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15th September 2025



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15th September 2025

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PM alleges plot to change mix of border population

In Assam, he says the conspiracy is a grave threat to national security, necessitating a demography mission across the country; he accuses the Congress of 'shielding and protecting infiltrators'

The Hindu Bureau
GUWAHATI

The Union government is preparing to launch a mission to thwart a conspiracy to alter the composition of the population in the border areas of the country with the help of "infiltrators", Prime Minister Narendra Modi said in Assam on Sunday.

Addressing a meeting at Mangaldoi in Darrang district, he said those bent upon sheltering infiltrators had been waging such a conspiracy in the areas bordering Bangladesh. Mangaldoi is about 70 km northeast of Guwahati.

"This is a grave threat to national security, necessitating a demography mission across the country," Mr. Modi said, underscor-



Prime Minister Narendra Modi and Assam Chief Minister Himanta Biswa Sarma in Darrang, Assam on Sunday. RITU RAJ KONWAR

ing the BJP's "goal" of ejecting infiltrators to save Indian citizens from them.

"I want to tell the [pro-infiltrator] politicians that I have accepted their challenge," he said, accusing the Congress of shielding

and protecting these infiltrators. "Write it down. I will see how you use your strength to protect the infiltrators and how we put our lives on the line to remove them. Let there be a contest. Those protecting

the infiltrators will suffer, and mark my words, the country will not pardon them," Mr. Modi said.

He said the Congress had supported infiltration when it was in power. "The Congress wants the infiltrators to stay in Bharat permanently and decide its future," he said.

"Congress promoted the encroachment of the land of our farmers, tribal people, and places of worship. BJP is changing that situation by clearing encroachment. Under Chief Minister Himanta Biswa Sarma, lakhs of *bighas* (one *bigha* is about 0.13 hectare) of land, grabbed by infiltrators, have been taken back. These include Darrang district's Gorukhuti," he said.

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Centre reopens PLI scheme for white goods till Oct. 14, cites market growth

The Hindu Bureau
NEW DELHI

The Union government has reopened the application window for the production-linked incentive (PLI) scheme for white goods, it said on Sunday, citing market growth and growing industry confidence following the success of earlier rounds of the scheme.

"The application window for the PLI Scheme for white goods (Air Conditioners and LED lights) is being reopened based on the appetite of the industry to invest more under the scheme, which is an outcome of the growing market and confidence generated due to manufacturing of key components of ACs and LED lights in India un-

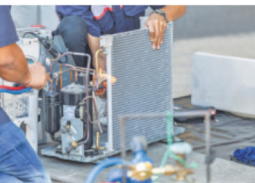
Switching on

The Union government is reopening the application window for the Production-Linked Incentive scheme for white goods

■ **Application window:** Sept. 15 to Oct. 14

■ **Scheme goal:** To boost manufacturing of **AC and LED light** components, including those not currently produced in sufficient quantities in India

■ **Who can apply:** Both **new applicants** and **existing beneficiaries** who wish to invest more



■ **Current status:** 83 applicants with a committed investment of **₹10,406 crore** have already been selected

der the PLI for white goods scheme," the Ministry of Commerce and Industry said on Sunday.

More investments

The application window for the scheme will remain

open between September 15 and October 14.

The release further said that in order to avoid any discrimination, both new applicants as well as existing beneficiaries of the scheme who want to invest

more would be eligible to apply, subject to the guidelines.

So far, the Ministry said, 83 applicants with committed investment of ₹10,406 crore have been selected as beneficiaries under the scheme.

"The investments will lead to manufacturing of components of Air Conditioners and LED lights across the complete value chain including components which are not manufactured in India presently with sufficient quantity," it said.

The Union Cabinet had given its approval for the PLI scheme for white goods for the manufacture of components and sub-assemblies of ACs and LED lights in April 2021.

Highest ratio of females married under 18 from West Bengal: SRS data

Shiv Sahay Singh
KOLKATA

West Bengal has the highest proportion of females getting married before the age of 18, according to the latest Sample Registration System (SRS) statistical report for 2023, published earlier this month.

The report, compiled by the Office of the Registrar General & Census Commissioner, India, recorded that 6.3% of females were married before the age of 18.

The report says that among the larger States and UTs, after West Bengal, Jharkhand had the highest proportion of females married before the age of 18 (4.6%), while Ker-

ala had the lowest rate (0.1%). Himachal Pradesh and Haryana reported rates of 0.4% and 0.6% respectively.

The report pegged the national rate at 2.1%.

In rural areas also West Bengal recorded the highest proportion of females (5.8%) married before the age of 18, followed by Jharkhand (5.2%).

In urban areas, West Bengal again reported the highest proportion (7.6%), followed by Jammu and Kashmir (3.5%) and Odisha (2.8%).

Notably, the SRS had placed West Bengal (6.5%) at the top of a similar list in a report published in May this year.



Pendency continues to plague SC as case backlog hits all-time high

Krishnadas Rajagopal
NEW DELHI

The pendency of cases in the Supreme Court has reached an all-time high of 88,417, even when the court is currently functioning with its full sanctioned judicial strength of 34 judges.

The court has 69,553 civil cases and 18,864 criminal matters pending currently, the National Judicial Data Grid shows. The filing of fresh cases in August surpassed the disposal rate. A total of 7,080 cases were instituted in the court in August. The court has managed a disposal rate of 5,667 cases in the month, that is, 80.04% of the cases filed. The escalation in pendency is despite Chief Justice B.R. Gavai's decision to have more Benches

Delayed justice

The Supreme Court continues to battle the problem of pendency of cases

Current pendency
88,417 cases,
an all-time high



Civil cases
69,553



Criminal cases
18,864

AUGUST DATA

Cases instituted
7,080

Cases disposed
5,667

Disposal rate
80.04%
(of cases in
August)

2025 ANNUAL DATA

Cases filed
52,630

Cases disposed
46,309
(nearly 88%)

Judicial strength:
The court
is currently
functioning with
its full sanctioned
strength of
34 judges



working through the long summer recess of the court in a bid to decrease the case log.

The CJI had renamed the summer holidays from May 23 to July "partial working days". The CJI and

five senior-most judges of the court had presided over the first batch of Benches hearing cases during the summer recess. A total of 21 Benches sat in batches throughout the "partial working days", hearing and disposing of cases, till the court reopened in July.

In 2025, 52,630 cases were filed while 46,309, nearly 88%, were disposed of during a year which has already seen two Chief Justices of India with a third, Justice Surya Kant, expected to be sworn in in late November. The corresponding period in 2024 had seen a similar climb in pendency to a then peak of over 82,000 cases. The increase in pendency persists despite successive Chief Justices, from Justice D.Y. Chandrachud to Justice Gavai, taking care to

maintain judicial vacancy in the top court to a minimum, if not zero.

Steady rise

The unceasing increase in backlog has become a perennial phenomenon since the pandemic years, and especially since 2023. The pendency had continued to rise steadily despite Justice Chandrachud, when he was CJI, acting swiftly to fill vacancies in the top court. His successors to the top judge post, Justices Sanjiv Khanna and Justice Gavai, have spearheaded their own collegiums to promptly recommend names of judges to the government.

Past Chief Justices and even collegium resolutions have raised the issue of "huge workload".

A November 2023 colle-

gium resolution had mentioned the bare truth that the court cannot afford even one vacancy, taking into account the "ever mounting pendency of cases". "The workload of judges has increased considerably. Bearing in mind the above, it has become necessary to ensure that the court has full working judge-strength leaving no vacancy at any point of time," the collegium had underscored.

The recent months have seen the government approve collegium recommendations for appointment to the Supreme Court without delay, often within 48 hours. Yet, the backlog continues to rise steadily.

The escalation is despite decision to have more Benches working during the SC's summer recess

Natural wonder



The Erra Matti Dibbalu (red sand dunes) beside the Visakhapatnam-Bheemunipatnam Beach Road in Andhra Pradesh. The unique geological formations were added to the Tentative List of UNESCO Natural Heritage Sites recently. V. RAJU





Sliver of hope

An inclusive vision of conservation can protect more habitats

The recent survey of saltwater crocodiles in the Sundarban Biosphere Reserve is a notable advance for conservation in India. The census indicates a rise in overall numbers and demographic diversity, implying an ecological success that is also a marker of how wildlife law and conservation policy are gradually moving beyond their fixation on a handful of charismatic species, including the tiger and the elephant. In the early years of the Wildlife (Protection) Act 1972, protection was disproportionately directed at megafauna whose appeal could mobilise public opinion. Saltwater crocodiles do not command the same affection, so their recovery demonstrates how the statutory framework, when coupled with targeted interventions such as the Bhagabatpur Crocodile Project, can yield durable gains even for less prominent species. In many countries, reptiles continue to receive weaker safeguards, often subordinated to fisheries or land-use concerns. The increase in Sundarban crocodiles suggests that India's model of combining blanket legal protection with site-specific captive breeding and release programmes has been effective. But in absolute terms, the law still has gaps: it does not adequately anticipate emerging threats linked to climate change, rising salinity or habitat fragmentation. Protection has also been reactive.

As hypercarnivorous apex predators, crocodiles regulate prey populations and remove carcasses from water channels, contributing to the health of mangroves. Thus, their presence signals that creeks and rivers still sustain a functioning food web despite immense pressures from human settlement, cyclones and sea-level rise. Better juvenile survival also indicates that the breeding habitat retains sufficient quality. This is an important ecological marker for the delta, where rising salinity and erosion are narrowing the niches available to wildlife. If the crocodile population can establish a stable age structure, it may bolster the resilience of the Sundarbans' mangrove networks. The species' trajectory also highlights what can be done for other neglected ones. Current Schedules under the Act should be accompanied by proactive, well-funded recovery plans, and public communication strategies need to be recalibrated. The crocodiles did not gain numbers because they became beloved but because conservation agencies invested in their protection. A similar shift in focus can support other species. Climate change integration is also essential. Saltwater crocodiles tolerate wide salinity ranges but many amphibians or freshwater reptiles do not. Anticipatory measures including identifying climate refugia and enabling assisted breeding are thus required. The recovery illustrates that non-charismatic species can benefit from law and policy with sustained attention. For India, the lesson is that a richer, more inclusive, vision of conservation is possible and necessary.

Previous Year Questions (PYQs)

- Q. Which one of the following is the national aquatic animal of India? [2015]
- (a) Saltwater crocodile
 - (b) Olive ridley turtle
 - (c) Gangetic dolphin
 - (d) Gharial





Cutting off online gaming with the scissors of prohibition

In a manner akin to a stealth operation, the Government of India pushed the Promotion and Regulation of Online Gaming Bill 2025 in Parliament as the monsoon session drew to a close. This Bill outlawed online real money games while aiming to promote the growth of e-sports and online social games. The Bill was rushed through both Houses without any debate and was not preceded by any consultations with the affected industry or with States, which have jurisdiction over key aspects of the topic.

Online gaming was a sunrise sector in India and had seen significant foreign investment. This sudden ban will have repercussions for foreign direct investment across domains. Why would global investors trust India when rules flip overnight, and when the government kills one of the few digital industries where India could lead globally?

The fallout

Online gaming sits at the intersection of technology, payments, and digital content – the very sectors India claims to champion under the banner of Digital India. Choking this industry means shutting the doors on thousands of skilled jobs, slowing down innovation, and discouraging entrepreneurship at a time when the economy desperately needs them all.

When job creation in India is pitifully slow and at a time when the world is investing in gaming as the next digital frontier, this Bill has directly resulted in tremendous job losses. The gaming sector was on track to employ 1.5 lakh people by 2025 – across development, design, programming, customer support and analytics. These are precisely the kinds of cutting-edge, quality tech jobs India needs in its digital economy. Some of these will survive the ban.

Online real-money games were expected to generate about ₹17,000 crore in Goods and Services Tax (GST) revenue for the Union



M.V. Rajeev Gowda

is a former Member of Parliament (Congress)

The Promotion and Regulation of Online Gaming Bill 2025 will only end the prospects of a sunrise sector

government and States. By closing this source of revenue, the Centre has unilaterally cut off a crucial revenue source for States also, while making a significant sacrifice. Why?

The government's central arguments in support of the ban are that online real money games have resulted in financial ruin for players and resulted in something akin to drug addiction. That it is clearly a societal harm that needed to be addressed urgently. However, is the ban likely to provide a cure? Or, would careful regulation, as being developed in States such as Tamil Nadu, provide a more balanced resolution? Were there other, possibly better, ways to curb the negative side-effects of online real money games?

Glossing over responsible gaming

Online gaming companies were working on technological initiatives to identify and prevent problematic gaming. Responsible play tools already exist and are proven globally. These include age-gating to restrict access to minors, self-exclusion mechanisms, deposit and time limits, bot-detection systems, Know Your Customer (KYC) and Anti-Money Laundering (AML) checks, and ethical advertising standards. Instead of strengthening such safeguards, the ban abruptly destroys them, leaving players more vulnerable than before.

If online gaming platforms that complied with taxation and regulation are forced out, compulsive players will inevitably find a way to shift to illegal apps hosted by offshore or underground networks. Such platforms operate beyond the reach of Indian authorities, pay no taxes, and expose consumers to fraud and unsafe practices. The government will not only lose revenue but also inadvertently encourage the very illegal gambling rackets that it seeks to curb. This ban would just end accountability. The real issue here is regulatory capacity. Instead of building strong oversight frameworks which

balance public interest with private profit, India has fallen back on the blunt tool of prohibition.

The ban also violates constitutional provisions, judicial doctrines and strikes a blow to federalism. Article 19(1)(g) of the Constitution grants every person the fundamental right to practise any profession or business. The ban attacks the very foundations of this right. With one piece of legislation, a thriving industry has been dealt a body blow. If the concern was about the promotion of gambling, the Union government should have consulted with States as regulation of betting and gambling are State subjects. The new law has already been challenged in courts as it raises several questions of constitutional propriety.

A grey zone concerning online gaming has been whether it constitutes a 'game of skill' or a 'game of chance'. Judicial decisions have consistently upheld the legitimacy of games of skill. States are allowed to regulate or ban games of chance or gambling. Good regulation would clear the doubts around this subject.

A middle ground exists

Ideally, legislation should be developed which protects players, prevents addiction and exploitation, and addresses the priorities of various stakeholders and States. The choice is not between prohibition and a free-for-all. There is a middle ground: a clear licensing framework, strict compliance standards, and a taxation regime that is fair but predictable.

Banning online real money gaming, on the other hand, only ensures that both revenues and opportunities vanish into the underground economy, while leaving players unprotected and vulnerable. Time will tell whether, through this ban, India has protected its citizens or failed them.

The views expressed are personal

What do SC guidelines say on DNA?

Why did the Supreme Court intervene in DNA samples in criminal cases? What lapses did the court uncover? What has the court said about DNA reliability in past rulings? What do the new guidelines mandate? Is DNA alone enough to convict?

EXPLAINER

R.K.Vij

The story so far:

The Supreme Court, in *Kattavellai @ Devakar v. State of Tamil Nadu*, recently issued guidelines to maintain the integrity of deoxyribonucleic acid (DNA) samples in criminal cases. The court directed the Director Generals of Police of all States to prepare sample forms of the Chain of Custody Register and all other necessary documentation as directed, and to ensure their dispatch to all districts with instructions.

What was the need to issue such directions?

The court, in the above case involving rape, murder, and robbery with an attempt to cause death, found significant unexplained delays in sending samples of the vaginal swabs to the Forensic Science Laboratory (FSL) for DNA analysis. Moreover, the chain of custody of the sample could not be established. Under such circumstances, the court held that the possibility of sample contamination could not be ruled out.

The court observed that although some guidelines have been issued by various bodies, there is neither uniformity nor a common procedure required to be followed by all investigating authorities. Even though 'Police' and 'Public Order' are subjects mentioned in the State List of the Seventh Schedule of the Constitution, the Supreme Court deemed it necessary to issue these guidelines to have uniformity of procedure.

What are the guidelines?

The Supreme Court issued four guidelines for cases where DNA evidence is involved. The first guideline states that the collection of DNA samples once made



DNA is a molecule that encodes the genetic information in all living organisms. GETTY IMAGES

after due care and swift and appropriate packaging, including FIR number and date, the sections and statutes involved, details of the investigating officer, the police station, and the requisite serial number, shall be duly documented. The document recording the collection must include the signatures and designations of the medical professional present, the investigating officer, and independent witnesses.

Second, the investigating officer shall be responsible for the transportation of the DNA evidence (sample) to the concerned police station or hospital, as the case may be. He must also ensure that the samples reach the concerned FSL within 48 hours of collection. In the event of any delay, the reasons must be recorded, and all efforts should be made to preserve the samples.

Third, while samples are stored pending trial or appeal, no package shall be opened, altered, or resealed without express authorisation from the trial court.

The fourth guideline states that from the time of collection to the logical end, i.e., conviction or acquittal of the

accused, a Chain of Custody Register must be maintained. This register must be appended to the trial court record. The investigating officer is responsible for explaining any lapses in compliance.

What has the Supreme Court said so far?

The DNA profiles have a tremendous impact on criminal investigations. In *Anil v. State of Maharashtra* (2014), the Supreme Court observed that a DNA profile is valid and reliable, but this depends on quality control and procedure in the laboratory. However, in the *Devakar* case, the court said that quality control and procedure outside the laboratory are equally important to ensure that the best results can be derived from collected samples.

In a three-judge Bench decision in *Manoj and Ors. v. State of Madhya Pradesh* (2022), the Supreme Court rejected a DNA report on the ground that recovery was made 'from an open area and the likelihood of its contamination cannot be ruled out'. It was also observed that the blood stains found on the articles were

disintegrated, and the quantity was insufficient to run any classification test.

In another case, *Rahul v. State of Delhi, Ministry of Home Affairs* (2022), DNA evidence was 'rejected because it remained in the police Malkhana for two months and during such time, the possibility of tampering could not be ruled out'. It was said that 'the collection and sealing of the samples sent for examination were not free from suspicion'. The court also said the trial court and the High Court did not examine the underlying basis of the findings in the DNA reports or whether the techniques used had been reliably applied by the concerned expert.

Therefore, while the investigating agency needs to ensure that samples are collected properly, without any possibility of contamination, and sent to the FSL without any (unexplained) delay, the expert must also ensure proper quality control and procedure in the FSL.

How important is the DNA evidence in criminal cases?

DNA is a molecule that encodes the genetic information in all living organisms. It can be obtained from biological materials, such as bone, blood, semen, saliva, hair, or skin. Generally, when the DNA profile of a sample found at a crime scene matches the DNA profile of a suspect, it can be concluded that both samples have the same biological origin. However, it is not substantive evidence in criminal cases.

The Supreme Court, in the *Devakar* case, stated that DNA evidence is in the nature of opinion evidence as envisaged under Section 45 of the Evidence Act (Section 39 of the Bharatiya Sakshya Adhiniyam, 2023), and like any other opinion evidence, its probative value varies from case to case. Therefore, DNA evidence must be proved scientifically and legally.

R.K. Vij is a former IPS officer

THE GIST

▼ The Supreme Court has issued uniform guidelines to ensure the integrity of DNA samples in criminal cases, directing strict documentation, swift transfer, and a clear chain of custody.

▼ Past rulings show that lapses in handling have led to DNA reports being rejected, making both proper collection and quality control essential.



How serious is the global plastic pollution crisis?

What role should governments and individuals play in curbing plastic use?

Prakash Nelliya

The story so far:

Rapidly increasing plastic pollution is a serious global environmental issue as it significantly impacts ecosystems, their functions, sustainable development, and ultimately the socio-economic and health dimensions of humanity. With this realisation, this year's World Environment Day (June 5) focused on "Ending Plastic Pollution" and encouraging worldwide awareness and action against it.

How serious is the issue?

The OECD's 'Global Plastic Outlook' reveals that global plastic consumption has increased significantly due to the growth of emerging economies and markets. Plastics production doubled from 2000 to 2019, reaching 460 million tonnes, while waste generation grew to 353 million tonnes. Nearly two-thirds of plastic waste has a lifespan of less than five years, with 40% coming from

packaging, 12% from consumer goods, and 11% from clothing and textiles. Among this waste, only 9% is recycled. Another 19% is incinerated, 50% ends up in landfills, and 22% evades waste management systems, often entering uncontrolled dumpsites, being burned in pits, or ending up in terrestrial or aquatic environments, especially in poorer countries.

According to the Intergovernmental Negotiating Committee on Plastic Pollution, in 2024 alone, 500 million tonnes of plastic were produced or used, generating around 400 million tonnes of waste. If the current trends continue, global plastic waste could almost triple by 2060, reaching 1.2 billion tonnes.

The Ocean Conservancy data reveal that each year, 11 million tonnes of plastic enter the ocean, in addition to the estimated 200 million tonnes that already flow through our marine environment. According to a United Nations Environment Programme (UNEP) expert, if the current rate of plastic production and waste generation continues, there

will be more plastic in the ocean than fish by the mid-century.

Why is plastic pollution such a grave problem?

The non-biodegradable character of plastics is a serious challenge. It simply breaks into smaller and smaller pieces over time, creating micro- and nano-plastics that infiltrate and contaminate every part of the planet, from the summit of Mount Everest to the depths of the oceans. Plastics account for 3.4% of global greenhouse gas emissions. UNEP has stated that plastic production, use, and disposal could account for 19% of the total global carbon budget by 2040.

What remedies are being proposed?

At the fifth session of the UN Environment Assembly (2022), all 193 UN member states agreed to end plastic pollution through a legally binding international agreement. This is critical to achieving the UN Sustainable Development Goals, including climate action, sustainable consumption and production, protection

of oceans, and the restoration of ecosystems and biodiversity. UNEP's ambitious goal of reducing plastic waste by 80% within two decades requires serious action and international cooperation, innovation, better product design, and environment-friendly alternatives, as well as efforts to improve waste management and increase recycling.

As plastics and their chemical additives are primarily made from petrochemical feedstock, limiting their production and eliminating unnecessary items, especially single-use plastics, is urgent.

Governments should permit production only within existing legal frameworks.

Most plastics used today are virgin (primary) plastics, while global production of recycled (secondary) plastics is only 6%. Improving recycling technologies and building profitable markets for recycled plastics are crucial.

Imposing landfill and incineration taxes can incentivise recycling. Extended Producer Responsibility schemes, landfill taxes, deposit refunds, and pay-as-you-throw systems need to be introduced.

Finally, people must adopt greener alternatives that have been used in the past. The media, too, has a significant role to play in shaping awareness.

Prakash Nelliya is Former Fellow, Centre for Biodiversity Policy and Law at the National Biodiversity Authority, Chennai, and the co-author of the books:

'Biodiversity Conservation through Access and Benefit Sharing' and 'Biodiversity and Business'

THE GIST

Plastic pollution is a serious global environmental issue that significantly impacts ecosystems, sustainable development, and human health, with rapidly increasing production and waste threatening oceans and the climate.

Addressing the crisis requires urgent international action, improved recycling, limiting production of unnecessary plastics, and responsible behaviour by individuals and governments.

Amit Khare appointed Secretary to Vice-President

The Hindu Bureau

NEW DELHI

The Union government on Sunday appointed former IAS officer Amit Khare as Secretary to the new Vice-President, C.P. Radhakrishnan.

Mr. Khare has been serving as Adviser to the Prime Minister since October 12, 2021, handling matters related to the social sector in the Prime Minister's Office. He was also part of the core team that formulated and implemented the National Education Policy, 2020.

Alma mater

A 1985-batch Jharkhand cadre IAS officer, Mr. Khare is a graduate of St. Stephen's College in Delhi, and holds a postgraduate degree in business administration from the IIM, Ahmedabad.

He is noted for his role in exposing the "fodder scam" of Bihar. He has also worked as Secretary, Information and Broadcasting, and Secretary, Higher Education. His appointment will be for a period of three years from the date he assumes charge.



PM inaugurates India's first bamboo-based ethanol plant

Golaghat facility billed as world's first green bamboo bioethanol plant; ₹7,230-crore polypropylene project also initiated at Numaligarh Refinery; the facility aims to reduce dependence on fossil fuels

The Hindu Bureau
GUWAHATI

Physical Minister Narendra Modi on Sunday underscored the need for India to be self-sufficient in energy. He was speaking after inaugurating the country's first bamboo-based ethanol plant in eastern Assam's Golaghat district.

He laid the foundation stone for a ₹7,230-crore polypropylene plant at the Numaligarh Refinery. The project will be established near the ₹5,000-crore bioethanol plant, a "zero-waste" facility described as the world's first to produce ethanol from green bamboo.

Terming the bioethanol plant a step toward ensuring energy security, Mr. Modi said the facility aimed to promote clean energy and reduce dependence on fossil fuels.

"Assam is a land that supports India's energy efficiency. The petroleum products from Assam are accelerating the development of India. The BJP government is trying to take this capacity of Assam to a new level," he said at a public event.

"India is one of the fastest-growing economies in



Clean energy: Prime Minister Narendra Modi during the inauguration of Assam Bio-Ethanol Private Ltd. (ABEL), Numaligarh Refinery Plant, in Golaghat on Sunday. (PI)

the world now. Our energy needs have been increasing with our Viksit Bharat dream. We spend crores of rupees on imports as we are dependent on other countries for energy. We want to change this by trying to achieve self-sufficiency in energy," the Prime Minister said.

Deep-water exploration

"While we are focusing on hydrocarbon exploration, we are also laying stress on green energy like solar," he said, highlighting the country's national deep-water exploration mission to

look for hydrocarbons under the sea. Referring to the bioethanol plant, Mr. Modi said it would benefit local farmers and tribal communities.

"The government will help them grow and procure the products to ensure a win-win situation," he said. He criticised the erstwhile Congress governments for penalising people for cutting bamboo, which was earlier categorised as a tree. He said the BJP government removed the ban on bamboo cutting and stressed that the decision was helping the locals

in this part of the country.

Numaligarh Refinery Limited (NRL) officials said five lakh tonnes of green bamboo would be sourced yearly from four northeastern States, including Arunachal Pradesh and Assam, to produce 48,900 tonnes of ethanol, 11,000 tonnes of acetic acid, 19,000 tonnes of furfural, and 31,000 tonnes of food-grade liquid carbon dioxide. A joint venture of NRL and Finland's Fortum and Chempolis OY, the plant is expected to give a ₹200-crore boost to Assam's rural economy.



The vaccine was developed by the University of the Sunshine Coast in Queensland, Australia.

Australia approves first vaccine to save koalas from chlamydia

Associated Press

Australian government has approved the world's first vaccine to protect koalas from chlamydia infections, which are causing infertility and death in the iconic native species that is listed as endangered in Australia.

The single-dose vaccine was developed by the University of the Sunshine Coast in Queensland state after more than a decade of research by professor of microbiology Peter Timms.

The research showed the vaccine reduced the likelihood of koalas developing symptoms of chlamydia during breeding and decreased mortality from the disease in wild populations by a half.

The recent approval by Australia's veterinary regulator means the vaccine can now be used in wildlife hospitals, veterinary clinics, and in the field to protect the nation's most at-risk koalas, Timms said.

"We have a single-dose vaccine with no need for a booster — was the answer to reducing the rapid, devastating spread of this disease, which accounts for as much as half of koala deaths across all wild populations in Australia," Timms said in a statement.

"Some individual colonies are suffering from local extinction every day," Timms said. "In northern Queensland and New South Wales, where infection rates are highest, up to 90% of koalas are infected with the disease, and in some cases can reach as high as 90%," Timms added.

Deborah Tibbitt, chair of the conservation charity Australian Koala Foundation, said resources being spent on vaccinating koalas should be redirected to saving koala habitat.

"If the risk of chlamydia infection, how can we protect the koala population? You can vaccinate 100,000 koalas but you can't protect their habitat," Tibbitt said.

Some colonies are closing closer to local extinction, particularly in southeast Queensland and New South Wales, where infection rates are around 80% and can reach as high as 90%.

Tibbitt's foundation estimates there are fewer than 100,000 koalas in the wild. The government-backed National Koala Monitoring Program estimates last year there were between 224,000 and 324,000 koalas.

Except that chlamydia is an issue for koalas, but it also went beyond to understand that they're sick because they have chlamydia, Tibbitt said.

The Queensland Conservation Council, an umbrella organization for more than 50 environmental groups across the state, welcomed the vaccine. But the council's director, Jane Copson, echoed Tibbitt's focus on preserving koala habitat.

"It's really good news. Chlamydia is one of the few diseases that has been a priority program for koala protection," Copson said.

"Koalas were at risk before chlamydia outbreaks, and they still remain at risk even if we manage chlamydia perfectly, because we keep on destroying their habitat," he added.

Koalas are listed as endangered species in the states of Queensland and New South Wales and in the Australian Capital Territory, with habitat loss due to wildfires, and urban expansion as the major threat. Chlamydia can cause urinary tract infections, infertility, blindness and death.

Treatment with antibiotics can damage an infected koala's ability to digest eucalyptus leaves. As koala food source, eucalyptus leaves, the university said in a statement. The research has been supported by the federal, New South Wales and Queensland governments.



Previous Year Questions (PYQs)

Q. A class of animals known as Marsupials is a characteristic feature of : [2001]

- (a) Africa
- (b) Australia
- (c) South America
- (d) South-east Asia

Mosquitoes suck – but should we simply get rid of them?

Scientists previously believed that as the world got hotter, mosquitoes might be forced to move to cooler areas. But it seems they can keep pace with a changing climate, so populations may actually expand. In such a world, does it make sense to try and wipe out some mosquitoes altogether?

Rohini Subrahmanyan

The U.S. Centres for Disease Control and Prevention (CDC) calls mosquitoes the "world's deadliest animals." They have good reason. Small, annoying but dangerous: this disease-carrying insect helps kill more than a million people in the world every year.

Now, as the world becomes warmer, their domain could be expanding. Previously, mosquitoes were only a concern in the warmer, tropical areas of the world. But now, malaria cases in the U.S. are on the rise, as are the number of warm and humid days when the insects can thrive.

Mosquitoes can adapt
Anopheles mosquitoes, which spread malaria, are spreading into cooler and drier parts of the African continent. A London School of Hygiene and Tropical Medicine study warned that if the current rate of emissions continues, billions more people will be at risk of dengue and malaria by 2100.

Mosquitoes can also adapt to higher temperatures. A team of University of California Berkeley scientists reported on January 7 that mosquitoes had natural variations in their genes that helped them tolerate heat better. "This paper found that mosquitoes might have the ability to respond to warming temperatures, rather than just being static players and just taking it and dying," said Dr. Lisa Couper, an environmental health scientist at Stanford University and lead author of the paper.

Scientists previously believed that as some parts of the world got hotter, mosquitoes might be forced to move to cooler areas, shifting the populations of the mosquitoes. But if they can keep pace with the changing climate, mosquito populations may actually expand their territories even further.

Against the backdrop of a world increasingly in the clutches of mosquito-borne diseases, does it make sense for scientists to try and wipe out some mosquitoes altogether, especially the ones that spread diseases?

Molecular biologists, environmental health scientists, and mosquito ecologists are all united by the goal to reduce the deadly impact of mosquitoes in our world – yet each group has varying takes on the topic of eradicating them altogether.

Sterling clear of extremes
"There are over 3,000 species of mosquitoes," Dr. Couper said. "If we just target the few species that are vectors for human disease, like the ones that carry dengue and malaria, [or] West Nile virus for example, I don't think that there's a major ecological harm that comes from eliminating those."

Getting rid of all the mosquitoes could have ecological ramifications, as some of them may be plant pollinators or their larvae could be food to small fish. Of the 3,000+ species of mosquitoes, eradicating some could affect the delicate balance of certain food chains. But the ones that spread disease may not even have a major role to play in pollination.

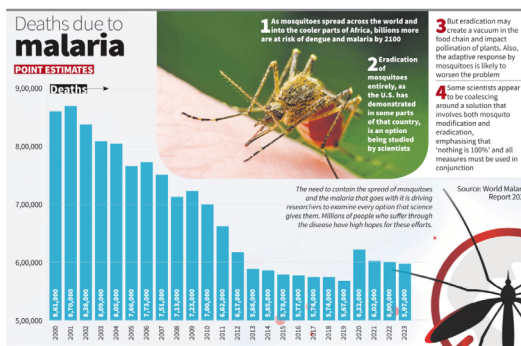
Mosquito eradication also need not be permanent, according to Dr. Andrea Smidler, a molecular biologist working on genetic engineering in mosquitoes at the University of California, San Diego (UCSD).

In the 1950s, the U.S. used to have cases of malaria. But federal relief organisations took aggressive mosquito control and malaria prevention steps – improving drainage, eliminating breeding grounds, and spraying insecticides like DDT – until the disease was eliminated from the country in 1951. The Anopheles mosquitoes were temporarily eradicated or at least brought down to such low levels that they couldn't spread the disease.

Later, however, there were mosquitoes that could transmit malaria again. "But when there's a malaria case, the CDC comes in and wipes out the mosquito locally and eliminates transmission," Dr. Smidler explained. "It's probably too difficult to expect [eradication] to be permanent, right?"

"Their one job in life..."

Some scientists believe using only insecticides to eradicate mosquitoes is futile because of how adaptable they are. "Eradicating mosquitoes is similar to killing bacteria with antibiotics," Dr. Marcelo Jacobs-Lorena, an entomologist at the Johns Hopkins Bloomberg School of Public Health in Maryland, the U.S., said. "It works very well in the beginning [but]



gradually the bacteria become resistant to the antibiotics, and that's exactly what's happening with the mosquitoes."

He referred to a graph in the 2024 WHO Malaria Report, which shows how malaria-induced deaths worldwide dropped by nearly half from 2000 to 2015. "But from 2015 to present, there is no change. It stopped declining..."

because mosquitoes become resistant." Insecticides like DDT also wrought significant environmental harm. A 1962 book called *Silent Spring* by Rachel Carson documented how DDT caused birds to lay eggs without shells.

Enter chemical-free, species-specific elimination methods like the sterile insect technique. The idea was to sterilise the male mosquitoes of a specific species and release hundreds of them back into the population.

"The males are literally flying penises in these insect systems; they don't bite; they don't spread diseases; their one job in life is to find a female and mate with her," Dr. Smidler said. "In mosquitoes, it's only females that bite and spread disease." When a normal female mates with one of the sterile males, they won't produce any viable offspring. So by slowly flooding the population with sterile males can lead to a population crash, a method that scientists have previously used to eliminate pests like the screw-worm fly (*Cochliomyia hominivorax*).

Frying pan or fire?

But traditional methods to sterilise the male flies involves irradiating their reproductive organs with X-rays, which leads to many males dying as well.

Some scientists are developing precision-guided sterile male techniques to further optimise the strategy. Using CRISPR-Cas9 methods to specifically target genes that affect fertility, Dr. Smidler and her colleagues in Dr. Omar Akbari's lab at UCSD are trying to create genetically modified sterile males. They also aim to target genes that cause "femaleness," such that all offspring end up being males.

The WHO also encourages research on genetically modified mosquitoes – as long as scientists are "supported by clear governance mechanisms to evaluate the health, environmental and ecological implications," according to a 2020 position statement.

Additionally, scientists are repurposing existing drugs to be used as

We should continue treating people to eliminate the reservoir, we should also continue killing mosquitoes. It's important not to rely on one approach but to combine every approach

DR. MARCELO JACOBS-LORENA
JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, MARYLAND

mosquito-killers. A team of scientists at Liverpool School of Tropical Medicine investigated the use of nitroson, an FDA-approved drug that is taken by patients with rare metabolic disorders. They discovered that drinking blood containing the drug was lethal to the malaria-causing *Anopheles gambiae*, as it acts by blocking a key enzyme the mosquitoes rely on for digesting their blood meals. Nitroson outperformed another mosquitoicidal drug ivermectin and even killed insecticide-resistant mosquitoes.

However, Dr. Phil Lounibos, a mosquito ecologist at the University of Florida, said that mosquito reduction or eradication may not be the most prudent way forward to curb diseases. He pointed out that even if one species is locally removed, another, potentially more dangerous species could quickly move into the area – or the same species could reinstate as well.

"The chances of actually getting rid of many of these vector species is relatively challenging; not only do they reproduce very fast, many of them are species that have been skilled in invading new environments," he said.

"Even if a project aimed at mosquito reduction is successful locally, you're going to need to set up a laboratory skilled at producing more of the modified mosquitoes that are used in the reduction efforts," Dr. Lounibos added.

"Nothing is 100%"

Dr. Scott O'Neil, founder and CEO of the World Mosquito Program non-profit, figured out a way to curb disease spread without eliminating mosquitoes altogether. He and his team discovered that *Wolbachia*, a naturally occurring bacterium in some insects, protected these insects from viral infections. They transferred *Wolbachia* into *Aedes aegypti* mosquitoes and realised that the bacteria

prevented dengue viruses from growing inside the mosquitoes. It could also be used to target chikungunya, yellow fever, and Zika viruses.

When they breed and released these *Wolbachia* mosquitoes locally in some places in Australia, Brazil, Colombia, and other countries, the modified mosquitoes could not transmit viruses as much, leading to a reduced spread of dengue.

The bacteria can also pass down generations in mosquitoes, making it a more sustainable disease control method. To the Australian regions where Dr. O'Neil first deployed it, team members were even able to show that dengue transmission had completely stopped. "It is mosquito modification as opposed to mosquito reduction, and I still feel that this is potentially a much more powerful tool," Dr. Lounibos said.

There was one drawback. Unlike *Aedes aegypti* mosquitoes that spread viruses, *Anopheles* mosquitoes spread a parasite called *Plasmodium* – which causes malaria – and *Wolbachia* didn't seem to work well in these mosquitoes. But then, GlaxoSmithKline researchers stumbled upon a bacterium that seemed to prevent *Plasmodium* infections in their *Anopheles* mosquitoes. They reached out to Dr. Lorena for help.

Dr. Lorena and his colleagues found that this bacterium secreted a toxic product called harmaline that could block *Plasmodium* parasites from developing in the mosquito gut. Just like *Wolbachia* in *Aedes aegypti*, this bacterium could "cure" *Anopheles* mosquitoes of the *Plasmodium* parasite, preventing them from carrying malaria. "The bacteria method does not rely on killing mosquitoes. So every mosquito becomes resistant. They continue to bite people but without transmitting the disease," Dr. Lorena said.

Dr. Lorena and his team had also previously discovered a different bacterium that prevented *Plasmodium* infections in mosquitoes. This one had the advantage of being able to spread across mosquitoes more easily, passing down mosquito generations via the female's eggs and being sexually transmitted from males to females. In the next steps, the scientists aim to test these methods extensively in wild *Anopheles* populations.

Dr. Lorena doesn't support the idea of stopping the killing of mosquitoes altogether. "Nothing is 100%," he said. "What we envision is these bacteria being a new tool that's added to all the existing tools."

According to him, these different strategies should all be used together to stop mosquitoes from spreading diseases like malaria. Even the act of eradicating mosquitoes – like the other tools – need not be the ultimate goal, but just another cog in the wheeling towards ridding the world of mosquito-borne diseases.

We should continue treating people with malaria to eliminate the reservoir, we should continue killing the mosquitoes as well as we can – even though it's getting less effective. We are now gradually introducing vaccines. What's extremely important is not to rely on only one approach but to combine every single approach together," he advised.

(Rohini Subrahmanyan is a freelance journalist in Bengaluru. roh.sub@gmail.com)



Scientists recommend that existing prevention and eradication measures be continued. (1)

Previous Year Questions (PYQs)

Q. Consider the following statements: [2017]

1. In tropical regions, Zika virus disease is transmitted by the same mosquito that transmits dengue.
2. Sexual transmission of Zika virus disease is possible.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

TATHASTUICS