# DIA, DEOGHAR IAS ACADEMY

# *Daily News Feed*

# *D.N.F*

# *05.12.2024*

**Sabaijor Complex, Near Jamunajor Pul, Castair Town**
**Deoghar, Mob:-9162500508**

# Is the caste Census a useful exercise?

Proponents argue that a caste Census would determine the population sizes of various castes and that these numbers can be used to provide a proportionate share to each caste in government jobs etc. However, upon closer inspection, it becomes clear that the caste Census would be impractical

FULL CONTEXT

Anish Gupta
Shubham Sharma

The demand for a caste Census has become a heated political issue, fuelled by calls from opposition leaders, NGOs, and, more recently, the Rashtriya Swayamsevak Sangh (RSS) also adding itself to the cohort. Proponents argue that such a Census would determine the population sizes of various castes and that these numbers can be used to provide a proportionate share to each caste in government jobs, land, and wealth.

This article discusses how the attempt to collect individual caste data will once again prove to be a futile exercise, and how individual caste-based proportionate reservations is a regressive policy.

**Caste Census: a historical background**

The exercise of a caste Census in India dates back to the late 19th century when the first detailed caste Census was conducted in 1871-72. It attempted to collect caste-based information and classify various groups, and was conducted across four major regions – the North-Western Provinces (NWP), the Central Provinces (CP), Bengal, and Madras.

There were several arbitrarily constituted "sets" based on a very superficial understanding of caste. In the NWP, for instance, only four sets were officially recorded – Brahmins, Rajputs, Banias, and "other castes of Hindus". Meanwhile, in the CP, groups such as "servants and labourers" and "mendicants and devotees" were arbitrarily included under these sets. Some of Bengal's classifications included beggars, musicians, and cooks, while Madras added "mixed castes" and "outcastes" as distinct categories.

Frustrated with the complexities of understanding caste, W. Chichele Plowden, who prepared the 1881 Census report, termed the whole question of caste 'confusing' and hoped that 'on another occasion no attempt will be made to attempt to obtain information as to the castes and tribes of the population'. However, the same issues persisted in the caste Census of 1931 where 4,147 castes were identified. The officials were surprised to find that caste groups frequently claimed different identities in different regions.

These challenges are not relics of the past but continue to shape the difficulties India faces to conduct a caste Census today. For instance, the Socio-Economic and Caste Census (SECC) of 2011 identified over 46.7 lakh castes/sub-castes with 8.2 crore acknowledged errors. A more recent example is the controversy surrounding the inclusion of 'hijra' and 'kinnar' as categories in the caste list in the Bihar Census (2022).

**Challenges to access accurate data**

**Upward caste mobility claim** – the reporting of one's caste by respondents can be influenced by the perceived prestige associated with certain social groups and their position within the varna hierarchy. This is evident from changes in caste claims between the 1921 and 1931 Censuses, where some communities that initially reported belonging to lower positions within the varna system in 1921 later reported themselves as belonging to higher categories in 1931 (see Table 1). Another notable observation from these claims is that different members of the same community, such as Sonar, reported belonging to different social categories –Kshatriya and Rajput in 1921, and Brahmin and Vaishya in 1931, in the same region (see Table 1). These occurrences were noted in colonial Censuses but their implications remain relevant even today.

**Downward caste mobility claim** – some respondents may claim to belong to a group positioned lower in the social hierarchy, particularly when they are aware of the potential benefits associated with such affiliations. Notably, these downward social group mobility claims are predominantly a post-independence phenomenon likely due to the advantages associated with reservation policies ( such as when some upper castes demand OBC status/ some OBCs demand ST status).

**Problem of caste misclassification** – similar-sounding castes and surnames often lead to confusion in caste classification. For example, in Rajasthan, surnames like 'Dhanak', 'Dhankia', and 'Dhanuk' are classified as SC, while 'Dhanka' is listed as ST. Similarly, the surname 'Sen' refers to an upper-caste group in Bengal, whereas 'Sain' is associated with the OBC barber community. Enumerators may mis-record such surnames, inadvertently placing communities in incorrect social categories. Additionally, caste remains a sensitive issue, which may make both respondents and enumerators uncomfortable discussing it directly.

As a result, enumerators might avoid asking about caste explicitly and instead make assumptions based on surnames, further increasing the risk of misclassification.

**On proportional representation**

Proportional representation in reservations may appear fair at first glance, but upon closer inspection, it becomes clear that it is both impractical and regressive. The system of reserving positions based on a reserved category's quota is straightforward: the reserved posts are determined by dividing 100 by the percentage of reservation allotted to that reserved category. For instance, since the reservation for OBCs is 27%, every 4th position in a sequence of vacancies would go to an OBC candidate (100/27 = 3.7, rounded up to 4). Similarly, an SC candidate would get every 7th position (100/15 = 6.7, rounded to 7), an ST candidate every 14th position (100/7.5 = 13.3, rounded to 14), and an EWS candidate every 10th (100/10 = 10).

However, significant flaws emerge when proportional representation formulas are applied to individual castes. According to different ministries data, there are around 6,000 castes. Assuming India's population is approximately 1.4 billion, the average population per caste would be around 2.3 lakh.

To illustrate the challenges of implementing proportional representation at the individual caste level (see Table 2), consider a hypothetical caste ranked last with a population of just 10,000 (0.0007% of the total population). For this caste to secure just one reserved vacancy in an institution, at least 1,40,845 positions would need to be advertised. Using the UPSC as an example, which typically advertises around 1,000 vacancies annually, it would take 141 years for the least populous caste to receive a single vacancy. To make matters worse, if we consider 46.7 lakh castes/subcastes as reported in SECC 2011, the number of vacancies required will be 46,73,034 and the UPSC will take more than 7,000 years to provide the first vacancy to the least populated caste.

Hence, the idea of proportional representation at the level of individual castes proves to be regressive, as it disproportionately excludes the least populous castes from accessing the benefits of reservation.

*Anish Gupta teaches economics at the Delhi School of Economics. Shubham Sharma is a Research Associate at the Institute for Educational and Developmental Studies (IEDS), Noida*


**Difficult task:** A teacher collecting details from a woman as part of the caste Census at Kandi in Sangareddy, Telangana on November 18. MOHD ARIF

## The problem with counting caste

The system of reserving positions based on a reserved category's quota is straightforward: the reserved posts are determined by dividing 100 by the percentage of reservation allotted to that reserved category. However, significant flaws emerge when proportional representation formulas are applied to individual castes

Table 1: How caste names changed in different Censuses

| Name of Caste | 1921 Census claims | 1931 Census claims |
|---|---|---|
| Kamar (Kumar) | Kshatriya | Brahman |
| Sonar | Kshatriya/Rajput | Brahman/Vaisya |
| Sutradar | Vaisya | Brahman |
| Nai | Thakur | Brahman |
| Napit | Baidya | Brahman |
| Rawani (Kahar) | Vaisya | Kshatriya |

Note: The change in caste claim was not influenced by reservation policies or any other form of government benefits

Source: Census of India Report, 1931 by J.H. Hutton, Page no. 431

Table 2: Number of vacancies and waiting time for least populated castes based on UPSC's average annual vacancies of 1,000

| Census | No. of castes | Assumption about the population distribution across castes | Estimated minimum vacancies required to provide at least one vacancy to least populated caste | Estimated years required to provide at least one vacancy to least populated caste |
|---|---|---|---|---|
| 1931 | 4,147 | All castes with equal population | 4,147 | 5 |
| | | Least populated caste's number is 10,000 | 1,40,845 | 141 |
| Number of castes listed by different ministries which is used for reservation | 6,000 | All castes with equal population | 6,000 | 6 |
| | | Least populated caste's number is 10,000 | 1,40,845 | 141 |
| 2011 SECC | 46,73,034 | All castes with equal population | 46,73,034 | 4,673 |

Source: Authors' calculation based on the data collected from 1931 census, 2011 SECC, different ministries and UPSC

## THE GIST

- The exercise of a caste Census in India dates back to the late 19th century when the first detailed caste Census was conducted in 1871-72.
- Frustrated with the complexities of understanding caste, W. Chichele Plowden, who prepared the 1881 Census report, termed the whole question of caste 'confusing' and hoped that 'on another occasion no attempt will be made to attempt to obtain information as to the castes and tribes of the population'.
- These challenges are not relics of the past but continue to shape the difficulties India faces to conduct a caste Census today.

# ₹2.4 lakh crore collected in toll plazas since inception

More than 98% of payments in recent months were done using FASTags, with over 10 crore tags issued till now

**DATA POINT**

**Amitha Reji George**
**Vignesh Radhakrishnan**

A total of ₹2.4 lakh crore has been collected as user fees at toll plazas across India's national highways since the inception of toll collection, according to recent data presented in the Lok Sabha. This figure is based on the 758 toll plazas for which the overall data was available.

Plazas in Uttar Pradesh, followed by Rajasthan and Maharashtra have collected the most among States. Notably, over 98% of the toll payments made in recent months were done through the FASTag technology. **Chart 1** shows the State-wise amount of fees collected (in crores) across tolls since inception. With ₹32,510 crore collected, Uttar Pradesh is at the top. The Delhi-NCR region collected the least tolls at ₹263 crore.

**Chart 2** shows the top four national highways where the most toll was collected since inception. The NH48, which runs from Delhi to Chennai, is listed first with a collection of ₹24,490 crore followed by NH44 (Srinagar to Kanniyakumari), NH16 (Kolkata to Chennai), and NH27 (Porbandar to Silchar).

**Chart 3** shows the number of FASTags issued cumulatively (left axis) and the amount collected electronically in crores across all tolls (right axis), every month over time. Except for the dip during the pandemic months, the transaction value and the tags issued have surged since inception. As of October 2024, 10 crore tags have been issued. **Map 4** shows the toll plazas which collected over ₹100 crore electronically from April to October 2024. The Gharaunda toll plaza in Haryana collected ₹256 crore in the period, the most across the 1,040 tolls for which this data was available. The Shahjahanpur toll plaza in Rajasthan and the Bharthana in Gujarat, are second and third on the list.

## Collections surge across India's tolls

The data for the charts were sourced from Lok Sabha questions and answers


**Chart 1:** State-wise fee collected (in ₹crores) across tolls since inception

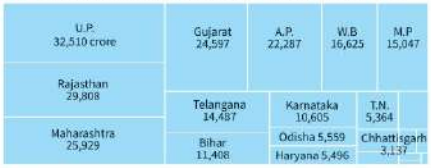
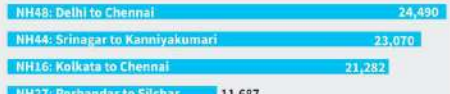


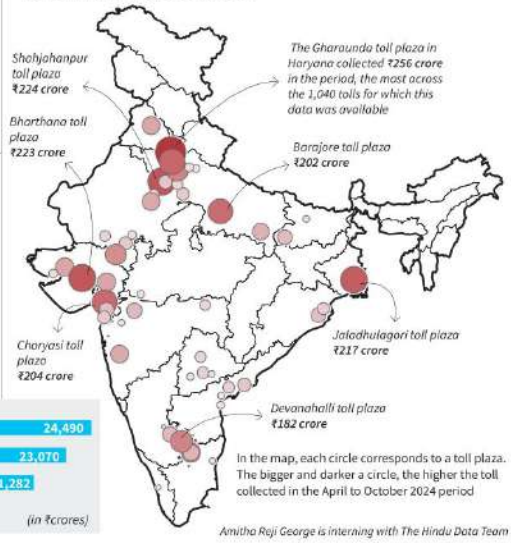

**Chart 3:** Number of FASTags issued cumulatively (left axis) and the amount collected electronically in ₹crores across all tolls (right axis)


**Chart 2:** Top four national highways where the most toll was collected




(in ₹crores)

**Map 4:** The map shows the plazas which collected a toll of over ₹100 crore electronically from April to October 2024




In the map, each circle corresponds to a toll plaza. The bigger and darker a circle, the higher the toll collected in the April to October 2024 period

*Amitha Reji George is interning with The Hindu Data Team*

# *India's strategic focus on West Africa*

**Harsh V Pant**

Vice President for Studies at Observer Research Foundation, New Delhi

**Samir Bhattacharya**

Associate Fellow, Africa, Observer Research Foundation, New Delhi

Last month, on his way to Brazil to participate in the G-20 Summit, Prime Minister Narendra Modi made a strategic halt in Nigeria. During his first two terms, Mr. Modi travelled to 10 African countries, including Uganda, where he delivered a historic speech outlining India's vision of Africa. However, his visit to Nigeria is significant as it marks the first African visit of the Prime Minister in his third term. This visit is also the first by an Indian Prime Minister to Nigeria in 17 years.

The importance accorded to India by Nigeria was evident from the very moment Nigerian President Bola Ahmed Tinubu welcomed Mr. Modi at Abuja airport. Later, the Indian Prime Minister was conferred Nigeria's second-highest national award, the Grand Commander of the Order of the Niger. He became the only second foreign dignitary to receive the distinction since 1969, after Queen Elizabeth II, underlining India's rising global stature and the trust and recognition Mr. Modi has gained for his commitment to the Global South.

**India-Nigeria ties**

Nigeria is both the largest economy and the largest democracy in Africa. Nigeria is also a regional hegemon in West Africa and plays an important role at the African Union level. It is regarded as a democratic role model and has, in the past, used its clout to mediate disputes on the African continent. Strengthening India's ties with Nigeria would undoubtedly have effects far beyond the nation's borders.

In his conversation with President Tinubu, Mr. Modi reiterated the high priority India accords to its strategic partnership with Nigeria and expressed interest in boosting ties in areas such as defence, energy, technology, trade, health, and education. With terrorism, separatism, piracy, and drug trafficking as major challenges for Nigeria, Mr. Modi underscored the continuing salience of strong cooperation on security issues. This encompasses the purchase of Indian weapons and cooperation in the counterterrorism operations against the Islamist groups, particularly Boko Haram.

Mr. Modi's trip is also a follow-up to an Indian defence industry delegation's visit to Lagos earlier this year. Mr. Tinubu had expressed interest in buying arms from India during that visit. India is emerging as a key defence supplier to Africa, with sales to Egypt, Algeria, Morocco, Tanzania, and Mozambique.

In over six decades of close partnership between India and Nigeria, India has also emerged as a development partner of Nigeria on two fronts – offering developmental assistance through concessional loans ($100 million) and capacity-building training programmes – shaping this partnership in a distinctive 'India Way'.

**Nigeria's China connection**

Nigeria currently has over 200 Chinese companies. It is China's largest export market and its second-largest trading partner in Africa. On the other hand, China is Nigeria's third-largest export market. China has funded over $47 billion for 22 large-size infrastructural projects across the country. As of March 31, 2020, Chinese loans to Nigeria totalled $3.121 billion, or 11.28% of Nigeria's $27.67 billion in external debt. Earlier, Nigeria had undertaken several significant infrastructure projects using Chinese money, such as the National Public Security Communications System project and the Abuja Light Rail project, and planned terminal expansions at four major airports.

In 2023, China funded the Lekki Deep Sea Port. The port, one of the largest in West Africa, will relieve cargo congestion, which costs billions of dollars in annual revenue and is expected to generate over 170,000 new jobs. It is anticipated that the port will boost Nigeria's struggling economy.

The Chinese technology giant Huawei has a significant presence in Nigeria. Since 2019, Huawei has trained 2,000 Nigerian youths and 1,000 federal civil servants across Ministries, departments, and agencies, and it plans to continue training government employees in cybersecurity strategy. Huawei has deployed over 27,500 mobile phone towers and up to 10,000 kilometres of fibre optic cable in Nigeria. It has also signed a contract with the Federal government to install an electronic surveillance system at the country's land borders.

China is also active in Nigeria's mining sector. Last February, Kaduna selected China's Ming Xin Mineral Separation Nig Ltd. to build the nation's first lithium-processing plant. It aims to produce batteries for electric vehicles. Yet, five months ago, the Nigerian government rejected Tesla's proposal to buy raw lithium from the country. Meanwhile, China Sinoma International Engineering and Nigeria's Dangote Industries Limited also signed a contract to construct a cement plant with six million tonnes per year in Itori, Ogun state.

Despite growing Chinese interest in financing and building infrastructure, India remains one of Nigeria's key partners. Trade between India and Nigeria has declined from $14.95 billion in 2021-22 to $7.89 billion in 2023-24, primarily due to India's increasing oil imports from Russia. India and Nigeria, however, continue cooperating on multiple issues. As leaders of the Global South, an enhanced bilateral relationship between India and Nigeria should also auger well for the larger Global South.

Mr. Modi's visit to Nigeria has brought the country into the spotlight, but much more sustained effort will be required to convert the goodwill into concrete deliverable outcomes.

Despite growing Chinese interest in financing and building infrastructure, India remains one of Nigeria's important partners

# A cut in time

## Economic costs of ban on plastic must be seen with its ill-effects on health

Despite a week of wrangling, an ambitious endeavour piloted by the United Nations Environment Programme to phase out plastic turned out to be a failure. The Global Plastics Treaty is the result of a resolution by member-countries of the United Nations, passed in 2022, to 'end plastic pollution, including in the marine environment.' Over the next two years, countries met five times, including the latest (billed as the final one), to create a broad framework agreement. The UN resolution of 2022 was deemed historic as it gave the impression that the world was unanimous that plastic pollution could only be addressed through globally coordinated action. However, it is the solution to the problem that has proven to be divisive. Of the nearly 170 countries gathered at the fifth round of meetings in Busan, roughly half – led by the European Union and supported by Pacific island-nations – were of the view that despite the usefulness of plastic and its significant role in enabling mass consumption through the modern era, its relative indestructibility was now an environmental hazard. It had begun to seep into the bodies of animals, both of the land and sea, and had progressed to be much more than an eyesore in the form of litter flowing out of overwhelmed municipal recycling systems.

The claim that better recycling and re-use will redeem the situation, these nations believe, is a pipe dream and, therefore, imposing gradual cuts on the source of plastic, virgin polymer, was the only effective route to ending plastic pollution. However, many of the large developing countries, and those with economies premised on the extraction of oil and petrochemical refining, baulk at such a proposal. They view calls to cut plastic production as trade barriers masquerading as environmentalism. They view the framing of the plastic pollution problem as one that requires regulating production as something that goes beyond the intent of the 2022 resolution. While talks have stalled, it is likely that countries will reconvene next year – possibly with a fresh perspective – and get beyond the impasse more creatively. India has chosen to side with the countries that are averse to production cuts; yet, it must acknowledge that its capacity to recycle plastic is only about a third of the plastic that is annually introduced. The indispensability of plastic to the economy cannot be a permanent excuse to delay action on evaluating its health impacts on people in India, its ecology and marine environment. A planned exit is always better than finding oneself on the wrong side of history.

# *Do not write off Trump's America*

In the aftermath of Donald Trump's resounding victory in the U.S. presidential elections, with a stunning Electoral College triumph of 312 votes to 226, the Indian commentariat appears to be divided between those lamenting the demise of Liberal America and those celebrating the rise of a right-wing transactional leader who might be "good for India". Both sides, however, appear to think that the America, over which Mr Trump will preside, has given one more sign of its irresistible decline, as the world becomes increasingly multi-polar and China continues its inexorable rise. For them, Mr. Trump's victory merely sets the seal on an America more divided against itself, more insular, more xenophobic, more racist and misogynist and less inclined to engage with the world than at any time since the Second World War.

**Shashi Tharoor**

the fourth-term Congress Member of Parliament (Lok Sabha) from Thiruvananthapuram, the author of 26 books including 'Pax Indica: India and the World of the 21st Century', and the Chairman of the Parliamentary Standing Committee on External Affairs

### The core elements are still strong

I am not prepared to write America off quite so quickly. For one thing, the fundamental elements of American global power remain unchallenged. It is still the world's largest, most diverse and most innovative economy. Its military budget dwarfs those of the rest of the planet's countries combined. It has a remarkable level of energy security, with its own domestic sources of oil, gas, solar and wind power, and seems to be gradually expanding its nuclear capacity as well. Its labour force may have priced itself out of the manufacturing business but American labour productivity and its talent for business and entrepreneurship remain incomparable. Its capital markets are thriving and stable, defying every doomsday prediction since the Great Depression. It has more billionaires than in any country on earth; the U.S. dollar remains the world's benchmark currency; and the average working American is still better off than the average worker almost anywhere else in the world.

It is still a land that wields an unparalleled influence over global culture – as the home of Coca-Cola, Starbucks, Levi's, McDonald's, Disney, Hollywood, CNN, Google, Microsoft, and Nvidia, it sets the global cultural agenda in ways that no one else comes remotely close to approaching. The "unipolar moment" that lasted from roughly 1990 to 2010 may have passed, but these factors mean that whatever degree of multi-polarity may be dawning, it is very much amongst second-order powers jostling for space with each other, rather than truly competing with the United States for global dominance.

It is of course true that the couple of decades of absolute dominance – politically, militarily, economically, and technologically – of the world by the United States of America have passed. This was an era in which Washington faced no near-term rivals for global power and influence, and one in which the defining feature of international politics was that America held sway over world affairs, and usually had its way. But in the last decade or so, it has become clear that the U.S. was no longer going to be uncontested in any of these domains. The first, largest, tallest, biggest everything – from skyscrapers to planes – used to be in America. That is no longer the case.

There are also the undoubted weaknesses with which America is now reckoning. Its industrial base has been weakened by decades of over-reliance on imports from China. Its public debt is out of control and is expected to rise to 122% of GDP by 2034. It is already the case that America spends more on public debt interest than on defence, even though its defence budget is larger than that of the rest of the world combined. Its public, as the recent election showed, is increasingly resentful of the country's own globalist elites, has rejected cosmopolitanism and multiculturalism, and wants to return to a more insular and arguably xenophobic insularity. Its appetite for global adventure has shrunk dramatically and might increasingly prompt American administrations to withdraw from their current engagements across the world and cease to make the major efforts required to manage and defuse international conflicts.

### The rise of China

And then there is China. Roughly around the 2008-09 financial crisis, pundits recognised that there had emerged on the global scene the spectre of Beijing. China's "peaceful rise" for the last quarter of a century, fuelled by American investment in its industries and burgeoning export trade for its manufactures, has culminated in its supplanting the U.S. as a manufacturing and industrial power, rivalling it in economic size and exceeding its surpluses, as well as challenging it in new cutting-edge technologies such as 5G. Under the assertive autocracy of Xi Jinping, China has emerged, after decades of uncontested U.S. hegemony, as the other aspiring hegemon – and it has the resources to make the Americans sweat. No wonder many American thinkers have called for policymakers to evolve a comprehensive strategy to counter China, much as George Kennan's famous "Long Telegram" from Moscow in 1946 led to the birth of the "containment strategy" that hemmed in the Soviet Union.

Such a strategy, by definition, will require the U.S. to stay engaged, if only to preserve its dominance in world affairs. Mr. Trump's first term demonstrated that he was no isolationist. His initiatives in promoting a "grand bargain" involving the U.S., Israel, Saudi Arabia, the United Arab Emirates and other moderate West Asian powers, did indicate a willingness to pursue a new regional compact that would isolate Islamic extremists. (The "I2U2" among Israel, India, the U.S. and the UAE, which was part of this vision, has been rendered dormant by the Gaza conflict, but will certainly be revived once that war is brought to an end.) His withdrawal from the Joint Comprehensive Plan of Action (JCPoA)/nuclear agreement with Iran, his imposition of extremely rigorous sanctions on that country, and the American assassination of Iran's intelligence chief, Qasem Soleimani, suggest a willingness to be belligerent in pursuing adversaries deemed to be hostile.

Mr. Trump has made it clear, especially through the trade war he launched against China, that a United States led by him will not permit Beijing to establish itself as the unchallenged Asian hegemon. To this end, Mr. Trump is likely to prioritise strengthening the Quad (India, Australia, Japan, the U.S.), and should India prove skittish in this regard, the new "Squad" (in which the Philippines replaces India in the quartet), could be energised.

Mr. Trump understands that if China is allowed to gain unchallengeable dominance over east and central Asia, the resources and markets it would command would enable it to seriously challenge American strategic and economic interests. A struggle for influence in this part of the world will certainly ensue over the next few years and India will be called upon to define its stand in relation to it.

> The U.S. is still the world's most diverse and innovative economy; and Donald Trump proved in his first term that he is no isolationist

### An Indian response

New Delhi will have to carefully juggle some crucial choices: how to define its uneasy relationship with a China that continues to threaten its borders, even while India's import dependence on that country grows to record levels each year; how to manage its close relationship with a Russia that is increasingly becoming a client state of Beijing; how to manage its friendship with Iran at a time when Israel's war with Hamas and Hezbollah and the U.S.-led attacks on the Houthis render Iran increasingly a regional undesirable; and how to defend its own strategic autonomy in a world where the freedom of manoeuvre we have so far enjoyed among all these actors is narrowing. The U.S. under Donald Trump will undoubtedly seek to contain China, limit Russia, disempower Islamic Iran, and further isolate North Korea – the new "axis of evil" identified by Washington – while it promotes Israel and whips Europe into shape. U.S. support for India will be contingent on how adroitly India manages to navigate its own relationships with these countries so that it is seen as willing to go along with, or at least not undermine, these objectives.

Not only is it unwise to write off Trump's America – in light of these considerations – we should take it very seriously indeed.

# How is science affected when companies fund research?

For scientists, the challenge is toeing the line between guarding their trade secrets in the current economy and advocating for transparency and reproducibility. The fundamental tension is that IP necessitates secrecy, whereas, historically, science isn't encouraged to stay behind closed doors

Rohini Subrahmanyam

In May 2024, Google DeepMind released AlphaFold 3, a tool that could predict protein structures. It used an artificial intelligence (AI) model to predict how different proteins were shaped and how they might interact with each other and with DNA, RNA, and other biomolecules of merit. Nobel laureates John Jumper and Demis Hassabis built the new model based on DeepMind's previous versions of the tool, namely AlphaFold and AlphaFold 2. Both those models were released open source, i.e., with their associated programming scripts and inner workings open and transparent to all.

AlphaFold3 was different: its senior authors didn't release the full code when they published their findings in *Nature*. How exactly the model worked was unclear to scientists who wished to probe deeper. They also couldn't make full use of AlphaFold 3's new abilities because its protein-drug interactions simulator wasn't fully accessible.

Google had a reason to withhold information in the paper. A DeepMind spinoff company called Isomorphic Labs was using AlphaFold 3 to develop its own drugs.

"We have to strike a balance between making sure this is accessible and has an impact in the scientific community as well as not compromising Isomorphic's ability to pursue commercial drug discovery," Pushmeet Kohli, DeepMind's head of AI science and a study co-author, told *Nature* in a news article earlier this year. But many scientists weren't convinced, leading them to sign an open letter saying publishing the paper without the code prevents scientific efforts to reproduce and verify the original findings.


A technician uses a microtome at the Frederick National Laboratory for Cancer Research in Maryland, USA. Intellectual property necessitates secrecy whereas science doesn't, but research institutes also need money to operate. US NCI

## A fundamental tension

The controversy brought a broader conundrum surrounding scientific research today, especially research with commercial potential. Commercialisation is driven by competition and profit, so the creators and/or owners invoke property and patent laws to protect their intellectual property (IP).

The fundamental tension here is that IP necessitates secrecy, whereas, historically, science isn't encouraged to stay behind closed doors. Science progresses when scientists are open and transparent about their work and when their methods and results are reproducible and falsifiable.

"If you make this fantastic discovery and you're the only person in the universe who can do it, nobody cares. It's not helpful for mankind," Benjamin Haibe-Kains, a professor using AI to study cancer at the University of Toronto, said. He openly advocates for scientists to be more open with their software and data when they publish papers based on AI. "How can you advance science if you keep everything to source? Nobody can see your data. Nobody can see the algorithm. Nobody can see the model, right?

"As a scientist, there is fundamentally a major conflict between doing things in secret versus advancing science. Those things are incompatible," he added.

Then again, hospitals, research institutes, and universities also need money to operate and hence bank on commercialisation for revenue. "Universities and research institutions are putting us [academics] in a very, very tricky spot," he said. "They actually want us to patent so that we can generate revenue and sustain this research enterprise."

## Door half-closed or half-open?

How can scientists toe the line between guarding their trade secrets in the current economy and advocating for transparency and reproducibility?

One option Haibe-Kains suggested, especially for computational scientists, is to publish all the code and details of any algorithm they are working on – but hold on to a premium, ready-to-use version of the software that could be commercialised. With the help of software engineers in his lab, he works on bringing the software to a level that's accessible to a broader group of people, which he then sells.

"Most of the discoveries have been disclosed already; it's just the packaging that I'm selling, right?" Haibe-Kains explained. "That's the way we do it in the lab – we do everything open source at the beginning, and if there is commercial potential, we work on an enterprise version that's more robust and deployable. That added value we keep secret, and that's what we would sell as a product."

"I can do my mission as a scientist, but I can also commercialise and potentially generate revenue that way," he added.

Thomas Hemmerling, MD, a professor in the Department of Anesthesiology at the same university, expressed a belief that divulging some of the basic algorithms but holding back some specific source code is a way to strike a balance between the "black box" that comes with full patent protection and scientific transparency.

He also agreed there is always a risk in such cases where someone else could commercialise the published work. But other scientists will at least be able to understand and potentially replicate the findings.

## Decency and deals

Hemmerling and his team developed an anaesthesia robot in 2008 that they named "McSleepy" (after Patrick Dempsey's character Derek "McDreamy" Shepherd, in the popular medical TV drama 'Grey's Anatomy'). The robot could autonomously administer drugs to induce general anaesthesia and monitor the effects. The scientists decided to explain the algorithms at work in the robot in detail in their paper.

"Because we described it quite well, certain parts were then put into other automated machines, but they referenced our method. So that's then basically a matter of scientific integrity," Hemmerling said. "If you use somebody else's algorithm, you should at least quote them and say, 'That's based on that machine or on that technology or that finding'."

But not all scientists have access to large amounts of public funding, which can affect their inclination to be fully open about any research that can be patented. Based on the researchers' financial needs, Hemmerling said the closer they are to a commercial product, the fewer details they'd feel comfortable divulging in their paper.

> These firms will fund your research, so you can move it forward, but on the other hand, they will obviously tighten your studies much more into some kind of IP protection, probably more than you want to

Collaborations with smaller start-ups or large corporations help some researchers get more money for their science. "These [large corporations] will fund your research, so you can move the research forward, but on the other hand, they will obviously tighten your [research] much more into some kind of IP protection, probably more than you want to."

That's the dilemma in front of many researchers around the world.

Some scientists strike deals with the companies: they study and develop a product the way the company likes it. In exchange, the company gives their lab unrestricted funds to continue other avenues of research (in which the company has no say).

"All over the world, there's very little governmental funding to do research," Hemmerling said. "So researchers need to find creative ways to find funding."

## 'I think it's human nature'

More government funding is a way to circumvent the conflict between patented and open science, according to Hemmerling. "At the end of the day, it gives you a different head start. Whenever I have governmental funding, it has secured me funding for a certain time. I don't have to declare a conflict of interest. Science is just… science – you innovate, and you're free to be creative; you're free to develop anything you want. Whereas if you have company funding, it might limit you to developing certain areas because the company might have a conflicting interest."

The government can also subsidise the costs of products made by companies such that the latter can still hold on to their IP even as the products are available for sale at a lower price. This is what happened with the COVID-19 vaccines made by Moderna and Pfizer.

But according to Haibe-Kains, even with more public funding, universities will still want to continue commercialising some research. "I think it's human nature. If you think you're doing amazing research and you see those industries generating billions of dollars in revenue, you cannot stop universities thinking, 'Oh, maybe I should generate revenue on my own stuff,' right?"

He believes additional funding will help academic researchers breathe a little easier and invest in doing science the right way: by being as open as possible. "It's more a matter of creating the right paradigm so that there is a healthy environment for researchers to do the right thing," Haibe Kains said. "But also, there is a path to commercialisation so that we can generate revenue."

## At the end of the day

For researchers working in a company, however, the primary objective is likelier to be to generate revenue, not necessarily to advance science, according to Haibe-Kains. Yet he also said it was unfair that sometimes big companies can blur the lines between industry and academia to their advantage, such as using academic tools like journals to advertise their science and also get away with withholding most of the data.

Thus, to him, the manner of AlphaFold 3's release exposed a deep misalignment of incentives between researchers, journals, and the industry.

Responding to criticism from the academic community, senior authors of the AlphaFold 3 paper had said they would publish their code within six months and did so early in November.

Haibe-Kains said publishing the paper first and fixing it six months later by releasing the full code is still a problematic move.

"But look, at the end of the day, it's a good thing they published the code out there."

*(Rohini Subrahmanyam is a freelance journalist in Bengaluru. roh.subs@gmail.com)*

Nobel laureates John Jumper and Demis Hassabis. AP

The Nilphamari narrow-mouthed frog, which is found in the lateritic plateaus of the northern Western Ghats. SPECIAL ARRANGEMENT

# *Study flags agroforestry threat to frogs*

**Rahul Karmakar**

Researchers have found that agroforestry practices may be harmful to some species of endemic frogs, while a few are less affected by modified habitats. The study was conducted by researchers from the Mysuru-based Nature Conservation Foundation (NCF-India), and the Bombay Environmental Action Group (BEAG).

The study was conducted by Vijayan Jithin and Rohit Naniwadekar of the NCF. The BEAG's researchers were Manali Rane and Aparna Watve. The findings were published in *Ecological Applications*, a journal of the Ecological Society of America.

They studied the amphibian diversity and abundance in the low-elevation lateritic plateau of Maharashtra's northern Western Ghats across orchards, paddy fields, and unmodified stretches during the monsoon season between June and September 2022. Four geographically separated plateaus – Devi Hasol, Devache Gothane, Gaonkhadi, and Bakale – were sampled to capture the spatial variability.

The research team found amphibian diversity was lowest in paddy and abundance was the least in orchards compared to the relatively undisturbed plateaus. Endemic species, including the CEPF burrowing frog (*Minervarya cepfi*) and Goan Fejervarya (*Minervarya gomantaki*), were less abundant in modified habitats, indicating that agroforestry practices may be particularly detrimental to these vulnerable amphibians.

"The conversion of plateaus into agricultural lands is a significant threat to these habitats and the species they support," Jithin, the lead author of the study, said.

"Given the expansion of orchards, we recommend adapting agroforestry

**Amphibian diversity was lowest in paddy, and abundance was the least in orchards compared to the undisturbed plateaus**

practices to be more frog-friendly. Retaining natural water bodies and adding water sources in orchards, combined with sensitisation and incentives for landowners, could help mitigate habitat loss," he said.

On the other hand, species such as the *Minervarya sahyadrensis* commonly found across South Asia were more prevalent in paddy fields, suggesting shifts in community composition due to habitat changes.

"We cannot say the more generalist species are adapting (to modified habitats) since that needs a longer period in the time scale of evolution. They are spreading into such habitats," Jithin, the lead author, told *The Hindu*.

The lateritic plateaus, formed through volcanic activity millions of years ago, are rich in endemic biodiversity but largely unprotected. Traditional conversion of these plateaus into paddy fields has now given way to blasting and transforming the landscape into mango and cashew orchards.

The study highlights how these conversions reduce critical habitats for frogs, such as rock pools that protect tadpoles and eggs during monsoon dry spells.

"Low-elevation plateaus are home to endemic and threatened species of plants and animals that rely on clean water sources. Their presence indicates the health of aquatic resources, which are the lifeline of local communities. It is necessary to conserve and restore the freshwater habitats to ensure the well-being of all life forms," Watve, also the coordinator of the International Union for Conservation of Nature Species Survival Commission's Western Ghats Plant Specialist Group, said.

The study was funded by the United Kingdom-based On the Edge Conservation, BEAG, The Habitat Trust, and NCF-India.

*(rahul.karmakar@thehindu.co.in)*

# After anomaly alert, ISRO sets PROBA-3 launch for today

The mission was scheduled to launch at 4.08 p.m. on Wednesday; the 44.5-metre PSLV-C59 rocket will carry 550-kg satellites to their orbit

**Sangeetha Kandavel**
CHENNAI

The PSLV-C59/PROBA-3 mission, initially scheduled for launch at 4.08 p.m. on Wednesday, has been rescheduled to 4.12 p.m. on Thursday after the detection of an anomaly.

At 3.19 p.m. the Indian Space Research Organisation (ISRO) announced on its official page on X: "Due to an anomaly detected in PROBA-3 spacecraft PSLV-C59/PROBA-3 launch rescheduled to tomorrow December 5, 2024 at 16.12 hours."

Key ISRO officials communicated the same to presspersons gathered at the launch venue.

Even at 3.08 p.m., the ISRO said the countdown had been progressing smoothly. "Countdown is progressing smoothly as PSLV-C59, an initiative led by NSIL and supported by ISRO's expertise, prepares to launch ESA's PROBA-3 satellites into a highly elliptical orbit," it said.

This mission is the 61st flight of PSLV and the 26th using the PSLV-XL configuration. PTI

Josef Aschbacher, Director-General of the European Space Agency, posted a message on social media saying: "During Proba3's pre-launch preparations at the Satish Dhawan Space Centre in India, an anomaly in the redundant propulsion system of the Coronagraph Spacecraft occurred. This propulsion system is part of the attitude and orbit control subsystem of the satellite and used to maintain orientation and pointing in space."

He further said: "The anomaly is currently under detailed investigation. The use of a software solution by the mission control team at European Space Agency's ESEC centre at Redu, Belgium is being evaluated to allow a launch on Thursday, December 5."

The PSLV-C59/Proba-3 Mission, the 61st flight of PSLV and the 26th using its XL configuration, is set to carry the ESA's PROBA-3 (Project for Onboard Autonomy) satellites into a highly elliptical orbit from the First Launch Pad (FLP), Satish Dhawan Space Centre (SDSC-SHAR), Sriharikota.

The 44.5-metre rocket will carry the 550-kg PROBA-3 satellites to their designated orbit in a mission lasting about 18 minutes.

# President lauds Navy as it displays operational prowess at Odisha event

**Satyasundar Barik**
BHUBANESWAR

The Indian Navy showcased its impressive technological capabilities and human expertise at the Puri Beach on Wednesday, in a grand operational demonstration witnessed by President Droupadi Murmu.

The demonstration was the Navy's second large-scale event hosted away from a major naval base.

It featured units with a total tonnage of 90,000 tonnes, equipped with advanced weapons and sensors capable of neutralising threats from surface, subsurface, or aerial sources within a 300-km radius.

Navy personnel take part in drills during the Navy Day celebrations, at the Puri beach in Odisha. PTI

More than 3,500 personnel participated in the demonstration from various platforms at sea, while an additional 350 personnel managed coordination from the shore for the event. Fifteen ships, over 37 aircraft, submarines, and marine commandos, along with personnel and equipment from the Indian Army, took part in the high-energy operational demonstration. The event showcased a vibrant aerial display featuring MiG-29K and Hawk fighter jets, helicopters, as well as submarine manoeuvres, amphibious operations, advanced tactics, and rocket firings by warships.

Addressing the event, Ms. Droupadi said, "Over the last year, the Navy was at the forefront of all operational activities in the region ensuring safety of seafarers and security of maritime trade. The seamless integration of technology, tactical acumen and sheer courage on display today aptly showcased the evolution of our Navy into a combat ready and future ready force."

# Hyderabad to get India's first Google Safety Engineering Centre

**The Hindu Bureau**
HYDERABAD

Google has chosen Hyderabad to set up Google Safety Engineering Centre (GSEC).

The Telangana government has entered into a 'strategically-crucial' and broad ranging partnership with Google on Wednesday with the company asserting that it is committed to establishing India's first Google Safety Engineering Centre (GSEC) in the city, as per an announcement.

It would be the first-of-its-kind in the Asia-Pacific region, after Tokyo, and only the fifth in the world, with similar facilities in Dublin, Munich and Malaga.

**GSEC's focus**

"This GSEC is a specialised international cybersecurity hub that will play a vital role in developing advanced security and online safety products for the Indian context. The centre will focus on cutting-edge research, AI-driven security solutions, and creating a collaborative platform for leading experts and researchers in cybersecurity. It also aims to foster skill development, boost employment, and enhance cybersecurity capabilities in India," as per the press release.

The establishment of GSEC in Hyderabad will be transformative for the city and the State, bringing in best-in-class safety engineers, local policy experts, and collaboration with academic institutions and government partners to address the unique challenges of cybersecurity in India, it added.

# Panel seeks timely action to curb illegal discharge of waste into Ashtamudi Lake

**The Hindu Bureau**
KOCHI

The State Level Monitoring Committee (SLMC), Kerala, appointed by the National Green Tribunal, has recommended implementation of projects in a time-bound manner to check the illegal discharge of biowaste, including faecal sludge, into Ashtamudi Lake in Kollam district.

A preliminary probe indicates the presence of excessive 'algae bloom', a direct result of discharge of biowaste, points out A.V Ramakrishna Pillai, Chairman of the SLMC, Kerala, in his report on the mass fish kill reported in Ashtamudi Lake on October 27.

Garbage accumulated on the shore of Ashtamudi Lake in Kollam district of Kerala. FILE PHOTO

The report dated November 13, 2024 was submitted before the Principal Bench of the tribunal in New Delhi in an original petition related to the pollution of Ashtamudi and Vembanad Lakes, both identified as Ramsar sites, or wetlands of international importance.

At present, a sewage treatment plant is being constructed at Kureepuzha by the Kerala Water Authority, the progress of which is sluggish. If it is completed on a war footing, a major portion of the problem relating to septage waste in Kollam district can be solved. The tribunal may issue instructions to the Kerala Water Authority to complete the project in a time-bound manner, says the report.

The SLMC has also urged the tribunal to issue strict instructions to the Kollam district administration, Kollam municipal corporation, and the Kerala Suchitwa mission to ensure that the tanker lorries engaged in collection of septage waste are registered with the local bodies concerned.