

# SCIENCE AND TECHNOLOGY PULSE

VOL. 3 ISSUE 1  
JANUARY 2026



### ***Editor's Note***

*Dear Readers,*

*Welcome to the First Edition of our Science and Technology Newsletter, January 2026.*

*This edition captures a pivotal moment in India's science, innovation and technology landscape, marked by a decisive push toward modernisation of regulatory systems, translational research, and high-value industrial capabilities. From the Draft Pesticides Management Bill, 2025 and enhanced agricultural diplomacy with Fiji and Argentina to the set-up of the CRISPR Innovation and Translation Centre and operationalisation of India's ₹1 lakh crore RDI Fund, the Union Government is deepening policy frameworks and widening financial instruments that encourage private-sector R&D and strengthen India's global technology footprint.*

*Emerging technology ecosystems continue to expand rapidly, with new MoUs in sodium-ion batteries, AI-enabled supply chains in medicinal plants, and precision agriculture pilots in sugarcane moving India closer to scalable commercial deployment. Health sciences are witnessing renewed momentum as genomics and AI advance predictive and personalised medicine, while India's progress in biotech, food and agriculture also benefits from stronger international linkages and enhanced focus on quality systems, testing infrastructure and export competitiveness.*

*This month also highlights India's expanding leadership role in clean technology and sustainability. The commercial launch of bio-bitumen, a world-first, underlines India's ambition to transform agricultural residues into green infrastructure inputs, reinforcing circular economy goals and reducing dependence on imports. Meanwhile, science-driven advancements across environmental technologies, space research, and high-performance engineering reflect the convergence of research excellence with strategic industrial priorities.*

*With international engagement deepening across AI, agriculture, food processing, energy transition and space, January 2026 offers clear signals that India's innovation trajectory is shifting toward scale, capability-building, and market transformation. Industry players, research institutions and technology firms stand to benefit from new policy windows, funding mechanisms and collaborative platforms that are reshaping strategic choices in the emerging decade.*

*I invite readers to explore the updates, sectoral developments and upcoming Indian and global conferences featured in this edition, and to reflect on how these shifts may influence investment priorities, industrial competitiveness and India's evolving contribution to global innovation agendas.*

*Warm regards,*  
*Abhilasha Nayal*



## India and Fiji Deepen Agricultural Cooperation with Extended MoU and Joint Working Groups

### **Business Impact:**

*It will help the Indian agricultural technology and machinery sectors expand exports and adopt collaborative R&D in Fiji's market. It also promotes investment in agri-innovation and training services, strengthening India's agribusiness footprint in the Pacific region.*

Union Agriculture and Farmers Welfare Minister Shri Shivraj Singh Chouhan held a bilateral meeting with Tomasi Tunabuna, Minister for Agriculture and Waterways of Fiji, in New Delhi to strengthen cooperation in agriculture and food security, agreeing to extend their existing Memorandum of Understanding (MoU) for five more years and establish a Joint Working Group (JWG) to advance collaboration. Discussions covered capacity building, technology sharing and research cooperation, including student exchanges, training programmes, and joint work on small-scale machinery and digital agriculture tools. Both sides also explored ways to improve research infrastructure, genetic exchanges, and knowledge sharing to reduce food loss and waste, reflecting the historical ties and mutual respect between India and Fiji in addressing agricultural challenges.

**In this newsletter  
you can expect  
updates from:**

Government Initiatives

Emerging Technologies

Health and Medicine

Environmental Science

Food and Agriculture

Space Exploration



## Centre Seeks Feedback on New Pesticides Management Framework

**Business Impact:** The updated Bill will benefit the agrochemical, pesticide testing, laboratory accreditation and agri-inputs sectors by providing clearer regulatory frameworks, fostering better quality control, and encouraging adoption of digital systems for compliance and traceability.

The Ministry of Agriculture & Farmers Welfare has released the Draft Pesticides Management Bill, 2025, for public consultation, inviting comments from stakeholders and citizens by 4 February 2026. The Bill aims to replace the Insecticides Act, 1968, ensure access to quality pesticides, and introduce greater transparency, traceability and digital processes to balance ease of living with ease of doing business. It proposes stricter action against spurious pesticides with higher penalties and state-level compounding of offences, alongside stronger administrative oversight and mandatory accreditation of testing laboratories to ensure quality. The draft and comment formats have been made publicly available to encourage broad participation before finalisation.

## India Signs LoI to Establish Centre of Excellence for CRISPR Innovation and Translation (CoE-CIT)

**Business Impact:** It will strengthen India's biotechnology and genomics sectors, enhancing competitiveness in global life sciences markets. It also attracts investment into translational research and precision health solutions, fuelling growth in biotech innovation and related service industries.



The Department of Science & Technology (DST) has signed a Letter of Intent (LoI) between the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru and CRISPRBITS Private Limited, Delhi to set up a Centre of Excellence for CRISPR Innovation and Translation (CoE-CIT) as a dedicated hub to harness CRISPR gene-editing technologies and translate laboratory discoveries into real-world clinical applications. The partnership, one of the first of its kind in India, aims to bridge the gap between basic biomedical research and therapeutic impact by combining JNCASR's expertise in fundamental sciences with CRISPRBITS's capabilities in applied gene-editing and affordable diagnostic platforms. The CoE-CIT is expected to serve as a national model for academic-industry collaborations, strengthening India's biotechnology ecosystem and enhancing translational research capacity. This collaboration reflects a replicable public-private approach to move cutting-edge innovation from discovery to societal benefit.

## DST's ARCI Partners with Industry to Strengthen Advanced Engineering Ecosystem

**Business Impact:** It will boost the competitiveness of domestic manufacturing and engineering industries by adopting advanced, scalable fabrication and materials processes. It also attracts investment and capability building in sectors such as aerospace, defence, automotive and speciality machinery, strengthening India's advanced manufacturing ecosystem.

The Department of Science & Technology's ARCI (International Advanced Research Centre for Powder Metallurgy and New Materials) has signed a Memorandum of Understanding (MoU) with Raghu Vamsi Machine Tools Pvt. Limited, Hyderabad, to jointly develop and demonstrate advanced manufacturing and materials technologies for strategic and high-performance engineering applications. The agreement builds a structured framework for technology development, product demonstration and application-oriented research, and promotes effective use of ARCI's specialised facilities under the Government Owned Company Operated (GOCO) model, including laser-based processes, additive manufacturing, precision machining and materials testing. It also supports intellectual property creation, knowledge transfer and technology transition from lab to industrial deployment, with flexibility to expand collaborative areas as requirements evolve. This partnership underscores a shared commitment to strengthening industry-R&D linkages and enhancing India's indigenous technological capabilities in advanced engineering sectors.



## DST Begins Operationalisation of RDI Fund for Innovation

**Business Impact:** It enhances competitiveness for industry players in deep tech, climate tech and digital platforms, enabling faster commercialisation and market diffusion of new technologies.

The Department of Science and Technology (DST) will open applications from 12 January 2026 for Second-Level Fund Managers (SLFMs) under the ₹1 lakh crore Research, Development and Innovation (RDI) Fund, approved in July 2025 to accelerate private-sector-led R&D in strategic and emerging technologies. The Fund will invest in areas such as deep tech, AI, climate and energy transition, biotechnology, digital economy and space technologies, helping bridge critical financing gaps in India's innovation ecosystem. SLFMs will channel capital into startups and companies working on transformative solutions, with applications expected to be processed from February 2026. This marks a major step in operationalising India's largest dedicated R&D financing mechanism, supporting technological self-reliance and innovation-led growth.



## Digital Tools to Transform India's Medicinal Plant Supply Chain

**Business Impact:** It will stimulate demand for precision agriculture technologies and traceability services, strengthening India's herbal and Ayush export ecosystem. It also enhances competitiveness for digital agri-tech and biotech firms by enabling scalable, quality-assured supply chains that attract global buyers.

Experts convened at IIT Delhi for a two-day national seminar on 8–9 January 2026, organised by the Ministry of Ayush and National Medicinal Plant Board (NMPB), to develop a digital roadmap for improving quality, traceability and global competitiveness in India's medicinal plant sector. Policymakers, scientists and industry leaders discussed AI-enabled diagnostics, digital phenotyping, blockchain traceability and portable testing tools for farm-gate quality assessment. Representatives from ICAR–Directorate of Medicinal and Aromatic Plants Research (DMPAR), WHO, Central Council for Research in Ayurvedic Sciences (CCRAS) and Himalaya Wellness stressed that standardised and traceable raw materials are vital for domestic and export markets. The seminar concluded with consensus on piloting digital tools, building capacity, and deploying technology across the supply chain to support sustainable, quality-driven sector growth.



## New MoU to Validate and Scale Sodium-Ion Battery Technology in India

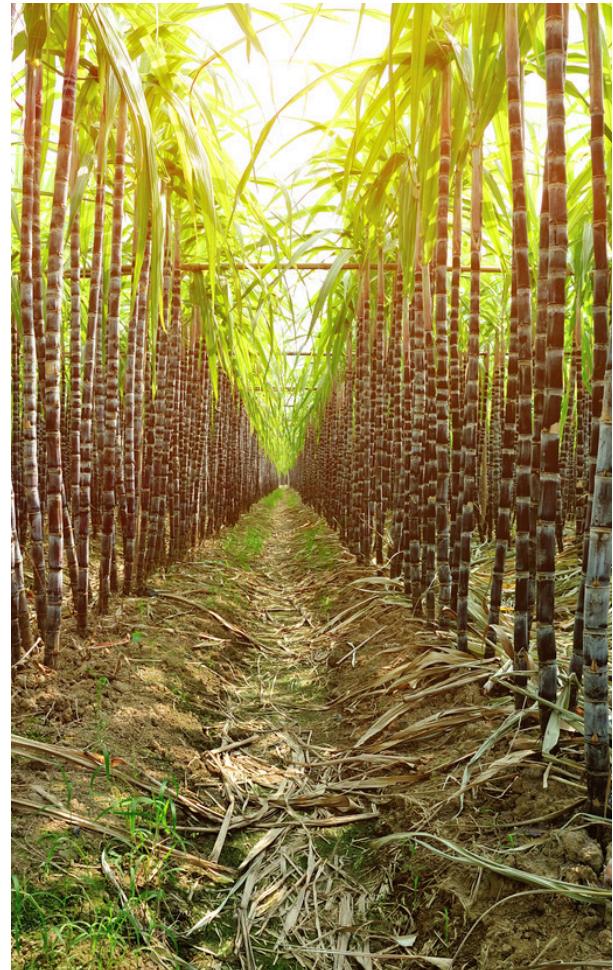
**Business Impact:** It can reduce reliance on lithium, lowering input costs for energy storage and EV sectors while enhancing domestic battery tech competitiveness. It also creates commercial opportunities for stationary storage, renewable integration and electronics industries to leverage alternative, cost-effective battery platforms.

The International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) under the Department of Science & Technology has signed a Memorandum of Understanding (MoU) with Voltasun Technologies Pvt. Ltd. on 15 December 2025 to validate the industrial performance of sodium-ion pouch cells made with Sodium Vanadium Phosphate (NVP) cathode material developed by ARCI. Under the agreement, ARCI will supply 80 Nos of 5 Ah pouch cells for performance testing and evaluation, with plans for further supply under a second phase. This collaboration aims to move sodium-ion battery technology out of the lab and towards commercialisation, offering a safer, lower-cost alternative to lithium-ion batteries commonly used in portable electronics, electric vehicles (EVs) and renewable energy storage systems. Field testing is currently underway, and the partnership reflects India's effort to translate indigenous R&D into industry-ready energy solutions aligned with self-reliance goals.

## AI-Driven Farming Initiative Launched in Ranjangaon to Boost Sugarcane Productivity

**Business Impact:** It will expand markets for precision agriculture solutions and farm data services, boosting demand for AI-enabled tools across the sugarcane sector.

An AI-enabled precision farming initiative has been launched in Ranjangaon, Dharashiv district, by Natural Sugar and Allied Industries Ltd, in collaboration with KVK Baramati, the Vasantdada Sugar Institute and the West Indian Sugar Mills Association. The project currently covers 753 farmers and has deployed 20 weather stations and 500 field sensors to guide irrigation, nutrient application, pest control and crop scheduling. Supported by a Sugarcane Development Department and a dedicated control room, the initiative aims to boost yields, reduce risks and improve crop quality through real-time analytics and decision support, marking one of the largest precision-agriculture pilots in Maharashtra's sugarcane belt.



## India–Argentina Expand Agricultural R&D Collaboration

**Business Impact:** It will support export-oriented agribusinesses and agri-innovation startups by enabling high-value technology adoption and broader market linkages through international partnerships.

India's Indian Council of Agricultural Research (ICAR) and Argentina's National Institute of Agricultural Technology (INTA) have signed a Work Plan for 2025–27 to enhance cooperation in agricultural research, capacity building and technology exchange. The plan covers natural resource management, sustainable agronomy (zero tillage, micro-irrigation), crop and animal biotechnology, livestock improvement, digital agriculture, biosafety and value-chain development through joint research, germplasm exchange and expert engagement. It also includes structured training and study visits in greenhouse vegetable production, floriculture, post-harvest physiology, precision livestock farming and microbial feed enhancement. The partnership further expands cooperation in mechanisation, plant and animal health (including FMD control and locust management) and crop value chains such as oilseeds, pulses and horticulture, with annual monitoring to track progress.



## MoFPI Expands Global Engagement in Food Processing

**Business Impact:** *It can increase export opportunities for Indian food products and processed goods by strengthening trade linkages and mutual recognition of safety standards. It also boosts demand for food testing services and quality certification, benefiting testing labs and agri-supply chain compliance industries.*

A delegation from the Ministry of Food Processing Industries (MoFPI), led by Deputy Secretaries Shri Vivek Kumar Singh and Shri Arunava Sengupta, participated in Africa Food 2025, held in Tunis, Tunisia from 11–13 December 2025, engaging with industry leaders and government representatives at the India Pavilion to explore trade and investment opportunities in the food processing sector. The delegation interacted with officials from Tunisia and several industrial associations to strengthen bilateral cooperation, enhance market access and promote global best practices in food safety and quality assurance systems. As part of the visit, the team also toured a food testing laboratory, shared insights on food safety infrastructure and contributed to discussions aimed at elevating food safety standards and collaborative practices. This participation reflects MoFPI's continued efforts to promote international collaboration, expand trade linkages and support the growth of India's food processing sector.



## Coffee Compounds Show Strong Antidiabetic Potential in Laboratory Tests

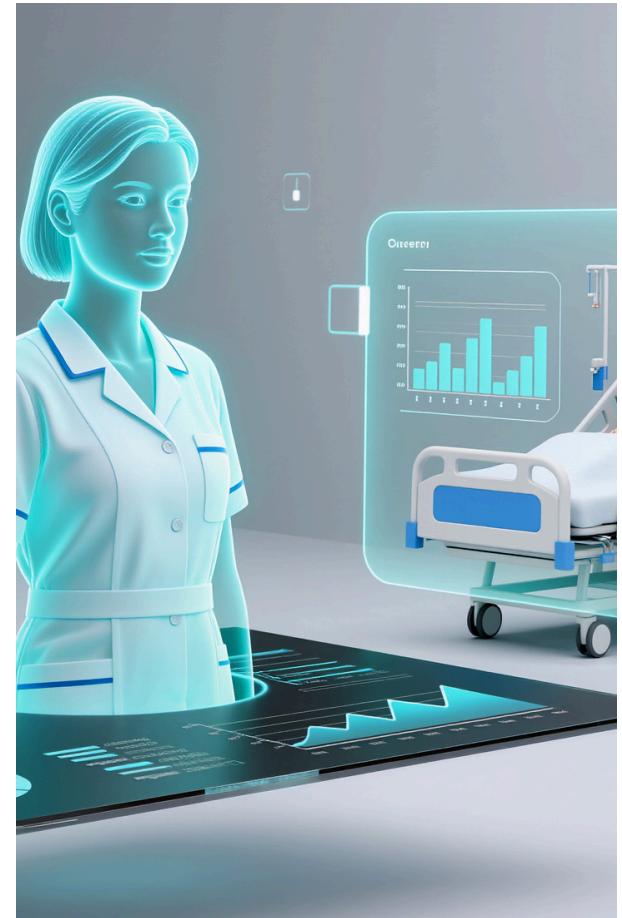
**Business Impact:** *It could spur growth in the health-oriented food and beverage sector, attracting investment into R&D and commercialisation of evidence-based functional ingredients.*

Researchers from the Kunming Institute of Botany, Chinese Academy of Sciences have identified several previously unknown compounds in roasted *Coffea arabica* beans that strongly inhibit the enzyme  $\alpha$ -glucosidase, which plays a key role in carbohydrate digestion and blood-sugar regulation. Using advanced analytical techniques like NMR and LC-MS/MS, the team isolated three new diterpene esters—caffaldehydes A, B and C—that showed stronger enzyme inhibition than the conventional anti-diabetic drug acarbose in lab tests, and uncovered additional related bioactive compounds through a molecular network analysis. This discovery highlights a greener, faster screening approach for finding functional food ingredients in complex foods and points to the potential of coffee-derived compounds as next-generation blood-sugar-controlling nutraceuticals. Future research will focus on testing these compounds' biological effects and safety in living systems.

## Genomics and AI Set to Transform Healthcare in India's Innovation Era

**Business Impact:** This convergence will accelerate demand for AI-powered diagnostics, genomic sequencing services and precision medicine platforms, creating opportunities for healthcare tech firms, biotech firms, and specialised data analytics providers. By enabling tailored drug development and predictive health tools, it can reduce treatment costs and expand India's role in global health innovation markets.

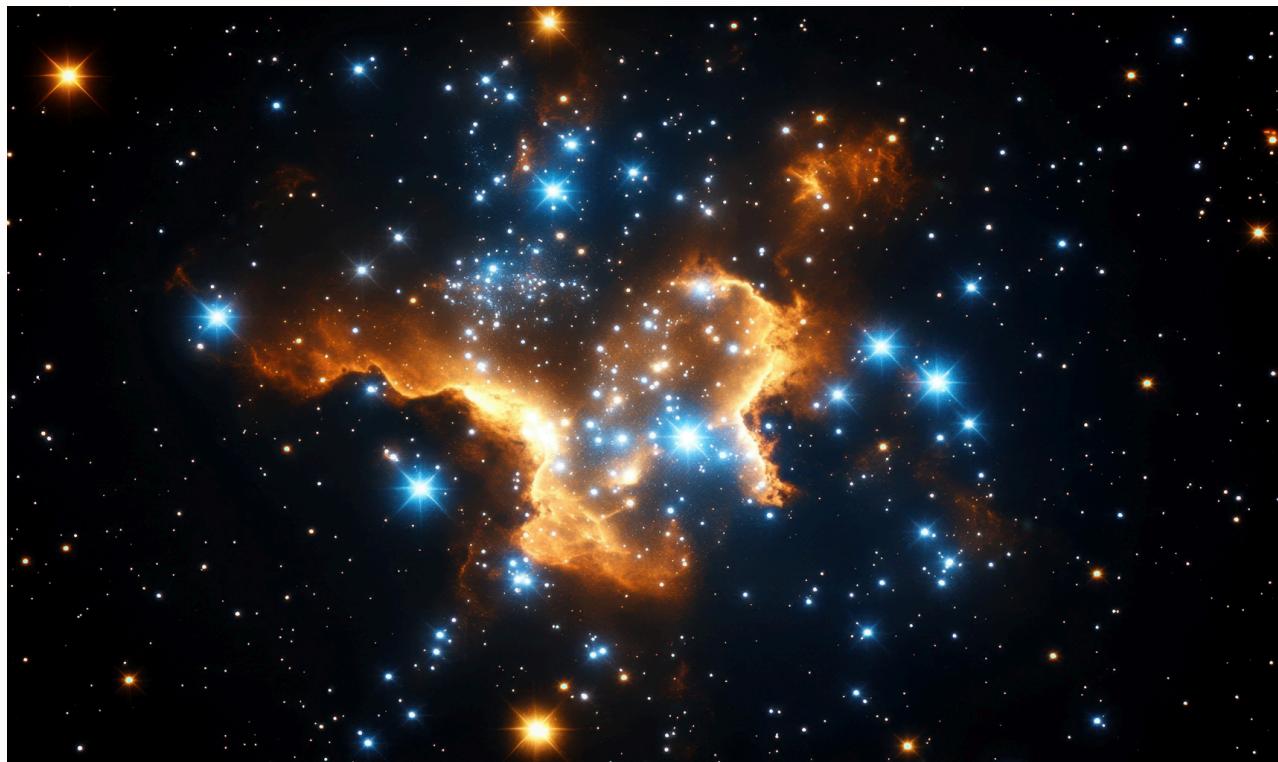
India's healthcare sector is undergoing a major shift as genomics and artificial intelligence (AI) converge to enable predictive, preventive and personalised care, moving far beyond traditional reactive treatment. Advances in genetic data analysis, disease-risk profiling and AI-driven diagnostics now allow clinicians to identify risks early and tailor interventions with far greater precision. The integration of large-scale genomic datasets with machine learning is improving understanding of complex diseases—including cancer, rare disorders and major non-communicable conditions—leading to more accurate diagnostics and treatment pathways. These tools also strengthen public-health planning through population-level genomic screening and real-time analytics across India's diverse genetic landscape. As these capabilities expand, the health system is expected to pivot towards early intervention, disease prevention and long-term wellness



## India Launches Commercial Bio-Bitumen for Green Roads

**Business Impact:** The shift to bio-bitumen can reduce reliance on imported bitumen, saving foreign exchange and stabilising raw material costs for the road construction and infrastructure sectors. It also stimulates demand for green materials and sustainable infrastructure solutions, enhancing competitiveness of Indian firms in domestic and global markets.

India has become the first country in the world to commercially produce bio-bitumen, an eco-friendly alternative to conventional petroleum-based bitumen used in road construction, developed jointly by CSIR-Central Road Research Institute (CSIR-CRRI) and CSIR-Indian Institute of Petroleum (CSIR-IIP) from agricultural residues such as crop waste via a pyrolysis process. The technology was transferred to industry partners at a ceremony in New Delhi, marking a shift towards clean, green highways that reduce environmental pollution, convert farm residue into value-added material and cut dependence on crude oil imports worth an estimated ₹25,000–30,000 crore annually when applied at scale. Field validations, including a trial stretch laid on the Jorabat–Shillong Expressway with up to 20–30 % conventional bitumen replaced, have shown bio-bitumen performs comparably under road conditions, while helping tackle crop burning and greenhouse gas emissions. The innovation aligns with India's Waste-to-Wealth, Atma Nirbhar Bharat and Viksit Bharat 2047 visions by promoting circular economy practices and sustainable infrastructure growth.



## Study of Binary Stars Reveals New Clues on Stellar Evolution

**Business Impact:** *It can benefit space technology and scientific instrumentation industries by guiding design and calibration of observation systems for stellar and exoplanet research. It also strengthens India's space research ecosystem, encouraging collaboration between research institutes and tech firms involved in observational data analytics and sensor development.*

Scientists from the Aryabhatta Research Institute of Observational Sciences (ARIES) and the Physical Research Laboratory (PRL), Ahmedabad have studied a class of binary stars known as W Ursae Majoris-type contact binaries, where two stars orbit so closely that they share a common outer atmosphere. Using data from ARIES's 1.3 m Devasthal Fast Optical Telescope and NASA's TESS space telescope, the team analysed detailed light curves of four such systems to map changes in their orbits, mass transfer between stars, and surface activity like magnetic star spots. Their findings, published in the *Astrophysical Journal*, improve understanding of stellar evolution, mass-radius relationships for low-mass stars, and the role of magnetic activity in tightly bound binary systems. The research also enhances empirical models used in exoplanet transit studies by refining how stellar behaviour affects observed light patterns.

# UPCOMING NATIONAL EVENTS 20 JAN

## 2026- 20 FEB 2026

21-23 January  
2026

**EVENT:** ICAMSE 2026: International Conference on Advances in Multidisciplinary Sciences and Engineering

**LOCATION:** Manipur, India

**FOCUS/ THEME:** A multidisciplinary forum for researchers, engineers and scientists to present and discuss innovations across science and engineering fields, including nanomaterials, biotechnology, environmental remediation and mathematical sciences.

**INDUSTRY RELEVANCE:** The conference connects industry with academic research, helping firms in nanotech, biotech, environmental engineering and materials science access emerging technologies and form R&D partnerships.

23 January 2026

**EVENT:** Kerala AI Future Con

**LOCATION:** Kovalam, Kerala, India

**FOCUS/ THEME:** AI applications in governance, public services, education, health, and economic development.

**INDUSTRY RELEVANCE:** Creates opportunities for AI companies to pilot solutions in public services. Opens channels for procurement, deployment and scaling through government and institutional partnerships.

27-30 January  
2026

**EVENT:** India Energy Week 2026

**LOCATION:** Goa, India

**FOCUS/ THEME:** Energy transition, national energy policy, sustainability, investment.

**INDUSTRY RELEVANCE:** Connects global energy players with Indian energy transition priorities and investment pipelines. Supports partnerships in clean fuels, decarbonisation, infrastructure and policy alignment.

9-12 February  
2026

**EVENT:** World Health Expo 2026

**LOCATION:** Dubai Exhibition Centre

**FOCUS/ THEME:** Global healthcare industry exhibition + conference for medical innovation, policy and technology.

**INDUSTRY RELEVANCE:** Offers market access and regulatory linkages for med-tech, biotech, pharma and AI-health firms. Facilitates cross-border procurement, clinical deployments and technology adoption.

## UPCOMING NATIONAL EVENTS 20 JAN 2026- 20 FEB 2026

15-20 February  
2026

**EVENT:** India AI Impact Summit 2026

**LOCATION:** New Delhi, India

**FOCUS/ THEME:** Global AI policy, innovation, governance and economic impact.

**INDUSTRY RELEVANCE:** Helps AI firms align products with policy frameworks and national AI deployment agendas. Facilitates partnerships and enterprise adoption across healthcare, finance, agriculture and logistics.

VeK is a policy advisory and research firm, distinguished by data-driven approach to analyse policy and regulatory developments in India and globally.

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