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समाचार पत्रों से चयनित अंश

Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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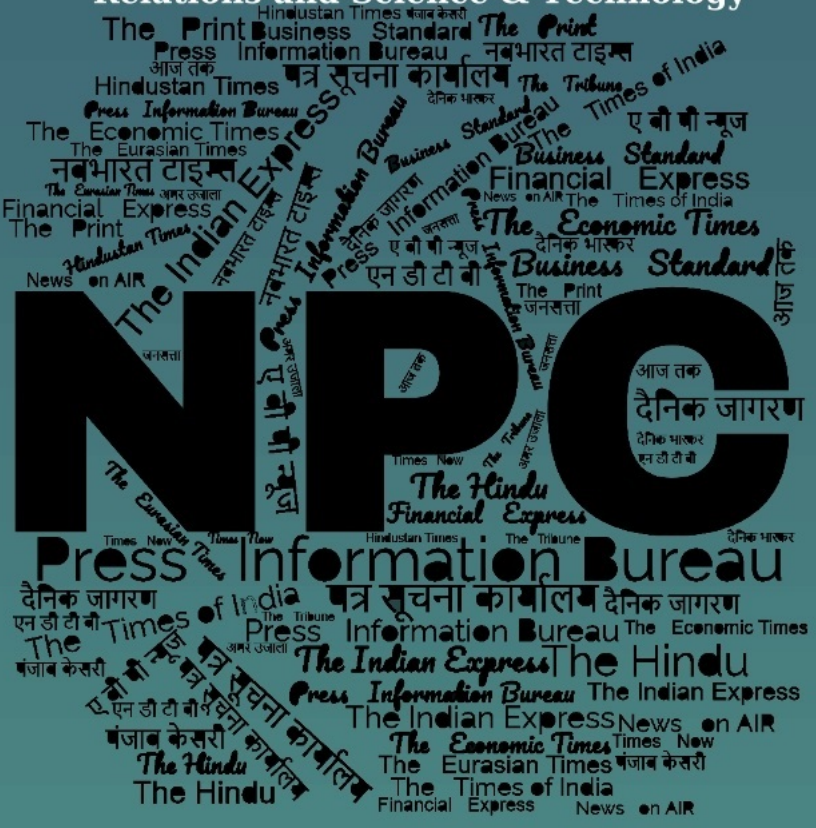

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DRDO News

एनसीआर को हवाई खतरों से बचाने के लिए तैनात होगा स्वदेशी एयर डिफेंस सिस्टम

Source: Dainik Jagran, Dt. 10 Dec 2025

- एनसीआर में महत्वपूर्ण प्रतिष्ठानों की सुरक्षा करेगा, वायुसेना के अधीन करेगा काम
- इससे पहले अमेरिका निर्मित एनएएसएएमएस-2 तैनात करने की बनाई थी योजना

नई दिल्ली, एएनआइ : एक बड़े घटनाक्रम में भारत राष्ट्रीय राजधानी क्षेत्र (एनसीआर) को मिसाइलों, ड्रोन और तेज रफ्तार वाले विमानों जैसे दुश्मन के हवाई खतरों से बचाने के लिए स्वदेशी इंटीग्रेटेड एयर डिफेंस सिस्टम तैनात करने की दिशा में आगे बढ़ रहा है।

वरिष्ठ रक्षा सूत्रों ने बताया कि एनसीआर की सुरक्षा के लिए मल्टीलेयर इंटीग्रेटेड एयर डिफेंस वेपन सिस्टम (आइएडीडब्ल्यूएस) स्वदेशी एयर डिफेंस मिसाइलों जैसे क्विक रिएक्शन सरफेस टू एयर मिसाइल (क्यूआरएसएएम) सिस्टम और वेरी शार्ट रेंज एयर डिफेंस सिस्टम के साथ तैनात होगा। आइएडीडब्ल्यूएस पर एनसीआर में महत्वपूर्ण प्रतिष्ठानों की सुरक्षा की जिम्मेदारी होगी और यह भारतीय वायुसेना के अधीन होगा। रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) इस परियोजना पर प्रोडक्शन एजेंसियों के साथ काम करेगा जो नेटवर्किंग और कमांड-कंट्रोल पर काम करेंगी। स्वदेशी हथियार प्रणाली को तैनात करने की योजना घरेलू रक्षा प्रणालियों को बढ़ावा देगी क्योंकि भारत ने पहले अमेरिकी निर्मित नेशनल एडवांस्ड सरफेस टू एयर मिसाइल सिस्टम-2 (एनएएसएएमएस-2) को तैनात करने की योजना बनाई थी। दोनों देशों ने अमेरिकी सिस्टम की बिक्री के लिए बातचीत भी शुरू कर दी थी जो वाशिंगटन डीसी और वहां व्हाइट हाउस की रक्षा करता है। सूत्रों ने बताया कि भारत सरकार अमेरिका के साथ इस सौदे पर आगे नहीं बढ़ी क्योंकि वह बहुत अधिक कीमत मांग रहा था। रक्षा मंत्रालय इस परियोजना को ऐसे समय क्रियान्वित कर रहा है जब पाकिस्तान ने इस वर्ष मई में आपरेशन सिंदूर के दौरान देश को निशाना बनाने की कोशिश की थी।

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Defence News

India-Nepal Army exercise concludes in Uttarakhand

Source: The Hindu, Dt. 10 Dec 2025

The India-Nepal joint military exercise, SURYAKIRAN-XIX, concluded at Pithoragarh in Uttarakhand on Tuesday (December 9, 2025). Marking the end of the intensive combined training cycle, the Directors-General of Military Operations (DGMOs) of the Indian and Nepal armies jointly witnessed and validated a two-day Battalion-level Validation Exercise at the Foreign Training Node in Pithoragarh.

The Indian Army said the validation phase showcased joint tactics, techniques and procedures for counter-terrorism operations mandated under Chapter VII of the UN Charter. The drills featured a suite of cutting-edge technologies, including ISR (intelligence, surveillance, and reconnaissance) and precision-targeting drones, advanced day/night weapon sights, AI-enabled surveillance feeds, unmanned operational and logistics platforms, and secure battlefield communication systems.

The exercise underscored seamless interoperability, synchronised mission planning and coordinated execution of combined tactical operations in a counter-terrorism environment across battalion, company and small-team levels. Troops carried out intelligence-based surgical missions in complex terrain, employing aerial insertion methods to strengthen rapid-response capability.

Reinforcing ties

Acknowledging the importance of shared security and humanitarian preparedness in the Himalayan region, both DGMOs lauded the exercise for enhancing operational synergy, deepening mutual trust and reinforcing the long-standing military brotherhood between the two Armies, the Army added.

As a mark of this enduring partnership, the DGMOs jointly planted a Tree of Friendship, reaffirming the timeless bonds and strategic cooperation between India and Nepal. SURYAKIRAN–XIX stands as a robust demonstration of unity, preparedness and partnership for regional peace and stability, the Army said in a release.

https://www.thehindu.com/news/national/india-nepal-army-exercise-concludes-in-uttarakhand/article70376384.ece

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India, France & UAE to kick off air drill today

Source: The Times of India, Dt. 10 Dec 2025

India on Wednesday will conduct a major air combat exercise with France and the UAE over the Arabian Sea, with the aim to further strengthen trilateral defence cooperation and enhance military interoperability in the Indian Ocean region and the larger Indo-Pacific. The IAF will deploy several fighters like Sukhoi-30MKIs and Jaguars, backed by IL-78 mid-air refuellers and AEW&C (airborne early-warning and control) aircraft, from airbases like Jamnagar and Naliya in Gujarat for the intensive combat manoeuvres.

France and the UAE, in turn, will field Rafale and Mirage fighters as well as other aircraft from the Al Dhafra airbase. India has issued a Notam (notice to airmen) for the exercise area, located around 200 nautical miles from Karachi in Pakistan, on Dec 10-11. The three countries had also undertaken such an air combat exercise called "Desert Knight" in Dec 2024.

India has been regularly undertaking such exercises to build military synergy with countries in the region, especially the Persian Gulf, in conjunction with other stakeholders like France, the US and Australia. "Bilateral, trilateral and multilateral exercises help refine combat skills, tactics and procedures in a realistic operational environment," an officer said.

The navies of India, France and the UAE, incidentally, had also conducted their first ever trilateral maritime partnership exercise to hone their combat skills against traditional as well as non-traditional threats through a wide spectrum of operations on the high seas in June 2023.

Under the trilateral framework launched by their foreign ministers in 2022, India, France and the UAE are working on several areas, including defence, technology, energy and environment, in tune with an ambitious roadmap chalked out by the countries.

https://timesofindia.indiatimes.com/india/india-france-uae-to-kick-off-air-drill-today/articleshow/125877218.cms

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Inaugural meeting of India-Brunei Joint Working Group on Defence Cooperation held in New Delhi to further strengthen bilateral ties

Source: Press Information Bureau, Dt. 09 Dec 2025

The inaugural meeting of India-Brunei Joint Working Group (JWG) on Defence Cooperation took place in New Delhi on December 09, 2025, marking a significant milestone in advancing the bilateral partnership between the two nations. Key areas that were discussed include expansion of military-to-military exchanges and joint training, maritime security collaboration, with focus on safety of sea lanes and Humanitarian Assistance & Disaster Relief, capacity building, opportunities for defence industry collaboration and technology cooperation.

The meeting was co-chaired by Joint Secretary, Ministry of Defence, Shri Amitabh Prasad and Deputy Permanent Secretary, Ministry of Defence, Brunei Ms Poh Kui Choon. Prior to the meeting, the co-chairs signed the Terms of Reference (ToR) for the establishment of JWG on defence cooperation.

The signing of the ToR marked the beginning of a new era of bilateral defence cooperation. The JWG serves as a constructive platform to review ongoing defence engagements and explore new avenues for cooperation.

Both sides welcomed the growing momentum in the defence partnership and agreed to implement a structured roadmap for cooperation under the JWG mechanism. They reaffirmed their shared commitment to maintaining peace, stability, and rules-based order in the Indo-Pacific region. The visiting Deputy Permanent Secretary also called on Defence Secretary Shri Rajesh Kumar Singh in New Delhi, as part of his two-day visit.

Ms Poh Kui Choon also visited DPSU Bhawan which is a new, state-of-the-art facility recently inaugurated by Raksha Mantri Shri Rajnath Singh in New Delhi as a central hub for all 16 Defence Public Sector Undertakings to foster collaboration, innovation, and showcase India's defence manufacturing capabilities to the world.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2200880&reg=3&lang=1

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Chief of the Naval Staff visit to Brazil

Source: Press Information Bureau, Dt. 09 Dec 2025

Admiral Dinesh K Tripathi, Chief of the Naval Staff (CNS), Indian Navy, has proceeded on an official visit to Brazil from 09 to 12 Dec 2025. The visit aims to consolidate the robust and growing maritime partnership between the Indian Navy and the Brazilian Navy, an important pillar of the broader India–Brazil Strategic Partnership.

During the visit, the CNS will hold discussions with senior leadership of Brazil, including Mr. Jose Mucio, the Defence Minister of Brazil; Admiral Renato Rodrigues de Aguiar Freire, Chief of the Joint Staff of the Brazilian Armed Forces; and Admiral Marcos Sampaio Olsen, Commander of the Brazilian Navy. These interactions will provide an opportunity to review ongoing bilateral maritime cooperation, enhance operational-level linkages, and explore new avenues for collaboration between the two navies.

The visit includes engagements with operational commands, visits to naval bases, and shipyards of the Brazilian Navy. Discussions will focus on shared maritime priorities, naval interoperability, capacity building, and collaboration within multilateral frameworks including the broader South–South collaboration.

The visit by the Chief of the Naval Staff reaffirms the Indian Navy's commitment to enhancing cooperation with the Brazilian Navy in the areas of maritime security, professional exchanges, and capacity building, thereby contributing to stability in the global maritime commons.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2200829&reg=3&lang=1

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India, US discuss trade, defence cooperation

Source: The Tribune, Dt. 10 Dec 2025

India and the US on Tuesday discussed a wide range of bilateral priorities, including trade and investment, defence cooperation, energy collaboration — particularly in the civil nuclear domain — as well as technology partnerships, critical minerals and trusted supply chains.

These discussions took place during the Foreign Office Consultations (FOC), co-chaired in New Delhi by Foreign Secretary Vikram Misri and US Under Secretary of State Allison Hooker.

According to the Ministry of External Affairs, the consultations offered an opportunity for a comprehensive review of the India-US Comprehensive Global Strategic Partnership. The two sides also exchanged views on regional and global developments of mutual interest, reaffirming their shared commitment to a free and open Indo-Pacific.

Both delegations welcomed the steady progress across existing dialogue mechanisms and agreed to accelerate the implementation of the “Catalysing Opportunities for Military Partnership, Accelerated Commerce and Technology (COMPACT) for the 21st Century” framework, aimed at driving transformative cooperation across key pillars of the relationship.

Meanwhile, a spokesperson for the US Embassy said the meeting helped advance the vision articulated by President Donald Trump and Prime Minister Narendra Modi during their February summit, translating it into concrete steps to strengthen US security, jobs and competitiveness while supporting India’s long-term strategic objectives.

Hooker added that the US sought to deepen collaboration in defence, energy, advanced technology, space and trusted supply chains, emphasising the value of a partnership that boosts American innovation while supporting India’s emergence as a global technology leader.

https://www.tribuneindia.com/news/india/india-us-discuss-trade-defence-cooperation/

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Science & Technology News

Chandrayaan-3 reveals high electrical activity near Moon surface

Source: The Pioneer, Dt. 10 Dec 2025

The electrical environment near the Moon’s surface in the south polar region is far more active than previously understood, ISRO said on Tuesday, based on an analysis of Chandrayaan-3 lander data.

The Chandrayaan-3 data, obtained between August 23 and September 3, 2023, provided critical ground truth on the Moon’s plasma environment. In a statement, ISRO said, “Analysis of the Chandrayaan-3 lander data has yielded significant and first-of-its-kind results on the plasma environment near the Moon’s surface at southern higher latitudes, revealing that the electrical

environment near the Moon's surface in the south polar region is far more active than previously understood."

In physics, plasma is often called the fourth state of matter, consisting of a mixture of charged particles, including ions and free electrons. Despite being electrically neutral overall, plasma is highly conductive and responds strongly to electromagnetic fields. "The Moon's thin plasma environment, or lunar ionosphere, is governed by several major processes. Solar wind, a continuous stream of charged particles (primarily electrons and hydrogen and helium ions) ejected from the Sun's upper atmosphere, constantly impinges on the Moon's surface," ISRO said.

This, along with the photoelectric effect, where high-energy photons from the Sun knock out outer-shell electrons from atoms on the surface and in the sparse atmosphere, causing ionisation, is the primary mechanism for generating plasma. The lunar plasma is further influenced by the deposition of charged particles originating from the Earth's magnetosphere (specifically the magnetotail) when the Moon passes through that region, typically for 3 to 5 days during 28 days, resulting in a constantly changing and dynamic electrical environment near the surface, ISRO said.

The results, obtained by the Radio Anatomy of the Moon Bound Hypersensitive Ionosphere and Atmosphere Langmuir Probe (RAMBHA-LP) instrument onboard the Vikram lander of Chandrayaan-3, mark the first-ever direct, or "in situ", measurements of lunar plasma at such low altitudes, it added. The agency said the electron density near the Chandrayaan-3 landing site, named Shiv Shakti Point, was measured to be between 380 and 600 electrons per cubic centimetre.

"This is significantly higher than estimates derived from observations taken at higher altitudes, which are primarily based on changes in the phase of electromagnetic signals from satellites passing through the Moon's thin atmosphere at grazing angles, a technique known as radio occultation," ISRO said. It also found that electrons near the Moon's surface possess remarkably high energy, with equivalent (kinetic) temperatures ranging from 3,000 to 8,000 Kelvin.

"The study uncovered that the lunar plasma is not static but is constantly modulated by two distinct factors, depending on the Moon's orbital position around the Earth," it noted. "These results from the RAMBHA-LP experiment provide essential ground truth needed for the next phase of lunar exploration," ISRO added. The RAMBHA-LP experiment was designed and developed by the Space Physics Laboratory (SPL) at the Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram.

https://www.dailypioneer.com/2025/india/chandrayaan3-reveals-high-electrical-activity-near-moon-surface.html

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Microsoft's USD 17.5 billion push signals India's leap into new AI era

Source: The Statesman, Dt. 10 Dec 2025

Microsoft announced a landmark USD 17.5 billion investment in India over four years, marking its largest commitment in Asia, aimed at expanding the country's cloud and artificial intelligence (AI) infrastructure, workforce skilling and operational capabilities. The announcement was made in a

statement issued soon after Microsoft Chairman and CEO Satya Nadella met Prime Minister Narendra Modi to discuss India's AI roadmap and growth priorities.

The company said the new commitment supplements the earlier USD 3 billion investment announced this year, which is expected to be fully deployed by the end of 2026. With this expanded investment, Microsoft is set to establish its largest hyperscale presence in India through a new data centre region scheduled to go live in mid-2026.

The tech major stated that its efforts align with India's ambition to build an AI-driven ecosystem at a national scale, focusing on "scale, skills and sovereignty". It added that India is at a "pivotal moment" in its AI journey as the country accelerates its digital and economic transformation.

Union Minister of Electronics and Information Technology Ashwini Vaishnaw welcomed the move, stating, "As AI reshapes the digital economy, India remains committed to innovation anchored in trust and sovereignty. Microsoft's landmark investment signals India's rise as a reliable technology partner for the world. This partnership will set new benchmarks and drive the country's leap from digital public infrastructure to AI public infrastructure."

Puneet Chandok, President of Microsoft India and South Asia, said, "Microsoft has been part of India's fabric for more than three decades. As the nation moves confidently into its AI-first future, we are proud to stand as a trusted partner… Our new USD 17.5 billion commitment and deep partnership across India's technology ecosystem are focused on turning India's AI ambition into impact for every citizen."

He added that the investment is anchored on building hyperscale infrastructure capable of operating AI at scale, deploying sovereign-ready solutions to ensure trust, and expanding skill-development programmes. A key component of the investment is the development of the India South Central cloud region in Hyderabad, projected to become the company's largest hyperscale region in the country with three availability zones.

Microsoft will also expand its existing data centre regions in Chennai, Hyderabad and Pune, enabling low-latency, mission-critical services for enterprises, startups and public institutions. Microsoft also announced that advanced AI tools will be integrated into the Ministry of Labour and Employment's e-Shram and National Career Service platforms, aimed at benefiting more than 310 million informal workers.

Built on Azure OpenAI Service, these enhancements include multilingual support, AI-enabled job matching, predictive analytics and automated resume creation. On the skilling front, Microsoft said it is doubling its commitment to train 20 million Indians in AI skills by 2030.

Through the ADVANTA(I)GE India initiative led by Microsoft Elevate, 5.6 million individuals have already been trained since January 2025, enabling more than 125,000 job or entrepreneurial opportunities. The company further announced the introduction of Sovereign Public Cloud and Sovereign Private Cloud solutions for Indian customers, offering environments tailored to regulatory compliance and data governance.

Microsoft 365 Copilot will also introduce in-country data processing by the end of 2025, making India one of the first global markets to receive the capability. Microsoft said the announcements reflect a reinforced commitment to building an ecosystem that advances innovation, trust and opportunity.

With expanded hyperscale infrastructure, AI integration into national platforms and a strengthened focus on skilling, the company said India is positioned to “lead the world in the AI era — powered by scale, skilling and sovereignty.”

https://www.thestatesman.com/world/microsofts-usd-17-5-billion-push-signals-indias-leap-into-new-ai-era-1503523732.html

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An Indian Nobel~I

-by O PRASADA RAO (retired Scientist, Council of Scientific & Industrial Research)

Source: The Statesman, Dt. 09 Dec 2025

India is home to some of the brightest scientific minds in the world, yet it has struggled to win international recognition in the form of Nobel Prizes in science. Since the Nobel Prize was first awarded in 1901, only 12 individuals of Indian origin have received it, and just five were Indian citizens. Among them, only one ~ Dr. C.V. Raman ~ won in the science category, way back in 1930 for his discovery of the Raman Effect. Nearly a century has passed since then, and despite many promising discoveries, Indian scientists have not returned to the Nobel stage.

This raises a crucial question: why does the Nobel Prize continue to elude Indian scientists, and what can be done to change that? To understand the issue, we must first look at the broader context of scientific research in India. The country has made significant strides in applied science and technology, especially in areas like space exploration, pharmaceuticals, and information technology. However, the Nobel Prizes in science typically honour fundamental research that opens new frontiers of knowledge. That kind of research requires long-term investment, intellectual freedom, and a culture that encourages bold thinking. Unfortunately, India still faces several challenges in these areas. One major issue is the nature of research itself.

Much of India’s scientific output involves adapting foreign technologies to local conditions rather than developing original, foundational innovations. This is partly because funding is limited and often only sufficient for small-scale, test-tube-level experiments. Large-scale, high-risk research projects that could lead to transformative discoveries require sustained investment, which is currently lacking. According to the Economic Survey 2024–25, India’s R&D spending remains at 0.64 per cent of GDP, far behind countries like China, the United States, and Israel.

Without adequate funding, researchers are forced to work within narrow constraints, which stifles creativity and ambition. Promotion and recognition within research institutions also play a role in shaping the kind of work scientists pursue. In many cases, career advancement is tied to the number of papers published rather than the impact or applicability of the research. This creates a system where researchers prioritize quantity over quality, often focusing on lab-scale studies that are easier to complete and publish a paper. While publications are important, they should not be the sole metric of success. A more balanced evaluation system that includes patents, technology transfers, and real-world impact would encourage scientists to pursue more ambitious and commercially relevant projects.

The lack of industry’s confidence in Indian scientists compounds the problem. Private sector involvement in R&D is minimal, and companies often prefer to license foreign technologies rather than invest in domestic research. This preference is driven by concerns over quality, scalability, and the commercial viability of Indian innovations. In fact, many companies include R&D

allocations in their budgets primarily to claim tax deductions under Section 35 of the Income Tax Act. A 2024 study noted that these incentives are frequently misused, with little accountability for actual research outcomes. As a result, the link between academia and laboratories and industry remains weak, and lab-scale research rarely translates into market-ready solutions. Politics and personal preferences within R&D institutions further hinder progress.

Leadership positions and funding decisions are sometimes influenced by non-scientific considerations, which undermines meritocracy and discourages talented researchers. Bureaucratic control over research programmes and budgets is another major hurdle. Government assessments reveal that top institutions like IITs and IISc are bogged down by complex accounting rules, rigid General Financial Rules (GFR), and low researcher compensation. These constraints discourage innovation and make it difficult for scientists to pursue ambitious projects. Decisions about funding and programme direction are often made by administrators with limited scientific expertise, leading to misaligned priorities and underutilised talent.

To address the above issues, India needs a multi-pronged strategy. Tax incentives must be linked to measurable research outcomes ~ such as patents, publications, or technology transfers ~ rather than just budget line items. The government must create dedicated grant schemes for high-risk research, with peer-reviewed selection and long-term support. The research institutions should be granted autonomy in budget management and project selection, with scientists, not bureaucrats, leading the process. Even though uncertainty is inherent in all scientific inquiry, Indian funding agencies tend to favour safe, incremental projects that promise predictable results. High-risk, high-reward proposals ~ often the kind that lead to Nobel-level discoveries ~ are rarely supported.

Even with the launch of a Rs 1 lakh crore Research Development and Innovation (RDI) Scheme Fund to catalyse private-sector investment in science and technology, experts opine that without structural reform, the funds may not reach projects that truly push boundaries. To nurture scientific talent, India must focus on Science, Technology, Engineering, Mathematics (STEM) education from an early age.

Programmes like the Kishore Vaigyanik Protsahan Yojana (KVPY), which identified and supported gifted students in science, must be revived and expanded. Schools should promote inquiry-based learning and provide opportunities for students to engage in research projects. Scholarships, mentorships, and exposure to real-world science can help nurture Nobel contenders. India must also offer competitive salaries, research autonomy, and clear career paths to retain talent. Awards and recognitions should be linked to performance and innovation, not seniority or bureaucracy.

Building world-class research institutions is essential for fostering Nobel-level work. While India has prestigious institutions like the Indian Institutes of Technology (IITs) and the Indian Institute of Science (IISc), many of them are focused on teaching and applied research. There is a need to create Centres of Excellence that prioritize fundamental research and interdisciplinary collaboration. These centres should have state-of-the-art labs, international faculty, and strong postdoctoral programmes. They should also be given autonomy to recruit talent, set research agendas, and manage resources without political interference. International collaboration plays a key role in scientific recognition. Many Nobel-winning discoveries are the result of joint efforts across countries and disciplines. Indian scientists must be encouraged to work with leading researchers around the world, including Nobel laureates. A proposed “1000 Scholar Programme” could help young Indian scientists intern with top research groups globally. This would not only expose them to cutting-edge techniques but also raise India’s profile in the global scientific

community. Hosting international conferences, joining global consortia, and co-authoring papers with foreign institutions are other ways to increase visibility.

https://www.thestatesman.com/opinion/an-indian-nobeli-1503523334.html

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An Indian Nobel~II

-by O PRASADA RAO (retired Scientist, Council of Scientific & Industrial Research)

Source: The Statesman, Dt. 10 Dec 2025

Perhaps the most important factor in nurturing scientific excellence is the culture of research itself. In India, scientists are often encouraged to pursue safe, incremental projects that guarantee results and funding. This discourages risk-taking and innovation. Nobel-worthy research usually involves bold ideas that challenge existing paradigms. It may take years to bear fruit and often faces initial scepticism. To foster such work, India must create grant schemes that support high-risk, high-reward projects.

Scientists should be given the freedom to explore unconventional ideas without fear of failure. Bureaucratic hurdles must be minimized, and research management should be streamlined to allow scientists to focus on discovery. Just like spotting talent in sports early helps children become champions, recognizing a child's interest in research and innovation is key to shaping future Nobel Prize winners. When children show curiosity, ask questions, and enjoy solving problems, it is a sign of a scientific mind. Encouraging this from a young age ~ through experiments, reading, and creative thinking ~ builds a strong foundation. With the right support, these children can grow into scientists who make big discoveries.

The Nobel Prize often goes to those who have spent years exploring ideas, so nurturing talent early is important for creating future leaders in science and innovation. Another critical issue is brain drain. Many of India's brightest scientists leave the country for better opportunities abroad. In 2024, more than six lakh people emigrated from India to countries like the US, UK, Canada, Australia, and UAE. A significant portion were highly educated professionals ~ including scientists, doctors, and engineers. Further, India has only 260 scientists per million people, ranking 81st globally. In contrast, countries like the United States and the United Kingdom have over 4,000 scientists per million. This gap is not just about numbers ~ it reflects the lack of infrastructure, funding, and career prospects for researchers in India. Talented scientists often find it difficult to secure grants, set up labs, or pursue independent research.

To retain talent, India must offer competitive salaries, research autonomy, and clear career paths. Recognition and reward systems also need reforms. The newly launched Rashtriya Vigyan Puraskar is a step in the right direction, aiming to honour excellence in science and innovation. However, its credibility depends on transparent selection processes and independence from political influence. Awards should be based on scientific merit, citation impact, and peer recognition. Showcasing Indian scientists who are already making waves globally ~ such as those listed in Stanford's top 2 per cent of cited researchers ~ can inspire others and build a culture of excellence. A total of 5,352 Indian scientists featured in the 2024 edition out of 223,252 scientists worldwide with China having the highest number of 10,687 ~ twice that of India – across all disciplines from physics and medicine to engineering and social sciences.

So, India has the intellectual capacity and scientific talent to produce Nobel Prize-worthy research, provided we continue to nurture innovation, invest in R&D, and support researchers with robust infrastructure and international collaboration. Science communication is another area that deserves attention. Many Indian discoveries go unnoticed because they are not effectively communicated to the public or the global scientific community. Scientists must be trained to present their work in accessible formats, engage with media, and participate in public lectures. Translating complex research into simple narratives can help build public support and attract young minds to science. Despite these challenges, there are signs of progress.

Initiatives like the Research Development and Innovation scheme aim to bridge the gap between laboratory research and commercial viability by using public procurement to create demand for indigenous technologies. Digital platforms like LabStack are also being developed to streamline R&D processes and improve collaboration across institutions. However, these efforts need to be scaled up and supported by a broader policy framework that prioritizes original research, industry partnerships, and global engagement. Over the past five years, Nobel Prizes in science and medicine have honoured discoveries that deeply reshaped our understanding of nature and health.

Few examples are given here along with the relevant research being carried out in India. In medical sciences, breakthroughs like mRNA vaccine technology (2023), got the Nobel Prize. India contributed to vaccine production but lagged in platform innovation and fundamental immunology research. In biology, the 2022 Nobel for sequencing the Neanderthal genome highlighted evolutionary genetics. India has strong labs in population genetics but lacks access to ancient DNA and long-term funding for paleo genomics ~ the study of ancient DNA to reconstruct and analyse the genomes of extinct species and ancient populations. In chemistry, Nobel-winning work on click chemistry and quantum dots emphasized molecular innovation.

India excels in applied chemistry, especially pharmaceuticals, but rarely leads in original molecular discoveries. In physics, prizes for quantum entanglement and climate modelling showcased deep theoretical and experimental work. Indian physicists participate in global collaborations like Laser Interferometer Gravitational-Wave Observatory (LIGO), yet such breakthroughs are limited. Overall, India has made progress in applied science and public health, but Nobel-level recognition demands long-term, curiosity-driven research, global collaboration, and original contributions. With its growing talent pool and infrastructure, India has the potential. It now needs sustained vision and support to convert promise into global impact. In conclusion, India has the talent and potential to produce Nobel-winning scientists.

What is missing is a coordinated, long-term strategy to nurture that talent, support bold research, and connect with the global scientific ecosystem. By reforming education, retaining talent, increasing investment, building world-class institutions, and encouraging risk-taking, India can create an environment where groundbreaking discoveries are not just possible but inevitable. India must shift from a compliance-driven model to an innovation-driven one. Only then can it unlock the full potential of its scientific community and compete globally. The Nobel Prize should not be seen as an elusive dream ~ it should be a natural outcome of a thriving scientific culture.

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