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Artificial intelligence can be a Y2K moment for India: MeitY Secretary

K. V. Kurmanath
HYDERABAD

Rapid advancements in the AI landscape could well be a Y2K moment. "It is an opportunity for the Indian IT industry to develop applications for deployment globally, not just within India," said S. Krishnan, Secretary, Ministry of Electronics and Information Technology (MeitY).

Krishnan noted that globally many are looking to India to do this, especially in the Global South. He emphasised leveraging the STEM (science, technology, mathematics, and engi-



S. Krishnan

neering) human resources in India to achieve this.

It may be recalled that the Y2K – Year 2000 – had engendered the fear that computers would get confused when the year changed from 1999 to

2000. This resulted in a huge opportunity for the Indian IT industry.

Addressing a select group of business and industry leaders at a 'Breakfast with *businessline*' event hosted by ITC Kohenu here on Thursday moderated by *businessline* Editor Raghuvir Srinivasan, the MeitY official said the country should follow a three-pronged approach towards artificial intelligence.

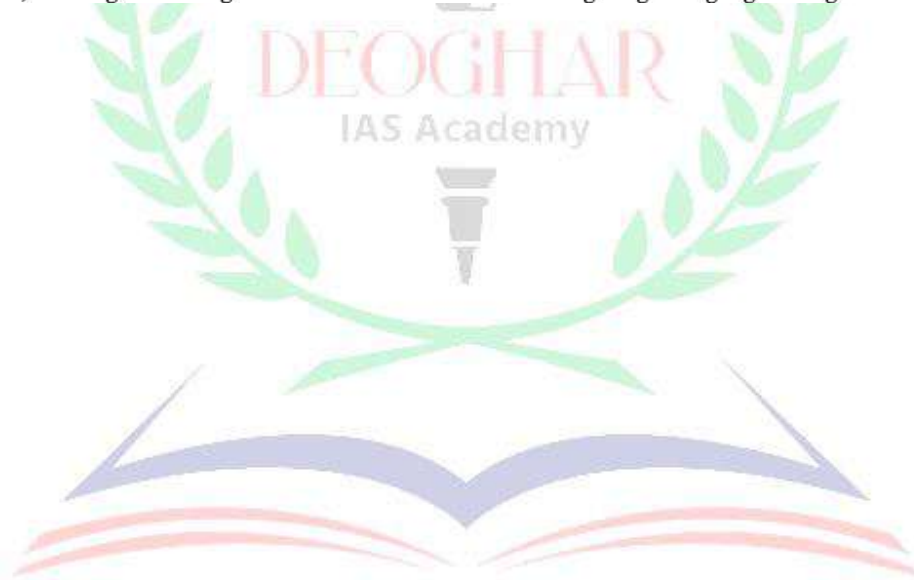
Frugal models

Besides promoting the building of applications over existing Large Language

Models like OpenAI, Gemini Advanced, and Llama, the government would encourage building models on top of existing open-source AI models, factoring in India's own knowledge to create a foundational model.

He said China's DeepSeek R1 has given the country the confidence that a foundational model can be built frugally, without guzzling resources.

Stating that the movement of data is common while using apps, Mr. Krishnan said the government was closely monitoring data movement.



What is happening in the DRC?

Why did the M23 militia capture the city of Goma which lies in the east of the Democratic Republic of Congo? Does Rwanda have any stake in the rebel groups' actions in the DRC? Did the conflict in the region start with the Rwandan genocide? Why is Goma coveted by rebel groups and governments?

EXPLAINER

Adithya Narayan

The story so far:

The crisis in the Democratic Republic of Congo (DRC) is back in the spotlight after the M23 militia, backed by eastern neighbour Rwanda, captured the mineral-rich city of Goma, which lies on the border between the two countries. UN estimates suggest that the fighting, which began in January, has taken the lives of more than 2,900 people, displaced close to 7,00,000 and injured many more. Since then, clashes have spread to the south of the border with the rebels eyeing Bukavu, the capital of the South Kivu province – another resource-rich region that is situated in the east of the DRC.

What is the history of the region?

While the root cause of the crisis is generally attributed to the 1994 Rwandan genocide, the region has been beset with conflict between the Hutus and Tutsis since colonial times; so much so that some 1,50,000 Tutsis had migrated to neighbouring countries even before Rwanda's independence from Belgium in 1962. Imperialist powers such as Germany and Belgium ruled over Rwanda through a Tutsi monarchy in which local administrative roles were occupied by members of the Tutsis, who were a minority there, ensuring better prospects for the group. This did not sit well with the Hutus who eventually called for a 'revolution' in 1959, costing the lives of some 20,000 Tutsis. Consequently, King Kigeli V fled, and a Hutu regime came to power. Further solidifying the group's grip on power were the elections of 1960 conducted by Belgian officials, in which Hutus emerged victorious in local communes. Two years later, the country proclaimed independence and got its first President in Grégoire Kayibanda.

What is the Rwandan genocide?

With Hutus at the helm, there was systematic repression of the Tutsis. This led to the formation of the Tutsi rebel group, the Rwandan Patriotic Front (RPF), which launched a civil war in 1990. The war reached its inflection point in April 1994, when an aircraft carrying Rwandan President Juvenal Habyarimana and his Burundi counterpart Cyprien Ntaryinira – two Hutus – was shot down. Blaming the RPF for the attack, the Rwandan military and the Hutu Interahamwe militia went on a rampage, murdering almost 8,000 people per day. By the time the campaign ended 100 days later, some 8,00,000 Tutsis and a moderate number of Hutus had been killed. The genocide ended only after an RPF reprisal emerged victorious in July 1994. Paul Kagame, one of the leaders of the uprising, was elected President of Rwanda in 2000 and has occupied the post ever since.

What was the aftermath of the genocide?

As a result of the killings, some two million Hutus, including the perpetrators, crossed into the eastern region of the DRC, then called Zaire. Today, the region comprises more than 120 armed groups such as the Democratic Forces for the Liberation of Rwanda (FDLR), claiming to fight for the Hutus, and the M23, which claims to represent the interests of the Tutsis.

After the genocide, Rwandan troops invaded Congo, first in 1996 and then in

A city under siege

The M23 militia, backed by eastern neighbour Rwanda, captured the mineral-rich city of Goma, which lies on the border between Rwanda and the DRC. The region has been beset with conflict between the Hutus and Tutsis since colonial times

THE M23 MILITIA

- One of about 100 armed factions vying for a foothold in mineral-rich eastern DRC
- Rwandan-backed group which consists primarily of Tutsis who failed to integrate into the Congolese army
- Led major insurgency against the DRC government in 2012, took up arms again in 2022. The group is estimated to have 6,500 fighters



Jan 27-28, Goma: While M23 rebels claim control of the city, they are reportedly facing resistance from army and pro-government militias



- Latest rebel advance has forced thousands to flee Goma. The city of two million people is a vital humanitarian aid hub for the region
- The UN and other global powers fear that the conflict could spiral into a regional war similar to those of 1996-1997 and 1998-2003



Effects of war: A displaced woman walks back to her home village, in Goma, Democratic Republic of Congo, on February 12. GETTY IMAGES

Sources: Assa/Gated Press, Institute for the Study of War, Reuters

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1998 – dubbed Africa's World Wars. The war of 1996, called the First Congo War, resulted in the country being renamed the Democratic Republic of Congo and witnessed the overthrow of longtime ruler Mobutu Sese Seko. The next battle, known as the Second Congo War, came about as President Laurent-Désiré Kabila turned against allies Rwanda and Uganda. The fighting eventually ballooned into one of the biggest battles on the continent after nine countries and 25 armed groups joined in. It ended only in 2003 after having killed five million from battle, disease and starvation.

From then on, the DRC has been marked by disarray while Rwanda, under Mr. Kagame, has been identified as a force of stability in Africa. With ample help from Western nations, the President lifted the country out of poverty. Yet, Mr. Kagame's government has been accused of helping the M23 rebels.

Who are the M23 rebels?

Formed in 2012, the M23 stands for Mouvement du 23 Mars – an abortive agreement signed on March 23, 2009, between the DRC government and the Tutsi-led National Congress for the Defence of the People (CNDP). According to the pact, the CNDP, which fought the government forces between 2006 and 2009, was to take the form of a political party and its fighters were to be absorbed

into the DRC Army.

These soldiers broke off from the Congolese Army and came together to form the M23. It is led by Sultani Makenga and is based in the North Kivu province. Claiming to protect Tutsis, the group managed to capture Goma for the first time in 2012. Following a series of setbacks at the hands of the Congolese Army and UN forces, the group retreated after it was assured the protection of the Tutsis. A decade later, it resurfaced in 2022 citing failure to meet the promises. The group stands accused of war crimes by the UN.

Is the conflict only about ethnic tensions?

Ethnic strife forms only one part of the story. The mineral-rich regions in the DRC's east, coveted by nations and armed groups alike, form the other part. The DRC is home to Coltan, the ore from which Tantalum is produced. This blue-grey metal is used in smartphones and other electronic devices for it can hold a high charge over a range of temperatures, making it conducive for the manufacturing of capacitors that store energy.

While Coltan is also mined in Brazil, Nigeria, and Rwanda, almost 40% of the global supply comes from the DRC.

And the capture of Goma, a key trading and transport hub, will help M23 to a

great degree.

How have regional players responded to the crisis?

DRC President Felix Tshisekedi called the capture of Goma "an act of war". The winner of the 2023 election, which has been decried by activists, the loss of Goma leaves him on shaky ground.

Mr. Kagame, while never admitting to complicity in the M23's actions, has issued remarks time and again, that hint at the M23's legitimacy. The Rwandan leader wants the militant group to be made part of discussions.

The Tutsi-led country's actions are in the interest of the group living across the border and to prevent the spillover of a civil war, he says.

Neighbouring Burundi, a Hutu-majority country that shares hostile relations with Rwanda, has warned the Kagame administration about the M23's advance further south. "If Rwanda continues to make conquests," he wrote, "I know that war will even arrive in Burundi... One day he [Kagame] wants to come to Burundi – we're not going to accept that. The war will spread."

President Evariste Ndayishimiye said, Uganda is toeing a middle line by helping the Congolese troops hunt down militants with Ugandan origins tied to the Islamic State. It also allows the M23 to use its territory as a base, reports the UN.

THE GIST

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In April 1994, when an aircraft carrying Rwandan President Juvenal Habyarimana and his Burundi counterpart Cyprien Ntaryinira – two Hutus – was shot down, the Rwandan military and the Hutu Interahamwe militia went on a rampage, murdering almost 8,000 people per day.

Is appointing ad-hoc judges a viable means to reduce backlog?



Justice Rajeev Shukla

Former Chief Justice of the Himachal High Court



Shadan Farasat

Senior Advocate based in Delhi

PARLEY

The Supreme Court on January 30, 2025, permitted High Courts to appoint retired judges on an ad-hoc basis to address the mounting backlog of cases. However, these judges were authorised to hear only criminal appeals as part of a bench led by a sitting judge. Is the ad-hoc appointment of judges a viable remedy for reducing pendency? Justice Rajeev Shukla and Shadan Farasat discuss the question in a conversation moderated by Aaratrika Bhamik. Edited excerpts.

Is appointing ad-hoc judges a viable remedy for reducing pendency?

Rajeev Shukla: The move is commendable. The Supreme Court first endorsed the appointment of ad-hoc judges in its 2021 ruling in *Lok Prabari v. Union of India*, though such a measure should have been introduced even earlier. As of January 25, 2025, High Courts were burdened with a staggering backlog of 62 lakh cases.

However, with only three recorded instances of such appointments in the past, the practice has failed to gain traction. Now that the Supreme Court has revisited the issue, there is renewed hope for the implementation of concrete and lasting reforms.

Shadan Farasat: The Constitution allows for appointing ad-hoc judges in both the Supreme Court and High Courts for a reason. However, my concern is that these appointments require presidential approval, making government cooperation crucial. While the judiciary may propose candidates, their appointment ultimately depends on the executive's willingness to act. Since ad-hoc judges are not typically assigned politically sensitive cases, I am hopeful that the government will approve these appointments without delay.

Is it more prudent to first address challenges in the regular judicial appointment process?

SF: In our 75-year constitutional history, no policy measure has been introduced to address the docket crisis systematically. We will have to wait and see how this initiative unfolds. However, the government's handling of regular judicial appointments remains a concern, with several deserving judges either overlooked for elevation to the Supreme Court or appointed as High Court Chief Justices far too late. This issue requires urgent redress.

RS: The appointment of ad-hoc judges is



A view of the Madras High Court in Chennai, K. PICHUMANI

unlikely to interfere with the regular judicial appointment process, as both operate independently. Ultimately, it is the common litigants who bear the brunt of judicial delays. From personal experience, no matter how much effort one exerts, there is rarely enough time to adjudicate each case satisfactorily.

Expediting criminal appeals would also benefit the government by reducing the financial strain of maintaining overcrowded jails filled with undertrials. However, for this measure to be truly effective, Chief Justices must take a proactive role. The real challenge lies in identifying a cohort of candidates with impeccable integrity and strong technical expertise. Only once this hurdle is overcome does the government's role come into play.

The Supreme Court has previously found the ad-hoc appointment process cumbersome. Are any reforms needed?

RS: To ensure these appointments achieve their intended purpose, the process must be simplified. The Chief Justice of the relevant High Court should directly recommend a candidate to the Supreme Court collegium after securing their consent, after which the collegium can forward its recommendation to the government. The *Lok Prabari* verdict also sets a three-month timeline for completing the process.

It may be prudent for the Chief Justice to secure some form of pre-approval from the Centre before making a recommendation. However, subjecting ad-hoc appointees to an Intelligence Bureau clearance would be unnecessary and counterproductive. As retired judges, they may be discouraged by such scrutiny, and the added procedural hurdle would only lead to further delays.

SF: Ad-hoc appointments should follow a summary process. As retired judges, they have



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JUSTICE RAJEEV SHUKLA

already undergone rigorous vetting – not just by the government but also by the legal fraternity. Therefore, their appointments should be largely uncontroversial.

Could these appointments hinder the career progression of senior judges or those in the district judiciary?

SF: No, they will not. Ad-hoc judges serve for a limited term of two to three years and do not compete with sitting judges. Their appointment does not affect the seniority of High Court judges for elevation as Chief Justices or to the Supreme Court. It also in no way impacts promotions within the district judiciary.

RS: Article 224A of the Constitution clearly states that while ad-hoc judges exercise the same judicial authority as sitting judges, they cannot be deemed to be a judge of that High Court. Since they are not eligible for elevation, their appointment does not impact other sitting judges. These appointments also do not affect the elevation of service judges in the district judiciary. Most High Courts are already functioning below their sanctioned strength. As of February 1, 2025, there were 367 vacancies against a sanctioned strength of 1,122 judges.

Indian courts already lack basic amenities. Will these appointments put additional strain on the existing judicial infrastructure?

RS: A judge cannot effectively perform judicial duties without essential personnel – stenographers, private secretaries, and court masters. The government must guarantee these resources. It could perhaps consider assigning more law researchers to ad-hoc judges, given their primary focus on judicial work rather than administration. This should not pose a major hurdle. If the government is truly committed to reducing arrears, it must allocate the necessary budget for this greater cause.

SF: As Justice Shukla pointed out, the key

issue is the executive's willingness to cooperate. Most High Courts already have ample space that could be repurposed into additional courtrooms. While some personnel may need to be reassigned or appointed on an ad-hoc basis, these are logistical challenges that can be easily addressed.

Justice Shukla, does the system adequately incentivise meritorious judges to return to the Bench? Or would most prefer arbitration or independent practice instead?

RS: You are right. Persuading judges to return to the system will be challenging. Much will depend on the perks and privileges offered. Financially, arbitration and independent practice are far more lucrative alternatives. In fact, I hear the Supreme Court is struggling to find suitable candidates for tribunal vacancies. Even appointing senior lawyers as ad-hoc judges presents a major hurdle: after serving the stipulated term, they are barred from practising in the same High Court. This forces them to relocate to another High Court or limit their practice to the Supreme Court, which is difficult for those based outside Delhi.

Do such appointments pose any concerns related to judicial independence?

SF: In my view, judicial independence is ultimately a state of mind. The mere fact that a judge was practising at the bar until recently and may return to it in the near future does not necessarily undermine their independence. Traditionally, judges were expected to remain isolated from society and the bar, but that notion has evolved – arguably for the better. Social interactions do not inherently compromise judicial independence. One can meet someone socially one day and face them in court the next, yet still adjudicate based solely on the merits of the case.

RS: If the right candidates are chosen, this should not be a problem. A judicial appointment comes with the legitimate expectation of rising through the ranks. However, the system does not always reward the most hard-working or capable judges, leading to dissatisfaction. With ad-hoc appointments, this concern does not arise. There is no aspiration for higher ranks – one serves for a limited period, fulfils their role, and moves on.



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China's dam project opens the floodgates of concern

The planned construction by China, of a massive hydroelectric dam on the lower section of the upper stream of the Yarlung Zangbo river in Tibet, has become a matter of concern for India due to its potential impact on the local environment and spillover, the flow of water downstream, and bilateral relations. Originating in Tibet, the Yarlung Zangbo is called the Brahmaputra after it reaches the Indian State of Assam where it meets its important tributaries. In India's Arunachal Pradesh, it is called the Siang.

The Brahmaputra is a part of the everyday life of millions of people from India's northeastern States and Bangladesh. China's decision to plan a dam on the Yarlung Zangbo is a part of its broader strategy to transition from coal to renewable energy sources, particularly hydroelectric power. As outlined in its 14th Five-Year Plan (2021-2025), China aims to reduce its reliance on fossil fuels and achieve carbon neutrality by 2060. While this transition is commendable, the reliance on large-scale hydroelectric projects raises significant concerns. While the dam project aligns with China's ambitious energy transition goals, its serious implications for India cannot be understated.

The legal dimensions

The construction of the dam raises critical legal issues under international water law. The United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (UN Watercourses Convention) 1997 emphasises the principles of equitable and reasonable utilisation, the obligation to prevent significant harm, and the duty to cooperate. These principles are essential in ensuring that shared water resources are managed sustainably and equitably.

However, China and India are not signatories to the UN Watercourses Convention. Nor do they adhere to a robust framework of domestic laws governing transboundary rivers. The official



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While the project aligns with China's ambitious energy transition goals, it has serious implications for India, which cannot be understated

documents on water published by the Chinese government maintain that Beijing is a benevolent upper riparian that follows: first, the principle of international cooperation; second, the principle of people orientation; third, the principle of sharing rights and obligations, and fourth, the principle of equal emphasis on development and protection.

However, many of China's lower riparian states accuse it for using water as a 'powerful tool'. India, which is one of the lower riparian states, depends on rivers that originate in Tibet for one-third of its river water supply. Due to the increasing securitisation of water and the rise of assertive military nationalism, a number of Indian political analysts say that China poses a serious water threat to India, making it vulnerable to unilateral actions. India has regularly expressed its concerns about the projects on the transboundary rivers. The memoranda of understanding between India and China on the sharing of water data about the Sutlej and Brahmaputra rivers have expired now. With ties improving between the two countries, there is a possibility that the MoUs could also be renewed. There is an expert level mechanism (ELM) to deal with water-related matters that meets regularly. In the absence of a concrete agreement, the ELM's role in managing water-related matters between India and China is significant.

Significant environmental concerns

The proposed dam is being constructed in one of the world's most seismically active regions. The risk of earthquakes poses a significant threat to the stability of the structure, with the possibility of catastrophic consequences for both upstream and downstream areas. For instance, the earthquake in Tibet in January 2025 led to the death of more than 120 people while over 150 were injured. Additionally, the construction of such a massive dam disrupts river ecosystems, alters sediment flow, and threatens biodiversity in

the river basin region. The potential environmental damage extends to the loss of habitats for aquatic and terrestrial species and increased riverbank erosion. Such a dam would also have an impact on Bangladesh which the Brahmaputra enters from India. However, Bangladesh has not expressed any serious concerns over the hydroproject. The main reason is the growing divide between Dhaka and New Delhi ever since the fall of the Sheikh Hasina government in August 2024 and the level of ties Bangladesh has with China.

A 'water alliance' and hurdles

But this is an issue that will not just affect Bangladesh. Water-related activities in Tibet will affect the other lower riparian South Asian states such as Nepal, Bhutan and Pakistan. To deal with the situation, it is better to have a water negotiation plan for the region.

However, given the political situation in South Asia, it is tough to imagine a water alliance between the countries receiving water from Tibet. An absence of an active regional organisation halts South Asia from developing a collective strategy to manage transboundary rivers and conduct negotiations with the upper riparian country. Bilateral ties between India and many of its neighbouring countries are not in good shape and see fluctuations frequently.

The water issue between India and China cannot be de-linked from their day-to-day political relations because of the influence of politics on water-related decisions.

The recent India-China diplomatic engagements raise hopes for renewing lapsed MoUs and improving trust through information-sharing on Tibet-origin rivers.

China has reiterated that the dam on the Yarlung Zangbo will not affect water flow to India. However, New Delhi has expressed its concerns. To clear any doubts or concerns that the lower riparian states might have, the ELM would be a better platform.



Challenges of malaria vaccination, as elimination becomes achievable

Giovanni Grassi confirmed that only female Anopheles mosquitoes carried the parasite, but the full cycle was still unclear. The final breakthrough came in 1897 when Ronald Ross in India demonstrated that Plasmodium completed its life cycle in mosquitoes, proving they were malaria's vectors

C. Aravinda

The WHO's recent declaration of Georgia as the 45th country to eliminate malaria is a significant milestone. Yet, even as we celebrate this achievement, a lingering question remains: if smallpox has been eradicated, why does malaria persist, and why is its vaccine far less effective than those for viral diseases? Despite decades of global efforts, malaria still causes over 240 million cases and more than 600,000 deaths annually.

The discovery of malaria's transmission was a fragmented journey, like a non-linear movie where different revelations come together to complete the puzzle at the end. Malaria was believed to be caused by miasma or foul air from swamps. This misconception persisted until Alphonse Laveran, a military doctor, identified the Plasmodium parasite in 1880, proving malaria was caused by a living organism. However, the question of how the parasite entered humans remained unanswered. In 1891, Patrick Manson hypothesised that mosquitoes played a role in transmission, though he lacked experimental proof.

Giovanni Grassi later confirmed that only female Anopheles mosquitoes carried the parasite, but the full cycle was still unclear. The final breakthrough came in 1897 when Ronald Ross in India demonstrated that Plasmodium completed its life cycle in mosquitoes, proving they were malaria's vectors. This scientific triumph had far-reaching consequences, allowing European colonial powers to survive in tropical Africa, where malaria had previously limited their expansion. In 1870, only 10% of Africa was under European control, but by 1914, nearly 90% of the continent had been colonised. Ironically, instead of liberating the populations most affected by malaria, the discovery of its transmission pathway paved the way for their subjugation, reinforcing colonial rule rather than dismantling it. Progress in science does not always translate to moral or equitable outcomes.

Understanding parasites

Knowing the parasite's life cycle is essential to understand the difficulty in developing vaccines. The cycle begins when an infected Anopheles mosquito bites a human, injecting Plasmodium sporozoites that are highly infective, into the bloodstream. These parasites first travel to the liver, invading liver cells and multiplying undetected by the immune system. After this phase, they re-enter the bloodstream, infecting red blood cells and causing malaria's characteristic fever and chills. As the parasite multiplies asexually within RBCs, some develop into sexual forms known as gametocytes, which are then taken up by another mosquito when it bites an infected individual. Inside the mosquito, these gametocytes undergo sexual reproduction, maturing into sporozoites that migrate to the mosquito's salivary glands, making the mosquito infectious to new human hosts.

Viruses are simpler in comparison, consisting of only genetic material (DNA or RNA) encased in a protein shell, and are relatively straightforward compared to parasites. Plasmodium is a protozoan parasite and eukaryotic organism with multiple stages of development, each featuring different surface antigens. Plasmodium species that infect humans –



A feeding female Anopheles gambiae mosquito. The species is a known vector for the parasitic disease malaria. AP

P. falciparum, *P. vivax*, *P. ovale*, *P. malariae*, and *P. knowlesi* have unique characteristics, adding to the challenge of vaccine development.

The malaria parasite masters deception, outmanoeuvring the human immune system. Its greatest strength is antigenic variation, where it frequently changes its surface proteins, making it difficult for immune cells to recognise it and respond. Plasmodium follows an intracellular lifestyle, hiding within the liver and RBCs, shielding itself from immune surveillance. This ability to evade detection weakens the body's ability to develop long-lasting immunity, making reinfection common. Adding to the challenge, malaria's life cycle spans multiple stages across two hosts—humans and mosquitoes—requiring any potential vaccine to target several phases simultaneously. So when a vaccine is developed, the parasite's genetic adaptability enables it to evolve resistance. Fighting malaria is like trying to corner a cunning politician who changes allegiance and ideology, senses the public sentiment, and always stays ahead of the game to remain in power. Plasmodium has been perfecting this trick for 30 million years, adapting and evolving to ensure its survival. When scientists find a way to combat one strain, the parasite shifts tactics, altering its

Fighting malaria is like trying to corner a cunning politician who changes allegiance and ideology, senses the public sentiment, and always stays ahead of the game to remain in power. Plasmodium has been perfecting this trick for 30 million years, adapting and evolving to ensure its survival

proteins and genetic structure to bypass immunity. The adaptability makes it difficult to develop a universal and long-lasting vaccine.

Malaria vaccines

The RTS, S malaria vaccine became the first to receive WHO approval for large-scale rollout in endemic regions after 60 years of research. It targets the liver stage of the parasite's life cycle by inducing an immune response against the circum-sporozoite protein (CSP) found on Plasmodium sporozoites. This stage infects the liver after a mosquito bite. However, its efficacy is limited, reducing malaria cases by approximately 36% after four doses over four years in children. It is significantly lower than the 90-95% efficacy in vaccines for diseases like measles. Protection is also inconsistent,

varying across age groups and transmission settings, and its effectiveness declines over time. RTS, S requires multiple doses, posing logistical challenges ensuring widespread distribution and coverage in resource-limited regions.

Researchers are now developing second-generation malaria vaccines. One promising candidate is the R21/Matrix-M vaccine, which enhances the immune response with a stronger adjuvant and has shown 77% efficacy over 12 months. The PISPZ vaccine, a whole-parasite vaccine, attenuates sporozoites to stimulate immunity against the liver stage of infection. RH5-based vaccines prevent Plasmodium from invading red blood cells and target the blood stage after symptoms. Meanwhile, transmission-blocking vaccines aim to halt the spread of malaria by preventing mosquitoes from becoming carriers, targeting proteins like PfS25 and PfS230, essential for parasite development within the mosquito.

Research underfunded

Malaria vaccine research has long suffered from underfunding. Since malaria primarily affects low-income countries in Africa and parts of South Asia, funding for research and healthcare infrastructure has remained limited. The availability of treatments for malaria has reduced the immediate urgency for vaccine development. Compounding this, the complexity of the parasite itself has discouraged pharmaceutical companies from investing in malaria vaccines, as the cost of research is high, and potential returns on investment remain uncertain. Countries are now facing a resurgence of the disease due to shifting mosquito habitats. An effective malaria control strategy will require a combination of more efficient vaccines, mosquito control & improved treatment options. The road to a malaria-free world is long, but it is an achievable goal.

(Dr. C. Aravinda is an academic and public health physician. The views expressed are personal. aravinda@msr10@hotmail.com)



The R21/Matrix-M vaccine enhances the immune response with a stronger adjuvant and has shown 77% efficacy over 12 months. AP

Rafale-M pact to be inked soon, delivery to start after 4 years

Dinakar Peri

NEW DELHI

Deliveries of the Rafale-M for the Indian Navy would begin in four years once the contract is signed, which is set to be done in the next couple of months when the French Defence Minister visits India, according to official sources. This also means that in 2029, the Indian Navy would begin receiving both the Rafale-M jets and also the MQ-9B armed high-altitude long-endurance Unmanned Aerial Vehicles (UAV) contracted from the U.S. last year.

The deal is wrapped up and is now a matter of when it is signed, a source said. Deliveries will begin 48 months from the contract date and will be completed in two years from that, the source added.

The Navy is keen that the deal is inked in this financial year ending March 31. Sources said that this is a government-to-government deal and funds can be blocked even if the deal is signed in April.

The dates for the French Minister's visit, either in March or April, are yet to be finalised, the source added.

There are two mega-de-



A Marine Rafale lands on the deck of French aircraft carrier Charles de Gaulle. FILE PHOTO

fence deals in the pipeline between India and France, the Rafale-M jets manufactured by Dassault Aviation and three additional Scorpène-class conventional submarines by Naval Group, together worth over \$10 billion.

In December, in response to a question from *The Hindu* at the annual press conference, Navy chief Admiral Dinesh K. Tripathi stated that both the deals are in the final steps and one step short of clearance from the Cabinet Committee on Security (CCS). "It is just a matter of completing the formalities of the acquisition process and we expect that if not this month, next month, hopefully, this [Scorpène submarines] and Rafale-M deals should be signed," he had stated.



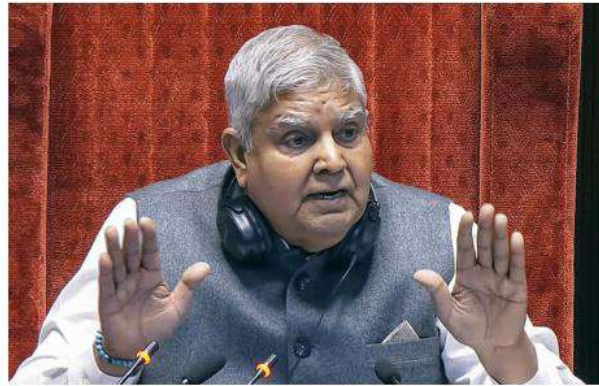
Only Parliament can constitutionally remove HC judge: Jagdeep Dhankhar

The Hindu Bureau
NEW DELHI

Rajya Sabha Chairman Jagdeep Dhankhar on Thursday asserted that only Parliament has the jurisdiction to constitutionally remove a High Court judge, saying a notice for the removal of Justice Shekhar Yadav of the Allahabad High Court is pending with him.

His remarks come in the context of the Supreme Court's summons to Justice Yadav to appear before senior judges of the top court regarding his communally charged remarks. Earlier in January, the SC sought a report from the Chief Justice of the Allahabad High Court on the issue as well.

Speaking in the House, the Chairman made it clear that Justice Yadav's fate fell within his domain. He



The RS Chairman's made the statement over the Supreme Court summon for Justice Shekhar Yadav of Allahabad HC. ANI

asked the Rajya Sabha Secretary General to share with the Secretary General of the SC the information that 55 members of the Upper House had also given a notice to the Chairman, seeking the removal of Justice Yadav in December.

"I am seized of an undated notice for motion received on 13 December

2024, bearing 55 purported signatures of the members of the Rajya Sabha seeking removal from office of Justice Shekhar Yadav of Allahabad High Court under Article 124(4) of the Constitution. The jurisdiction for the stated subject matter constitutionally lies in exclusivity with the Chairman, Rajya

Sabha and in an eventuality with the Parliament and Hon'ble President," Mr. Dhankhar said.

"Taking note of public domain information and inputs available, it is expedient that the Secretary-General, Rajya Sabha shares this information with the Secretary-General, Supreme Court of India," he said.

Impeachment notice

Members of several Opposition parties had moved the notice in the Rajya Sabha on December 13, 2024, seeking the impeachment of Justice Yadav over his alleged controversial remarks, which they said were "hate speech and incitement to communal disharmony" at an event organised by the Vishwa Hindu Parishad (VHP), sources said.

