW DAY: WHAT IS IT, WHY DOES IT HAPPEN

At 12:17 pm on Tuesday (April 25), Bengaluru experienced a 'Zero Shadow Day', when vertical objects appear to cast no shadow. This was because the sun was at its zenith, and so the shadow was directly under the object.

"On April 25, 2023, the Sun reaches exactly overhead at (12:17 pm) in Bengaluru and at all places along the 13^0 north Latitude. The shadow of any vertical object would disappear at that instant. Zero Shadow Day occurs on different days in places away from 13^0 latitude," the Jawaharlal Nehru Planetarium said in a release ahead of the phenomenon.

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

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What is Zero Shadow Day?

As The Indian Express has explained earlier, for every point on Earth between the Tropic of Cancer and the Tropic of Capricorn, there are two Zero Shadow Days a year.

For Bengaluru, the next one is on August 18. The Zero Shadow Day is restricted to locations between the tropics, and so places north of Ranchi in India are out of it. "One falls during the Uttarayan when the Sun moves northwards, and the other is during Dakshinayan when the Sun moves southwards,".

Why does a Zero Shadow Day happen?

Uttarayan (movement of the Sun from south to north from winter solstice to summer solstice) and Dakshinayan (back from north to south) happen because Earth's rotation axis is tilted at an angle of roughly 23.5° to the axis of revolution around the Sun. Ramanujam explained that the Sun's location moves from 23.5°N to 23.5°S of Earth's equator and back. All places whose latitude equals the angle between the Sun's location and the equator on that day experience zero shadow day, with the shadow beneath an object at local noon.

"We have all studied in school that the Earth's rotation axis is inclined at 23.5 degrees to the plane of its revolution around the Sun, which is why we have seasons. This also means that the Sun, in its highest point of the day, will move from 23.5 degrees south of the celestial equator to 23.5 degrees north of the equator (Uttarayan), and back again (Dakshinayan), in a year. Of course, the northern most and southern most points are the two solstices, and the crossing of the Sun across the equator are the two equinoxes," the ASI says on its website.

WHAT IS THE RS 6,000 CRORE NATIONAL QUANTUM MISSION, AND WHAT IT MEANS FOR SCIENCE IN INDIA

"Nature isn't classical, dammit, and if you want to make a simulation of nature, you'd better make it quantum mechanical, and by golly it's a wonderful problem because it doesn't look so easy," remarked Richard Feynman, a Nobel Prize-winning physicist with a cult status, at a lecture at the MIT Computer Science and Artificial Intelligence Laboratory in 1982. This lecture — later published as a paper under the title 'Simulating Physics with Computers' — in which Feynman proposed the development of different, more powerful computers by utilising the quantum mechanical properties of matter, is often considered the original idea behind quantum computers.

Four decades later, quantum computers have become a reality, though they are yet to do anything meaningful. Getting quantum computers to realise their full potential and perform tasks impossible or impractical for the conventional computers is one of the hottest areas of research. Last week, India decided to join in this global effort in a big way, by setting up a Rs 6,000 crore National Mission on Quantum Technologies and Applications. Development of homegrown quantum computers is one of the major objectives of the mission.

Not just another fast computer

Quantum computers are not just the next generation of faster and more efficient computers. Conventional computers, when they are more powerful and have much higher capabilities, become supercomputers. But these perform their tasks in the same way as the normal home computers or mobile phones do. Quantum computers are fundamentally different in the way they handle and process information. They are meant to be useful in some very specific situations

where the traditional ways of computing are inadequate. For more mundane uses, like playing a video or browsing the internet, quantum computers would not offer any significant advantage over conventional computers.

If conventional computing is compared to the task of climbing up the stairs of a tall building, a more powerful computer would mean getting a fitter or healthier person to climb. The fitter person can probably go faster and a few storeys higher, but would eventually get exhausted. Using the elevator is a fundamentally different way of accomplishing the task. There is a significant gain in speed, but the main advantage is the ability to access floors that would be out of reach, or extremely inefficient to climb, for any person. At the same time, in certain situations, like when only the first couple of floors are to be reached, the elevator might not offer any great advantage.

Quantum properties

While elevators rely on machines and electricity to perform a task too difficult for human beings, quantum computers exploit the very special properties of matter in the sub-atomic world for calculations beyond the capabilities of ordinary computers.

Small particles, the size of atoms or its constituents like protons or electrons, exhibit a number of strange properties that go entirely against our everyday experiences. For example, these particles can exist at multiple locations at the same time, a phenomenon called superposition, but only till no one is looking. The moment they are observed at one place, they cease to exist at all other places. Then there is the property of entanglement, the ability of a particle to instantaneously influence the behaviour of another with whom it had an earlier 'interaction', even when they are separated by arbitrarily great distances. Research on entangled particles won the Physics Nobel last year.

Conventional computers store and process information in bits. A bit is the smallest unit of data that computers can handle. It can take just two values — 0 or 1 — but only one of these at a time. A zero would result in a certain set of instructions to be carried out, while a one would lead to a different set of instructions. All data in computers, including text, pictures and videos, are broken down into a sequence of zeros and ones for purposes of storage and processing, and can be reconstructed from these.

A two-bit system in a conventional computer can have four states — (0,0), (0,1), (1,0) and (1,1) — but again only one at a time. To go through each of these four states, the computer has to take four steps. A more powerful computer can speed up the process, but it would still have to go through the four steps.

This is where the quantum computer starts to do things differently. Superposition makes it possible for the quantum bit, or a qubit as it is called, to exist in both 0 and 1 state simultaneously. Counter-intuitive as it may appear, it can be 60 per cent 0 and 40 per cent 1 at the same time, or any other combination. Similarly, the two-qubit system can be in all four states at the same time — some part (0,0), some part (0,1), some part (1,0) and remaining (1,1). What it means is that a quantum computer can go through these four states in one step, unlike the conventional computer that requires four steps.

Not yet perfect

As more qubits are added, the processing capability of the quantum computer increases exponentially. With just a few qubits, say 50, quantum computers can outpace traditional

computers that perform a couple of billion operations per second. Tasks that conventional computers would take millions of years to finish can become a matter of seconds with a quantum computer. Such tasks are found in a variety of domains, like internet and data security, and health research. And this is where the main use cases of quantum computers lie.

However, it is not all straightforward. Apart from the challenges in building a quantum computer — requirements of very cold temperatures and extreme isolation — there is a significant risk of errors. The parallel processing happening in superposition states all lead to different results, only one of which is correct or desirable. In other situations, when the superposition breaks down, the final outcome is randomly selected from the range of possibilities. But this would make quantum computer totally useless. Error correction, and the ability to guide the computer to produce the correct result as the most favoured option, is one of the ongoing areas of active research.

The mission in India

The excitement in the scientific community about the Quantum Mission is because it allows India to join a global technology development race when it is still in the nascent stages. "We are in the game. We have rarely been in the game (with regard to other technologies). Work on quantum technologies has been going on in India for the past 10 years, more vigorously in the last four-five years, whereas groups in some other countries have been working for close to three decades. We have some catching up to do, but this mission will help us do that. We have a fairly large pool of people with the right skills," said Rajamani Vijayaraghavan of Tata Institute of Fundamental Research (TIFR) who will play an important role in the computing node of the mission.

Several scientific groups in the country are already working on quantum computers and related technologies. A collaborative effort of Tata Institute of Fundamental Research (TIFR), Defence Research and Development Organisation (DRDO) and Tata Consultancy Services (TCS) is developing a 7-qubit quantum computer. Much more powerful quantum computers, having a few hundred qubits, have been developed in some other countries, though none of these have yet performed calculations beyond the capabilities of regular computers. One objective of the mission is to build a 1,000-qubit computer in the next eight years.

PM MODI INAUGURATES KOCHI WATER METRO: WHAT IS THIS PUBLIC BOAT SERVICE?

Prime Minister Narendra Modi on Tuesday (April 25) inaugurated the first phase of the Kochi Water Metro — a first of its kind public boat service in India integrated with a metro rail network.

What is the Kochi Water Metro?

The Kochi Water Metro is a project being implemented by Kochi Metro Rail Corporation Limited (KMRL) with the assistance of a German funding agency, Kreditanstalt für Wiederaufbau.

It includes boats that are hybrid, battery-powered, air-conditioned and disabled-friendly among other features. The water metro will operate on water bodies like any other ferry or traditional boat service, but with modern facilities, enhanced safety and security measures.

How is the water metro linked to the metro rail?

Kochi Water metro has been envisaged as a feeder service of the Kochi metro rail, which has been operational since 2017. While boats have been designed as coaches of Kochi Metro, boat terminals,

passenger entry and exit gates, ticket counters and safety measures mirror the features of the metro rail service.

All jetties feature electronic display boards about boat service. Announcements will be made in English, Hindi and Malayalam when the services are operating in full swing. Passenger entry and exit to boats, with air-conditioned cabins, are similar to the system in Kochi metros.

Boats, routes and terminals

The water metro boat service will operate in the backwaters of Kochi, connecting 10 nearby islands with the mainland of Kochi, the commercial hub of Kerala. The project is envisaged with 38 jetties, and 78 boats, covering a distance of 76 km. The non-polluting, battery-powered boats are noise-free and produce low waves, unlike traditional ferries. Boat re-charging facilities have been provided in all terminals. Costing Rs 7 crore each, these boats can go up to a speed of eight nautical miles per hour and feature aluminium-catamaran hulls. Each boat can carry 100 passengers with a seating capacity of 50.

Existing boat services

At present, Kerala Water Transport Department is operating around 200-odd boat services on different routes, which mainly connect Vypin islands to Kochi. Over the years, however, these services have been criticised for several reasons such as for not being punctual and offering poor passenger safety.

Apart from the water transport department, there are stray services operated by private players.

Project cost, stakeholders

The Kochi Water Metro project has been conceived as part of the Kochi Metro Rail service. In 2016, the cost of the water metro had been pegged at Rs 747 crore, but the estimate has been revised to Rs 1136 crore. Boats have been constructed by Cochin Shipyard Limited.

The first phase of commercial operation

The commercial operation of water metro boat services will begin on April 26. The initial operation will be on two routes; High Court to Vypin and Vyttila to Kakkanad stretches. Eight boats will be part of the service along these two routes, at an interval of 15 minutes from 7 am to 8 pm.

KOLKATA'S UPCOMING METRO UNDER HOOGHLY RIVER: HOW IT WILL WORK, CHALLENGES AHEAD

Trial runs are underway on the challenging western portion of the Kolkata Metro's East-West corridor, a 520-m stretch of which passes under the Hooghly. This is the country's first underwater transport tunnel, and the corridor will significantly improve commuting on one of the city's most congested stretches

By the end of this year, commuters could be taking a Metro train across the Hooghly, which separates Kolkata from Howrah, its smaller twin city on the opposite bank, travelling under the mighty river. The passage, 520 metres from one bank to the other and more than 30 metres (100 feet) below the river surface at its deepest points, is India's first underwater transport tunnel.

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Trial runs on the Howrah Maidan-Esplanade section — of which the tunnel under the Hooghly river is part — of the city's East-West Metro are currently ongoing, and could continue for perhaps another seven months, after which regular commuter services will begin.

The trains will have an operational speed of 80 km/h, and will cover the half-kilometre stretch under the Hooghly in about 45 seconds. The 16.55-km East-West corridor, the second line of the Kolkata Metro network, will, when complete, connect the IT hub of Salt Lake Sector V on Kolkata's eastern flank to the western suburb of Howrah, where the city's main train station is located. The line, called the Green Line, will link Howrah station to Sealdah station, which is the hub of Kolkata's suburban railway network.

Technology & challenges

The tunnels under the Hooghly have an internal diameter of 5.55 metres and an external diameter of 6.1 metres. The centre-to-centre distance between the east- and west-bound tunnels is 16.1 metres. Two TBMs finished the job in a record 66 days from April to June 2017. The first machine crossed the river in May 2017; the second in June that year.

"Several measures have been taken to prevent water inflow and leakages in the tunnel. Concrete mixes composed of fly ash and micro silica have been used for the segments to minimise water permeability. The inner walls are of high-quality M50-grade reinforced concrete segments with a thickness of 275 mm each, which were sealed together using a complex grouting process," a technical expert associated with the project said.

Under the organic clay of the riverbed lies a layer of sandy silt. The German-made TBMs, christened Prerna and Rachna, bored through the layer below that, described as "firm to stiff clayey silt".

The Brabourne Road area that lies close to the river is old and busy, and residents of several old buildings were moved out to hotels while the TBMs were at work. The problem of seepage in the Bowbazar area due to the punctured aquifer is yet to be resolved — until that happens, the entire East-West corridor cannot be commissioned and the full potential of the project will not be realised, officials said.

Kolkata and the Metro

The Kolkata Metro is integral to the city's identity. The North-South line, the first section of which was opened in 1984, was India's first Metro railway. The line, also known as the Blue Line or Line 1, now runs from Dakshineshwar to Kavi Subhash in New Garia. A northern extension is planned from Dakshineshwar to Barrackpore.

Stations of the North-South Metro are now old, and have several problems associated with age and outdated technology. The East-West Metro's stations are state-of-the art structures, and have a host of passenger amenities. Two more Metro corridors have been proposed for the city.

NETWORK OF SENSORS TO MONITOR GROUNDWATER QUALITY

The Jal Shakti Ministry is working on an ambitious plan to deploy a vast network of groundwater sensors that will continuously relay information on groundwater levels and the degree of contamination down to the taluk level. Currently, such information is only measured a handful of times a year and communicated via reports of the Central Groundwater Board.

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Establishing a network that will continuously measure groundwater quality, feed it into a centralised network such as that of the National Water Informatics Centre and make it available for monitoring would make groundwater visible much the same way as air quality and meteorological variables — air pressure, moisture, precipitation — are now, Subodh Yadav, Joint Secretary, Department of Water Resources, told The Hindu. "We can potentially provide groundwater forecasts to farmers that would be useful for sowing, and updated advisories can influence groundwater extraction policies by States," he added. "Except for information on international treaties, most of this information will be accessible."

67,000 recordable units

The Central Groundwater Board currently relies on a network of about 26,000 groundwater observation wells that require technicians to manually measure the state of groundwater in a region. Under the new initiative, around 16,000 to 17,000 digital water level recorders will be connected to piezometers in the wells. Piezometers measure groundwater levels, the recorders will transmit the information digitally.

In the next three years, the CGWB aims to increase its network from 26,000 to 40,000. When combined with similar networks possessed by other institutions — State bodies, agriculture and meteorology departments — India will have 67,000 digitally recordable units to monitor groundwater dynamics.

The CGWB is in charge of the National Aquifer Mapping Programme (NAQUIM), that as of March has mapped the country's aquifers at a resolution of 1:50000 and under the second phase of the programme, expects to improve the resolution by five times. So far, an area of 25.15 lakh sq. km has been covered under the NAQUIM studies.

In the latest Ground Water Resource Assessment-2022, the total annual groundwater recharge in the country has been assessed as 437.60 billion cubic metres (BCM). The annual extractable groundwater resource has been assessed as 398.08 bcm, with actual extraction of 239.16 bcm.

The average stage of groundwater extraction for the country as a whole works out to be about 60.08%. Anything above 70% is considered "critical" though there are regions in Punjab, Haryana, Delhi and Rajasthan with groundwater blocks with over 100% extraction. Reports over the years suggest that 85% of rural India uses groundwater for drinking and domestic purposes. In cities with a population of over 10 lakh, about 40% have seen water levels in monitored wells either stay stable or drop.

Groundwater contamination, the CGWB says, is mostly "geogenic" (natural) and hasn't significantly changed over the years. However, nitrate contamination — a result of the use of nitrogenous fertilizers — has been observed. Sections of nearly 409 districts have been confirmed with fluoride contamination and parts of 209 districts have noted arsenic contamination. Those regions and States known to have groundwater contamination will be monitored more intensely for action by States, said Mr. Yadav.

THE AZADI OF AZAD

Imagine a home-schooled Indian boy at the turn of the 20th century who begins work on his Persian dictionary at the age of nine, completes his early education by 12, establishes himself as a leading columnist, the editor of a monthly and a poet before he reaches 15, and goes on to become the youngest president of the Indian National Congress (INC) at 35.

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The child prodigy was Mohinuddin Ahmad (1888-1958), aka Maulana Abul Kalam Azad (the liberated father of discourse) whose birth anniversary (November 11) is celebrated as National Education Day. Yet, a revised Class 11 political science textbook published by the National Council for Educational Research and Training reportedly deleted any mention of Azad.

Thankfully, S. Irfan Habib's Maulana Azad: A Life reminds us of Azad's sacrifices for the cause of a united India, and highlights the continued relevance of his iconoclastic views on religion and politics.

Religious worldview

Azad identified himself more with the liberalism of Sir Syed Ahmad Khan than with his father's clerical puritanism which he found intolerable. In his view, "The perpetrators of oppression have always availed of the services of the ulema who are more than willing to serve the state."

Azad's father, Maulana Khairuddin, tried to stop him from becoming a free-thinker. He told Azad about Abdur Rahim 'Dahri' (1785-1853), a rationalist Muslim, to warn him that "too much intelligence many times becomes reason for waywardness." But Azad was all praise for Rahim and said that he did not deserve to be dismissed as a dahri (atheist).

This intrepid defence of a condemned dissentient in the conformist milieu of the early 20th century is breathtaking in its audacity. Only an original scholar of the Koran like Azad could have done it. However, a new book Another India: The Making of the World's Largest Muslim Minority, 1947–77 by Pratinav Anil, accuses Azad of pushing Indian Muslims into a "juristic ghetto" after Independence by sacrificing their political safeguards on the altar of cultural safeguards which included the protection of a gender-biased Muslim Personal Law.

Political dissent

To oppose Muhammad Ali Jinnah's two-nation theory, Azad advocated the idea of composite nationalism (muttahida qaumiyat) arguing that Hindus and Muslims were part of the same nation, and therefore, dividing India on the basis of religion would be an act of sheer folly.

But he did not hold Jinnah solely responsible for the Partition. In India Wins Freedom, Azad expresses extreme disappointment with Sardar Patel for telling him that there were two nations in India, and therefore, "it was better to have one clean fight and then separate than have bickerings every day". This prompted Azad to remark: "Jinnah may have raised the flag of partition but now the real flag bearer was Patel."

However, Azad's biggest shock came when Jawaharlal Nehru asked him to accept Partition as "it would be wisdom not to oppose what was bound to happen". Azad warned Nehru that "history would never forgive us if we agreed to Partition. The verdict would then be that India was divided as much by the Muslim League as by Congress". According to Azad, one of the main reasons for Partition was Nehru's rejection of the Cabinet Mission Plan.

One may disagree with Azad's assessment, but this is how he perceived the events that led to India's Partition. His forthrightness tells us why the free-thinking Mohinuddin Ahmad renamed himself Abul Kalam Azad. It was to announce his liberation from the narrow perspectives of the religion and politics of that period, and speak his mind as the father of discourse without fear or favour.

PROMISING BILL

With an estimated eight million people employed in an industry built on the back of the smartphone revolution, "gig" work has become a major source of jobs for youth in India. It goes without saying that in a country where informal labour and unemployment have defined the nature of the jobs market in the last decade, the gig economy has been a beneficial outlet of employment. This is especially true of youth and migrant workers, as they seek a ready and quick means of securing finances and flexible hours — an option used by informal workers who have used gigs for moonlighting. With growing smartphone use and a reliance on apps for daily needs and purposes, the gig economy is only set to flourish in terms of usage and opportunities. Yet, increased competition among platforms and the availability of a cheap labour force have led to a lowering of incentives for gig workers even as their workload and uncertainty of work hours have increased significantly relative to pay, which has also become insufficient for many. Adding this to the fact that gig workers are not recognised as "workers" but partners by most aggregating platforms and that they lack any social security or related benefits due to them as "workers", working conditions have become increasingly harsh in an industry that is no longer a fledgling one. This is now evident in growing flash strikes by gig workers.

Seen in this light, the decision by the Rajasthan government, to deliver a Rajasthan Platform-based Gig Workers (Registration and Welfare) Bill, 2023, should be welcomed, even if it will be introduced before the Assembly elections later this year. While the draft Bill envisages a "welfare board" that will design welfare policies and hear grievances of gig workers on a piece rate basis, the specificities of the policies and how they might benefit the workers are still un clear. The board is expected to work towards a social welfare corpus which will be financed by a cess on the digital transactions made by consumers on the platforms that utilise the gig worker labour. This schema is not unfamiliar — platform workers in the transport sector in Thailand and Malaysia, for instance, benefit from health and accident insurance as well as social security that is financed by a deduction of 2% for every ride. Recently, the Union government passed the Code on Social Security (one of four labour codes), which also allowed for some social security for gig workers, but the scheme only remains on paper without proper implementation. If Rajasthan's pioneering draft Bill takes off, other States could be compelled to utilise similar measures to ensure the welfare of gig workers.

GENOME SEQUENCING AND THE GENOME INDIA PROJECT

The story so far:

The Department of Biotechnology recently said that the exercise to sequence 10,000 Indian human genomes and create a database under the Centre-backed Genome India Project is about two-thirds complete. About 7,000 Indian genomes have already been sequenced of which 3,000 are available for public access to researchers.

What is genome sequencing?

The human genome is the entire set of deoxyribonucleic acid (DNA) residing in the nucleus of every cell of the human body. It carries the complete genetic information responsible for the development and functioning of an organism. The DNA consists of a double-stranded molecule built up by four bases. While the sequence of base pairs is identical in all humans, there are differences in the genome of every human being that makes them unique. The process of

deciphering the order of base pairs, to decode the genetic fingerprint of a human is called genome sequencing.

In 1990, a group of scientists began to work on determining the whole sequence of the human genome under the Human Genome Project. The Project released its latest version of the complete human genome in 2023, with a 0.3% error margin. This shows that genomic sequencing has now evolved to a stage where large sequencers can process thousands of samples simultaneously. There are several approaches to genome sequencing, including whole genome sequencing. The process of whole-genome sequencing, made possible by the Human Genome Project, now facilitates the reading of a person's individual genome to identify differences from the average human genome.

What are applications of sequencing?

Genome sequencing has been used to evaluate rare disorders, preconditions for disorders and even cancer from the viewpoint of genetics, rather than as diseases of certain organs. Nearly 10,000 diseases — including cystic fibrosis and thalassemia — are known to be the result of a single gene malfunctioning. In public health, however, sequencing has been used to read the codes of viruses. One of its first practical usages was in 2014, when a group of scientists from M.I.T and Harvard sequenced samples of Ebola from infected African patients to show how genomic data of viruses could reveal hidden pathways of transmission.

How did it help during the pandemic?

In January 2020, at the start of the pandemic,Chinese scientist Yong-Zhen Zhang, sequenced the genome of a novel pathogen causing infections in the city of Wuhan. Mr. Zhang then shared it with his virologist friend Edward Holmes in Australia, who published the genomic code online. It was after this that virologists began evaluating the sequence to try and understand how to combat the virus, track the mutating variants and their intensity and spread, and to come up with a vaccine.

To enable an effective response against COVID-19, researchers kept track of emerging variants, conducting further studies about their transmissibility, immune escape and potential to cause severe disease. Genomic sequencing became one of the first steps in this important process. Here, the purpose of genome sequencing was to understand the role of certain mutations in increasing the virus's infectivity.

India also put in place a sequencing framework — the Indian SARS-COV-2 Genomics Consortia (INSACOG). This consortium of labs across the country, was tasked with scanning coronavirus samples from patients and flagging the presence of variants known to have spiked transmission internationally. As of early December 2021, INSACOG had sequenced about 1,00,000 samples.

What is the Genome India Project?

India's 1.3 billion-strong population consists of over 4,600 population groups, many of which are endogamous. Thus, the Indian population harbours distinct variations, with disease-causing mutations often amplified within some of these groups. But despite being a large population with diverse ethnic groups, India lacks a comprehensive catalogue of genetic variations.

Creating a database of Indian genomes allows researchers to learn about genetic variants unique to India's population groups and use that to customise drugs. About 20 institutions across India are involved in the Project.

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STRAY DOG POPULATION CONTROL IS DOGGED BY BAD SCIENCE

The horror stories continue to pour in. Children, usually from poor families or in rural areas, are being hunted and killed by homeless dogs. State and central governments seem to be helpless to ensure the safety of people on the streets, from what has clearly become a human rights issue and a public health crisis.

The main culprit behind this is the Animal Birth Control (ABC) Rules that were first introduced in 2001 by the Ministry of Culture, and now replaced by even more absurd ABC Rules, 2023. This policy, despite the protestation by those who promoted it, is completely lacking in both science as well as logic.

The policy aims to implement a technique called 'catch-neuter-vaccinate-release' to control populations of free-ranging dogs and cats.

Unimplementable

However, despite 20 years of this policy and hundreds of crores of rupees being spent, dog population in India is now more than 65 million. Proponents of this method aver that the only reason it did not work is because it has not been implemented properly. But what they fail to understand is that it is unimplementable from a scientific, logistic and economic perspective.

The ABC programme does not seem to have any benchmarks or targets. For example, before the start of the programme, a municipal corporation would be required to estimate the base population of dogs to be sterilised. It would then need to set targets for population reduction within a reasonable time period, say five years, and then calculate how many would need to be sterilised to achieve this objective.

However, municipalities set targets for sterilisation based on budgets and available facilities. In most cases, only a small fraction of the population is sterilised, and in many cases, the programme itself is discontinued after a few cycles.

Dogs are incredibly fecund animals, and reproduce at a high rate if enough resources are available. Both field and modelling studies show that nearly 90% of the dog population needs to be sterilised over a short period of time to achieve a sustained population reduction over a 10-15-year period. This 'minor' detail is conveniently skipped by most proponents of the ABC programme.

Feeding dogs

The other major problem is that the ABC Rules, 2023, bizarrely require people to feed dogs, wherever they may be. Most people either throw a few biscuits on the roadside or leave leftover food outside their houses, but some people, with almost religious fervour, go out of their way to feed dozens of dogs.

Reckless feeding tends to congregate dogs and leads to pack formation, territoriality and aggression even amongst sterilised dogs. This behaviour is usually triggered at night. At its very worst, this frenzied hunting behaviour can end up causing severe injury or even death due to mauling, especially of small children and the elderly. Another study also found that in urban areas, dogs were the second leading cause of road accidents.

Despite all these negatives, why does the government persist with a policy that is cruel at multiple levels? It is cruel to dogs, since homeless life on the streets is not easy, with accidents, disease,

wanton cruelty and constant fear being their normal state. It is cruel to ordinary citizens, depriving people of their right to life, free movement, and a safe environment. In many areas, dogs are also leading causes of harm to wildlife, and cause immense loss of biodiversity.

The unkindest cut of all is that the ABC Rules ban the euthanasia of rabid animals, making India the only country in the world to follow such a cruel practice.

However, it does not have to be this way. Solving this problem requires a multi-pronged approach, and some difficult decisions. Strict pet ownership laws, a ban on irresponsible feeding in public places, and encouraging adoption and long-term sheltering of homeless dogs will result in win-win solutions.

Expenses

Unlike the ABC programme, the expenses incurred in setting up shelters will at least result in removing dogs from streets permanently, whereas the ABC Rules require that the dogs be released back into the same area, where they can be a nuisance in perpetuity. The same people who feed dogs on the streets can supervise shelters to ensure that they are well maintained and also feed them there.

If the "greatness of our nation and its moral progress" is to be judged by how we treat animals, then surely we should not be making the worst enemies of our best friends.

WHAT CAUSES CHEETAH DEATHS, AND WHY CONFINING THEM MAY NOT HELP

One of the 12 cheetahs flown in from South Africa in February, a six-year-old male named Uday, died in Kuno National Park on Sunday (April 23) morning.

Only days ago, Madhya Pradesh Chief Minister Shivraj Singh Chouhan had asked the state forest department to prepare Gandhisagar Wildlife Sanctuary as the second home for the spotted cats to relieve pressure on Kuno.

Of the 20 cheetahs brought to India from Africa in the world's first intercontinental translocation project, 18 now remain. Five-year-old Sasha, one of the eight cheetahs that arrived from Namibia last September, died on March 27.

Were these unfortunate cheetah deaths unexpected?

The Cheetah Project did anticipate high mortality. The criteria for the project's short-term success was only "50% survival of the introduced cheetah for the first year". That would be 10 out of 20.

The project, however, came under pressure after a number of experts pointed out that it had overestimated Kuno's carrying capacity for cheetahs. The field experience of the project staff at Kuno also back this assessment.

As a result, the Madhya Pradesh government set a six-month deadline for readying Gandhisagar — in the Chambal river valley in Mandsaur and Nimach districts — for the cheetahs. There is also talk about moving a few animals from Kuno to the safety of an 80-sq-km fenced area in Rajasthan's Mukundra Hills Tiger Reserve.

The focus, therefore, is shifting from the project's stated purpose — that of establishing the cheetah in an open landscape as a free-roaming and self-sustaining population occupying

thousands of square miles — to managing the African imports as a few pocket populations in fenced-in or restricted areas.

So is shifting the goalpost a viable step?

In the absence of natural dispersal, managing a meta-population involves moving suitable individuals from one pocket population to another to maintain genetic viability. Studies on similar efforts elsewhere offer useful insights.

In 2018, a study documented how meta-population management conserved a declining population of 217 cheetahs in 40 small populations in South Africa.

In 2009, 40 fenced reserves in South Africa held only 289 cheetahs even though as many as 343 were translocated to 48 fenced reserves from Namibian and South African ranches since 1965. Once the supply was stopped in 2009, numbers further fell to 217 by 2012.

At that stage, the key conservation problems (such as high lion density) were identified and addressed before shuffling cheetahs from one pocket population to other.

In six years, the meta-population grew to 328 cheetahs, offering a viable roadmap for the South African model of conserving animals in fenced reserves in regions with dense human populations blocking natural gene flow.

And how do cheetahs die?

The South African study also documented the causes of mortality, where it could be established, for 293 cheetah deaths.

It found that holding camps caused 6.5% of cheetah deaths, immobilisation/ transit caused 7.5% deaths, and another 0.7% were caused by tracking devices. This added up to almost 15% — so, one in every seven cheetah deaths was attributed to handling and management.

Predation turned out to be the biggest killer in the study, accounting for 53.2% of cheetah mortality. Lions, leopards, hyenas, and jackals were primarily responsible. Several other wildlife including warthogs, baboons, snakes, elephants, crocodiles, vultures, zebras, and even ostriches killed cheetahs.

It is well documented that cheetahs suffer very high cub mortality — up to 90% in protected areas — mainly due to predation. Consequently, nearly 80% of all cheetahs throughout their range in Africa are found living outside of protected parks and reserves.

In Africa, the lion is the chief predator of cheetahs; in India, where lions are absent except in Gujarat, leopards are likely to slip into that role in potential cheetah landscapes.

It is certainly not viable to keep cheetahs in leopard-proof enclosures in the long run. The strategy of restricting them to sanctuaries and national parks by repeated sedate-and-recover interventions is fraught with the risk of harming the animals, project experts have conceded.

So what options are available to the project now?

The Cheetah Project can choose to cut the risk by settling for the South African model of retaining a few pocket populations in fenced-in reserves. But if it chooses not to make this compromise, the project does face an uphill task.

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The project does not seem to have carried out the necessary groundwork before bringing in the animals, and it has to now race against time to find a way for people and cheetahs to share space in the central Indian landscape.

In the long run, the success — or failure — of the cheetah project will be determined within the framework of India's traditional conservation ethos that envisages protecting naturally dispersing wildlife in viable non-fragmented habitats.

MALARIA SET TO BE NOTIFIABLE DISEASE ACROSS INDIA EVEN AS CASES SHOW A DECLINE

Malaria is all set to become a notifiable disease across India, with Bihar, Andaman and Nicobar Islands and Meghalaya too in the process of putting the vector-borne disease in the category. This will then require by law that cases be reported to government authorities. Currently, malaria is a notifiable disease in 33 States and Union Territories in India.

Confirming the development, a senior Health Ministry official said this is part of India's vision to be malaria-free by 2027 and to eliminate the disease by 2030. The Health Ministry has also initiated a joint action plan with the Ministry of Tribal Affairs for malaria elimination in tribal areas.

Meanwhile, delivering the keynote address at the Asia-Pacific Leaders' Conclave on Malaria Elimination on Monday, Health Minister Mansukh Mandaviya said that in India, malaria is not just a public health issue but also a social, economic, and political challenge that requires the cooperation of all stakeholders.

"India was the only high-burden, high-impact country in the southeast Asia region to report a decline in malaria cases in 2020 as compared to 2019. India witnessed a 85.1% decline in malaria cases and 83.36% decline in deaths during 2015-2022."

The Health Ministry added that there is now availability of near-real time data monitoring through an integrated health information platform (HIP-Malaria Portal) and periodic regional review meetings to keep a check on malaria growth across India.

WHAT THE LATEST NATIONAL HEALTH ACCOUNT FIGURES SAY ABOUT INDIA'S HEALTHCARE SECTOR

There has been a consistent increase in government spending, coupled with declining out-of-pocket expenditure by people on their healthcare needs, shows the National Health Account Estimates 2019-20, which was released earlier this week. The government spent 1.35% of the country's Gross Domestic Product (total value of the final goods and services in a year indicative of a country's economy) on healthcare during the year, bouncing back from a slight drop seen in 2018-19 as per the report.

The health account estimates describe the country's total expenditure on healthcare – whether by the government, private sector, NGOs, or individuals – and the flow of these funds. It answers questions such as what are the sources of healthcare expenditures, who manages the expenditures, who provides health care services, and which services are utilised.

What were the main findings of the report?

There are four main findings of the report:

One, the government spending on healthcare has been on the rise. The money spent by the government on healthcare as a percentage of GDP has increased from 1.13% in FY 2015 to 1.35% in FY 2020. Even this small percentage increase in the government's health kitty has translated into nearly double the money spent on each person – the per capita health spend of the government in this period has increased from ₹1,108 to ₹2,014.

Although the number is still far from the target of 2.5% investment in healthcare by 2025, the number is likely to shoot up in next year's report, with the increased government spending during the pandemic getting reflected.

The government's share in the total money spent on healthcare in the country went up by a 12.4 percentage point between FY 2015 and FY 2020, increasing from 29% to 41.4%.

Two, money spent by people from their own pocket on healthcare has been going down. The report shows that 47.1% of the total spending on healthcare in FY2020 came directly out of people's pockets. But this is actually a 15.5 percentage point drop from 62.6% of the spend coming out-of-pocket in FY 2015. The aim is to bring this down as low as possible by investing in public health and insurance among others so that people don't have to shell out the money when they are sick.

Three, a major chunk of the government's health spend was in the primary sector. Out of the total spending by the government on healthcare in FY 2020, 55.9% went to primary care, 29.6% went to secondary care, and 6.4% went to tertiary care. To compare, the government spent 51.3% in primary care, 21.9% in secondary care, and 14% on tertiary care in FY 2015.

"It is heartening to see that there has been a consistent and fast increase in the government spending on primary healthcare. This is important because it forms the basis for preventive healthcare. This has been articulated in the National Health Policy that there will always be more spending on primary healthcare which is the backbone," said NITI Aayog member (health) Dr VK Paul. He added: "Now, there has been the great achievement of 1.5 lakh health and wellness centres across the country that can also screen people for cancers, diabetes, and eye disease."

Four, the union health secretary Rajesh Bhushan pointed out that there has been a consistent increase in social security expenditure by the government, which increased from 5.7% of the total spending on health in FY 2015 to 9.3% in FY 2020.

Why does the decline in out-of-pocket expenditure bother experts?

The marginal increase in the government spending while there is a significant drop in out-of-pocket spending bothers Dr Indranil Mukhopadhyay, health economist and professor at school of government and public policy at OP Jindal University.

He says: "First of all, the increase in government health expenditure as a percentage of GDP also takes into account capital spending (money spent on developing infrastructure). Other countries look at only the current health expenditure, which for India stands at 1.04% calculated based on this report. This puts India in 164th place out of 184 countries in terms of government health spending. Also, the marginal increase in percentage could be a factor of a shrinking economy – GDP growth was slow in FY 2020. In fact, this percentage is likely to go up further next year because the economy tanked as a result of Covid-19."

EXPRESS VIEW: WHY IT IS GOOD TO HAVE MORE NURSES

The government's decision to set up 157 nursing colleges is a step in the right direction. Despite the proven capabilities of the country's nurses, the profession hasn't always received its due. The move will add more than 15,000 nursing seats. More than 40 per cent of the country's nursing colleges are located in Kerala, Andhra Pradesh, Tamil Nadu and Karnataka. With Rajasthan, Uttar Pradesh and Madhya Pradesh getting a major share of the new nursing colleges, the skew towards the southern states will be addressed to an extent. Much more will, however, need to be done to equip the country's healthcare facilities with the caregiving expertise they regularly fall short on. The government has rightly been giving emphasis on setting up hospitals and medical colleges, including AIIMS, in places that are in desperate need of such infrastructure. The private sector has also been increasing its footprint in the healthcare sector. These hospitals will require a regular supply of nurses.

The WHO recommends three nurses for a population of 1,000 people. According to official estimates, India currently has less than two nurses for 1,000 people. But this is a conservative figure. A FICCI-KPMG report last year reckoned that the number of allied healthcare professionals needs to go up eight times to meet the country's needs in the next 25 years. Increasing the number of nursing professionals is, however, just one part of addressing this imperative. An equally important requirement is equipping these caregivers with the skill-sets required in a medical set-up which keeps throwing up new challenges even as old problems remain unresolved. For instance, a lot of the acrimony between patients and healthcare professionals, that keeps surfacing every now and then, can be resolved if the nursing cadre is given proper communication training. Equipping caregivers with knowledge of the rapidly changing technologies in medical care is another imperative. Of course, addressing many of these challenges is part of on-the-job training. But given the pressure on frontline workers in the country's hospitals, it is important that nurses are taught to work autonomously of physicians in several aspects of patient care. Experts believe that institutes in the country currently do not provide nurses with adequate training to take up leadership positions.

Migrant nurses — most of them from the Southern states — have been, for many decades, a major source of remittance. These professionals are much sought after in hospitals in Europe, the Americas and West Asia. Investing in nursing education will only enhance the revenue-generating capacity of potential migrants. The new colleges announced by the government on Wednesday should be seen as a beginning in this endeavour.

HOW TO CHECK RELATIVE HUMIDITY ON A HOT DAY TO KEEP YOURSELF COOL

Relative humidity is a simple concept as far as weather phenomena go, but it has significant, far-reaching consequences for how we must take care of ourselves on a hot or wet day.

Humidity is the amount of moisture in the air around us, and there are three ways to track it. The most common of them is absolute humidity — the mass of water vapour in a given volume of air and water vapour mixture, expressed as kg/m3. The second is specific humidity, equal to the mass of the moisture divided by the mass of air. It is expressed as a dimensionless number (but sometimes as grams per kilogram among other similar units).

The third way is relative humidity: it is important because it factors in the amount of vapour that air can hold at different temperatures. Determining its value is a bit more complicated — it is the vapour density of the air divided by the saturation vapour density at dry-bulb temperature.

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Why does relative humidity matter?

On a hot day, our body uses sweat to cool itself. Sweat is released via our skin to the surface. There, the liquid evaporates. When water changes phase from liquid to vapour, it absorbs heat from the surface on which it lies. So when sweat evaporates, it absorbs heat from the skin, cooling it.

The higher the relative humidity of air, the more it is filled with moisture. When air already contains a lot of moisture, it won't easily accept more. This means that the sweat on your skin can't evaporate. At the same time, the body keeps sweating as it is still expecting to cool itself. As a result, if the relative humidity is high, you can sweat on a hot day even when you are sitting still while your body keeps accumulating heat. This can quickly become dangerous.

A relative humidity of 30-60% is generally considered to be comfortable. Environments that have lower levels than this typically use humidifiers to increase the humidity. When the level is higher, a fan will help move the air around you and help sweat evaporate better.

In both cases, drinking water is important.

What does relative humidity imply physically?

Warmer air can hold more moisture than cooler air. So at the same absolute humidity, the relative humidity of warmer air will be lower than that of cooler air. It is like saying two vessels can hold the same amount of water — just that the bigger vessel will be less full than the smaller vessel.

This is why, for example, while Chennai had an absolute humidity of 70% at 2.30 pm on April 23, its relative humidity was lower, around 60%, because it had an ambient temperature of 32°C. The change in the capacity for moisture as the air warms is also non-linear, meaning it doesn't increase by the same amount as the air warms. For example, the difference as it warms over 20º C from -20º C to 0º C is small, but there is an enormous improvement in its vapour-carrying capacity as it warms over 20º C from 30º C to 50º C.

A psychrometer is a device that has two such thermometers plus a chart to get the final reading. Modern, electronic psychrometers can calculate the relative humidity directly.

For a rough sense, the lower the wet-bulb temperature, the drier the air is, and the less relatively humid it is.

Why does the wet-bulb temperature matter?

A more direct way to understand the implications of relative humidity for your wellbeing is in the form of the wet-bulb temperature (also known as the adiabatic saturation temperature). It is the lowest temperature a surface — like your skin — can reach when water evaporates from it. The wet-bulb temperature is equal to the dry-bulb temperature when the relative humidity is 100%.

A wet-bulb temperature in an environment of 32-35ºC or higher can be quickly lethal, even if you are not doing any physical activity or are in the shade. (At least one study has shown that even a wet-bulb temperature of more than 29º C can be dangerous.)

The climate crisis is rendering heatwaves more common, more frequent, more spread out, and more potent over the Indian subcontinent. One way to adapt is to keep an eye on the relative humidity, drink lots of water, and cool yourself.

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BUSINESS & ECONOMICS

RUSSIA'S OIL IMPORTS TO INDIA RISES FURTHER, TRADE DEFICIT BALLOONS

In February 2023, Russia surpassed Saudi Arabia to become the second biggest exporter of crude oil to India in FY23. Iraq continued to retain the top spot, though the gap is closing fast. In the four-month period between November 2022 and February 2023, Russia took over the top spot, while the shares of Saudi Arabia and Iraq in India's oil imports are fast decreasing.

As can be observed, Russia's share zoomed to second-highest in FY23 from a negligible proportion in the previous years. Russia is pulling away from Iraq and Saudi Arabia, and is leading by quite a distance.

While the rise of imports from Russia was due to surging inflow of crude oil, India is taking in other products too. In FY23 (till February), 50% of India's imports of project goods — input materials required in infrastructure projects — were from Russia. Close to 30% of newsprint rolls, mineral/chemical fertilizers and sunflower/cotton seed oil each came from Russia in FY23.

India and China have snapped up the vast majority of Russian oil in April at prices above the Western price cap of $60 per barrel, according to traders and Reuters calculations. Oil loadings from Russia's western ports in April will rise to the highest since 2019, above 2.4 million barrels per day, shipping sources told Reuters. This means that the Kremlin is enjoying stronger revenues despite the West's attempts to curb funds for Russia's military operations in Ukraine. A G7 source told Reuters on April 17 that the Western price cap would remain unchanged for now, despite pressure from some countries such as Poland, to lower the cap to increase pressure on Moscow. The advocates of the cap say that it reduces revenues for Russia, while allowing oil to flow, but its opponents say it is too soft to force Russia to backtrack on its activities in Ukraine.

India and China have not agreed to abide by the price cap, but the West had hoped the threat of sanctions might deter traders from helping those countries buy oil above the cap. India accounts for more than 70% of the seaborne supplies of the grade so far this month and China for about 20%, Reuters calculations show. Average discounts for Urals were at $13 per barrel in Indian ports and $9 to ICE Brent in Chinese ports.

But the sudden surge in oil imports meant that India's trade deficit with Russia ballooned in recent years. India exports pharma products, crustaceans, tea, coffee and some other products but relatively of much lesser value. And so, India's trade deficit with Russia has surged in FY23.

On April 18, India and Russia agreed to address trade deficit and market access issues as New Delhi sought to narrow its trade imbalance with Russia. Reuters reported in November that Russia was potentially seeking to import more than 500 products from India. Indian representatives said, in December, that they shared a list of Indian products with Moscow for access to Russian markets.

Meanwhile, Russia's richest people added $152 billion to their wealth over the past year, buoyed by high prices for natural resources and rebounding from the huge loss of fortunes they experienced just after the Ukraine war began, Forbes Russia said. Also, recently Pakistan placed its first order for discounted Russian crude oil.

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THE EU'S NEW CRYPTO-LEGISLATION

The story so far:

The European Parliament, the legislative body of the 27-country block European Union, has approved the world's first set of comprehensive rules to bring largely unregulated cryptocurrency markets under the ambit of regulation by government authorities. The regulation, called the Markets in Crypto Assets (MiCA), will come into force after formal approval by member states.

Why regulation?

Having a comprehensive framework like MiCA for 27 countries in Europe not only harmonises the crypto industry but also gives the EU a competitive edge in its growth compared to the U.S. or the U.K. which lack regulatory clarity. More importantly, 2022 saw some of the biggest failures and wipeouts in the crypto industry involving bankruptcies and fraud scandals, be it the collapse of the crypto exchange FTX and its spat with Binance or the failure of Terra LUNA cryptocurrency and its associated stablecoin. The liquidity shortage caused by these shocks led other crypto lending platforms to halt customer transfers and withdrawals before filing for bankruptcy.

What kind of assets will MiCA cover?

The MiCA legislation will apply to 'cryptoassets', which are broadly defined in the text as "a digital representation of a value or a right that uses cryptography for security and is in the form of a coin or a token or any other digital medium which may be transferred and stored electronically, using distributed ledger technology or similar technology". This definition implies that it will apply not only to traditional cryptocurrencies like Bitcoin and Ethereum but also to newer ones like stablecoins.

As for the assets that will be out of MiCA's scope, it will not regulate digital assets that would qualify as transferable securities and function like shares or their equivalent and other cryptoassets that already qualify as financial instruments under existing regulation. It will also for the most part, exclude nonfungible tokens (NFTs). MiCA will also not regulate central bank digital currencies issued by the European Central Bank and digital assets issued by national central banks of EU member countries when acting in their capacity as monetary authorities, along with cryptoassets-related services offered by them.

The regulation prescribes different sets of requirements for CASPs depending on the type of cryptoassets. The base regime will require every CASP to get incorporated as a legal entity in the EU. They can get authorised in any one member country and will be allowed to conduct their services across the 27 countries. They will then be supervised by regulators like the European Banking Authority and the European Securities and Markets Authority, who will ensure that the companies have the required risk management and corporate governance practices in place. Another legislation passed with MiCA requires crypto companies to send information of senders and recipients of cryptoassets to their local anti-money laundering authority, to prevent laundering and terror financing activities.

What has been the reaction?

Leaders at some of the biggest cryptocurrency firms have taken exception to some aspects of MiCA but the broad view is that it is better to have a regulatory framework than having no rules at all and attracting regulatory action on a case-by-case basis without clarity.

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How is crypto regulated in India?

India is yet to have a comprehensive regulatory framework for cryptoassets. A draft legislation on the same is reportedly in the works.

A full-fledged regulation aside, the Indian government has taken certain steps to bring cryptocurrencies under the ambit of specific authorities and taxation. In the Union Budget for 2022, the Finance Ministry said that cryptocurrency trading in India has seen a "phenomenal increase" and imposed a 30% tax on income from the "transfer of any virtual digital asset." In March this year, the government placed all transactions involving virtual digital assets under the purview of the Prevention of Money Laundering Act (PMLA).

BATTING FOR BORROWERS

The Reserve Bank of India's recent draft circular on penal charges on loan accounts is a welcome move that should give respite to individual borrowers. The RBI has emphasised that it wants to ensure that lenders do not seek to unduly profit from borrowers' defaults in servicing their loans even as it allows the credit provider to reprice the loan in case a borrower's 'credit risk profile' has changed. The central bank's draft guidelines on 'Fair Lending Practice' are aimed at obviating a practice where lenders have hitherto levied a penal interest over and above the contracted rate of interest when borrowers delay repayment or default. Observing that the regulatory intent of a penal levy was solely to foster credit discipline among borrowers through a negative incentive, the RBI noted that lenders, however, had in practice turned the penal interest into a revenue enhancement tool. Supervisory reviews had found that some entities were in fact charging 'excessive' rates of penal interest, leading to hardship to the borrowers and disputes. Lenders had also, in certain cases, been capitalising the penal interest, thereby increasing the principal amount that the borrower would ultimately have to repay. The banking regulator has now emphatically laid down that penal charges should be recovered separately and must not be added either to the principal outstanding or the rate of interest charged on the loan. Lenders could, however, still follow the normal process for compounding the outstanding primary interest, it clarified.

The RBI's decision to step in to ensure a fair and transparent approach to credit pricing has to be seen in the context of the sharp uptick in retail lending in recent years. While industry's share of outstanding bank credit had shrunk to about 24% as of February 2023, from over 43% in 2014-15, the omnibus category of personal loans had surged to 30%, from just 19% eight years ago, making it the largest credit category. The central bank has made clear to lenders that while it gives them the freedom to set the quantum of penal charges proportional to the default or non-compliance with the terms of the loan contract beyond a preset threshold, the threshold itself should not be discriminatory within a specified loan or product category. And the penal charges so levied on individual borrowers cannot be at a rate higher than a similar charge applicable to corporate borrowers. Crucially, the penal charge must be communicated upfront when finalising every loan and unfailingly reiterated to the borrower in every subsequent reminder for loan repayments. Small borrowers are sure to heave a sigh of relief as the RBI has made clear it will not brook any usury.

NO SMALL CHANGE

Indian households' financial surpluses parked in small savings schemes operated by banks and post offices got a significant fillip this quarter, with the government raising the returns on most such schemes by 0.1 to 0.7 percentage points. This constituted the third successive hike in the

rates that are reset each quarter. However, the breadth of the schemes covered was wider than on the last two occasions. For October 2022 to December 2022, a mere 0.1 to 0.3 percentage hike was announced on just five of the dozen small savings schemes. The first quarter of 2023 saw another 0.2 to 1.1 percentage point hikes on eight schemes. These increases came after a long pause in rates since April 2020. As the central bank started rate hikes last year and government bond yields (to which small savings rates are linked) hardened, there was a widening gap between the extant rates and the rates prescribed by the formula recommended by the Shyamala Gopinath panel that was officially adopted in 2016. This gap stood at 44 to 77 basis points (bps) after the meagre hikes of October (one basis point equals 0.01%).

Now, that gap is zero or marginal on six schemes, but for five schemes, it is still at 5 bps to 82 bps. These include the Public Provident Fund (PPF), whose rates have been frozen at 7.1% for three years now and should have fetched 7.72% last October and 7.76% for this quarter as per the formula. Government mandarins indicate they are not inclined to hike the PPF rate as its returns are tax-free, unlike in the case of other schemes. If that is so, it must publicly restate its policy position. Yet, the returns on the Sukanya Samriddhi Account Scheme, which are also tax-free, were hiked to 8% this quarter. Its only ostensible difference with the 1960s-origin PPF is it was launched by the current government to encourage savings for the girl child. The General Provident Fund rate for government employees has also been retained at 7.1%, but their dearness allowance has been hiked and a review of their benefits under the New Pension Scheme is underway. While PPF savings are capped at ₹1.5 lakh a year, this Budget raised the limits on a couple of small savings schemes to multiple times of that. It is perhaps no coincidence that the last time small savings rates were hiked across the board was in January 2019, ahead of the Lok Sabha battle. That several States vote this year and the general election looms in 2024 may have influenced the latest hikes as a feel-good device. An even-handed and transparent policy approach rather than quinquennial bouts of relief for small savers, would inspire more confidence.

EXPRESS VIEW ON WHEAT PROCUREMENT: RELIEF AMID FEAR OF INFLATION, POOR MONSOON

Wheat procurement by government agencies has touched 20.5 million tonnes (mt) in the ongoing rabi marketing season. The fact that it has already crossed the 18.8 mt for the whole of the last season is proof of a better crop this time. Last year's heat wave-impacted crop, in combination with surging prices fueled by export demand and the Ukraine war, had resulted in governmental wheat purchases plunging to the lowest since 2007. This year's crop has also suffered damage from unseasonal rains during the second half of March, but production doesn't seem to have taken as much of a hit. That should be a matter of comfort, especially given the stocks of wheat at the start of the current marketing season. These, at 8.3 mt, were the lowest in six years and just over the required minimum of 7.5 mt for April 1.

A second reason for comfort is the prospect of El Nino, which many global weather agencies are predicting may develop during May-July. That could adversely affect the coming monsoon and, in turn, rice production during the ensuing kharif crop season. In 2022-23 (April-March), offtake of grain under various government schemes totalled 92.7 mt. The share of rice in that was 63.8 mt and wheat at 28.9 mt. Low wheat stocks in government godowns meant that the burden of feeding the public distribution system was largely borne by rice. Replenished wheat stocks from higher procurement should help take some load off rice now. That is required, more so in the event of a poor monsoon after four consecutive years of good rainfall. The government would also want sufficient stocks of both wheat and rice in a year leading up to the general elections.

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While one has to wait for the final procurement figure — the government has targeted total wheat purchases of 34.1 mt — the trends so far should provide relief to the RBI as well. Cereal inflation, at 15.3 per cent year-on-year in March, has been a major worry for the central bank. That should hopefully subside somewhat when its monetary policy committee meets next in early June to decide on the course of interest rates. The next few months — particularly how the southwest monsoon season from June to September pans out — are going to matter, both for Indian agriculture and the overall supply position with regard to inflation. Thankfully, global food prices have eased and that should considerably aid the government's supply management programme.

ONLY HALF OF PMJDY INSURANCE CLAIMS SETTLED IN TWO YEARS

In the past two financial years, only 329 of the 647 claims filed for accident insurance cover provided to bank account holders under the Pradhan Mantri Jan Dhan Yojana (PMJDY) have been settled.

This information was revealed in a reply to an RTI (Right to Information) application filed by activist Chandra Shekhar Gaur. In August 2014, while launching the Jan Dhan Yojana that was hailed as an unprecedented step for financial inclusion, Prime Minister Narendra Modi had also announced accident cover for the account holders.

The accident insurance cover for death or permanent disability is extended to all the 48.65 crore account holders, more than 50% of them women. No premium is charged from account holders.

Under the PMJDY, a RuPay debit card is provided to account holders. The key condition to get the accident insurance is that the beneficiary must have performed at least one successful transaction (financial or non-financial) using the card in the 90 days prior to the date of the accident. This condition can make filing claims difficult.

In 2021-22, 341 claims were received, of which 182 were settled and 48 rejected. No details about the remaining 111 cases was provided by the Union Finance Ministry. The total claim amount paid for the period was ₹2.27 crore.

In 2022-23, 306 claims were received, of which 147 were settled and 10 rejected. Again no information was shared on the status of the remaining 149 claims. The total claim payout for the year was ₹1.88 crore.

Mr. Modi had first announced his government's intention to offer zero balance accounts to the "unbanked" in his first Independence Day address as Prime Minister in 2014 and he had formally launched the project on August 28 the same year. Originally, an accident insurance cover of ₹1 lakh was offered and later, it was enhanced to ₹2 lakh for new accounts opened after August 28, 2018.

In the original scheme, the government had announced a life insurance cover of ₹30,000 to the account holders. But the government's reply to the RTI query says this had been discontinued since March 2020. As of March 2023, these 48.65 crore PMJDY bank accounts have a total deposit of ₹1,98,844.34 crore. But 4.03 crore of them hold zero balance.

EXPRESS VIEW ON TAMIL NADU LABOUR LAWS: BE MINDFUL OF WORKERS' CONCERNS

In February, the Karnataka state assembly passed amendments to The Factories Act of 1948 to bring flexibility in the labour regime for industry. The changes carried out, ostensibly aimed to

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facilitate greater investments by Apple's vendors such as Foxconn, permit firms to extend the working hours, increase overtime, and allow women to work during night shifts. Subsequently, in April, its neighbouring state, Tamil Nadu also passed similar amendments aimed at providing greater flexibility to industry in its production activities. However, following protests by political parties and labour unions, the state government has now unfortunately put the bill on hold. While the government had previously sought to assuage their concerns and Chief Minister M K Stalin has now said that worries of the unions will be taken into consideration, this entire episode only underlines the challenge facing governments — how to ease labour law restrictions to provide greater flexibility to industry while being mindful of the welfare of labour.

The attempts by these two states to ease certain contentious provisions of labour laws come at a time when multinational firms are looking to move their production out of China as part of their China plus one strategy in order to reduce their risks. India faces stiff competition in this regard from countries like Vietnam, Indonesia and Bangladesh. As the country steps up its efforts to attract foreign investments, not only the Union government, but state governments too need to take decisive steps. Since state governments exercise control over vexing issues like land and labour, they need to be equally motivated to undertake the necessary regulatory and administrative changes to attract investment. In this regard, the competition between these two states to attract foreign investment is welcome. Perhaps on seeing the benefits that flow from higher investment, others will be nudged into following suit.

However, this episode underlines the tricky terrain of labour reform. While lower wages and flexibility in labour laws improve the attractiveness of India as an investment destination, in societies where labour has little negotiating power, there is a concern of workers being exploited. Governments would do well to engage in conversations with all stakeholders. Fears of workers need to be assuaged. But there can be no debate that both central and state governments need to facilitate the flow of investments in the economy to create jobs for the millions entering the labour force each year.

EXPRESS VIEW: RECORD CONSUMPTION OF UREA IS THE OUTCOME OF RAMPANT OVERUSE FROM UNDERPRICING

The previous UPA government introduced the so-called nutrient-based subsidy (NBS) regime in fertilisers from April 2010. The Narendra Modi government made it mandatory to coat all urea with neem oil since December 2015 and replaced 50 kg bags with 45 kg from March 2018. None of these measures — or even the much-talked-about Nano Urea — have succeeded in their stated goal of achieving balanced fertilisation. On the contrary, sales of urea, the primary cause of worsening plant nutrient imbalance and deteriorating soil health, have crossed an all time high 35.7 million tonnes (mt) in 2022-23. Urea consumption has gone up by over a third compared to the pre-NBS year of 2009-10. Far from discouraging nitrogen use at the expense of other primary, secondary and micro nutrients, farmers are over-applying urea. This, when there is clear evidence of declining nitrogen use efficiency and crop yield response to fertilisers.

The reason for such skewed nutrient use is simple: The maximum retail price (MRP) of urea has been unchanged at Rs 5,628 per tonne since November 2012. Given the corresponding per-tonne MRPs of Rs 27,000 for di-ammonium phosphate, Rs 34,000 for muriate of potash and Rs 28,000-31,000 for most complexes, why would farmers apply less urea? The various solutions currently offered — from Nano Urea to incorporation of compounds that reduce ammonia volatilisation and nitrate leaching — skirt the real issue of rampant overuse from under-pricing. While diesel, petrol

and LPG aren't under-priced like before — they are, in fact, net taxed — urea has continued to be a political hot potato for successive governments. And one cannot expect anything substantial in this regard, till at least next year's general elections.

There can only be one solution to the problem: Raising MRPs. This can be done by first bringing urea under NBS. Linking subsidy to the nutrient content of fertilisers wasn't a bad idea. It failed because NBS excluded urea and was implemented only for other fertilisers. By allowing their MRPs to go up and simultaneously retaining control on urea, the cure proved worse than the disease. The government should do what it has done in other fertilisers: Decontrol MRP of urea and pay a fixed per-tonne subsidy linked to its nutrient content of 46 per cent nitrogen. In the long run, even the NBS should go and be replaced by a flat per-acre subsidy that could be given for every crop season. This wouldn't penalise the serious farmer who takes more than one crop a year and, at the same time, applies fertilisers (including organic manures) judiciously.

STOCK TIPS VIA TELEGRAM: WHY HAS SEBI BANNED THREE PEOPLE FROM ACCESSING THE MARKETS?

The Securities and Exchange Board of India (SEBI) has barred three individuals who were the administrators of a Telegram channel named @bullrun2017 from accessing the market and imposed a penalty of Rs 5.68 crore on them for providing "misleading recommendations" on specific stocks in the messaging app.

The three persons – Himanshu Patel, Raj Patel (both are brothers and based in Mehsana) and Jaydev Zala (Ahmedabad) – used to first buy stocks of a particular company and then recommend other subscribers of the channel to buy those specific stocks. After the subscribers used to buy the recommended stocks, the three perpetrators would sell those stocks at higher prices and book wrongful profits.

What was the modus operandi?

Both Patel brothers used to purchase specific stocks through their own trading accounts as well as the trading accounts of their family members named Mahendrabhai Bechardas Patel, Kokilaben Mahendrabhai Patel and Avaniben Kirankumar Patel. Zala, a friend of Raj, was also involved in the same business.

After purchasing stocks of specific companies, the three men used to circulate messages in the Telegram channel named @bullrun2017, recommending other subscribers to buy those specific shares without disclosing their own interest and intent to sell the stocks instead.

Subsequently, contrary to their own recommendations, the trio used to sell their stocks at inflated prices to unsuspecting investors who had followed their advice, thereby booking unlawful profits. They carried out the same process in different scrips on a routine basis between January 1, 2021 to November 12, 2021, as per Sebi's investigation.

The market regulator, in its investigation, found out that Patel brothers and Zala booked a total profit of Rs 2.84 crore by engaging in the fraudulent scheme repeatedly on several days in multiple scrips. Mahendrabhai, Kokilaben and Avaniben also received the unlawful profits from the scheme, it said.

What was the Telegram channel about?

It provided recommendations to its subscribers for trading in both cash as well as derivatives segments, for both intra-day as well as positional trades. The recommendations issued with respect to the cash segment were majorly focused on small cap scrips. The channel was promoted through Facebook, WhatsApp, Instagram, etc.

Sebi found that the channel had more than 49,000 subscribers, as of January 12, 2022.

Growing concerns around finfluencers

Recently Finance Minister Nirmala Sitharaman asked investors to exercise caution while following the advice of financial influencers or finfluencers.

The capital market regulator is also working on guidelines for financial influencers who give advice to stock investors on various social media platforms like Twitter, Youtube, Telegram, Instagram and Facebook. It recently announced advertisement guidelines to stop misleading advertising by investment advisers and research analysts.

CASES OF AVIATION STAFF CAUGHT SMUGGLING GOLD DOUBLED IN 2022-23

With global gold prices soaring over the past year and the government raising import duties on the yellow metal, gold smuggling seems to have become an attractive side hustle for some aviation staff. Between April 2022 and February 2023, the Department of Revenue Intelligence and customs authorities booked 29 cases involving about 81 kg of seized gold where airline cabin crew members or airport staffers were implicated. By February, 29 such staff had been arrested. This is twice the average number of such cases detected in the previous three years, including the pre-COVID year of 2019-20.

LIFE & SCIENCE

UNUSUAL HEAT IN 2022 LED TO 15,000 DEATHS IN EUROPE: WMO REPORT

Several parts of Europe had recorded their highest-ever temperatures last year. The United Kingdom, for example, experienced 40-plus degree Celsius for the first time ever, while Ireland had its highest temperature since 1887.

The unusual heat in Europe last year, during which several countries experienced record-breaking temperatures, contributed to the deaths of at least 15,000 people, more than any other single extreme climate event, according to a new report by the World Meteorological Organisation.

Several parts of Europe had recorded their highest-ever temperatures last year. The United Kingdom, for example, experienced 40-plus degree Celsius for the first time ever, while Ireland had its highest temperature since 1887. Hamburg, in Germany, became the most northern part of the country to ever record 40 degree Celsius. Even Sweden, one of the coldest countries, recorded temperatures in excess of 37 degree Celsius last year.

This happened despite the prevalence of a strong La Nina event which is known to have an overall cooling impact on the planet, the WMO said.

On an average, global temperature in 2022 was 1.15 degree Celsius higher than pre-industrial times, which is the average of the 1850-1900 period. This is in line with what the WMO had said in its provisional report for 2022 last year. The provisional report had been released during the climate change conference in Egypt when about two months were still remaining in the year.

The warmest year on record so far has been 2016 when average global temperatures were measured to be 1.28 degree Celsius higher than pre-industrial times, not very far away from the 1.5 degree Celsius milestone, which the world is aiming to avoid. The years 2015 to 2022 have been the eight warmest years in the 173 years of direct record keeping. The year 2022 would be fifth or sixth on that list of warmest years, WMO said.

It said the concentrations of three main greenhouse gases — carbon dioxide, methane and nitrous oxide — responsible for global warming were all at record levels in 2021, the latest year for which confirmed values are available. Carbon dioxide concentrations in the atmosphere now exceed 415 parts per million. Just a few years ago, 400 ppm was considered a danger mark and the effort was to keep the concentrations below that. Now, the attempt is to ensure that the rise is contained to as low a value as possible.

The concentrations of methane, less prevalent but more damaging than carbon dioxide, increased to 1908 parts per billion in 2021. The increase of 18 ppb between 2020 and 2021 was the highest annual rise ever, the WMO said.

The report said 95 million people across the world had already suffered displacement because of climate change reasons. "Most people displaced in climate or weather related events remained within the territories where they resided, while in some situations people were forced to flee across international borders in search of safety and assistance," it said.

With the La Nina phase getting over, and forecasts of El Nino taking over in a few months, this year is predicted to be warmer than 2022, with the likelihood of more intense heatwaves and droughts occurring.

Heatwave in India

In India, heatwave conditions existed even in February which is not even a summer month. After a relatively cool March, heatwaves were back in April, and more are predicted in the coming months. The India Meteorological Department has predicted a normal monsoon this year, but there are fears that rainfall might be suppressed because of the impact of El Nino.

THE THREAT OF RISING SEA LEVELS

The World Meteorological Organisation (WMO) has found in a new report that the world's sea level is rising at an unprecedented rate, portending potentially disastrous consequences for the weather, agriculture, the extant groundwater crisis, and social disparities.

The report, entitled 'State of the Global Climate 2022', was published last week. Along with accelerating sea-level rise, it focused on a consistent rise in global temperatures, record-breaking increases in the concentration of greenhouse gases as well as glacier loss, sustained drought-like conditions in East Africa, record rainfall in Pakistan, and unprecedented heatwaves that struck Europe and China in 2022.

A release said "droughts, floods and heatwaves affected communities on every continent and cost many billions of dollars. Antarctic sea ice fell to its lowest extent on record and the melting of some European glaciers was, literally, off the charts."

While the sea-level rise is one of several compounding disasters, it also merits individual attention for the unique crises it can precipitate, especially for coastal areas, the communities there that depend on life in the sea, and its ability to render the loss of land.

How much is the sea rising?

The press release said, "The rate of global mean sea-level [GSML] rise has doubled between the first decade of the satellite record and the last."

Since the 1990s, scientists have been measuring sea-level rise using satellite altimeters. These instruments send radar pulses to the sea surface and measure the time they take to get back and the change in their intensity. The higher the sea level, the faster and stronger the return signal.

Researchers are able to determine GSML by collecting this data from different points on earth and calculating the average. To calculate the rate of change in the GSML — i.e. how fast or slow the sea level is changing — we can calculate the difference in the GSML across a few years, usually a decade, and then divide the difference by the number of years. This provides an estimate of the rate of sea-level change.

According to the WMO report, the sea level has been rising in the three decades for which satellite altimeter data is available (1993-2022). But, while the rate of sea-level rise was 2.27 mm/year in 1993-2002, it shot up to 4.62 mm/year in 2013-2022.

What causes accelerated sea-level rise?

The WMO report points to the following factors as being responsible for a rising GSML: "ocean warming, ice loss from glaciers and ice sheets, and changes in land water storage".

The report also quantifies the individual contribution of these factors to yield, what researchers call the "GSML budget".

According to the report, in 2005-2019, loss of glaciers and ice sheets contributed 36% to the GSML rise. Ocean warming — the phenomenon of rising mean ocean temperatures — contributed 55%, and changes in the storage of land water contributed less than 10%.

As increasing concentrations of carbon dioxide and other greenhouse gases drive global warming, 90% of the 'extra' heat is stored in the oceans. This leads to ocean warming. And as the ocean heats up, it undergoes thermal expansion, which in turn leads to a rise in the GSML. One measure of ocean warming is the ocean heat content (OHC).

As per the report, OHC measures in 2022 touched a new record.

The report also says that the earth's ice cover, known as the cryosphere, has thinned. The cryosphere includes the Arctic and Antarctic regions (called "sea ice"), glaciers, the ice sheets of Greenland and Antarctica (area of ice on land covering more than 50,000 km2), seasonal snow cover, and permafrost (mass of land that remains below 0 degree Celsius for at least two straight years).

What problems will sea-level rise cause?

Dr. Prabakaran added that as rising seas swallow more of the land cover, particularly in coastal areas, coastal communities will face an "acute shortage of land for human use".

This land crunch, according to Dr. Prabakaran, will mean that those who are better off will be able to cope better than marginalised groups, leading to an increase in social disparities between people living in coastal areas.

Second, weather formations such as cyclones are known to typically originate in the open seas. As the GSML continues to rise, along with a rise in ocean temperatures, the chances of cyclones could increase, affecting coastal communities and leading to large economic liabilities for tropical countries such as India and South Africa, which have high population densities.

Besides this, the WMO report says that South Africa was affected by five cyclones in over two months in 2022, leading to the displacement of "hundreds of thousands of people".

Third, Mr. Palanichamy said that as the GSML continues to rise, more sea water could seep into the ground, leading to the groundwater — which is usually freshwater — turning more and more saline.

This, in turn, can exacerbate water crises in coastal areas as well as agriculture in adjacent regions.

How will sea-level rise affect societies?

Dr. Prabakaran said that coastal ecosystems could be "completely changed".

For example, he said that in the Sundarbans delta in West Bengal, the world's largest mangrove area, rising sea levels and coastal erosion, due to loss of land and sediment from coastal areas, has left more islands submerged under water, and that, in turn, has forced members of local communities to migrate.

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Since the lives of coastal communities, including their economic activities, is tied intricately with the coastal ecosystem, changes in the coastal ecosystem as a result of GSML rise — especially when it happens faster than rehabilitative policies and laws can catch up — will further endanger the socio-economic stability of these communities.

Indeed, a combination of these forces having increased child trafficking in the Sundarbans area has already been documented.

Thus, for Dr. Prabakaran, it is crucial that reports such as the WMO's 'State of the Global Climate 2022' continue to generate and accumulate data on climate change.

"I hope it presses for global and local policy-level changes related to climate change," he told The Hindu.

WHAT IS LOCKBIT RANSOMWARE AND HOW IS IT SPECIFICALLY TARGETING APPLE COMPUTERS?

On April 16, in a first, reports emerged that LockBit ransomware was found to be targeting Mac devices. Cybercriminals have developed new ransomware encryptors designed to target macOS devices, making this the first major ransomware operation to specifically target Apple computers. The new encryptors target both older Macs and newer ones running on Apple Silicon. The same gang was also reportedly behind a cyber-attack on U.K. postal services earlier this year, causing international shipping to grind to a halt.

What is LockBit ransomware?

First reported in September 2019 and dubbed the "abcd" virus, due to the file extension used when encrypting victim's files, the LockBit ransomware is designed to infiltrate victims' systems and encrypt important files. The virus is categorised as a "crypto virus" due to its requests for payment in cryptocurrency to decrypt files on the victim's device. The ransomware is therefore typically deployed against victims who feel hindered enough by the disruption to pay heavy sums in exchange for access to the files and can afford to do so.

The gang behind the LockBit ransomware reportedly maintains a dark web portal to recruit members and release data of victims who refuse to meet their demands, as part of their business model. In the past, LockBit ransomware has been used to target enterprises and organisations in the U.S., China, India, Ukraine, and Indonesia. Attacks have also been recorded throughout Europe, including France, Germany, and the U.K.

Why is LockBit targeting macOS?

Historically, ransomware has targeted Windows, Linux, and VMware ESXi servers. However, LockBit is now working to create encryptors targeting Macs for the first time, a report from BleepingComputer said. Analysis of the encryptors revealed they were put together as a test, rather than an actual ready-to-use ransomware. Experts believe that, after launching multiple attacks across Europe and Asia, the gang is developing tools to target macOS and further increase the scope of attacks to bring in more financial gains for the operation.

How does LockBit ransomware work?

It works as a self-spreading malware, not requiring additional instructions once it has successfully infiltrated a single device with access to an organisational intranet. It is also known to hide

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executable encryption files by disguising them in the .png format, thereby avoiding detection by system defences. Attackers use phishing tactics and other social engineering methods to impersonate trusted personnel or authorities to lure victims into sharing credentials. Sometimes, the ransomware has also used brute force to gain access to the intranet server and network of an organisation.

Once it has gained access, the ransomware prepares the system to release its encryption payload across as many devices as possible. It then disables security programs and other infrastructures that could permit system data recovery. The goal is to ensure that data recovery without assistance from the LockBit gang is impossible.

After this is ensured, the ransomware places an encryption lock on all system files, which can only be unlocked via a custom key created by the LockBit gang. The process leaves behind a ransom note, with instructions to restore the system, and has reportedly also included threatening blackmail messages. Victims are then left with no choice but to contact the LockBit gang and pay up for the data, which the gang may sell on the dark web — whether the ransom is paid or not.

Who is behind the ransomware?

The group behind this is known as the LockBit gang. It is considered the most prolific ransomware group ever.

It operates on the ransomware-as-a-service (Raas) model and comes from a line of extortion cyberattacks. In this model, willing parties put down a deposit for use in a custom attack and make profits through the ransom payment. The ransom is divided between the LockBit developer team and attacking affiliates, who receive up to three-fourths of the ransom, cybersecurity company Kaspersky revealed in a blog post.

Though the exact location of the gang is yet to be ascertained, their attack patterns and propensity to avoid attacking Russian systems or countries within the Commonwealth of Independent States (CIS) suggest the group operates within its territories, and that it avoids these countries to escape prosecution.

What actions have authorities taken?

Due to its ransomware-as-a-service model, the LockBit gang has been on the authorities' radar for some time now. In November 2022, a dual Russian and Canadian national with suspected links to the gang was arrested, in Ontario, Canada for his alleged involvement in attacks targeting critical infrastructure and large organisations. The arrest came after similar action was taken in Ukraine, in October 2021, a report from TechCrunch said. A press release from the U.S Department of Justice notes that LockBit has claimed at least 1,000 victims in the U.S., extracting millions of dollars in the process.

How do we protect systems against the LockBit ransomware?

While there are no fool-proof ways of protecting against ransomware attacks, organisations and individuals can take certain steps to increase resilience against such cyber threats. The use of strong passwords, with strong variations of special characters which are not easy to guess along with multi-factor authentication should be implemented. This ensures the use of brute force will not be enough to compromise systems. Organisations can also undertake training exercises to educate employees on the use of phishing attacks and their identification. Old and unused user accounts should be deactivated and closed as they can become weak links in the security

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apparatus. Additionally, organisations and individuals should have an understanding of cybersecurity threats and vulnerable points that may be exploited by cybercriminals.

GREY HAIR

Certain stem cells have a unique ability to move between growth compartments in hair follicles, but get stuck as people age and they lose their ability to mature and maintain hair colour, a release says. The new work (Nature) focused on cells in the skin of mice and also found in humans called melanocyte stem cells (McSCs).

During normal hair growth, the melanocyte stem cells continually move back and forth on the maturity axis as they transit between compartments of the developing hair follicle.

Researchers at the NYU Grossman School of Medicine found that as hair ages, sheds, and then repeatedly grows back, increasing numbers of McSCs get stuck in the stem cell compartment.

There, they remain and do not mature into the transit-amplifying state. The stuck McSCs ceased their regenerative behaviour as they were no longer exposed to WNT signalling, which stimulates the McSCs to mature and produce pigment in new hair follicles, that continued to grow.

ROSALIND FRANKLIN'S ROLE IN DNA DISCOVERY GETS A NEW TWIST

The discovery of DNA's double helix structure 70 years ago opened up a world of new science — and also sparked disputes over who contributed what and who deserves credit. Much of the controversy comes from a central idea: that James Watson and Francis Crick — the first to figure out DNA's shape — stole data from another scientist named Rosalind Franklin.

Now, two historians are suggesting that while parts of that story are accurate — Watson and Crick did rely on research from Franklin and her lab without their permission — Franklin was more a collaborator than just a victim. In an opinion article published Tuesday in the journal Nature, the historians say the two different research teams were working in parallel toward solving the DNA puzzle and knew more about what the other team was doing than is widely believed.

"It's much less dramatic," said article author Matthew Cobb, a zoologist at the University of Manchester who is working on a biography of Crick. "It's not a heist movie."

The story dates back to the 1950s, when scientists were still working out how DNA's pieces fit together. Watson and Crick were working on modeling DNA's shape at Cambridge University. Meanwhile, Franklin — an expert in X-ray imaging — was studying the molecules at King's College in London, along with a scientist named Maurice Wilkins.

It was there that Franklin captured the iconic Photograph 51, an X-ray image showing DNA's criss-cross shape. Then, the story gets tricky. In the version that's often told, Watson was able to look at Photograph 51 during a visit to Franklin's lab. According to the story Franklin hadn't solved the structure, even months after making the image.

But when Watson saw it, "he suddenly, instantly knew that it was a helix," said author Nathaniel Comfort, a historian of medicine at Johns Hopkins University who is writing a biography of Watson. Around the same time, the story goes, Crick also obtained a lab report that included Franklin's data and used it without her consent.

And according to this story, these two "eureka moments" — both based on Franklin's work — Watson and Crick "were able to go and solve the double helix in a few days," Comfort said. This "lore" came in part from Watson himself in his book "The Double Helix," the historians say.

But the historians suggest this was a "literary device" to make the story more exciting and understandable to lay readers. After digging in Franklin's archives, the historians found new details that they say challenge this simplistic narrative — and suggest that Franklin contributed more than just one photograph along the way.

The proof? A draft of a Time magazine story from the time written "in consultation with Franklin," but never published, described the work on DNA's structure as a joint effort between the two groups. And a letter from one of Franklin's colleagues suggested Franklin knew her research was being shared with Crick, authors said.

Taken together, this material suggests the four researchers were equal collaborators in the work, Comfort said. While there may have been some tensions, the scientists were sharing their findings more openly — not snatching them in secret.

"She deserves to be remembered not as the victim of the double helix, but as an equal contributor to the solution of the structure," the authors conclude. Howard Markel, a historian of medicine at the University of Michigan, said he's not convinced by the updated story.

Markel — who wrote a book about the double helix discovery — believes that Franklin got "ripped off" by the others and they cut her out in part because she was a Jewish woman in a male-dominated field. In the end, Franklin left her DNA work behind and went on to make other important discoveries in virus research, before dying of cancer at the age of 37. Four years later, Watson, Crick and Wilkins received a Nobel prize for their work on DNA's structure.Franklin wasn't included in that honor.

Posthumous Nobel prizes have always been extremely rare, and now aren't allowed. What exactly happened, and in what order, will likely never be known for sure. Crick and Wilkins both died in 2004. Watson, 95, could not be reached and Cold Spring Harbor Laboratory, where he served as director, declined to comment on the paper.

But researchers agree Franklin's work was critical for helping unravel DNA's double helix shape — no matter how the story unfolded."How should she be remembered? As a great scientist who was an equal contributor to the process," Markel said. "It should be called the Watson-Crick-Franklin model."