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Daily News Feed

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Jaffna mass grave, a test for the Dissanayake government

The site was discovered by accident in February this year when workers, who were readying land in Chemmani, located in the outskirts of Jaffna, to build a Hindu crematorium, stumbled upon what appeared to be human bones; Justice Minister says the govt. has 'the complete political will' to address the grievances of those who have suffered 'catastrophic deaths, disappearances and losses'

Meera Srinivasan
COLOMBO

A mass grave site in Sri Lanka's northern Jaffna district, which has drawn domestic and international attention, is putting to test the Anura Kumara Dissanayake government's pledge to address Tamil people's grievances.

The site was discovered by accident in February this year when workers, who were readying land in Chemmani – on the outskirts of Jaffna, a former war zone – to build a Hindu crematorium, stumbled upon what appeared to be human bones. They immediately alerted authorities, prompting the Jaffna Magistrate Court to order excavation and further investigation.

A team of experts, comprising a senior archaeologist, assisted by students from the University of Jaffna, and Judicial Medical Officers, has since been excavating the site that is now protected with restricted access. According to sources familiar with the excavation, about 65 skeletons, including some believed to be children, have been found so far, at times with what appeared to be school bags and other personal belongings.

The growing count is agonising for locals, especially families of disappeared persons, who have been chasing the truth about their missing loved ones for years. Their resolve continues to date, 16 years after the civil war ended with the state armed forces crushing the LTTE, while tens of thousands of civilians were massacred.

From the time his 21-year-old brother was arrested by the Army in 1996, Ponnambalam Arumugasamy has spent much of his time and energy trying to trace him. "Each of us looking for a missing relative has been undergoing enormous pain, not knowing what happened to our brother or son or daughter," says Mr. Arumugasamy, 75, who resides near Jaffna town.

About 65 skeletons, including some believed to be children, have been found so far in Chemmani. KUMANAN KANAPATHIPILLAI

Political will

This is not the first time Chemmani has been in focus. In a startling court revelation in the late 1990s, soldier Somaratne Rajapakse – among those convicted in a case of rape, abduction, and murder of 18-year-old Tamil Krishanthi Kumaraswamy – testified that "300-400 bodies" were buried in Chemmani. His disclosure led authorities to some 15 bodies at the location, but the case was dropped after that.

"This government is unique," asserted Sri Lanka's Justice Minister Harshana Nanayakkara, pointing to the ruling National People's Power's (NPP) huge mandate in last year's general election in the island's north and east, where Tamil-speaking people are a majority. "So, unlike previous governments, we have a bigger responsibility in fulfilling their aspirations, looking after their well-being," he told *The Hindu* in an interview.

Observing that the Dissanayake government has "the complete political will" to address the grievances of those who have suffered "catastrophic deaths, disappearances, and losses", Mr. Nanayakkara said the Janatha Vimukthi Peramuna (JVP, the chief political constituent of the ruling alliance) had "suffered the same" in the late 1980s, and therefore "takes it very seriously". Amnesty International estimates that Sri Lanka has one of the world's highest number of disappearances, with a backlog of 60,000 to 1,00,000 complaints, including from the island's south where thousands went missing during the JVP-led insurrections in the 1970s and 1980s.

Mirak Raheem, a commissioner at the Office on Missing Persons, set up in 2016 to probe disappearances, observed that investigating mass graves is "a very complex" exercise.

To start with, the whole process of excavation is destructive. The site must be destroyed [to recover the skeletons] and can never be reconstructed. The focus is not only on recovering human remains, but also on collecting as much information as possible from the location. "For instance, the orientation and the position of the bodies, the geography of the site, details such as the boundary of the mass grave, may provide useful pointers on how the site might have been dug," he said.

While political will is fundamental to see the case through, technical expertise is also critical, experts noted. Earlier, the community, including the families, activists, and lawyers, was not as aware of the subject, according to Ranitha Gnanarajah, an Attorney at Law, working with and appearing on behalf of families of the disappeared. "But now, we have had more exposure, including to other contexts that have dealt with mass graves, such as Guatemala, Argentina, and Rwanda. We are more aware of the strategies, systems, legal process, challenges and the diverse approaches in the excavation at tracing of mass grave sites," she said.

Winning families' trust will be crucial, according to Minister Nanayakkara. Acknowledging that "people need closure, people need justice", he also flagged the need for dignity of families, recognition as a special category of victims and some form of social protection to support their lives. "When you fight for 30, 40 years, discriminate and marginalise, they (Tamils) are not going to trust the Sinhalese just like that. Our job is to win their trust and help heal."

BioEmu sketches the moving picture of protein structures

The new deep learning system developed by Microsoft, Rice University and Freie Universität allows high-resolution protein flexibility modelling at scale, unlike slower, more classical approaches

Anirban Mukhopadhyay

Proteins aren't rigid sculptures. They twist, flex, and sometimes unravel – movements essential to understanding their function. Some proteins, like enzymes, open like clamshells to grab molecules. Others such as signalling proteins shift shape to control cell processes. Still others briefly reveal hidden gaps where drugs can bind. Artificial intelligence (AI) tools like AlphaFold have made structure prediction routine, but they typically yield just one stable form, a single frame from what is really a moving picture.

A new deep learning system called BioEmu, developed by Microsoft and researchers at Rice University in the US and Freie Universität in Germany, predicts the full range of shapes a protein naturally explores under biological conditions. Known as the equilibrium ensemble, it allows high-resolution protein flexibility modelling at scale, unlike slower, more classical approaches. Described in *Science*, BioEmu is faster and cheaper, enabling large-scale predictions of protein function.

To understand BioEmu's significance, it helps to see what it's up against. The gold standard for modeling protein flexibility is molecular dynamics (MD), which tracks atomic movements at millionths of a billionth of a second using tools like GROMACS or Anton.

Despite its ultrafine resolution and accuracy, MD is slow and costly. Simulating motions over microseconds or milliseconds can take tens of thousands of GPU-hours, even on supercomputers.

BioEmu sidesteps this bottleneck by relying on an AI diffusion model. To train BioEmu, researchers first fed it real protein structures, from millions of AlphaFold-predicted assemblies, 200 milliseconds of MD simulations spanning thousands of proteins, and half a million mutant sequences from experimental stability measurements.

It's like dropping a sugar cube into a glass of water: the original structure, clear and defined, is gradually dissolved. BioEmu's real task is to learn how to run that process in reverse: from noise to a sugar cube. Once trained, it can generate thousands of plausible protein conformations from scratch.

BioEmu excelled at benchmarks. It captured large shape changes in enzymes, local unfolding that switches proteins on or off, and fleeting cryptic pockets, temporary crevices that can serve as drug docking sites, like in the cancer-linked protein Ras. It predicted 83% of large shifts and 70-81% of small changes accurately, including open and closed forms of a vital enzyme called adenylate kinase. It also handled hard to predict proteins that don't have a fixed 3D structure and how mutations affect protein stability.

Fast, not fully detailed

While MD simulates how proteins move over time, including interactions with water and drugs, BioEmu quickly generates snapshots of all the stable shapes a protein is likely to adopt. It can produce thousands of these structures in minutes to hours on a single GPU. But it can't show how a process unfolds.

"If a researcher wants to understand how a drug reaches a hidden binding site, MD can reveal the step-by-step pathway," says Kalairasan Ponnuswamy, bioinformatician and assistant professor at SRM Institute of Science and Technology. "BioEmu shows the final shapes, not how the protein gets there."

MD also handles temperature shifts, membranes, and other conditions that BioEmu's static predictions can't yet model.

BioEmu also can't model cell walls, drug molecules, pH changes or show prediction reliability like AlphaFold.

It's also limited to single chains and can't model how proteins interact, a key part of most biological processes and drug targets. "It's better seen as a hypothesis-generating tool than a source of final conclusions," says Ponnuswamy.

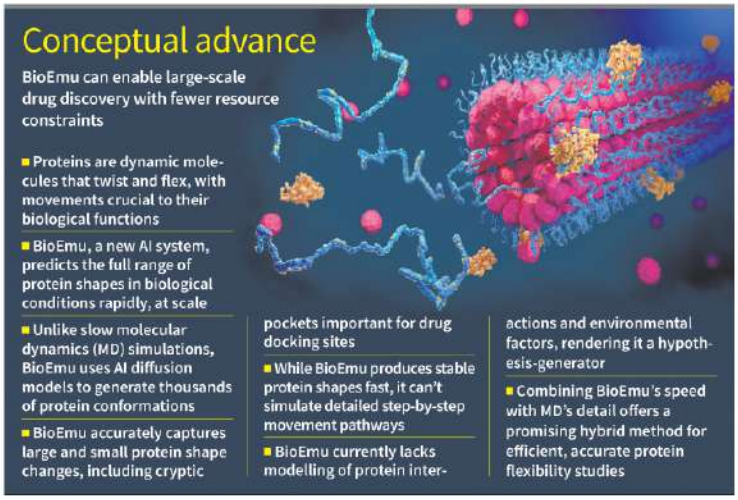
As the system grows to handle more complex proteins and chemical interactions, researchers may still need experiments or older simulation methods to validate what it proposes.

Still, the conceptual advance is clear. If AlphaFold provided the protein world's blueprint, BioEmu sketches its choreography. By capturing flexibility quickly across thousands of proteins, it enables large-scale drug discovery and function studies with fewer resource constraints, Ponnuswamy notes: "Tasks that took weeks will now take hours." He does however emphasise the need for proper training and skillset acquisition.

"Future scientists will not only need a deep grounding in physics and chemistry, they'll also need fluency in machine learning and physical modelling to unlock the true potential of such hybrid approaches."

The researchers see BioEmu and MD as complementary tools. BioEmu can quickly generate a range of plausible conformations, which MD can then explore in detail. This hybrid approach could greatly reduce simulation time while preserving fidelity.

(Anirban Mukhopadhyay is a geneticist by training and a science communicator from Delhi)



What is the universe's antimatter mystery?

What have scientists uncovered in the matter versus antimatter puzzle? Where did the experiment take place and what data did the Large Hadron Collider collect? How will the discovery help scientists understand how the universe came to be?

Vasudevan Mukunth

The story so far:

On July 16, an international collaboration of scientists based in Europe reported that they had, for the first time, observed that the matter and antimatter versions of a type of subatomic particle called a baryon decay at different rates. The result revealed a new difference in their behaviour that may help explain why the universe is made mostly of matter.

New discovery shows clues why universe has more matter than antimatter

Why is the universe made mostly of matter?

The Big Bang 13.8 billion years ago should have created equal amounts of matter and antimatter. But when we look around, we see a universe filled with matter – stars, planets, people – while antimatter is almost nowhere to be found. This lopsidedness is one of the biggest unsolved mysteries in science. Physicists believe subtle differences in how matter and antimatter behave, especially something called CP violation, could be a major clue to understanding this imbalance.

CP stands for charge conjugation (C) and parity (P). Charge conjugation means swapping a particle for its antiparticle (which has the opposite electric charge) and parity means flipping left and right, like looking in a mirror. If the universe treated matter and antimatter exactly the same, even after a particle swap and a mirror flip we'd say the laws of physics are the same. But experiments have shown that this symmetry can be broken. This is called CP violation.

CP violation is crucial because it's one of the conditions necessary for a universe to end up with more matter than antimatter.

Key finding: The experiment took place at the Large Hadron Collider in Europe, and data was collected by the machine's LHCb detector. CERN

Has CP violation been seen before?

"While CP violation had previously been observed in mesons, particles made of quark-antiquark pairs, it had never before been seen in baryons, three-quark particles such as protons and neutrons that constitute the majority of visible matter in the universe," Indian Institute of Science, Bengaluru, experimental high-energy physicist Minakshi Nayak told *The Hindu*.

The new result is the first to show CP violation in baryon decays, specifically in a particle called the Λb0 baryon.

The Λb0 baryon is a heavy subatomic particle made of three quarks: an up quark, a down quark, and a bottom quark. Its antiparticle, the Λb0-bar, has the corresponding antiquarks. In the new study, scientists studied how the Λb0 baryon decays into a proton, a negatively charged kaon, and two pions (one positive, one negative). They also looked at the same decay for the antiparticle but with opposite charges.

How are particle decays observed?

The experiment took place at the Large Hadron Collider (LHC) in Europe, and data for its analysis was collected by the machine's LHCb detector. Over several years, the team collected data from billions of proton-proton collisions, which occasionally produced Λb0 and Λb0-bar baryons. Sophisticated algorithms and machine learning techniques then helped the researchers pick out the rare events where these baryons decayed into the specific set of particles they were looking for.

The key is to compare how often the Λb0 baryon decays into the chosen set of particles with how often its antiparticle does. If the laws of physics treated matter and antimatter identically, these rates would be the same. Any difference, after accounting for possible experimental biases, would be evidence of CP violation. The researchers measured a quantity called the CP asymmetry, which is the difference in decay rates divided by the total number of decays.

The researchers were very careful about identifying and removing other effects that mimic CP violation. For example, the LHC might produce slightly more Λb0 baryons than Λb0-bar antibaryons or the LHCb detector might be better at spotting one over the other. To correct for these effects, the team used a control channel, a similar decay where no CP violation is expected. By measuring any asymmetry in this control channel, they could subtract these nuisance effects and isolate the true CP violation signal.

What was the main result?

The researchers found a clear difference in the decay rates: the CP asymmetry was measured to be about 2.45%, with a very small uncertainty.

"Statistically, the measured CP asymmetry deviates from zero by 5.2 standard deviations, surpassing the 5-sigma threshold required to claim a discovery in particle physics," Dr. Nayak said. "This historic discovery holds the potential to deepen our understanding of the matter-antimatter imbalance".

It's a big step forward, although the amount of CP violation observed is still too small to account for the large imbalance between matter and antimatter in the universe.

Scientists can now look for CP violation in other baryon decays and try to measure it more precisely. Theoretically, they can work to understand the complex dynamics that produce these effects and search for signs of previously undiscovered particles and forces, in a bid to plug the gaps in our knowledge of our universe. The ultimate goal is to find out whether there are additional sources of CP violation that could explain matter's dominance.

The finding also addresses a fundamental question about our existence: why is there something rather than nothing? Every atom in your body, every star in the sky, exists because matter somehow won out over antimatter. By uncovering the subtle differences in how nature treats matter and antimatter, scientists are piecing together the story of how our universe came to be the way it is.

What does the sugar and salt labelling say?

What is the Health Ministry doing to promote healthier dietary habits?

Bindu Shajan Perappadan

The story so far:

The Health Ministry has asked all government departments to prominently display the amount of oil and sugar content on popular Indian snacks like samosa, vada paav, kachori, pizza, and burger, stating that this information has to be shared in cafeterias, lobbies, meeting rooms, and even government stationery.

What is the proposal?

"We are proposing a display of sugar and oil boards initiative to promote healthier dietary habits in various settings. These boards serve as visual behavioural nudges in schools, offices, public institutions, etc., displaying key information about hidden fats and sugars in everyday foods," said Union Health Secretary Punya Salila Srivastava in a recent letter to all ministries, departments, and autonomous bodies of the Union government.

It has also requested that all official stationery-letterheads, envelopes, notepads, folders, etc., and publications print health messages as daily reminders to reinforce the fight against obesity.

Why are warning labels being devised?

The Health Ministry says these warnings are designed to create awareness.

According to the information released by the Health Ministry, India is currently facing an unprecedented rise in non-communicable diseases (NCDs), which account for over 66% of all deaths across the country.

> Creating public consciousness about foods high in sugar, salt, oil and fats is necessary to stop the rising rates of obesity and non-communicable diseases

With the rapidly changing demographic and epidemiological landscape, the burden of NCDs such as cardiovascular diseases, diabetes, chronic respiratory diseases, and cancers has become a public health challenge, particularly among individuals over the age of 30, it noted.

Pariksha Rao, director of nutrition and medical affairs at The Good Bug, a private venture in the wellness industry, points out that too much sodium, added sugar, refined oils, and sugar-sweetened drinks, often disguised as healthy options, can derail even the best diets. "These contribute directly to the risk of heart disease, stroke, type 2 diabetes, and poor metabolic health. At the same time, many people fall short on essential nutrients by not getting enough fibre, fruits, vegetables, whole grains, healthy fats, or fermented foods that support gut health," she adds. Functional snacks, which promise health benefits, also add to the problem.

How is the nutrient value of food calculated?

Nutrient values of foods are calculated by conducting laboratory assessment of prepared foods and are represented on a per 100g basis for ease of understanding. It considers total sugar, saturated fat, and salt levels. Where lab-based nutrient analysis is not available/feasible, evaluations are based on aggregating the nutritional values of ingredients available in the Indian Food Composition Tables (IFCT) published by the Indian Council of Medical Research-National Institute of Nutrition-Hyderabad (ICMR-NIN).

The recently released ICMR-NIN's Dietary Guidelines for Indians, 2024, made an attempt to indicate high fat, sugar, and salt (HFSS) foods as foods in which calories from total sugar exceed 10% of total energy, calories from added fat/oil exceed 15% of total energy, and salt content is more than 625 mg per 100g of solid food, explains Bharati Kulkarni, director at ICMR-National Institute of Nutrition, Hyderabad.

She adds that the NIN supports the Centre's initiative to create public consciousness about HFSS foods as a step toward addressing the rising rates of obesity and non-communicable diseases, especially among children and youth.

The HFSS foods are usually processed and are typically low in essential nutrients; excessive consumption of HFSS foods can contribute to various health problems.

What are the guidelines on sugar and salt?

The World Health Organization recommends a healthy diet throughout life to help prevent all forms of malnutrition, as well as a range of diet-related non-communicable diseases, and lower the risk of infectious diseases. For adults in India, the recommended daily intake is less than 65g of total fat, less than 25g of added sugar, and less than 5g of salt. The limits have also been set for children in their various phases of development.

Ms. Rao advocates for building meals around fibre-rich ingredients, local produce, lean proteins, and healthy fats. "Cook at home more often, slow down at meals, and reduce reliance on packaged shortcuts. Small, consistent changes make a bigger impact than restrictive trends. What matters most isn't perfection, but a long-term pattern of choosing food that nourishes the body."

BRICS forum seeks equitable sharing of AI benefits

The Hindu Bureau
RIO DE JANEIRO

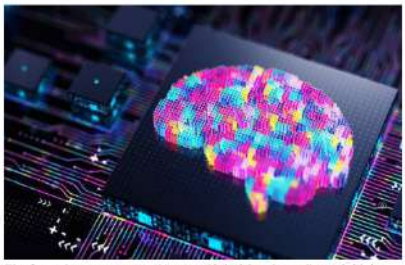
At the seventh plenary session of the BRICS Media and Think Tank Forum (earlier known as the 'BRICS Media Forum'), more than 250 representatives from media organisations, think tanks, government agencies and enterprises from 36 countries gathered in Rio de Janeiro to deliberate on ways to foster greater South-South cooperation, including on joint R&D and co-established standards, for a more equitable sharing of Artificial Intelligence (AI) benefits across nations.

A major concern that emerged was the risks of AI capabilities being concentrated among a few actors located in a handful of countries, with several participants noting that it could create dangerous dependencies for Global South nations.

'Regulatory autonomy'

The forum, organised on July 15-17, highlighted the importance of open source development of AI as well as the need for Global South nations to work together for a greater say in the shaping of AI governance frameworks. Mr Thorsten Jelinek, Europe Director and Senior Fellow of Taihe Institute, pointed out that some amount of "regulatory autonomy" is critical to maintain the balance between multilateralism and sovereignty.

"The history of modern technology, whether it is telecommunications or the internet, has been shaped not only by innovation but also by technological, economic and institutional hierarchies and dependencies," he noted, adding that the right governance framework would encourage AI as "a moral partner" to growth and development.



The forum's statement on AI urges Global South media and think tanks to develop a multilingual and multimodal corpus. GETTY IMAGES

The forum's lead statement on AI also called upon media organisations and think tanks in the Global South to develop a "multilingual and multimodal corpus". This would "lay the foundation for training large-scale AI models that serve journalism and think tank research." By "leveraging AI to translate quality content into multiple languages," it will become possible to increase "the availability of 'Global South Stories', elevate the international voice and influence of the Global South" and showcase the diversity of Global South civilisations, it said.

Mr. Fu Hua, Executive Chairman of the Forum and president of *Xinhua News Agency*, observed that BRICS was becoming the "main channel for fostering Global South unity and self-reliance".

Noting that the BRICS countries represent vast civilisational diversity and pluralism, he urged BRICS media organisations and think tanks to prioritise and amplify stories from different parts of the Global South as a necessary corrective to the prevailing hegemonies and biases in the international media landscape.

Speaking in the context of the U.S. threat to impose additional punitive tariffs on countries wanting to join BRICS, Mr. Wu Hailong, President of the China Public Diplomacy Association, emphasised that the BRICS grouping was not in opposition to any country but a mechanism "to seek equity and justice" in the international governance scenario. "Given that the world seems to be going back to the jungle rule of tariff turbulence, BRICS nations must cooperate more to protect their interests and oppose unilateralism," he said.

Organised by *Xinhua News Agency* in collaboration with partners from BRICS nations, the forum officially launched the 'Global South Joint Communication Partnership Program', an initiative by *Xinhua* to promote dialogue and cooperation across various sectors within the Global South.

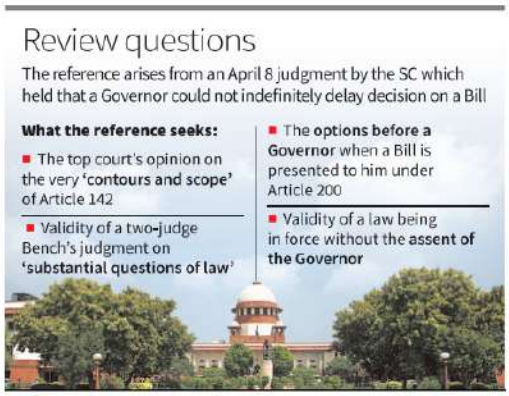
Top court to hear Article 143 reference on President and Governor's powers on July 22

Krishnadas Rajagopal
NEW DELHI

The Supreme Court will hear on Tuesday a Presidential Reference under Article 143 of the Constitution asking if the court can "impose" timelines and prescribe the manner of conduct of Governors and the President while dealing with State Bills sent to them for assent or reserved for consideration.

A Constitution Bench comprising Chief Justice of India (CJI) B.R. Gavai and Justices Surya Kant, Vikram Nath, P.S. Narasimha, and A.S. Chandurkar will hear the matter.

Broadly, the Presidential Reference has asked whether judicial orders can dictate by what time and in what manner the President and Governors should function under Articles 200 (which covers the process of grant of assent by Governors to State Bills) and 201 (when Bills are reserved by Governors for Presidential assent) of the Constitution.



Key question

"In the absence of any constitutionally prescribed time limit or manner of exercise of powers by a Governor, can time limits be imposed and manner of exercise of powers be prescribed through judicial orders? Can judicial orders impose timelines and manner of exercise of powers by the President under Article 201," the reference dated May 13, the last working day of former CJI Sanjiv Khanna, has asked.

The President's move to seek clarity under the top court's advisory jurisdiction arises from an April 8 judgment by a Supreme Court Bench of Justices J.B. Pardiwala and R. Mahadevan on a petition filed by the Tamil Nadu government challenging the Governor's delay in clearing 10 re-passed Bills, and his subsequent action to reserve them for consideration by the President.

The two-judge Bench had ruled that the Governor's action was illegal. This had led to the default cancellation of the President's decision to assent to one of the 10 Bills, while rejecting seven and not considering two others.

The verdict, authored by Justice Pardiwala, had invoked Article 142 of the Constitution to deem that all 10 Bills had got assent.

The reference has now sought the court's opinion on the very "contours and scope" of Article 142.

Questions scope

"Can the Constitutional powers of the President/ Governors be substituted by a judicial order exercising Article 142? Is Article 142 limited to matters of procedural law or does it extend to issuing directions contrary to or inconsistent with existing substantive or procedural provisions of the Constitution?" it asked.

Indirectly questioning the validity of the "deemed" assent, the reference has asked whether a law made by a State Legislature could even "be considered a law in force without the assent of the Governor".

"Are decisions of the Governor and the President under Articles 200 and 201, respectively, justiciable at a stage prior to even the Bill in question becoming a law? Is it permissible for the courts to undertake judicial adjudication over the contents of a Bill, in any manner, before it becomes law?" the Presidential reference queried.

It said that the "concept of deemed assent" of the President and the Governor, introduced in the judgment, was alien to the constitutional scheme, and worked to fundamentally circumscribe the power of the President and Governors.

Vice-President Jagdeep Dhankar had called Article 142 a "nuclear missile against democratic forces".

In his judgment, Justice Pardiwala had explained that Article 142 was invoked only to do complete justice in public interest for the people of Tamil Nadu.

The reference has also touched on the basics of Article 200, asking the court to clarify the constitutional options before a Governor when a Bill is presented to him under Article 200.