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Topics Covered

- **Operation Sindoor- a reshaping confrontation**
- **Principled criminalisation and the police as pivot**
- **The road to safety**
- **How did India develop genome-edited rice?**
- **Justice B.R. Gavai takes over as the next CJI**
- **Scientists make unique 2D metals**

Operation Sindoor- a reshaping confrontation

Syllabus

GS 3: Internal Security

GS 2: I.R.

Operation Sindoor — a reshaping of confrontation

The recent India-Pakistan standoff presents a significant shift in the evolution of modern day warfare. It signifies a transformation in India's military engagement that transcends a traditional understanding of how wars are fought in South Asia and beyond. Operation Sindoor can no longer be seen as a bilateral dispute between the two countries but as an important example of how wars are fought globally, highlighting how technological innovation, strategic calculus, and information manipulation have fundamentally reshaped how military confrontation happens. Drone warfare is the most revolutionary feature of this war. The use of unmanned aerial vehicles (UAVs) is a sharp departure from traditional operating strategies, as emphasised by Prime Minister Narendra Modi in his recent speech. In contrast to traditional air combat, which was based on costly and manned fighter jets, contemporary drone warfare is a case of deployment of asymmetric technology. Operation Sindoor has also demonstrated that conventional military force is now not about standalone and expensive platforms, but the capability to introduce swarms of inexpensive, expendable reconnaissance and strike vehicles in order to deluge the enemy.

Drones in the matrix
India's reported interception of Pakistan's attempted drone intrusion that reportedly involved between 300 to 400 Sogor drones (Turkish-made) across 36 locations demonstrates the scale of this technological revolution. This approach has transformed aerial warfare from a high-stakes, high-risk engagement to a more calculated, probabilistic domain. The SkyStriker Kamekazi drones that India used, allowed India to probe defensive capabilities, gather intelligence about Pakistan's air defence system, and conduct precision strikes with minimal human risk and collateral damage. The proliferation of drone technologies in all modern conflicts underscores a normalisation of aerial warfare capabilities that was unimaginable just a decade ago.

Air defence has moved from fixed, hardware-oriented methods to layered, dynamic networks of defence. India's multi-layered air defence – that is composed of indigenous systems such as Akash and Quick Reaction Surface-to-Air Missiles (QRSAM) together with imported state-of-the-art systems such as Russia's S-400 and the Barak-8 (jointly developed by Israel and India) – is an example of the new strategic philosophy of a layered defence approach, as emphasized in a press release by Lieutenant General Rajiv Ghai, the present



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The most important lesson is that contemporary warfare is now multi-dimensional

Director General of Military Operations. India's Akashteer system, that digitally merges radar information for real-time decision-making, is an evolutionary step in defensive capabilities. No longer are missile systems a concern but the development of an adaptive, smart defence network that is able to process and neutralise several simultaneous threats.

Information, deterrence and doctrine
Information warfare has emerged as perhaps the most sophisticated battlefield in the turn of the event. The confrontation has also exposed how disinformation has transformed itself from a mere propaganda tool to a strategic weapon at an unprecedented scale. Pakistan's information operations demonstrated a nuanced approach to psychological warfare, leveraging digital platforms to create alternative narratives and manipulate international and domestic perceptions, and attempting to fracture India's morale. By circulating doctored videos, fabricated claims and strategically crafted social media content, it was evident that countries can now wage psychological operations that extend far beyond traditional propaganda mechanisms.

The parallels with the modern wars such as the Israel-Palestine and Russia-Ukraine wars are quite evident. Both conflicts illustrate how modern warfare has transcended physical boundaries, transforming information spaces into multiple theatres of engagement. The ability to control narratives, manipulate international attention and create strategic ambiguity has become as crucial as traditional military capabilities. This represents a fundamental shift from kinetic warfare to a more nuanced form of conflict where perception management can be as decisive as military action.

Technological independence has become an imperative strategic necessity. India's show of indigenous platforms such as the Akash missile system and its current work on Project Kusha (a missile project) reflect a larger worldwide trend towards technological independence. It is not just a question of military prowess but also an all-encompassing strategy of minimising foreign dependency, generating economic opportunities through exports of defence products, and asserting technological credibility at the international level.

India's strategic deterrence approach has seen a qualitative transformation. The standoff with Pakistan has shown a sophisticated style of escalation management, where India has signalled strategic capabilities without necessitating full-scale war. This calibrated response model permitted the firm projection of military intent while leaving space for diplomatic

flexibility and communication. It was a nuanced departure from traditional models of binary military engagement, where conflicts were normally framed as either total war or total peace.

There seems a visible shift in India's military warfighting doctrine, signalling a departure from its historically defensive posture to a more proactive, precision-oriented strategic approach. Perhaps the most evident and strategic shift after India's enunciation of its nuclear doctrine can be sensed in the Prime Minister's address on May 12. This doctrinal shift can be characterised by three critical elements.

First, the capacity to respond quickly to provocations with accurately measured force; second, the development of a comprehensive and layered defence and offence capability that combines indigenous technologies with cutting-edge imported systems; and third, an advanced escalation control posture that makes precision projection of military power possible without precipitating all-out war. This was reiterated in the May 12 speech by explaining how war has created 'new normal' in the 'new age warfare' for India.

Joint operations by the forces

Of note is a transformation in joint operations by the Indian armed forces, reflected in unprecedented levels of inter-service coordination that cut across the conventional organisational silos. The Integrated Air Command and Control System (IACCS) became the operational spine, synchronising action by the Indian Army, the Indian Navy, and the Indian Air Force in real time. It fulfilled inter-service integration from a theoretical concept and transformed it into an operational reality. Internal and external intelligence agencies delivered a unified support that facilitated strategic decision-making and precision targeting.

But the democratisation of warfare technologies also poses challenges and opportunities for India. With cutting-edge technologies becoming more accessible, Pakistan is also now capable of creating asymmetric warfare capabilities that can successfully counter the conventional military power of India. This transformation calls for a complete overhaul of military strategy, intelligence gathering, and defence planning. The most important lesson from this confrontation may be the realisation that contemporary warfare is inherently multi-dimensional. Victory is no longer measured in terms of territorial conquest or brute military power, but in terms of the capacity to combine technological, informational and psychological methods in an operational model.





Key Points

* Op Sindoor marks paradigm shift + showcase of modern warfare

1) DRONES & TACTICAL INNOVATION

- ↳ interception of 300-400 Turkish origin Saggar drone
- ↳ Skystriker kamikaze drones
- ↳ Akashteer (integrated air defence interface).

2) TECH ENABLED DECISION ARCHITECTURE

- ↳ Akashteer, Project Kushi → reflect adaption of AI, real time digital mixing of battlefield data
- ↳ IACCS Integrated Air Command & Control System.
↳ (are AI driven target recognition systems)

3) INFORMATION WARFARE & NARRATIVE CONTROL

Pakistan: used Deepfake videos + psychological warfare to distort perceptions.
Social media exploitation.

SIGNIFICANCE

- ↳ Redefines India's military readiness (blend of kinetic + cyber + psychic elements)
- ↳ Emphasize tech. self reliance (Atmanirbharta)
- ↳ Trends of information manipulation, AI systems.

Principled criminalisation and the police as pivot

IMRAN PRATAPGARHI VS STATE OF GUJARAT

SC ruling reasserts that criminalisation must be principled & tied to procedural safeguards.

* Role of police discretion in criminalising conduct + potential overreach.

SYLLABUS

GS 2: Governance

GS 3: Internal Security

(role of law enforcement agencies)

Principled criminalisation and the police as pivot

Procedural law tends to receive less attention than substantive law in criminal law discussions. A major reason for this is that procedural criminal law is seen as dealing with the prosaic question of 'how', while the more dramatic question of 'what' crimes and punishments exist are associated with substantive criminal law. But, in reality, procedure is the beating heart of action. The recent Supreme Court of India ruling, in *Imran Pratapgarhi vs State of Gujarat*, is a reminder of how principled criminalisation is contingent on the adherence of the police to India's criminal procedure law, the Bharatiya Nagarik Suraksha Sanhita (BNS).

A straightforward way of thinking about criminalisation is in terms of the exercise of state power and duty. Criminalisation is about the state's power to name a wrong/harm as 'crime' and impose 'punishment'. It is, equally, about the state's duty to address wrongdoing by holding individuals accountable publicly and administering appropriate penalties. Criminal law in a constitutional democracy seeks to ensure that this enormous authority and responsibility is exercised properly.

Legal philosopher Victor Tadros suggests that the state's duty/power to criminalise wrongful conduct is part of a larger complex duty/power to criminalise, prosecute, convict, publicly condemn and punish the conduct. Within the broader normative context, criminalisation exists as part of social institutions and practices that address wrongdoing, such as families and private law. The claim, therefore (and importantly), is that criminalisation has a role independent of its effects that can be realised through the operations of the criminal law.

The basis That said, the full force of criminalisation depends on criminal law and the workings of the criminal justice system. Given the powerful symbolic and concrete effects of criminalisation, legal scholars have sought to identify one (or



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more) 'master principle(s)' on the basis of which the kinds of behaviours that should be criminalised can be satisfactorily decided. Tatjana Hörnle makes a cogent case for three principles: conduct should be criminalised only if first, it is incompatible with important collective interests, second, it constitutes a violent attack against other persons, and third, it violates another person's right to non-interference. These principles can be seen at the core of criminalisation under India's substantive criminal law, the Bharatiya Nyaya Sanhita (BNS).

Even if the substantive criminal law structures criminalisation in accordance with pragmatic and restrictive principles, some social groups and behaviours can be over-criminalised and others under-criminalised.

This is because beyond the conceptual labelling lies the actual labelling of acts and individuals as 'crime' and 'criminal' through the process of detecting, recording, arresting, charging, prosecuting, convicting and sentencing. Therefore, it is essential to pay equal, or possibly more, attention to the powers and functions of criminal justice agencies under the procedural law that governs the process.

The police as the focus

In this context, the focus inevitably shifts to the role of the police because they spearhead the process of criminalisation by detecting, registering, investigating crime, and, most conspicuously, by arresting suspects. There is general consensus that the police exercise considerable discretion in their daily work. As a result, the nature and the extent of criminalisation is largely shaped by how this discretionary authority is regulated and used. A case in point here is the possibility of overzealous policing of non-harmful wrongdoing (minor infractions) deflecting attention from harmful wrongdoing (serious offences). A key provision in the BNS is Section 173(3), which ostensibly confers more discretion on the

police to decide which cases to investigate, but should actually be viewed as directed towards preventing unnecessary criminalisation due to police overreach.

Under the provision, when the officer in charge of a police station receives information relating to the commission of a cognisable offence punishable for three years or more but less than seven years, they need not immediately register a First Information Report (FIR) and investigate. Rather, they have the option to conduct a preliminary inquiry within 14 days to check whether a prima facie case exists to proceed in the matter.

The case in question

In *Imran Pratapgarhi*, the Court has interpreted such a preliminary inquiry as a positive obligation on the police where an offence covered under the provision is allegedly committed in the exercise of the fundamental right to freedom of speech and expression guaranteed by the Constitution. The Court quashed a first information report against Mr. Pratapgarhi, a Member of the Rajya Sabha, for posting what was alleged to be an inflammatory poem on a social media platform. The Court found that the police had gone overboard by launching an investigation without complying with the provision that enables them to first conduct a preliminary inquiry. Referring to Section 173(3), the judgment notes that "[t]he intention appears to be to prevent the registration of FIRs in frivolous cases..."

Principled criminalisation is no doubt central to the legitimacy of the state's power to criminalise. Also, it is as crucial for substantive law to be defined by judicious principles as it is for procedural law to be able to control the actual effects of criminalisation. But none of this works unless the police show a commitment to responsible criminalisation and are held accountable.

The views expressed are personal





Key Points

WHAT IS PRINCIPLED CRIMINALISATION

Criminalisation is the state's power to define wrongs as crimes and impose punishments.

Victor Tadros: describes this as a part of larger moral function of the state in a democratic society.
(—to punish wrongs only after due process)

COURT RULING

→ Quashed an FIR against the politician over a social media post seen as inflammatory.

→ Held police must have first conducted a preliminary enquiry under Section 173(3) BNSS before proceeding.

BNSS

allows police 14 days to conduct preliminary enquiry in cases with punishment of 3 years or more before registering FIR.

CONCEPTUAL FRAMEWORK

Criminalisation should be based on "Master Principles"

- offence must conflict with core public interest.
- must constitute violent harm
- must violate non-intervention rights (eg privacy)

Significance

re-affirms importance of procedural justice in preserving individual freedoms in a constitutional democracy.

Advocates reformist policing culture shifting from mechanical criminalisation to responsible discretion.

Strike balance b/w public order & fundamental rights
esp misuse of digital speech related laws.





The road to safety

Syllabus

GS: 3 Infrastructure

roads, transportation, safety measures

Essay: Urbanisation, mobility, public health.

Key facts:

→ INDIA: 1.68 lakh road accidents deaths in 2022.

→ Economic cost of road crashes 3% of GDP.

→ Article 21 (Right to Life) → foundation of road safety

The road to safety

India is at a crucial juncture in mobility transformation, where economic growth and urbanisation bring both opportunities and challenges to road safety. With one of the world's largest road networks, India also carries the burden of having among the highest number of road traffic fatalities globally. In 2022, India recorded 1.68 lakh road accident fatalities. This translates to approximately 12.2 deaths per 1 lakh population. To put this in perspective, Japan and the U.K. have road traffic death rates of 2.57 and 2.61, respectively.

The economic repercussions of this are equally alarming. Road crashes cost India an estimated 3% of its GDP annually. This hampers national development and underscores the urgency for effective road safety measures.

Right to life

The foundation of all road safety efforts must rest on a fundamental constitutional principle: the right to safe road travel is an essential component of the right to life under Article 21 of the Constitution. Every citizen, whether a pedestrian, cyclist, or driver, has the right to move through public spaces without fear of injury or death. Recognising this right imposes a moral and legal duty on the state and society to treat road safety not as a privilege or technical matter, but as a human right and public good.

India's urban landscape is poised for significant transformation. By 2047, the urban population is expected to account for about 50% of the total population. This rapid urbanisation will be accompanied by a substantial rise in vehicle ownership. The growing urban and vehicular population necessitates people-centric interventions to ensure that streets remain safe, especially for vulnerable road users such as pedestrians, cyclists, the elderly, and public transport commuters.

At the heart of future-ready urban mobility lies the Safe



Alok Mittal
Senior Indian Police
Service officer in
Haryana



Sarika Panda
Road safety expert

System Approach, which places human vulnerability and error at the centre of road design. This philosophy acknowledges that people will make mistakes, but those mistakes should not result in fatalities or serious injuries.

Prioritising pedestrian safety is fundamental under this approach. Urban streets must be redesigned with wider footpaths, dedicated cycling tracks, well-marked crossings, pedestrian refuge islands, reduced speed limits, and calming measures such as raised intersections. This system moves away from blaming individual road users and instead emphasises creating a forgiving and resilient road environment.

Recognising the urgency of the road safety crisis, the Ministry of Road Transport and Highways (MoRTH) has launched a series of targeted initiatives. These include rectification of over 5,000 black spots on highways, mandatory road safety audits, and stricter safety norms such as airbags and anti-lock braking systems in vehicles. Electronic enforcement mechanisms such as speed cameras and CCTV surveillance have also been rolled out to improve compliance. In a major push to strengthen driver training, Union Minister Nitin Gadkari recently announced the setting up of driving training centres and vehicle fitness centres in every district. This bold initiative aims to ensure safer driving practices and reduce accidents caused by unskilled driving.

To meet the massive financial requirements of road safety improvements, innovative funding models must be explored. One such approach could be a nationwide mandate for all automobile manufacturers to channel their entire Corporate Social Responsibility funds towards road safety initiatives for the next 20-25 years. This investment, executed in collaboration with the Indian government, could support black spot elimination, public awareness campaigns, emergency trauma

care, driver training, and road safety research. As primary stakeholders in the mobility ecosystem, auto-makers bear a shared responsibility for making Indian roads safer, and this long-term commitment can become a cornerstone of India's Vision Zero ambitions.

Road safety strategy

The four Es of road safety – engineering, enforcement, education, and emergency care – remain the cornerstone of an integrated road safety strategy. While enforcement and emergency care are gaining ground, there is an urgent need to strengthen infrastructure design and user education to prevent accidents before they occur.

Importantly, the World Bank Report 2020 outlines a strategic framework for enhancing road safety in India. It emphasises the need for substantial investment, estimating that an additional \$109 billion over the next decade is required to achieve a 50% reduction in road crash fatalities. The report highlights that this investment will yield enormous social and economic returns by saving lives, reducing injuries, and improving mobility efficiency.

The IRAP Four States Report and other global analyses further confirm that investments in road safety deliver high returns. For every rupee spent on proven safety interventions, India can save up to four rupees in avoided crash costs, lives saved, and productivity gains.

India's roads must also become kinder to the most vulnerable users – pedestrians, cyclists, and children. Roads are not just conduits for vehicles but shared public spaces that reflect our civic values. Urban mobility must be reimagined to prioritise inclusivity and safety over speed. As we envision Viksit Bharat 2047, the path ahead must be paved with accountability and data-driven policy. Road safety is not a luxury; it is a prerequisite for sustainable and equitable development.

Urban mobility must be reimagined to prioritise inclusivity and safety over speed





ROAD SAFETY CHALLENGES

- Poor infrastructure for pedestrians + cyclists
- Weak enforcement of traffic laws.
- Inadequate driver training & vehicle fitness checks.

Fatalities per lakh population

Country	Fatalities per lakh population
Japan	2.57
UK	2.61
INDIA	12.2

VISION ZERO

accepts human error but seeks zero deaths.

CONSTITUTIONAL MANDATE

Art 21 {right to move freely without risk of injury}

Road safety is thus not a privilege but a legal & moral duty of state.

ENGINEERING & ENFORCEMENT FOCUS

MORTH steps taken:

- Rectifying 5000 black spots
- Mandatory Safety Audits
- Airbags, Camera, CCTV, Speed enforcement.
- Nationwide driving training centres

AE (Engineering & Enforcement):

- Engg.
- Enforcement
- Education
- Emergency care.

IRAP (International Road Assessment Prog.)

Global benchmark for road safety intervention returns

How did India develop genome edited rice?

Syllabus: GS 3 Science & Tech: Biotech, GMDs, genome editing
GS 2 Govt. policies: Agricultural research.

→ India: 1st country to develop 2 rice varieties using genome editing

DRR Dhan 100 (Kamala) derived from Samba Mahuri
Pusa DSR Rice 1 derived from MTU1010

→ Using Site-Directed Nuclease Technology (by ICRAR)

→ These crops are not GM ∴ no foreign genes are inserted.
(They are Non Transgenic.)

GENOME EDITED RICE

precise mutation using tech → SDN-1
SDN-2
SDN-3

India → edits plants own genome without introducing foreign DNA.

exempt from GM regulations.

enhanced traits (yield, early maturity, resilience)

How did India develop genome edited rice?

Is India the first ever country to develop rice using genome editing technology? What are the unique characteristics of the two newly developed rice varieties? Are these crops genetically modified? What have been the controversies surrounding the announcement of these two genome-edited rice varieties?

EXPLAINER

A. M. Jigesh

The story so far
Union Agriculture Minister Shri Shiv Singh Chaudhary recently announced that India has become the first country in the world to develop rice varieties using genome editing technology. The new seeds will be available for farmers after the required clearances within six months and large-scale seed production will probably take place during the next three crop seasons.

What are the new varieties?
A team of researchers from various institutions, guided by the Indian Council of Agricultural Research (ICAR), were behind the development of the two varieties - the DRR Dhan 100, also known as Kamala, which was developed from a popular high yielding green rice Samba Mahuri, and Pusa DSR Rice 1, which was developed from the Maruturu K100 (MTU1010) variety.

What are its peculiarities?
According to the ICAR, the increase in food demand, challenges posed by climate change and increasing biotic and abiotic stresses such as pest attacks and acidity, led to the development of high yielding, climate resilient and nutritionally rich crop varieties. Kamala has shown superior yield, drought tolerance, high nitrogen use efficiency and 20 days earlier over its parent variety. It has an average yield of 5.37 tonnes per hectare against the 4.5 tonnes per hectare of Samba Mahuri across two years and 24 locations of testing in the country. "The earliest trait will help in saving water, fertilizers, and reduce emission of methane," the ICAR said. The second variety, Pusa DSR Rice 1, has a yield of 5.58 kilograms per hectare (a capacity of 5.66% more over the parent rice variety, MTU 1010), which has an



Excellent rice Union Minister of Agriculture Shiv Singh Chaudhary launches two genome-edited varieties of rice by the ICAR, at the IASIC, Coimbatore in New Delhi on July 4, 2024.

average yield of 3,500 kg per hectare under "inland salinity stress". It also showed a superiority of 14.66% over the MTU 1010 under alkalinity conditions, and a 30.4% yield advantage under coastal salinity stress.

What was the technology used?
According to Joint Director (Research), Indian Agricultural Research Institute, Varanasi, ICAR scientists have used Site-Directed Nuclease 1 and Site-Directed Nuclease 2 (SDN-1 and SDN-2) genome editing techniques to develop the seeds. "Through this technique we used to develop different crops since 2010, such as tomatoes, a high variety in Japan and a soybean variety in the US, making a rice variety has been done for the first time. In 2020, the first peer reviewed research paper on Pusa DSR Rice 1 was published, which got cited in more than 300 papers since then. The paper on Kamala is in the stage of publication." "The international research community has approved both the varieties," Dr. Viswanathan said.

Are they GM crops?
Dr. Viswanathan says that since the genome editing technology (SDN) is not involved in this process, they are not genetically modified (GM) crops. In the SDN-1 approach, scientists make a cut and the repair is done automatically while in SDN-2, scientists give guidance to the cell to do the repair and the cell copies it. In SDN-3, however, scientists introduce a foreign gene from other varieties and integrate it into the improved varieties. This process is considered as genetic modification. In this case, the peer reviewed research paper on Pusa DSR Rice 1 was published, which got cited in more than 300 papers since then. The paper on Kamala is in the stage of publication. "The international research community has approved both the varieties," Dr. Viswanathan said.

THE GIST

According to the ICAR, the increase in food demand, challenges posed by climate change and increasing biotic and abiotic stresses such as pest attacks and acidity, led to the development of high yielding, climate resilient and nutritionally rich crop varieties.

The DRR Dhan 100, also known as Kamala, was developed from a popular high yielding green rice Samba Mahuri, and Pusa DSR Rice 1, was developed from the Maruturu K100 (MTU1010) variety.

Viswanathan, who was a farmer's representative in the ICAR governing body, said in a statement that farmers demand accountability, transparent data, and technologies that are tested in our fields - not just polished press releases. He was expelled from the governing body soon after this and the ICAR accused him of spreading falsehoods about the institution. The Coalition for a Genetically Modified-Free India, a group of activists who are fighting a case against GM crops in the Supreme Court, said the biotech industry and lobbies have resorted to discrediting genome editing as a precise and safe technology, whereas published scientific papers show that this is untrue. "India's de-regulation of two kinds of gene editing is outright illegal," the organisation said. They claimed that gene editing tools are proprietary technologies under Intellectual Property Rights (IPR) ownership and have a direct bearing on the seed sovereignty of the country's farming community. "The Government of India has created a situation with regard to IPRs on the released varieties transparently. The Government of India is compromising on farmers' seed sovereignty and our food sovereignty by bringing in regulations entangled in IPR issues," they said.





Key Points

Kamala (DRR Shan 100)

- yield 5.3 tons/hectare
- 20 days early maturity
- high nitrogen use efficiency

Pusa DSR Rice 1

- 14.6% higher yield than parent
- thrives in alkaline soil, water scarce zones

Identify target gene

Use gene editing tool (like CRISPR)

Make small change

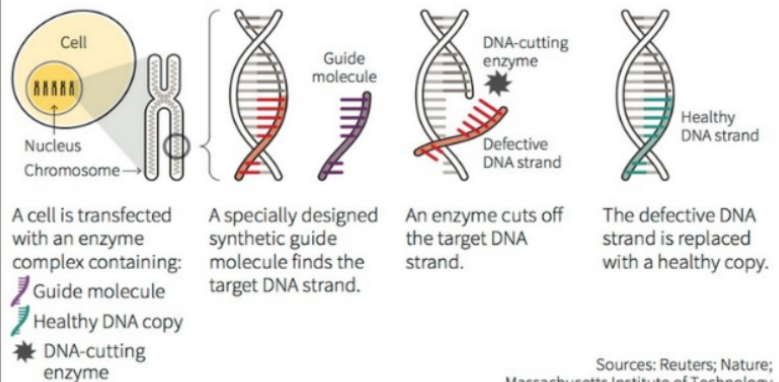
regrow plant

Yield trial

DNA editing

A DNA editing technique, called CRISPR/Cas9, works like a biological version of a word-processing programme's "find and replace" function.

HOW THE TECHNIQUE WORKS



Justice B.R Gavai takes over as CJI

Justice B.R. Gavai takes over as CJI for a six-month tenure

His time in office could see important hearings in the challenges to the Places of Worship Act and the Waqf (Amendment) Act; he has been part of many impactful decisions at the Supreme Court, including upholding of abrogation of Article 370

The Hindu Bureau
NEW DELHI

Justice Bhushan Ramkrishna Gavai was sworn in by President Droupadi Murmu as the 52nd Chief Justice of India at the Rashtrapati Bhavan on Wednesday.

He took his oath of office, pledging his commitment to uphold the Constitution and faithfully discharge duties, in Hindi.

Chief Justice Gavai acknowledged the applause with folded hands, shook hands with Vice-President Jagdeep Dhankar, Prime Minister Narendra Modi, Law Minister Arjun Ram Meghwal, Home Minister Amit Shah, other dignitaries and family members sitting in the foremost row, including his immediate predecessor, Justice Sanjiv Khanna.

The Chief Justice of India touched his mother's feet. Mr. Modi was also seen going up to the Chief Justice's mother to greet her.

Judges of the Supreme Court and High Courts, both sitting and retired, were present at the ceremony.

Chief Justice Gavai has a tenure of over six months



In high office: Justice B.R. Gavai takes oath as the 52nd Chief Justice of India during the swearing-in ceremony, at Rashtrapati Bhavan, next to President Droupadi Murmu on Wednesday. PTI

till November 23. He was elevated as a judge of the Supreme Court on May 24, 2019 from the Bombay High Court.

Justice Gavai is the first Buddhist Chief Justice of India. He was born on November 24, 1960 at Amravati. He joined the Bar on March 16, 1985. Justice Gavai's father, Ramkrishna Suryabhan Gavai, also known as 'Dadasaheb', was a former Governor of Bihar and a prominent Da-

lit leader. Known as a bold and decisive judge who speaks his mind, Chief Justice Gavai will have a tenure that may see important hearings in the challenges to the Places of Worship Act and the Waqf (Amendment) Act of 2025.

As a Supreme Court judge, he was part of many impactful decisions at the Supreme Court, including the upholding of abrogation of Article 370 of the Constitution and the strik-

ing down of the electoral bonds scheme.

He was part of a Constitution Bench which held that States have a right to sub-classify Scheduled Castes.

He headed the Bench which had ordered the release of Perarivalan, a convict in the Rajiv Gandhi assassination case.

As a lawyer, he had practised independently in the Bombay High Court from 1987 to 1990. After

Bench to hear pleas against Waqf law today

NEW DELHI

A Bench of Chief Justice of India B.R. Gavai and Justice Augustine George Masih is scheduled to hear the challenge to the Waqf (Amendment) Act, 2025, on Thursday. The case last came up before a three-judge Special Bench led by Chief Justice Gavai's predecessor, Justice Sanjiv Khanna, on May 5. Justice Khanna had at the time expressed reluctance to continue hearing the case, saying he had very little time till his retirement on May 13. The case was then posted on May 15.

1990, he appeared mainly before the Nagpur Bench of the Bombay High Court. He had practised in Constitutional and administrative law, and was standing counsel for the Municipal Corporation of Nagpur, Amravati Municipal Corporation and Amravati University.

He was elevated as Additional Judge of the Bombay High Court in 2003 and became a Permanent Judge in November 2005.





Scientists make unique 2D metals

Syllabus: S&T (GS-3) → Nanotech, Material Science
GS-1 (Geog) → Distribution & uses of metals & minerals

What are 2D Metals?

Atomically thin sheets of metal → where the metal atoms are arranged in a two dimensional (2D) layer like a flat sheet.
eg: 2D (Bismuth) → 0.63 nm thick.
↓
Causes Quantum Confinement (which gives metal new + unusual properties).



Scientists make unique 2D metals much sought after for future tech

The unique material properties resulting from quantum confinement have great real-world applications, this has driven scientists to pursue creation of 2D metals, inspired by materials like graphene and quantum dots, but they've encountered a challenge: the behavior of metal atoms themselves.

Vanadium Hexahydride
A team of scientists from the University of California, Berkeley, and the Lawrence Berkeley National Laboratory have created a new 2D metal, vanadium hexahydride (VH₆), which is only one atom thick. The material is made by depositing a thin layer of vanadium on a surface of hydrogen atoms, which then reacts to form the 2D metal. The material has a unique electronic structure, with a band gap that is much larger than that of other 2D materials. This makes it a promising candidate for use in next-generation electronics and quantum computing.

Break and show the sheets to the world
The scientists who discovered vanadium hexahydride were inspired by the unique properties of graphene and quantum dots. They wanted to create a material that had the same unique properties but was made of metal atoms. They found that vanadium hexahydride was the only material that met their criteria.

2D metals are expected to have unique properties that can be used in a variety of ways
2D metals are expected to have unique properties that can be used in a variety of ways. They are expected to be used in next-generation electronics, quantum computing, and other applications. They are also expected to be used in the development of new materials and devices.

The unique properties of 2D metals
The unique properties of 2D metals are due to quantum confinement. This is a phenomenon that occurs when the size of a material is comparable to the wavelength of the electrons. This causes the electrons to behave differently than they do in bulk materials. This leads to unique electronic and optical properties.

Quantum confinement
Quantum confinement is a phenomenon that occurs when the size of a material is comparable to the wavelength of the electrons. This causes the electrons to behave differently than they do in bulk materials. This leads to unique electronic and optical properties.

High pressure synthesis
The scientists used high pressure synthesis to create vanadium hexahydride. This is a process in which a material is subjected to high pressure and temperature. This causes the material to undergo a phase transition, which results in the formation of the 2D metal.

The use of 2D metals and quantum dots
The use of 2D metals and quantum dots is expected to revolutionize the field of nanotechnology. They are expected to be used in a variety of ways, including in the development of new materials and devices, in the creation of new electronic and optical components, and in the development of new quantum computing architectures.

