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- Three-Language Formula.
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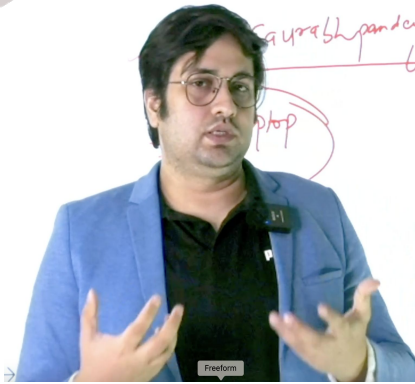

By saurabh Pandey

THE HINDU

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Q. ''Simultaneous elections could reduce costs and improve governance by addressing policy paralysis and excessive election-related expenditures'' Critically analyse.

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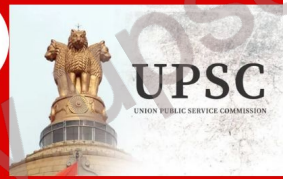

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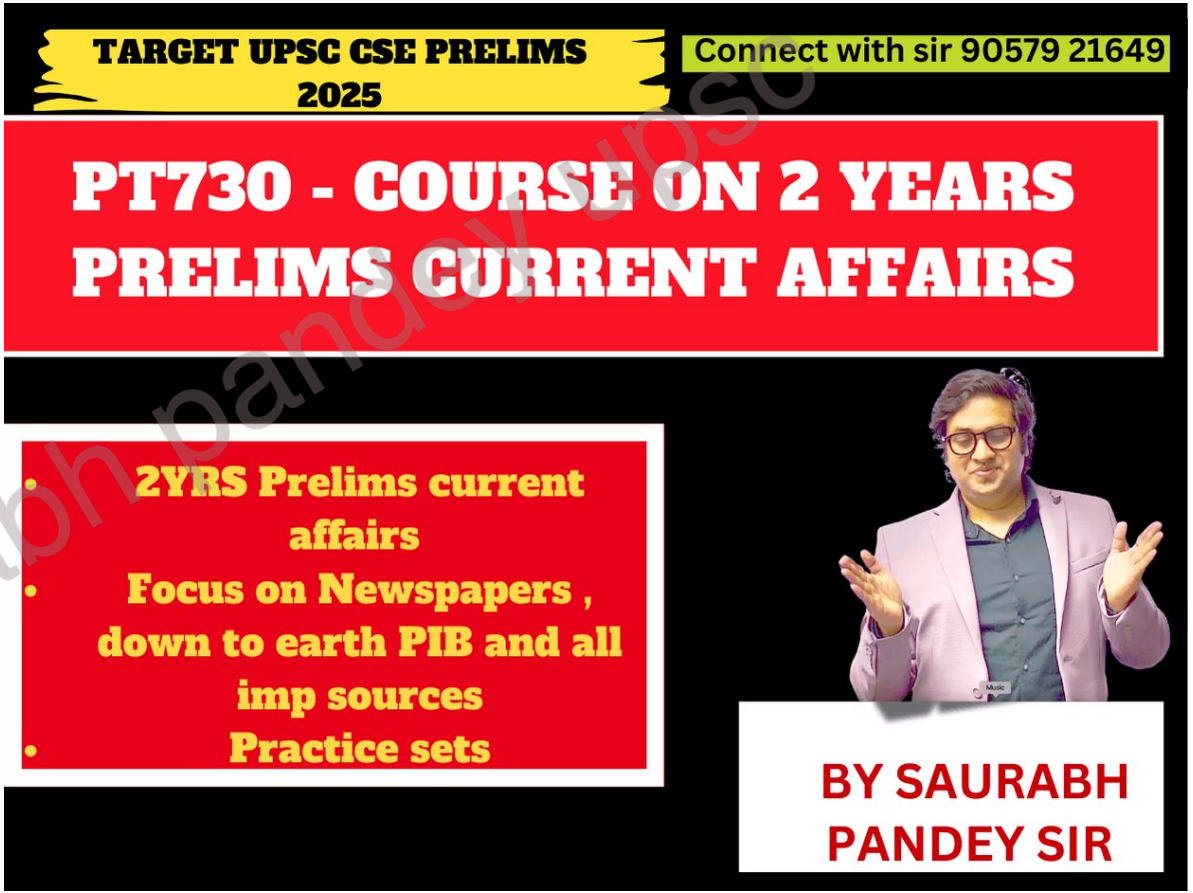

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By saurabh pandey sir

SC reinstates Bihar RJD MLC, says ouster was 'highly excessive, disproportionate'

Krishnadas Rajagopal
NEW DELHI

The Supreme Court on Tuesday reinstated Rashtriya Janata Dal leader Sunil Kumar Singh to the Bihar Legislative Council, setting aside the Election Commission notification for a byelection to his seat.

A Bench headed by Justice Surya Kant concluded that Mr. Singh's expulsion from the Council following his remarks against Chief Minister Nitish Kumar was "highly excessive and disproportionate".

"The expulsion of a member from the House constitutes a higher degree of deprivation and must only be sustained in exceptional circumstances," Justice Kant observed.

Noting that the main function of a legislator is to act as a reflection of the people's will in a representative democracy, Justice Kant said imposing a disproportionate punishment not only undermines democratic values by depriving the member from participating in House proceedings, but also affects the voters, who remain unrepresented.

"The absence of a duly elected representative undermines the voice of the electorate. In such a situation, if the punishment inflicted upon the member concerned appears to be *prima facie* harsh and disproportionate, constitutional courts owe a duty to undo such gross injustice and review the proportionality of such disqualifications or expulsions," Justice Kant noted.


Sunil Kumar Singh

The purpose of punishment is not to serve as a tool for retribution but rather to uphold and enforce discipline within the House, the court pointed out. The primary objective must be to maintain decorum and foster an environment of constructive debate and deliberation, it added.

The court also rebuked Mr. Singh, finding his conduct unbecoming of his position as a lawmaker. "There is no place for aggression and indecency in the proceedings of the Parliament or the Legislature," Justice Kant observed.

The judgment modified Mr. Singh's July 2024 expulsion into a suspension. He will remain eligible for all the perks and benefits of a full term at the end of his tenure.

Article 191 in Constitution of India

191. Disqualifications for membership

(1) A person shall be disqualified for being chosen as, and for being, a member of the Legislative Assembly or Legislative Council of a State

(a) if he holds any office of profit under the Government of India or the Government of any State specified in the First Schedule, other than an office declared by the Legislature of the State by law not to disqualify its holder;

(b) if he is of unsound mind and stands so declared by a competent court;

e -> if he is an undischarged insolvent;

(d) if he is not a citizen of India, or has voluntarily acquired the citizenship of a foreign State, or is under any acknowledgement of allegiance or adherence to a foreign State;

(e) if he is so disqualified by or under any law made by Parliament.Explanation. For the purposes of this clause, a person shall not be deemed to hold an office of profit under the Government of India or the Government of any State specified in the First Schedule by reason only that he is a Minister either for the Union or for such State.

(2) A person shall be disqualified for being a member of the Legislative Assembly or Legislative Council of a State if he is so disqualified under the Tenth Schedule.

Tamal, India's last imported warship, likely to be commissioned in June

Dinakar Peri
NEW DELHI

The Indian Navy crew that will operate *Tamal*, the stealth frigate under construction in Russia, reached St. Petersburg last week in preparation for its commissioning, which is expected to take place in early June.

The event is significant as *Tamal* will be the last warship to be commissioned outside India or imported. The country now designs and constructs its own warships.

The commissioning crew of around 200 personnel reached St. Petersburg around 10 days ago for training as the ship will undergo a series of trials leading up to its commissioning, officials sources in the know confirmed. The crew will shift to Kaliningrad after the training to oversee the trials.

INS Tushil was the first ship to be manufactured in Russia under the present deal. It was comssioned in December 2024. ANI

The ship is being built as part of the deal for four additional follow-on stealth frigates under an Inter-Governmental Agreement signed in October 2016. Under the deal, two ships are to be imported and two manufactured by Goa Shipyard Ltd. (GSL) under technology transfer. A $1-billion deal was subsequently signed for the two frigates under direct purchase.

Tamal has completed manufacturer trials and is currently undergoing State Committee Trials. It will then go through delivery acceptance trials, both in harbour and at sea, which will be spread over 45 to 50 days, sources said, explaining the process.

The ship's weapons will also be fired after which it will be ready for commissioning.

INS Tushil, the first ship to be manufactured in Russia under the deal, was commissioned on December 9, 2024 at Kaliningrad in the presence of Defence Minister Rajnath Singh. The ship reached its home port in Karwar on February 14 after sailing over 12,500 nautical miles, visiting eight countries across three continents through the journey.

The Indian Navy, which set up a Directorate of Naval Design way back in 1970, has, for sometime now, graduated into a builder's navy with over 60 warships being constructed at Indian shipyards.

Indian Navy's Stealth Frigate Tamal: A New Era in Naval Self-Sufficiency

Overview of the Tamal Frigate

🇮🇳 Arrival in St. Petersburg: The Indian Navy crew for the stealth frigate Tamal arrived in St. Petersburg for training before its commissioning in early June.

🛳️ Significance: Tamal will be the last warship commissioned outside India, highlighting a shift towards domestic warship design and construction.

👨‍✈️ Commissioning Crew: Comprising around 200 personnel, the crew will oversee trials post-training, moving to Kaliningrad for this purpose

Details of the Frigate Deal

🤝 **Inter-Governmental Agreement:** Part of a deal for four additional stealth frigates signed in October 2016, with two ships imported and two manufactured in India.

💰 **Financials:** A $1 billion deal was signed for the direct purchase of two frigates, with Tamal undergoing State Committee Trials and set for delivery acceptance trials.

🔫 **Weapons Testing:** The ship's weapons will be tested before commissioning, following a series of trials lasting 45 to 50 days

Historical Context and Future Implications

🌍 **INS Tushil:** The first ship from this deal, commissioned on December 9, 2024, has traveled over 12,500 nautical miles, visiting eight countries.

Summary: The Indian Navy's Tamal frigate, the last to be commissioned outside India, is set for trials and commissioning in June, reflecting India's growing naval self-sufficiency

Bill on simultaneous polls will fail legal challenge, former CJI tells House panel

Justice U.U. Lalit (retd.) backs underlying principle, but says curtailing the tenure of the Assemblies to synchronise polls runs counter to the Basic Structure of Constitution; former Law Commission Chairperson says simultaneous polls help cost optimisation; panel to meet again on March 10

Sobhana K. Nair
NEW DELHI

In its current form, the Bill on simultaneous elections will not sustain a legal challenge in the Supreme Court, former Chief Justice of India U.U. Lalit said in a submission before the Parliamentary Joint Committee reviewing the legislation on Tuesday.

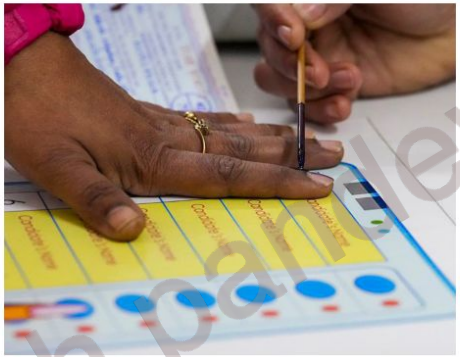
Sources said Justice Lalit said that the provision to curtail the tenure of the Assemblies to synchronise the polls runs counter to the Basic Structure of Constitution, which is protected by the *Kesavananda Bharati* judgment.

The committee, headed by BJP MP P.P. Chaudhary, is reviewing the Constitution (One Hundred and Twenty-Ninth Amendment) Bill, 2024, which was introduced in the Lok Sabha on December 17, 2024.

The Bill seeks to empower the Election Commission to conduct simultaneous elections to the Lok Sabha and the Assemblies.

To synchronise the elections, the Bill includes a provision enabling the President to set an "appointed date", through a notification issued on the first sitting of the Lok Sabha post a general election. This "appointed date" will mark the beginning of the new electoral cycle.

The Assemblies formed after that date and before the completion of the Lok Sabha's term will conclude their own term before the subsequent Lok Sabha election. After this, elections to the Lok Sabha and the Assemblies will be held simultaneously.



Deep dive: A Parliamentary Joint Committee headed by BJP MP P.P. Chaudhary is reviewing the legislation. PTI

'Staggered approach'

Sources said Justice Lalit supported the underlying principle of the legislation, but said that curtailing the tenure of the Assemblies on the "appointed date" will not pass legal scrutiny in the Supreme Court. He made a distinction between the "non-substantial" or "peripheral" tenure of an Assembly versus the "substantial term".

The former Chief Justice said that if 30% to 40% of the tenure of an Assembly is yet to be concluded, it fell under the category of a "substantial" term, and curtailing it would be considered a violation of the Basic Structure of the Constitution. Instead, sources said, Justice Lalit suggested a staggered approach, with the Assemblies being disbanded in batches.

At this point, an Opposition member of the panel pointed out that the electoral cycle had evolved organically, without any constitutional fiat, from the initial elections during colonial rule under the 1935 Government of India Act till the Lok Sabha and Assembly electoral cycle diverged after the 1967 election. Justice Lalit, sources said, conceded that the proposed legislative intervention could stunt such an organic evolution.

The curtailment of the tenure of the Assemblies has been a major concern for several parties, including the Janata Dal(U), which is a partner in the ruling BJP-led National Democratic Alliance, and also leads the NDA government in Bihar. Rajya Sabha member and JD(U) national general secretary Sanjay K. Jha, who is a former member of the panel, had raised this question.

Congress MP Manish Tewari, while opposing the introduction of the Bill in the Lok Sabha, had argued that the State legislatures stand on an equal constitutional footing with Parliament and therefore cannot be made subservient, as this legislation aims to do.

The panel's discussion with Justice Lalit went on for nearly three hours, with several interventions and questions from the Opposition members, sources said.

Cutting costs

Former Law Commission Chairperson Ritu Raj Awasthi also appeared before the panel.

Arguing in support of the legislation, Justice Awasthi called it a "transformative idea" which will address challenges such as "policy paralysis, governance inefficiencies, excessive election-related expenditure, and the prolonged deployment of security and administrative personnel".

Justice Awasthi argued, sources said, that simultaneous elections would allow for cost optimisation. The parliamentary polls are funded by the Union government, while the Assembly elections are funded by the States.

The average expenditure per Assembly constituency for the 2019 Lok Sabha election and subsequent Assembly elections revealed that both incurred nearly the same costs. In certain cases, Justice Awasthi said, citing the examples of Delhi and Haryana, the Assembly election expenditure even exceeded that of the Lok Sabha election.

The meeting began with more than an hour of wrangling over procedures. Opposition members demanded that a consolidated list of the witnesses to be called to appear before the panel must be shared. The next meeting of the panel is scheduled for March 10.

Simultaneous Elections Bill Overview

⚖️ Legal Concerns

Former Chief Justice U.U. Lalit expressed doubts about the Bill's ability to withstand a Supreme Court challenge.
Concerns focus on provisions that curtail Assembly tenures, potentially violating the Constitution's Basic Structure.

📅 Bill Overview

The Constitution (One Hundred and Twenty-Ninth Amendment) Bill, 2024 aims to empower the Election Commission.
Introduced in the Lok Sabha on December 17, 2024, to facilitate simultaneous elections for the Lok Sabha and Assemblies

🗳️ Election Synchronization

The Bill allows the President to set an "appointed date" for a new electoral cycle.
This leads to simultaneous elections after adjusting the tenure of Assemblies.

🔄 Staggered Approach Suggested

Justice Lalit recommended a staggered approach for disbanding Assemblies.
Emphasized the importance of preserving the substantial term of Assemblies

Election Synchronization Process:

💰 Cost Efficiency Argument

Ritu Raj Awasthi, former Law Commission Chairperson, supported the Bill. Argued that simultaneous elections could reduce costs and improve governance by addressing policy paralysis and excessive election-related expenditures

Opposition Concerns

Opposition members, including Congress MP Manish Tewari, raised concerns. The Bill is seen as undermining the equal constitutional status of State legislatures compared to Parliament.

Researchers spot a clue as to why human and mouse genomes overlap

Parts of human, mouse, chicken, and dog DNA called ultra-conserved elements have remained completely unchanged for the last 80 million years. What biological constraints preserved them so precisely across such diverse genomes? For years, scientists were unsure — but this year, a research team made a breakthrough

D.P. Kasbekar

Eighty million years ago humans, rats, and mice shared the same mammalian ancestor.

More recently, researchers made the astonishing discovery that even today our genomes contain close to 500 segments that have remained totally unchanged since then. These segments are called ultra-conserved elements (UCEs). Nearly all the UCEs are also highly unchanged in the chicken and dog genomes, and many are significantly conserved in fish, too.

What biological constraint maintained the UCEs intact in so many different genomes for these tens of millions of years?

For a long time scientists had no idea – so much so that our ignorance was considered profound.

But a team made a breakthrough this year. Researchers led by David J. Elliott of Newcastle University in the UK reported in *EMBO Journal* that a UCE in a mouse gene has an important role in limiting the production of the protein encoded by this gene.

Using genetic engineering, they deleted this gene in mouse testes, and found that these mice over-produced the corresponding protein in their testes. The overproduction resulted in death of the sperm-producing cells and the mice becoming infertile.

This result suggested that if the UCE underwent any change that interfered with its role in limiting that protein's levels, it would result in loss of sperm production. Thus the altered UCE would not be transmitted to the next generation, accounting for the maintenance of the UCE across species.

Nearly all the UCEs are also highly unchanged in the chicken and dog genomes, and many are significantly conserved in fish, too. GETTY IMAGES

From gene to protein

The DNA is a double-helix molecule. Each helix is a string of four bases. The double helix is held together because a base on one strand bonds with a base on the other. Each bond represents a base-pair. A gene is a relatively short stretch of the DNA molecule, typically only a few thousand base-pairs long.

When a gene is 'expressed', the cell copies its sequence of bases into a messenger RNA (mRNA) and loads it onto a cellular machine called the ribosome. There its base sequence specifies the sequence amino acids should be stitched together to make the protein encoded by the gene.

The mRNA also has any one of three short sequences of bases called stop codons. When the ribosome encounters a stop codon, it stops adding more amino acids and releases the newly synthesised protein.

Our genome contains 20,000 genes that code for proteins and another 20,000 used to make RNA that influence the expression of other genes.

(Some DNA sequences, called promoters and enhancers, bind to regulatory proteins which specify when and where other genes are copied into mRNA. These too are called genes because changes in their sequence can have visible effects on the organism.)

The poison exon

Researchers first identified UCEs as DNA sequences longer than 200 base-pairs that retained perfect sequence identity across the human, rat, and mouse genomes. That is, they hadn't tolerated even a single base-pair change in the last 80 million years.

Most UCEs don't code for proteins. Initially researchers thought the UCEs might be exceptionally long enhancers. A subset even showed enhancer activity in the mouse. However, mice bearing altered versions of UCEs didn't have significantly perturbed enhancer function, so the enhancer role couldn't account for the extreme conservation.

The fact that some UCEs could be deleted from the genome without any observable consequence only added to their intrigue.

The fact that some UCEs could be deleted from the genome without any observable consequence only added to their intrigue

After the RNA is copied from a gene's DNA strand, the cell subjects it to a maturation step called splicing: splicing removes, or splices out, segments called introns from the newly made mRNA. The segments retained in the mature mRNA are called exons.

For some genes, an intron is removed from only a subset of mRNA molecules but retained in the rest. This gives rise to alternative forms of mRNA called splice variants: they vary in whether they contain an intron.

The mouse *Tra2b* gene has eight introns and nine exons. Interestingly, the Tra2β protein that the gene encodes for is used for splicing. There is a UCE embedded within the first intron of the *Tra2b* gene. Once the level of the Tra2β protein rises above a certain threshold in the cell, it recognises this UCE as an additional exon to be included in a new splice variant of the gene's mRNA.

The new exon does not introduce new protein-coding sequences. Instead, it contains multiple stop codons that cause protein synthesis to terminate, the mRNA to fall off the ribosome, and then the mRNA to enter a degradation pathway.

Effectively, the new exon prevents further accumulation of the Tra2β protein. Hence it is also called a poison exon.

In sum, the UCE in the *Tra2b* gene's first intron acts as a poison exon that limits the production of the Tra2β protein.

A precise intervention

A protein named Cre can recognise certain short sequences in the DNA and bind to them. The binding causes the DNA sequence located between the two short sequences to be cut out.

The researchers inserted these sequences into the first intron of the *Tra2b* gene, on either side of the UCE. Next, they engineered mice to express Cre in only the sperm-producing cells of the testes. These mice thus lacked the poison exon and were unable to limit the production of the Tra2β protein in their testes. This led to death of the sperm-producing cells.

Admittedly, completely cutting out a UCE from the genome is not the same as changing one or a few of its base-pairs. As of now, we know no biological function that depends on a unique 200 base-pair DNA sequence.

If altering even a single base-pair of the UCE keeps it from being included as a poison exon in the *Tra2b* splice variant and renders the mouse infertile, then an 80-million-year-old mystery will be cracked.

The new study represents a big step towards achieving this goal.

(D.P. Kasbekar is a retired scientist. kasbekardp@yahoo.co.in)

THE GIST

When the UCE was deleted in some mice, they over-produced the corresponding protein. This resulted in death of the sperm-producing cells and infertility. Thus the altered UCE would not be transmitted to the next generation

Researchers first identified UCEs as DNA sequences longer than 200 base-pairs. Most UCEs don't code for proteins. Initially it was thought UCEs might be enhancers. However, mice bearing altered versions of UCEs didn't have significantly perturbed enhancer function

The mouse *Tra2b* gene has eight introns and nine exons. It carries a UCE in the first intron. Once the level of Tra2β protein it encodes rises it recognises this UCE as an additional exon. The new exon contains stop codons that terminate protein synthesis, hence it is also called a poison exon

As of now, we know no biological function that depends on a unique 200 base-pair DNA sequence. If altering even a single base-pair of the UCE keeps it from being included as a poison exon and renders the mouse infertile, then an 80-million-year-old mystery will be cracked

The Significance of Ultraconserved Elements (UCEs) in Evolutionary Biology

Understanding Ultraconserved Elements (UCEs):

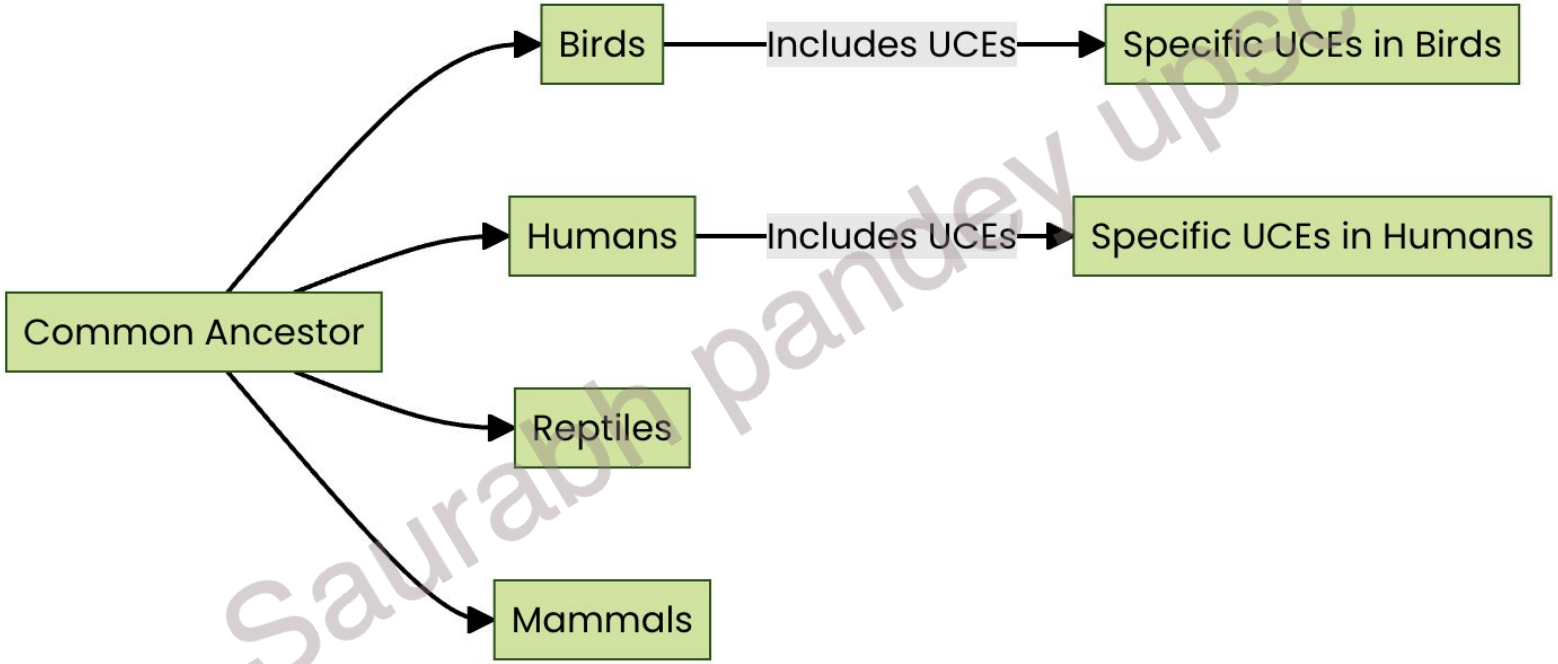
Ultraconserved Elements (UCEs) are stretches of DNA that exhibit remarkable conservation across a variety of distantly-related organisms. These genomic marvels are not just random sequences; they tell a story of evolution, revealing the intricate connections between vastly different species.

Highly Conserved Regions: UCEs are regions of the genome that remain almost unchanged through millions of years of evolution. Their stability across taxa makes them particularly valuable for evolutionary biologists.

Shared Among Distant Taxa: UCEs are identified in organisms as diverse as birds and humans, highlighting their broad significance in the tree of life.

Flanking DNA Variability: The DNA adjacent to UCEs, known as flanking DNA, tends to exhibit greater variability, allowing scientists to differentiate UCEs from more mutable genomic regions.

Figure 1.1: Evolutionary Tree Highlighting UCEs:



How are UCEs Identified?

Identifying UCEs is a meticulous process that involves several advanced genomic techniques. Researchers leverage comparative genomics to pinpoint these highly conserved regions.

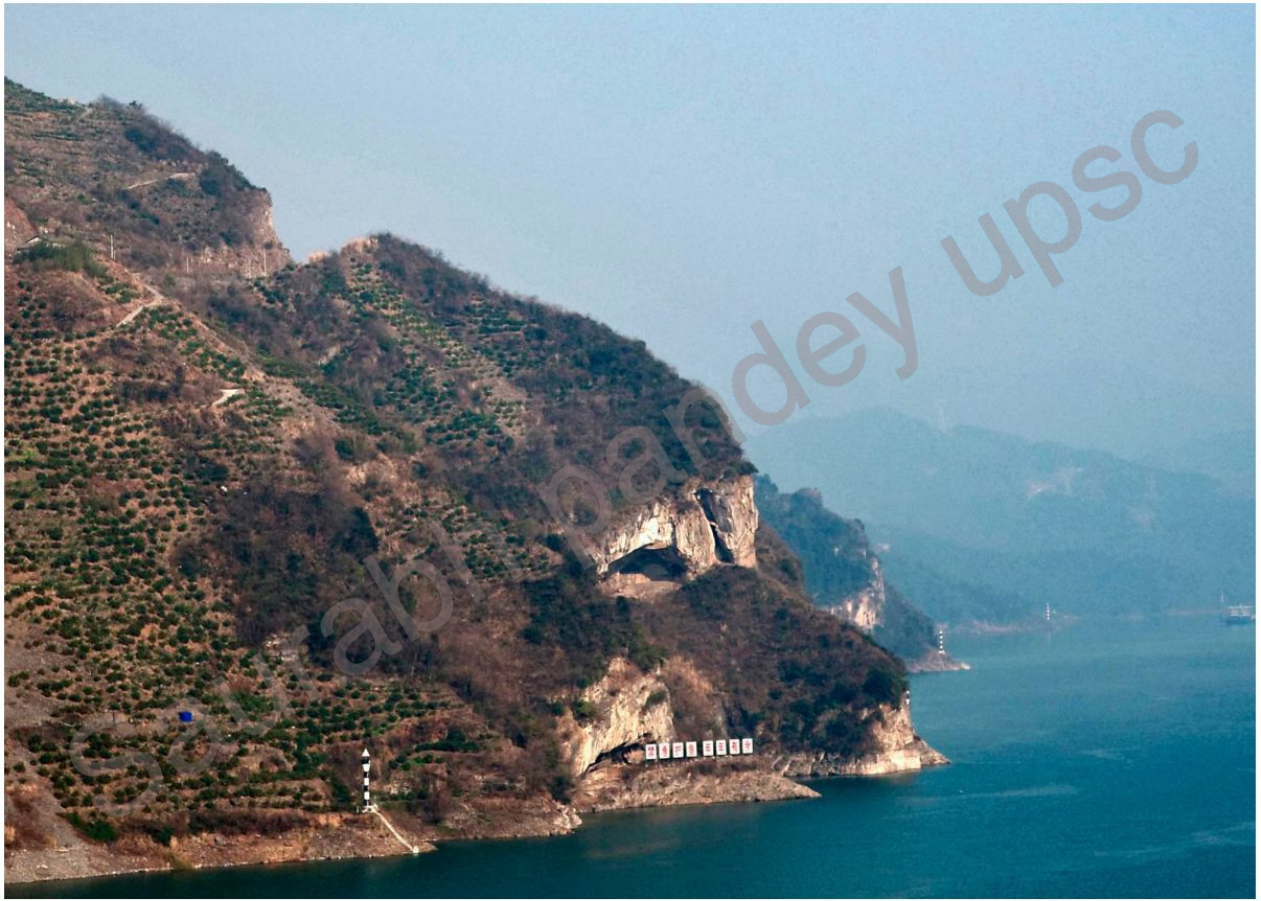
Comparative Genomics: By comparing the genomes of various organisms, scientists can identify sequences that remain unchanged across species.
Targeted Sequence Capture: This technique allows researchers to isolate UCEs and analyze them in detail, providing insights into their functional roles.
Phylogenomic Analyses: UCEs are utilized in constructing phylogenetic trees, helping to illustrate evolutionary relationships among species.

Applications of UCEs in Evolutionary Studies:

The applications of UCEs in evolutionary biology are vast and profound. They serve as critical tools for researchers aiming to understand the evolutionary history and relationships among different taxa.

Reconstructing Evolutionary Histories: UCEs aid in piecing together the evolutionary puzzle by providing reliable markers for tracing lineage divergence.
Inter-species Conservation: The conservation of UCEs across species indicates their functional importance, making them vital in conservation genetics.
Genomic Stability and Organization: UCEs are enriched within specific genomic domains, playing a crucial role in maintaining genomic stability and organization.

BIG SHOT



This photo taken on January 2025, and released by Guo Qingshan, shows the "puppy mountain" — which went viral over the Internet in China — in Yichang, a city in central China's Hubei Province. The tendency to see a face where none exists in an image is called pareidolia. AP

Mapping

Puppy Mountain

- mountain in China, it resembles a puppy's head and has become a popular tourist destination.
- This mountain is set along the Yangtze River in Yichang, a city in Hubei province in central China.

Blunt weapon

India should end Net curbs, especially when imposed without good reason

The number of Internet shutdowns in India was slightly lower in 2024 than in 2023, according to the Software Freedom Law Center (SLFC), India's annual report. A separate report by the web rights advocacy, Access Now, shows that India continues to lead globally in the number of government-ordered Internet shutdowns. The Union government has maintained that mobile Internet shutdown is an indispensable instrument in the toolkit to control law and order situations. Most of the Internet use in India is mobile. A closer examination of the shutdowns imposed even over the last year reveals some disturbing data: 41 of the 84 shutdowns in India in 2024 were imposed during protests, compared to the 23 that were imposed for communal clashes. Five were even issued for cheating during examinations. In situations on the brink of violence where rapidly spreading disinformation may swerve out of control of the authorities, there may be a case for considering restrictions on communications. But no shutdown is without a cost – the delayed information regarding violence can also impede fast response. The Supreme Court of India recognised this when it ruled, in *Anuradha Bhasin vs Union of India*, that each shutdown must meet the tests of necessity and proportionality. Internet shutdown impedes people's livelihoods, access to medical care and education. It is a blunt weapon and the least the government could do is to measure its impact and use it sparingly. The government has been urged on preparing such an assessment for years, but no headway has been made here.

Even for those in favour of retaining shutdowns as a tool in the repertory of emergency policing, the process being followed is cause for alarm. Many a time, as Access Now and SFLC report, there is no valid order uploaded on government websites detailing the duration and the causes in detail, as required by the Telecommunications (Temporary Suspension of Services) Rules, 2024 and its preceding rules of 2017. Ideally, every shutdown should be followed by a sombre examination of whether it was necessary and what its deployment cost was. The ideal number of Internet shutdowns in any country is zero. It is especially troubling that 296 of them were imposed on millions around the world last year. India's case shows that there is an urgent need for circumspection and restraint. The Internet shutdowns index is, after all, one of the indices in which India should not aspire to lead.

The Numbers: A Look at 2024 Shutdowns

In 2024, India recorded a staggering 84 Internet shutdowns, maintaining its position as the world leader in government-imposed restrictions. This figure is crucial, not just in isolation, but as part of a troubling trend over recent years.

Statistical Breakdown:

- 41 shutdowns occurred during protests.
- 23 were linked to communal clashes.
- 5 shutdowns were enacted due to examination-related cheating.

This data underscores a disturbing pattern where the justification for curtailing digital access often stems from social unrest rather than any genuine threat to public safety.

Reasons Behind Shutdowns

The rationale provided by the government for these shutdowns often hinges on the need to control the spread of misinformation and maintain public order. However, this narrative is increasingly challenged by civil rights advocates who argue that such measures are excessive and disproportionately impact the populace.

Key Drivers:

Protests: Rapidly spreading dissent often triggers shutdowns as a preemptive measure.

Disinformation: In an age of digital communication, the fear of misinformation gaining traction acts as a catalyst for restrictions.

As the Supreme Court of India has noted, each shutdown must meet tests of necessity and proportionality, but the lack of transparency in government actions raises serious questions about adherence to these principles.

Government Justifications and Challenges

The Indian government maintains that mobile Internet shutdowns are critical tools in managing law enforcement challenges. However, the Telecommunications (Temporary Suspension of Services) Rules, 2024 stipulate that clear documentation of the reasons and duration of shutdowns must be made public.

Challenges Faced:

Lack of Accountability: Many shutdowns lack official documentation, making it difficult for citizens to understand the reasons behind them.

Legal Framework: The existing laws do not adequately cover the implications of prolonged Internet restrictions on daily life.

Impact on Society

The ramifications of Internet shutdowns extend far beyond the digital realm. They create a ripple effect, impacting livelihoods, education, and healthcare acc

ess for millions.

Consequences:

Economic Impact: Businesses reliant on digital platforms suffer significant losses during shutdowns.

Access to Education: Students are unable to attend online classes, exacerbating educational inequalities.

Healthcare: In emergencies, the inability to access medical services can prove disastrous.

Personal narratives of those affected illustrate the human cost of these policies, painting a grim picture of life under constant digital surveillance and restriction.

The Call for Transparency and Reform

Advocates for civil liberties urge the Indian government to re-evaluate its approach to Internet governance. A shift towards transparency and accountability is essential to restore faith in democratic processes.

Recommendations:

Regular Assessments: Conduct evaluations post-shutdown to determine necessity and impact.

Public Reporting: Ensure that shutdown orders are made public with clear justifications.

The ideal scenario would be a zero shutdown environment, fostering an atmosphere where citizens can freely communicate without fear of reprisal.

Conclusion

As India continues to navigate the complexities of Internet governance, it is crucial for policymakers to consider the broader implications of their actions. The year 2024 serves as a stark reminder of the delicate balance between maintaining order and upholding democratic rights. The need for a sensible approach to Internet access has never been more urgent.

AI has an environmental problem

AI has become an indispensable part of our lives, transforming how we work, live, and do business. Broadly defined, AI encompasses technologies that simulate human thinking and decision-making. While basic forms of AI have existed since the 1950s, the field has advanced rapidly in recent years, driven by improvements in computing power and the exponential surge in data availability. With the global AI market valued at $200 billion and projected to contribute up to $15.7 trillion to the global economy by 2030, AI adoption and its recognition as a driver of economic value have reached unprecedented levels. In the U.S., the announcement of the Stargate Project, involving more than $500 billion in AI infrastructure investments over four years, is testament to this. In India, Reliance Industries is planning to build the world's largest data centre in Jamnagar, in partnership with Nvidia. India has also announced plans to build its own LLM (large language model) to compete with DeepSeek and ChatGPT. However, as governments race to tap AI's economic potential, it is crucial to acknowledge that its rapid rise brings not only opportunities but also risks, particularly environmental costs.

Impact across stages

The environmental impact of AI arises across several stages of its value chain, including energy consumption from infrastructure, computing hardware production, cloud data centre operations, AI model training, inferencing, validation, and related processes. In terms of hardware, data centres, the backbone of AI operations, contribute 1% of global greenhouse gas emissions, according to the International Energy Agency (IEA). This figure is expected to rise significantly as electricity demand from data centres is projected to double by 2026. Generative AI models like ChatGPT, which rely on sophisticated machine learning (ML) techniques, require 10-100 times more computing power than earlier versions, further driving demand for graphic processing units and worsening the environmental footprint. Moreover, the rapid expansion of data centres is also fuelling a growing e-waste crisis.

Urmi Tat

U.S.-India AI Fellow, Observer Research Foundation

To balance innovation and environmental responsibility, action is needed across the AI value chain

AI's software life cycle emissions arise from processes like data collection, model development, training, validation, maintenance and retirement, and are equally concerning. Training advanced AI models, such as GPT-3, can emit up to 552 tonnes of carbon dioxide equivalent – comparable to the annual emissions of dozens of cars. To mitigate these environmental risks, governments and the private sector must proactively work towards embedding sustainability into AI ecosystem design.

Global conversations on this issue have been gaining momentum. At COP29, the International Telecommunication Union emphasised the urgent need for greener AI practices. Such commitments demand that businesses also align their processes with sustainability targets. Over 190 countries have adopted non-binding ethical AI recommendations addressing the environment, and regions such as the European Union and the U.S. have introduced laws to curb AI's environmental impact. However, such policies are scarce. While governments across the globe are crafting national AI strategies, they often overlook sustainability, particularly the private sector's role in reducing emissions.

The way forward

To balance innovation and environmental responsibility, action is needed across the AI value chain. Investing in clean energy is a key step in achieving net-zero emissions. Companies can achieve this by transitioning to renewable energy sources and purchasing carbon credits. Locating data centres in areas with abundant supply of renewable resources can also reduce strain on existing resources and help lower the carbon footprint. AI can also help optimise energy grids, particularly by integrating renewable energy sources. For instance, Google's DeepMind has leveraged ML to improve wind energy forecasting, enabling more accurate wind pattern predictions and facilitating better integration of wind power into the grid.

Using energy-efficient hardware and ensuring regular maintenance can also significantly minimise emissions. Equally important is the development of efficient AI models. Smaller, domain-specific models that are tailored to their applications can deliver the same outputs with less processing power, reducing demand on infrastructure and resources. A study by Google and the University of California, Berkeley, has found that the carbon footprint of LLMs can be minimised by a factor of 100 to 1,000 through optimised algorithms, specialised hardware, and energy-efficient cloud data centres. Further, instead of collecting new data or training models from scratch, businesses can adapt pre-trained models to new tasks.

Lastly but most importantly, transparency is essential in driving sustainability efforts. Measuring and disclosing the environmental impact of AI systems will help organisations understand their life cycle emissions and address the negative externalities of their operations. Establishing standardised frameworks for tracking and comparing emissions across the industry will ensure consistency and accountability.

Sustainability needs to be incorporated into the very design of the AI ecosystem, in order to ensure its long-term growth and viability. By balancing environmental responsibility with innovation, we can harness AI's transformative potential without compromising the Earth's future.

The Indispensable Role of AI in Our Lives

Artificial Intelligence (AI) has become an indispensable part of our lives, transforming how we work, live, and do business. It's fascinating to think about how something that started as a concept in the 1950s has evolved into a powerhouse of technology that shapes our daily experiences. But what exactly is AI, and why is it so crucial today?

Understanding AI

What is AI?

Broadly defined, AI encompasses technologies that simulate human thinking and decision-making. From virtual assistants like Siri and Alexa to complex algorithms that drive financial markets, AI is everywhere.

A Brief History of AI

While basic forms of AI have existed since the 1950s, the field has advanced rapidly in recent years. This surge is largely driven by improvements in computing power and the exponential increase in data availability.

The Current State of AI

AI Market Valuation

Did you know that the global AI market is valued at a staggering $200 billion? And it’s projected to contribute up to $15.7 trillion to the global economy by 2030! That’s a lot of zeros, and it shows just how integral AI has become.

Major Investments in AI

The Stargate Project

In the U.S., the announcement of the Stargate Project, which involves more than $500 billion in AI infrastructure investments over four years, is a testament to this growth. It’s like the government is saying, “Let’s put our money where our future is!”

India’s Data Centre Ambitions

On the other side of the globe, India is making waves too. Reliance Industries is planning to build the world’s largest data centre in Jamnagar, in partnership with Nvidia. Plus, India has announced plans to develop its own large language model (LLM) to compete with giants like DeepSeek and ChatGPT.

The Economic Impact of AI

AI as a Driver of Economic Value

As governments race to tap into AI's economic potential, it's crucial to acknowledge that its rapid rise brings not only opportunities but also risks, particularly environmental costs.

The Environmental Costs of AI

Energy Consumption and Emissions

The environmental impact of AI arises across several stages of its value chain. For instance, data centres, which are the backbone of AI operations, contribute about 1% of global greenhouse gas emissions, according to the International Energy Agency (IEA). This figure is expected to rise significantly as electricity demand from data centres is projected to double by 2026.

Data Centres and Greenhouse Gas Emissions

Generative AI models like ChatGPT require 10–100 times more computing power than earlier versions, further driving demand for graphic processing units and worsening the environmental footprint.

E-Waste Crisis

Moreover, the rapid expansion of data centres is fuelling a growing e-waste crisis. It’s a bit like a double-edged sword; while AI is advancing, it’s also creating new challenges.

The Need for Sustainable AI Practices

Global Conversations on AI Sustainability

Global conversations on this issue have been gaining momentum. At COP29, the International Telecommunication Union emphasized the urgent need for greener AI practices.

The Role of Governments and Businesses

Over 190 countries have adopted non-binding ethical AI recommendations addressing the environment. However, while governments are crafting national AI strategies, they often overlook sustainability, particularly the private sector’s role in reducing emissions.

The Path Forward

Investing in Clean Energy

To balance innovation and environmental responsibility, action is needed across the AI value chain. Investing in clean energy is a key step in achieving net-zero emissions. Companies can transition to renewable energy sources and purchase carbon credits.

Optimizing AI Models

Using energy-efficient hardware and ensuring regular maintenance can significantly minimize emissions. Smaller, domain-specific models tailored to their applications can deliver the same outputs with less processing power, reducing demand on infrastructure and resources.

The Importance of Transparency

Lastly, transparency is essential in driving sustainability efforts. Measuring and disclosing the environmental impact of AI systems will help organizations understand their life cycle emissions and address the negative externalities of their operations.

Conclusion

In conclusion, while AI has transformed our lives in remarkable ways, it’s crucial to recognize the environmental costs associated with its rapid growth. By embedding sustainability into the very design of the AI ecosystem, we can harness its transformative potential without compromising the Earth’s future.

Should a third language be compulsory?

Why is the Union government delaying funds under the Samagra Shiksha Abhiyan to Tamil Nadu? When was the three-language policy first introduced and what did it mandate? What are the challenges in having extra language courses in government schools?

EXPLAINER

Rangarajan. R

The story so far:

There has been a tussle between the Centre and the Tamil Nadu government over the three-language formula in schools under the New Education Policy (NEP), 2020. The Union government has indicated that it needs to be complied with for release of funds tied to the Samagra Shiksha Abhiyan. However, the Tamil Nadu government views it as a 'smokescreen' for Hindi imposition and insists that it would continue with its two-language policy.

What are constitutional provisions?

The Constitution provides that Hindi is the official language of the Union. English was originally meant to continue as the official language for 15 years from the commencement of the Constitution (till 1965). However, the Official Languages Act, 1963 provides for the continued use of English, in addition to Hindi, for all official purposes of the Union without any time limit. The legislature of a State may adopt any one or more of the languages in use in the State or Hindi as the official language(s) for official purposes of that State.

Further, the Constitution provides that it shall be the duty of the Union to promote the spread of the Hindi language so that it may serve as a medium of expression for all the elements of the composite culture of India.

What is the three-language policy?

The three-language formula was first introduced in the NEP of 1968. This policy and the Official Language Resolution, 1968 mandated the teaching of Hindi as a language in non-Hindi speaking States. There were protests against the same in Tamil Nadu and it has steadfastly followed its two-language policy of teaching Tamil and English in its government schools.

Firm stance: A protest against the three-language policy, in Chennai, on February 18. PTI

The NEP, 2020 has retained the three-language formula albeit with a key difference that it doesn't impose any language on any State. It specifies that the languages to be learnt will be the choice of States, regions and the students, so long as at least two of the three languages are native to India.

What are the issues?

The Annual Status of Education Research (ASER) conducted regularly by renowned NGO Pratham leaves much to be improved upon with respect to learning abilities. The report of 2022 indicates that close to 60% of students in Class V could not read a Class II level text. The report of 2023 reveals that 25% of youth in the age group of 14-18 years could not read a Class II level text fluently in their regional language. More than 40% of this age group could not read sentences in English. The learning outcomes in foundational numeracy skills like subtraction and division is equally poor.

As per the report on 'Analysis of Budgeted expenditure on Education' prepared by the Ministry of Education, Government of India, in 2022, out of the total revenue expenditure on elementary education estimated at ₹3.03 lakh crore (2019-20), 15% is spent by the Centre while 85% is spent by the States. The total expenditure on elementary, secondary, higher and technical education by the Centre and States combined hovers around 4-4.5% of the GDP as against the target of 6% set out in the NEP 2020. Thus, the expenditure on education is yet to reach the desired levels.

What can be the way forward?

While English is not a native language, its proficiency has helped us in becoming globally competitive in various service industries. India is a multi-lingual country and the objective of learning more Indian languages in schools in desirable. However, the existing issues of learning outcomes coupled with constraints on resources require that the efforts of government run schools should be focused on improving the teaching of the mother tongue/local language and English, apart from foundational numeracy skills. Even in private schools where a third language is taught till Standard VIII, there is limited proficiency being attained by the students in such language.

The 2011 Census data reveals that approximately 26% of India is bilingual and 7% is trilingual. The corresponding figures for urban areas are 44% and 15%, as against 22% and 5% for rural areas. With rapid urbanisation and migration of labourers across the country, this number is bound to increase in the forthcoming Census, indicating that the young and adult population would learn additional languages according to their needs.

There must be a constructive dialogue between the Centre and the Tamil Nadu government to ensure that funding is not delayed.

Considering the share of expenditure borne by the States as well as regional diversities, there also needs to be a productive discussion on providing more autonomy to the States in policy matters relating to school education.

Rangarajan. R is a former IAS officer and author of 'Polity Simplified'. Views expressed are personal.

THE GIST

- The three-language formula was first introduced in the NEP of 1968. This policy and the Official Language Resolution, 1968 mandate the teaching of Hindi as a language in non-Hindi speaking States.
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Three-Language Formula

Introduction

The debate surrounding language policy in India is not merely a matter of semantics; it is a profound clash of identity, heritage, and educational equity. A significant tussle has erupted between the Centre and the Tamil Nadu government regarding the controversial three-language formula under the New Education Policy (NEP) 2020. This conflict has ignited fervent discussions nationwide, raising questions about the future of education in the state and the implications for its unique cultural identity.

Background of the Three-Language Formula

Historical Context

The roots of the tussle can be traced back to the NEP of 1968, which introduced a three-language formula intended to promote Hindi in non-Hindi-speaking states. This initiative was met with resistance in Tamil Nadu, where the two-language policy, emphasizing Tamil and English, had already taken root.

The New Education Policy (NEP) 2020

Fast forward to 2020, the NEP retained the three-language formula but with a crucial caveat: states could select the languages to be taught, provided at least two were native to India. While this flexibility was designed to alleviate tensions, the storm over language policy in Tamil Nadu is far from reaching a calm.

Constitutional Provisions

Official Languages in India

According to the Indian Constitution, Hindi serves as the official language of the Union, while English is permitted for official purposes indefinitely. Additionally, states are empowered to designate any language in use within their borders as their official language, which gives Tamil Nadu the prerogative to uphold its linguistic heritage.

Role of the Union Government

The Union government's role is to promote Hindi as a medium of expression for India's diverse cultures. However, this has fueled accusations of Hindi imposition, particularly from Tamil Nadu, which perceives the Centre's insistence on the three-language formula as a veiled attempt to enforce Hindi dominance.

Current Issues in Education

Learning Outcomes

Despite the ongoing debate, alarming statistics from the Annual Status of Education Research (ASER) reveal that nearly 60% of Class V students in Tamil Nadu struggle to read a Class II level text. This stark reality serves as a wake-up call for stakeholders involved in education reform.

Budgetary Concerns

The financial aspect of education cannot be overlooked. Reports indicate that only 15% of the total revenue expenditure on elementary education is contributed by the Centre, with states bearing the brunt of 85%. This disparity raises critical questions regarding the adequacy of funding for educational initiatives.

The Way Forward

Importance of Multilingualism

While English may not be a native language, proficiency in it is vital for global competitiveness. India, being a multilingual nation, must promote the learning of various Indian languages in schools. However, addressing the existing learning gaps should take precedence.

Focus on Foundational Skills

Government-run schools must prioritize the teaching of local languages and English, alongside foundational numeracy skills. Even in private institutions, where a third language is often taught, proficiency remains limited.

Conclusion

The ongoing tussle between the Centre and Tamil Nadu over the three-language formula transcends mere policy debate; it encapsulates the cultural and linguistic diversity that defines India. Constructive dialogue is essential to ensure that education funding is not delayed and that states possess the autonomy to shape their educational policies.

What did the HC rule about arresting women at night?

Is the provision which restricts the arrest of women after sunset and before sunrise absolute? What did the 135th report of the Law Commission of India on Women in Custody recommend?

R.K. Vij

The story so far:

The Madurai Bench of the Madras High Court in *Deepa versus S. Vijayalakshmi and Others* ruled that the legal provision in the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023, which restricts the arrest of a woman after sunset and before sunrise, is directory and not mandatory. In this case, a woman was arrested at 8pm. A single Judge of the High Court held that the arrest was in breach of Section 46(4) of the Code of Criminal Procedure (CrPC). However, a two-Judge Bench of the High Court, in an appeal, held that Section 46(4) of the CrPC was directory and not mandatory.

What are the safeguards?

Two safeguards are provided under Section 43(5) of BNSS (which corresponds to Section 46(4) of CrPC) for the arrest of a woman by the police. First, no arrest of a woman shall be made after sunset and before sunrise except in exceptional circumstances. Second, even in exceptional circumstances, the prior permission of the jurisdictional magistrate must be sought by a woman police officer by making a written report. Section 46(4) of the CrPC is a beneficial provision incorporated to ensure the safety of women. However, the provision does not explain what would constitute an exceptional situation. In addition, the proviso to Section 46(1) states that the arresting police officer should not touch the person of the woman, unless it is a woman police offer or if the circumstances otherwise require it.

What did the Madras HC rule?

The Madras High Court said that Section 46(4) of CrPC does not spell out the consequence of non-compliance of the provision. If the provision was intended to be mandatory, the legislature would definitely have provided for the consequences of non-compliance. A police officer who effects arrest, carries out a public duty. The Court underlined that there could be a situation where a heinous offence is committed by a woman in the night and the magistrate may not be available for obtaining permission. Under such a situation, the accused woman may escape. Therefore, such mechanical adherence to procedure can injure public interest.

What is history of Section 46(4) CrPC?

The 135th report of the Law Commission of India on Women in Custody (1989) recommended that ordinarily no women shall be arrested after sunset and before sunrise. If there are exceptional cases, prior permission of the immediate superior officer shall be obtained, or if the case was of extreme urgency, then an arrest report with reasons shall be made to the immediate superior officer and to the magistrate. Similar recommendations were made in the 154th report of the Law Commission in 1996, and Section 46(4) of CrPC was inserted with some changes in 2005.

What has the Supreme Court said?

In a case, the Nagpur Bench of the Bombay High Court directed the State to issue directions to all police officials that no female persons shall be detained without the presence of a lady constable, and in no case after sunset and before sunrise. Here, the Supreme Court observed that a strict compliance with the said directive in a given circumstance would cause practical difficulties.

Will the ruling dilute the provision?

The Court has clearly said that despite holding Section 46(4) of CrPC/43(5) as directory and not mandatory, the provision cannot be rendered futile by the police. While failure to adhere to the statutory requirement may not lead to the arrest being declared illegal, the officer may have to offer explanation for the inability to comply with the provision. The Court also directed the police to issue guidelines, clarifying as to what constitute exceptional circumstances.

R.K. Vij is a former IPS officer.

THE GIST

- The Madurai Bench of the Madras High Court ruled that the legal provision in the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023, which restricts the arrest of a woman after sunset and before sunrise, is directory and not mandatory.
- The 135th report of the Law Commission of India on Women in Custody (1989) recommended that ordinarily no women shall be arrested after sunset and before sunrise.
- The Court has clearly said that despite holding Section 46(4) of CrPC/43(5) as directory and not mandatory, the provision cannot be rendered futile by the police

Legal Examination of Women's Arrests

Overview of Women's Arrest Regulations

🕗 Arrest Timing: A woman was arrested at 8 PM, prompting a legal review of the arrest's validity.

⚖️ Judicial Rulings: Initially, a single Judge found the arrest violated Section 46(4) of the Code of Criminal Procedure (CrPC). However, a two-Judge Bench later interpreted this section as directory rather than mandatory.

🚨 Legal Provisions: Section 43(5) of BNSS, akin to Section 46(4) of CrPC, restricts arrests of women after sunset unless exceptional circumstances exist, requiring prior magistrate approval.

👮‍♀️ Arresting Officer Requirements: The arresting officer must be a woman or have valid reasons to physically engage with the woman being arrested, ensuring her safety.

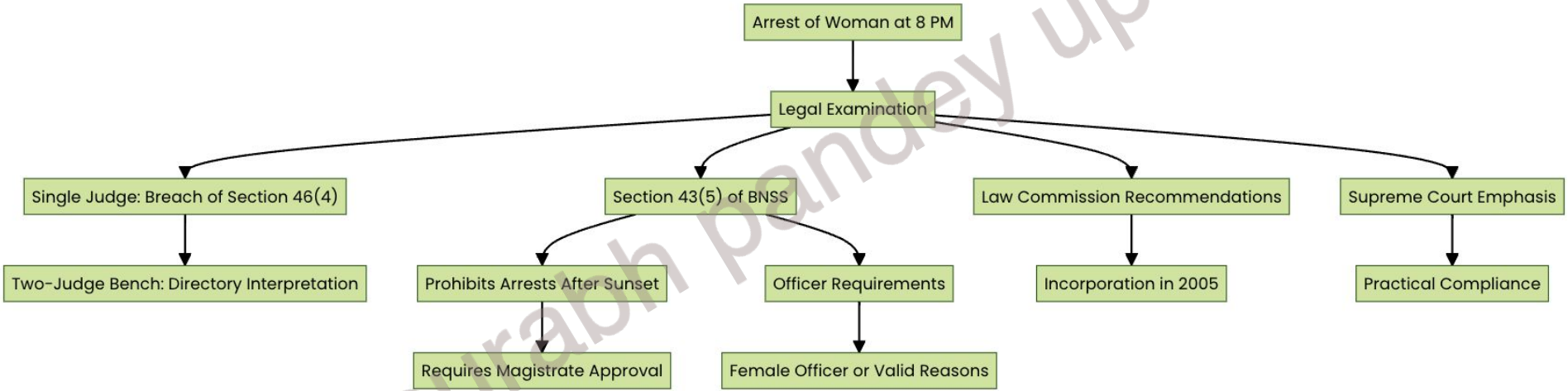
📜 Historical Recommendations: The Law Commission of India, in its 1989 and 1996 reports, recommended restrictions on women's arrests after sunset, leading to the inclusion of Section 46(4) in 2005.

🏛️ Supreme Court's Stance: The Supreme Court stressed the importance of practical adherence to directives concerning the presence of female officers during arrests.

⚖️ Provision's Aim: The provision is designed to safeguard women's safety but lacks clarity on defining "exceptional circumstances."

Summary: The legal framework for arresting women focuses on their safety, with specific provisions and historical recommendations, yet faces challenges in practical enforcement.

Legal Framework Flowchart:



‘Simandou mine can end or start Australia’s golden iron ore age’

OPINION

Clyde Russell
LAUNCESTON, AUSTRALIA

The term gamechanger is often over used enough to be rendered meaningless, but the huge Simandou mine in the West African country of Guinea is going to be just that as its start up is set to rock the seaborne iron ore market.

The first cargoes from the project may arrive by the end of this year and it’s expected that it will ramp up to its full capacity of 120 million metric tonne per annum fairly quickly.

The four blocks of Simandou are impressive in their scale and infrastructure challenges, boasting a 620 kilometre (384 mile) rail line, a new port with dedicated trans-shipment vessels that will load bulk carriers offshore.

But Simandou is more than a technical marvel, as it will meet around 10% of the annual seaborne imports of China, the world’s biggest buyer of the key steel raw material, taking about 75% of global seaborne iron ore. Simandou is largely a Chinese venture, with 75% of the production controlled by Chinese companies including Baosteel , and 25% held by Rio Tinto, the world’s largest iron ore miner.

China’s dominance

While in theory Simandou’s output could be sold to buyers across the globe, in practice virtually all of it is likely to head to China.

New era: Simandou can also give impetus for Australia to kick-start new investment spree into adding value to iron-ore bounty. REUTERS

The project will also produce high-grade iron ore, around 65.3% iron content, which is better quality than most of what Rio and its competitors mine in Western Australia, the top iron-ore producing region. High grade iron ore may be in stronger demand in coming years as Chinese steel mills seek to decarbonise, an imperative given that steel production accounts for about 8% of total worldwide carbon emissions.

Simandou’s iron ore will be of sufficient quality to be fed directly into electric arc furnaces (EAFs), which produce steel with considerably lower emissions than through the more common process of using basic oxygen furnaces, which require substantial volumes of coal. The question for the iron ore market is who gets pushed out of China when Simandou’s ore starts to arrive?

This of course assumes China’s steel output stays constant at around the 1 billion tonne a year level it has been at since 2019.

There may be some loss of supply from major exporters Australia and Brazil as existing mines reach end of life and aren’t replaced, but even allowing for this it’s likely that some iron ore will be pushed out of the market.

This spells bad news for some of the miners in Western Australia as a combination of a switch to higher-grade iron ore, stagnant demand from China and increased supply from Guinea may put downward pressure on prices.

New investment

Australia’s miners and governments have enjoyed a strong run with iron ore for much of the past decade, reaping the benefits of building vast, efficient mines and logistic solutions. Even at the current price of around $108 a tonne, iron ore remains vastly profitable given the cost of producing a tonne and getting it to a port in Western Australia is around $23.

With Simandou’s new high-grade iron ore coming and the need to decarbonise steel production, it could be argued that Australia’s golden age of iron ore is coming to an end.

But it could also provide the impetus for Australia to kick-start a new investment spree into adding value to its iron ore bounty.

If the assumption is that the world’s manufacturers will increasingly turn to green steel, then Australia is perhaps better placed than any other country.

To make green steel you need low-cost iron ore and massive volumes of cheap renewable energy.

Australia already has the low-cost iron ore and is more than capable of building sufficient renewable energy, chiefly solar backed by battery storage.

The renewable energy is used to make green hydrogen, which in turn is used to turn iron ore into direct reduced iron (DRI) or hot briquetted iron (HBI).

DRI can be used to make steel in an EAF, while HBI can be shipped to customers in Asia to made into steel using EAFs.

However, it will likely take the support of both the federal and state governments to give momentum to any plans to beneficiate iron ore domestically.

(The views expressed here are those of the author, a columnist for Reuters)

Simandou Mine Overview

🏞️ Location: The Simandou mine is situated in Guinea, West Africa.

⛏️ Resource: Known for its significant deposits of iron ore, it is one of the largest untapped reserves globally.

🌍 Economic Impact: The mine has the potential to greatly influence Guinea's economy and boost its GDP.

🔗 Infrastructure: Development plans include a railway and port to facilitate ore exportation.

🤝 Investment: The project has attracted substantial foreign investment, particularly from companies in China.

⚖️ Controversies: The mine has faced various controversies, including environmental concerns and disputes over land rights.

📈 Future Prospects: If fully developed, Simandou could become a major player in the global iron ore market.

Summary: The Simandou mine in Guinea is a major iron ore deposit with significant economic potential, infrastructure development plans, and associated controversies

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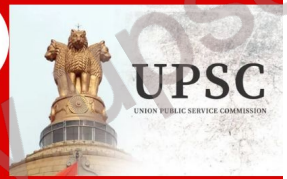

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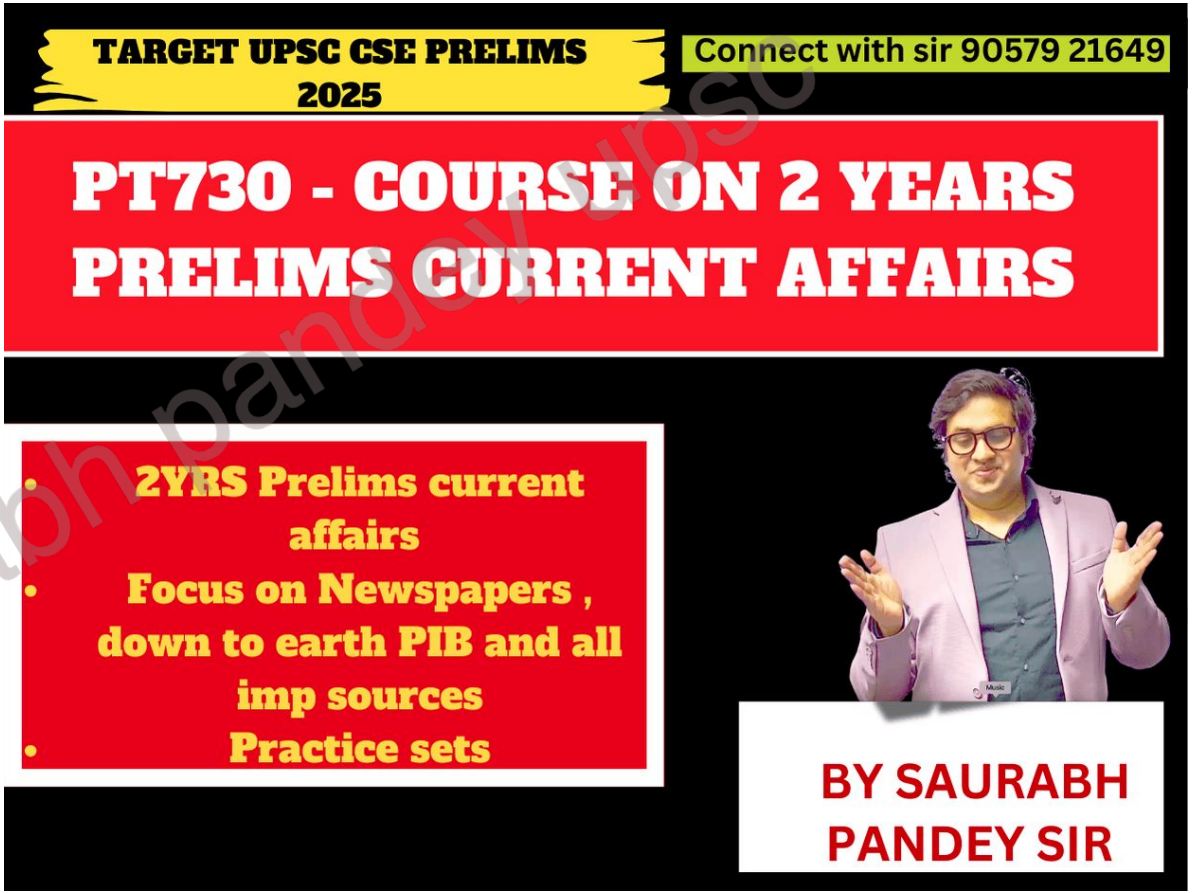

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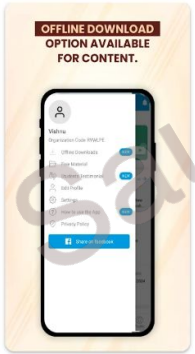

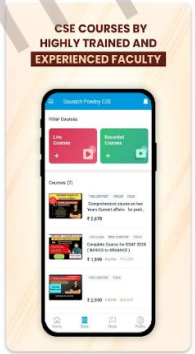

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