PRAJYA

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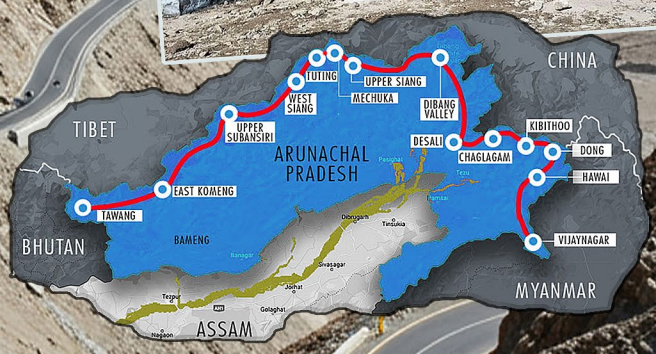
Arunachal Frontier Road and BRO's Mig La Pass



National POST DAY

10th OCT

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FROM THE EDITOR'S DESK

"Your strategy is the roadmap for bringing your goals to fruition… Ask yourself, "What are the steps to achieve this goal?""

Vishakhapatnam Declaration is a roadmap for India's e-governance strategy. This was revealed at the 28th National Conference on e-Governance held recently. It focuses on extending digital governance to areas beyond metros and towns; strengthening civil services for a **Viksit Bharat;** providing AI-driven platforms for improving citizen services; fortifying cybersecurity to protect vital data and maintain digital sovereignty; benchmarking systems and enhancing quality of digital service delivery and promoting innovation at Gram Panchayat levels.

By declaring 2025 as the **"Year of Reforms – Transformation for the future"** at the Combined Commanders' Conference, the Armed Forces and top civilian leadership have laid the groundwork for the future development of India's military preparedness.

The **'Mumbai One' app** is a decisive step in the direction of 'One Nation, One Mobility' to make commuting faster and smarter.

National Internship, Placement Training and Assessment' (NIPTA) designed to offer engineering and diploma students skill-based training will pave the path to their brighter future, boosting their employability potential.

One's vision is not just a roadmap, it is a compass, providing direction.

Read, reflect and revert with your thoughts and feelings.

We look forward to your support and suggestions.

- Editorial Team

Dear Readers,

There have been requests from quite a few readers for hard copies of Prajya. We understand that quite a high percentage of our young readers keep revisiting some articles, and a handy print version within reach induces one to read more often, highlight things and make notes. This also partly contributes to students spending less screen time. The Prajya team is happy to bring to you the issue in print.

However, there are few things that we want to be careful about:

A. We don't want to print more than what is required and

B. Keep the cost of the print version (plus postage) within reasonable limits.

Please note that the access to free online e-version will continue.

So, it will greatly help us if you could fill in the details in the link provided.

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Content :

International Current Affairs

National Current Affairs

Defence updates

General Knowledge

Smt Gaayathiri G

DIELLA

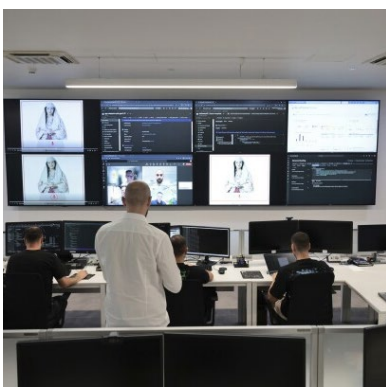
World's first AI Cabinet Minister

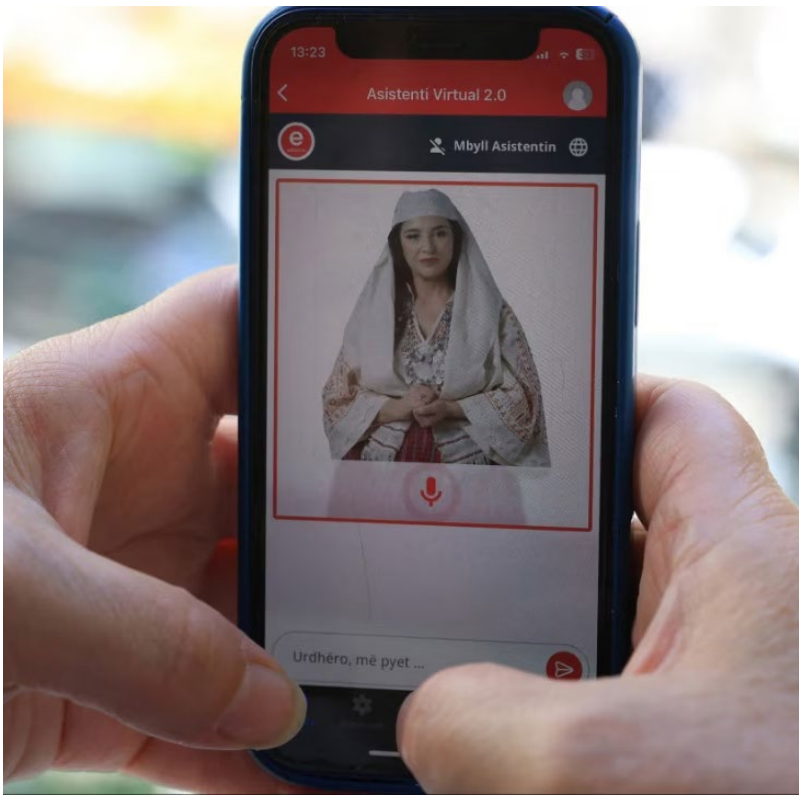
"Diella would help ensure that external funds and public contracts became 100% corruption-free."

In an unprecedented move in global governance, the Balkan nation of Albania in September 2025 formally appointed an artificial-intelligence system named Diella as a cabinet-level minister. Known as the "Minister for Public Procurement" (or "Minister of State for Artificial Intelligence"), Diella is widely described as the world's first AI-generated government minister.

Background and purpose

Originally launched in January 2025 as a virtual assistant on Albania's e-government platform ("e-Albania"), Diella helped citizens navigate online services, issue digital documents and reduce bureaucratic delays. Based on her initial performance, the government elevated her role to one of overseeing public tenders and procurement—a sector that had long been plagued by corruption. The decision was announced by Prime Minister Edi Rama, who stated that Diella would help ensure that external funds and public contracts became "100 % corruption-free".





How it works

Diella is powered by AI models developed in collaboration between the Albanian National Agency for Information Society (AKSHI) and technology partners, including Microsoft (using infrastructure from OpenAI). **She functions as a virtual avatar (often depicted as dressed in traditional Albanian attire) and is tasked with applying algorithms and automation to assess procurement bids, issue digital stamps, monitor tender processes and reduce human-bias**.

Significance

- **For governance:** Diella's appointment marks a distinctive experiment in entrusting AI with governmental functions at the cabinet level, not merely as a support tool but as a decision-making entity.

- **Against corruption:** Albania's decision comes amid long-standing issues of procurement corruption and is linked to its ambition to join the European Union by 2030—where reducing corruption is a key criterion.
- **Global precedent:** While many countries have ministers for technology or artificial-intelligence policy, Albania is credited with making the first AI system itself a ministerial entity.

Challenges and questions

Despite the novelty, Diella's appointment raises important questions:

- **Legal and constitutional legitimacy:** Can an AI system hold the same ministerial responsibility and accountability as a human?
- **Transparency and oversight:** How transparent are her algorithms, decision logic and training data? Will there be human supervision to guard against errors or abuse?
- **Effectiveness and trust:** Will Diella genuinely reduce corruption or could it become a symbolic gesture? The public's trust in AI for government functions remains to be tested.

In summary

Diella's role as the world's first AI cabinet minister is a bold step toward blending digital innovation with public administration. It reflects an aspiration for transparent, efficient governance, but also invites careful scrutiny of how AI is governed within governance itself. Whether this model succeeds or serves as a warning will be closely watched by governments globally.

Kum Anu Narayanan

India's defence manufacturing plant in MOROCCO

India's **Tata Advanced Systems Limited** (TASL) has marked a significant milestone with the inauguration of its first overseas defence production facility in North Africa, located in Berrechid near Casablanca. This move represents a pivotal step in India's global industrial expansion and supports Morocco's aspirations to localise military manufacturing.

The new plant will focus on assembling the **8×8 Wheeled Armoured Platform** (WhAP), designed for modern warfare and internal security missions. Attended by India's Defence Minister Rajnath Singh and Moroccan counterpart Abdelatif Loudyi, the inauguration underscores the deepening strategic ties between the two nations and Africa's increasing role as a defence investment hub amidst growing regional security challenges.

Initially, the Berrechid facility will source about 35% of its components locally, with plans to increase this to 50% as local supply chains mature. It is expected to employ approximately 200 workers, combining Indian engineering expertise with Moroccan manufacturing capabilities.

For Morocco, the TASL facility represents progress towards its goal of establishing a self-sustaining defence ecosystem capable of meeting domestic needs and exporting to neighbouring North African markets. This aligns with broader trends across Africa where countries like Nigeria, Egypt, Mali and Burkina Faso are shifting from import reliance to local production in defence.

The project positions Morocco within Africa's emerging defence manufacturing landscape, responding to rising military budgets and security threats across the continent. Global defence companies including those from Turkey, China and the UAE are increasingly investing in Africa, drawn by expanding markets and strategic opportunities.

For India, this expansion into Morocco is not only commercial but also geopolitical, providing access to stable North African markets and enhancing influence in Francophone (French-speaking) regions. It reflects India's ambition to transition from a major arms importer to a significant exporter of advanced defence technologies.

Together, India and Morocco's collaboration at the TASL facility exemplifies a new era of African defence self-reliance, where industrial cooperation supports continental security goals and enhances regional stability.

Kum Pavithra S

A new milestone in India-Qatar relations was achieved with the launch of the Unified Payments Interface (UPI) in Qatar. Developed by the National Payments Corporation of India (NPCI) and operated globally through its international arm, NPCI International Payments Limited (NIPL), this launch marks another important step in expanding India's digital payment network to the global stage.

The project was officially launched by India's Minister of Commerce and Industry Piyush Goyal who described it as a proud moment for India's digital journey. He noted that UPI's success abroad reflects global confidence in India's financial technology systems and opens new opportunities for digital trade between the two nations.

The introduction of UPI in Qatar has been made possible through a collaboration between NIPL, **Qatar National Bank** (QNB) and Japanese payment gateway provider **NETSTARS Co. Ltd**. The system enables people to make instant payments at retail and service outlets across Qatar using UPI-enabled mobile applications.

The first phase of the rollout began at Hamad International Airport in Doha, where UPI was introduced at Qatar Duty Free outlets. This allows Indian travellers to pay easily for their purchases without worrying about cash or currency exchange. Soon after, the service was extended to several stores of LuLu Group, one of the largest retail chains in Qatar. With this, UPI transactions are now accepted at more locations across the country, especially in areas frequented by Indian residents and visitors.

Qatar has now become the eighth country to adopt UPI for in-store payments, joining others like **Singapore, France, the UAE, Bhutan, Sri Lanka, Nepal** and **Mauritius.** The benefits are far-reaching for the large Indian community in Qatar with over 8,00,000 people. UPI makes everyday transactions faster, safer and more convenient.

On the technical side, the UPI system in Qatar is integrated with QNB's point-of-sale network. When a customer scans a QR code through a UPI app, the payment is processed instantly, with real-time confirmation for both buyer and seller. This simple, secure and fast method has already changed how millions in India handle daily payments and now it is extending the same comfort to Indians abroad.

Beyond convenience, this move represents India's growing influence in the global digital economy. UPI's success in Qatar is not just a financial achievement but a symbol of trust and innovation. It strengthens the partnership between the two nations and sets the stage for wider adoption of Indian fintech solutions around the world.

Smt Anuradha V R

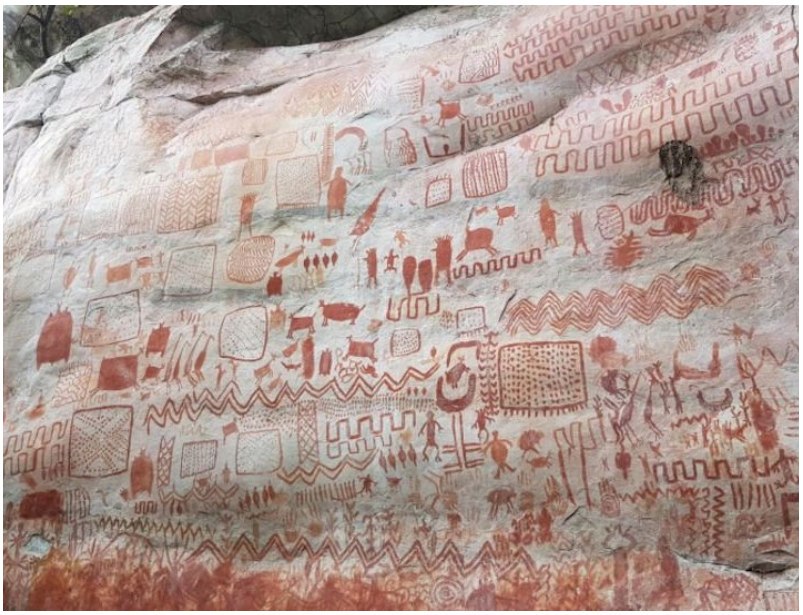
Prehistoric art sites in Columbia

Colombia possesses a remarkable and extensive record of prehistoric art, primarily in the form of rock art that spans millennia and provides a window into the lives of ancient people. The nation's diverse geography—**from the Amazon rainforest to the andean highlands** - contains distinct artistic traditions that document ancient rituals, beliefs and interactions with a changing environment.

Tens of thousands of ice age paintings across a cliff face shed light on people and animals from 12,500 years ago.

Colombia is home to a rich and varied tapestry of prehistoric art, providing invaluable insights into the spiritual lives and ancient ecosystems of its first inhabitants. The two most spectacular examples are the **ceremonial centres of San Agustín** and the **vast pictographs found in the Serranía de Chiribiquete.**

The Archaeological Park of San Agustín, a UNESCO World Heritage Site, showcases some of the most impressive megalithic sculptures in South America. Flourishing between the 1st and 8th centuries CE, the San Agustín culture carved hundreds of large volcanic stone statues, many reaching several metres high. These figures often blending human, animal and mythical characteristics served as guardian figures for elaborate burial mounds and tombs, reflecting profound beliefs about the afterlife and spiritual duality. Sites like the **Fuente de Lavapatas**, a stream bed carved into religious pools and channels, further demonstrate this civilisation's sophisticated ceremonial architecture, though the



precise origins of the San Agustín people remain an enduring mystery.

Serranía de Chiribiquete National Park

This remote region has been hailed as the "**Sistine Chapel of the ancients,"** where cliff faces stretch for miles, adorned with tens of thousands of vivid red pictographs. Dating back as far as 20,000 years, these paintings are unique for depicting extinct Ice Age fauna, alongside scenes of hunting, rituals and the central motif of the jaguar. The scale and antiquity of the Chiribiquete art offer an unparalleled record of early human occupation and the deep spiritual connection between people and the Amazonian rainforest ecosystem.

While **San Agustín** provides a glimpse into a complex, monument-building society of the Classic Period, **Chiribiquete** illustrates the deep time and enduring cosmological worldview of early hunter-gatherers.

Experts have dated the rock art based on the portrayal of animals that are now extinct, such as a mastodon (a prehistoric relative of the elephant) known to have inhabited North and Central America about 12,000 years ago.

Among the other beings portrayed in the rock art are giant ground sloth, fish, turtles, lizards and birds; and people dancing and holding hands.

Apart from the **Chiribiquete National Natural Park (Rock Paintings) and San Agustin**, there is also the **Facatativá Archaeological Park (Piedras del Tunjo)** which is located near Bogotá. This site, often referred to as **Piedras del Tunjo**, features massive **sandstone rock** formations that were once part of the Muisca territory. The site is famous for its concentration of petroglyphs **(rock carvings) created by pre-Columbian inhabitants.** These carvings include various abstract and zoomorphic figures, which are still visible on the shelter walls.

Tierradentro National Archaeological Park (Tomb Murals) - Tierradentro is renowned for its hypogea (underground tombs) that contain some of the finest examples of **prehistoric painting in Colombia.** The interior walls and ceilings of these elaborate funerary chambers, which were carved into volcanic rock, are covered with intricate murals featuring geometric patterns, human figures and animal motifs, typically painted in red and black on a white background.

Together, these sites underscore Colombia's pivotal role in pre-Columbian history, preserving powerful artistic expressions that bridge the Ice Age to the agricultural era, offering silent testimony to the region's rich human heritage.

Zoomorphic - having or representing animal forms or gods of animal form.

Smt Shubha T R

Southeast Asia's first coral cryobank

In a pioneering step towards marine conservation, **University of the Philippines Marine Science Institute (UPMSI)** has launched **Southeast Asia's first Coral Larvae Cryobank, a scientific facility,** aimed at **preserving coral genetic diversity** and **protecting its vital reef ecosystems.**

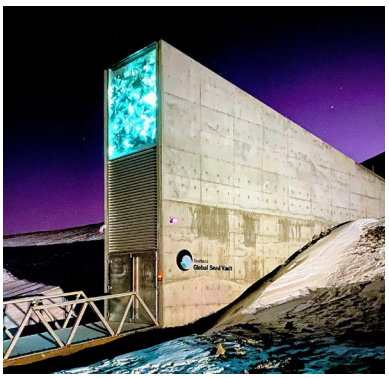
Coral reefs are in crisis worldwide with 14% of corals lost between 2009 and 2018, primarily due to climate change-induced coral bleaching, rising sea temperatures, pollution etc. Cryobank acts as "genetic seed vault" for corals, safeguarding their genetic material thereby helping to prevent their extinction by restoration of coral reefs.

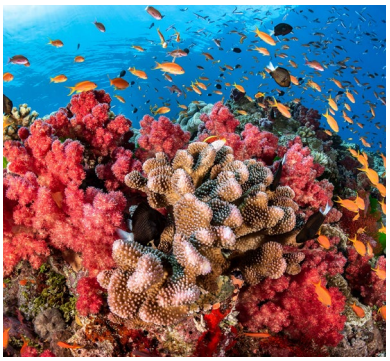
This initiative is part of a regional network that includes **Taiwan, Indonesia, Malaysia and Thailand** aimed at combating threats to the **Coral Triangle's marine biodiversity.**

Process

Coral larvae (Coral seeds) are collected during spawning events. These are treated using glycerol, ethylene glycol etc., to prevent ice-crystal formation during freezing thereby avoiding cellular damage to the larvae. Further, **vitrification** - a modern technique of **cryopreservation** is done where the larvae are plunged into liquid nitrogen at ultra-low temperature (–196°C). The rapid freezing process results in glass-like state. This results in **pausing** all biological activity of the larvae. Once preserved, coral larvae can be stored indefinitely.

When needed, the larvae can be revived by rapidly thawing using lasers. Revived larvae are rehydrated in seawater, monitored for movement, settled and then transferred to controlled tanks for coral regrowth.





Limitations

Coral larvae species majorly are **heat sensitive** and requires **different freezing** and revival parameters, thereby making **maintenance process very challenging.** Also, not all thawed larvae survive or successfully recolonise reefs. This facility requires specialised labs, liquid nitrogen systems and expert training to sustain as a world class facility.

Cryobank is a timely intervention that gives us hope in stemming the coral decline and thereby improving marine life, fisheries and coastal livelihoods.

DO YOU KNOW ?

Coral Larvae

Corals are marine invertebrates that form large colonies called polyps. These polyps secrete calcium carbonate to build protective exoskeletons, forming coral reefs.

Reefs in India

India's major coral reef areas are the Andaman and Nicobar Islands, the Lakshadweep Islands, the Gulf of Mannar, the Palk Bay and the Gulf of Kutch.

Coral Triangle

Coral Triangle also called as the "Amazon of the seas" is the richest marine ecosystem on the earth. This 5.7 million sq. km expanse across the tropical waters of Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor-Leste are home to more than three-quarters of the world's coral species, a third of all reef fish, the vast mangrove forests and six of the seven marine turtle species. It also sustains the food security and livelihoods of more than 120 million people.

Coral bleaching

This occurs when corals, owing to high temperatures or pollution, expel the symbiotic algae (zooxanthellae) living in their tissues turning them white and often leads to death if conditions don't improve.

Shri Ramaswamy R

12,000– year–old pillar unearthed

Archaeologists have made an exciting discovery in the ancient site of **Karahantepe** in southeastern Türkiye. A 12,000-year-old T-shaped pillar with a carved human face was unearthed. This finding is part of the **Tas Tepeler (Stone Mounds) Project** which explores some of the earliest monuments ever built by humans. Türkiye's Minister of Culture and Tourism, Mehmet Nuri Ersoy, announced that this is the first time in history a pillar like this has been found with a human face carved into it.

The pillar has deep-set eyes, a broad, flat nose and carefully shaped features. Experts believe that this carving represents one of the earliest artistic depictions of humans in history. The pillar is similar to others found at the nearby site of Göbekli Tepe, which is considered one of the oldest temples in the world. Chatalhooyuk, a large prehistoric settlement, and other sites offer insights into the transition from nomadic to settled life.

The Neolithic Period

The Neolithic period, also known as the New Stone Age, began around 10,000 BCE. During this time, humans made great progress. They started farming, domesticating animals and building permanent homes instead of moving from place to place. This period was a turning point in human history, leading to the rise of villages and, later, cities. It was also when people began creating art, pottery and tools, showing their growing intelligence and creativity.

Why Türkiye is important in archaeology

Türkiye is one of the most important countries in the world for archaeology. Unlike archaeology in Egypt on the other side of Mediterranean Sea, focusing on one time period and one ancient Nile River civilization, Türkiye's excavations belonged to diverse cultures present during the vast range of time periods. Türkiye's complex cultural history is because of its presence in both Europe and Asia. The nation is also a leader in underwater archaeology, with discoveries of ancient shipwrecks and artifacts along its long coastline.

A window into humanity's past

The newly discovered pillar at Karahantepe is more than just a piece of stone—it is a window into the minds of people who lived 12,000 years ago. These discoveries show that even before farming, writing or cities began, humans were already expressing art, identity and spirituality through their creations; and that our story began much earlier than we once believed.

Shri Nagarajan R

Pink and Purple fungi discovered

Deep within rainforests and damp woodlands, scientists have recently discovered eye-catching species of pink and purple fungi. These dazzling organisms add new colour to the world's fungal family and remind us that nature still has countless surprises waiting to be explored.

Fungi are not plants or animals but belong to their own special kingdom. They grow almost everywhere — in soil, on trees and even on decaying leaves. The newly found pink and purple species thrive in humid environments with rich organic matter. Researchers say these fungi may have special pigments that protect them from sunlight and bacteria, helping them survive in tough conditions. Some even glow faintly in the dark.

The colours of fungi aren't just for show. Many shades come from natural chemicals that help fungi fight harmful microbes. Some pink fungi produce compounds researchers are studying for new medicines. Unlike plants, fungi don't make their own food. They break down dead wood and leaves into nutrients, returning goodness back to the soil. This makes them vital "recyclers" of our planet. Without fungi, forests would be buried under layers of fallen leaves that never rot away.

Fun facts

- Fungi can communicate through underground "networks" called *mycelium.*
- Some varieties, like the **Amethyst Deceiver**, already show bright violet shades similar to these new finds.
- The largest fungus on Earth covers more than 2,000 acres in Oregon, USA.
- The striking colour helps make them "beginner-friendly" for people doing citizen science surveys, because they stand out among green grass.
- One very unusual pink fungus, ***Podoserpula miranda*** (nicknamed the "Barbie pagoda fungus"), has a stacked-pagoda-like shape and lives in New Caledonia.

These discoveries remind us that our everyday surroundings—even our neighbourhood field or park—can hide amazing treasures.

Smt Sandhya Nair

India's direct air cargo mission to Antarctica

The Goa-based **National Centre for Polar and Ocean Research** (NCPOR) under the Ministry of Earth Sciences, is a premier institution responsible for India's research activities in the polar and Southern Ocean realms.

It has sent a direct air cargo flight from the state to Antarctica, using a Russian IL-76 aircraft operated by the **Dronning Maud Land Air Network** (DROMLAN). This historic mission took off on 2nd October 2025, from Goa's Manohar International Airport marking a significant advancement in India's Antarctic expedition logistics.

The cargo plane carried 18 tonnes of essential supplies including scientific instruments, medicines and provisions vital for the Indian research stations **Bharati** and **Maitri** in Antarctica. This direct air route enables faster and more efficient delivery. It took nearly 40 days for shipments to arrive.

This was very much needed as scientific shipments to Antartica were facing unacceptable delays. Researchers would have to wait for their shipments to arrive, thus defeating the whole purpose of the mission.

The mission flights were routed via South Africa's Cape Town, an important gateway hub for Antarctic missions. This shipment, routed via the gateway city of Cape Town in South Africa, marks a significant step in enhancing logistical efficiency for India's polar expeditions.

Dr. Thamban Meloth, Director of NCPOR, says that the direct air cargo mission underscores India's commitment to supporting cutting-edge research in glaciology, oceanography and climate studies in Antarctica.

The IL-76 aircraft, known for its heavy-lift capability and ability to safely operate in extreme environments, chartered exclusively for this mission was facilitated by **GMR Aero Cargo and Logistics, Alpha Crux**, **Ultima Antarctic Logistics** and partners in South Africa. Goa has now emerged as a strategic logistics hub for India's Antarctic expeditions.

This initiative marks a significant step in improving the efficiency and reliability of India's polar research operations, reflecting the country's growing capabilities in high-priority scientific explorations.

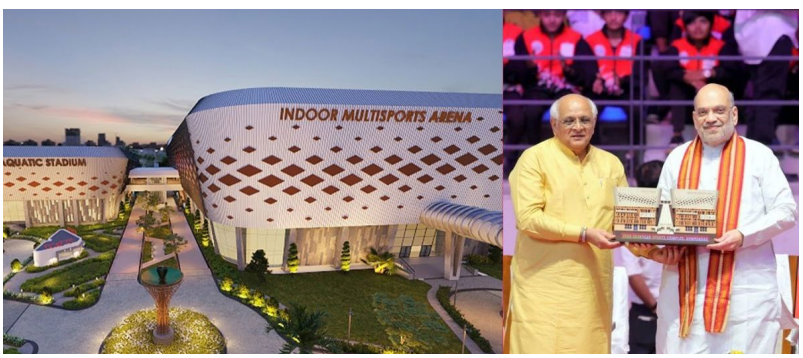
Shri Sampath D

Government of India's new initiatives

NIELIT Digital University platform inaugurated

The Union Minister of Information and Electronics Technology Ashwini Vaishnaw inaugurated the NIELIT Digital University (NDU) platform in New Delhi. The aim was to provide accessible digital education across India, including the remote areas. In this regard 5 new NIELIT centres have been inaugurated virtually in **Muzaffarpur** (Bihar), **Balasore** (Odisha), **Tirupati** (Andhra Pradesh), **Daman** (Dadra and Nagar Haveli and Daman & Diu) and **Lunglei** (Mizoram).

The centres will offer many new courses which include **Artificial Intelligence** (AI), **cybersecurity**, **data science** and **semiconductors**. The NDU is a platform designed to provide flexible learning opportunities, including multilingual modules, virtual labs and digital certifications.



The event also included a panel discussion on the role of AI in digital education with participation of representatives of Intel, Infosys, Microsoft, Barco Electronics and academic institutions.

India's largest sports complex in Ahmedabad

The Union Home Minister and Minister of Cooperation Amit Shah inaugurated the **Veer Savarkar Sports Complex** Naranpara, Ahmedabad. It is the largest in India and among the most modern sports complexes in the world.

To promote sports in a larger way, every effort is being made to ensure that the best of infrastructure, training facilities, transparent selection processes and fair opportunities for high-performing players to represent India are guaranteed.

It has world-class sports arrangements, hostel facilities for training athletes, accommodation for coaches and all types of medical support for players. Additionally, the complex has a beautiful theatre where players can analyse their techniques and further improve their performance.

Spread over 1, 19,000 square metres, the massive sports complex is comprehensive and state-of-the-art. It has seven entry gates, parking space for 900 vehicles, a 275-kilowatt solar power plant and a 60 KLD sewage treatment plant, making it a fully eco-friendly (green) complex. It has been developed jointly by the Government of India and the Government of Gujarat.

Logistics Data Bank 2.0 to strengthen India's digital trade launched

The Union government launched an upgraded logistics tracking platform aimed at improving supply chain efficiency and boosting India's digital trade and export competitiveness.

The launching of the Logistics Data Bank (LDB) 2.0 by the Union Minister of Commerce and Industry Piyush Goyal coincided with the decade-long celebrations of **Make in India** and marks a major step in India's journey toward becoming a digitally empowered, globally competitive economy.

The system developed by NICDC Logistics Data Services (NLDSL) expands the scope of the existing platform by offering real-time tracking of containers at sea and multi-modal shipment visibility. LDB 2.0 is designed to provide industry and government with detailed insights into logistics infrastructure and performance.

The new version introduces high-seas container tracking, which will enable exporters to monitor shipments after they leave Indian ports and cross international waters.

The upgraded logistics platform keeps track of container distribution across India which thereby helps detect regional imbalances all of which will significantly improve supply chain efficiency and export competitiveness, particularly benefiting MSMEs and exporters. India's logistics costs being traditionally high, impacts exporters. By reducing inefficiencies through real-time tracking and predictive analytics, it will improve supply chain reliability, enhance India's credibility in global markets and empower MSMEs and startups

Goa's 'Mhaje Ghar' scheme to grant home rights

Union Home Minister Amit Shah inaugurated and launched the Goa government's 'Mhaje Ghar Yojana'. It is not just another government initiative but more of a reform-driven and citizen-centric governance model. The scheme grants ownership rights to thousands of Goans whose properties were previously caught in multiple legal disputes. Granting property rights to lakhs of Goa's citizens caught up in nearly 11 types of legal disputes is a significant symbol of empowerment.

The Government of Goa by enacting a single law, has resolved housing discrepancies, which has benefitted a majority of Goa's population and ensuring time-bound permissions for house repairs, along with guaranteed water and electricity supply.

He said that through the Mhaje Ghar Yojana alone, 10 lakh citizens have received home ownership rights, marking a major milestone in Goa's development.

India's first electric truck battery swapping station

Union Minister of Roads, Transport and Highways Nitin Gadkari inaugurated India's first commercial electric truck battery swapping and charging station at the Delhi International Cargo Terminal Private Limited (DICT) in Panchi Gujran village on GT Road near Ganaur in Sonipat.

Developed by **Energy in Motion**, the facility **enables battery swaps in seven minutes, a major improvement over the conventional two-hour charging process, thereby drastically reducing charging time.** The initiative supports cleaner logistics, lowers operational costs and aligns with India's energy independence and net-zero emission goals by promoting sustainable heavy vehicle transport. The facility marks a significant milestone in India's transition to sustainable transportation contributing to cleaner, faster and more reliable freight operations across India.

The establishment of the battery swapping station is part of a broader government initiative to lower logistics costs below 9% by December 2026. **Measures include developing multimodal infrastructure, integrating road, rail and waterways to enhance transport efficiency and support the growth of sustainable freight and supply chain operations.**

Smt Manju Aildasani

India's first semiconductor innovation museum

India took a major leap in its technological evolution with the inauguration of its **first Semiconductor Innovation Museum** on 12th **October 2025,** in **Hyderabad**. The initiative was led by the **Technology Chip Innovation Program (T-Chip)** to promote innovation, public awareness and investment in the semiconductor ecosystem. The launch event was attended by former Haryana Governor **Bandaru Dattatreya**, Telangana's Sports and Youth Affairs Minister **Vakiti Srihari**, T-Chip Chairman and Managing Director **Sundeep Kumar Makthala**, several MLAs and senior policymakers.

Hyderabad has become a major destination for **fabless chip design** (a model where companies focus on the design and marketing of semiconductor chips but outsource the manufacturing process to specialised third-party foundries), **AI research** and **electronics manufacturing**. Global firms like **AMD** and **Qualcomm** have already established R&D bases here, and **T-Chip's new museum** further consolidates the city's identity as a **semiconductor innovation hub**.

Vision and objectives

- Showcase India's growing capabilities in semiconductor design and manufacturing.
- Act as a hub for innovation, investment and talent discovery.
- Inspire the next generation of engineers, developers and policymakers.
- Host monthly demo days, global showcases and networking events for investors and tech leaders.

Exhibits

- India's first indigenous AI chip.
- AI-powered humanoid robots.
- Robotic pet companions.
- A reusable rocket engine prototype.
- Next-generation EV technology and smart display systems.

Strategic relevance

- Global chip shortages.
- Geopolitical emphasis on supply chain resilience.
- Rising demand in EVs, 5G, IoT and AI-driven products.

The initiative strengthens **Hyderabad's position** as a growing **semiconductor and deep-tech hub,** complementing India's broader aim of achieving **self-reliance in chip production** under the **Make in India** campaign. This highlights the **cross-sectoral impact** of semiconductors across defence, space, automotive and consumer technology.

The museum also known as **Cyberabad** will also host a 30-day Innovation Residency Model, which will enable startups, research institutions and global innovators to display their work every month.

Shri Sridhar P

India's first integrative oncology centre

The Ministry of Ayush inaugurated the first of its kind integrative oncology research and care centre (IORCC) at the All-India Institute of Ayurveda (AIIA), Goa on the 10th national Ayurveda Day. **This pioneering idea will aim to revolutionise cancer care by effectively blending traditional and modern medical systems.** Consequently, this institute will offer patient centric, evidence based oncology treatment and rehabilitation.

Cancer: Cancer was always thought of as a dreadful disease. The enigma that shrouded cancer, its virulence, progress and response to treatment has always challenged oncologists and cancer researchers. Molecular biology and genetics unravelled gene mutations to be a very important causative factor behind cancer incidence. The commencement of the human genome project revealed spectacular insights into cell biology and provided exciting times for cancer researchers. Researchers were able to study several genes at the same time and confirmed that multiple mutations in several genes are involved in cancer. Detection rates and treatment success rates have impressively shot up. Yet patients have to put up with financial strain and morbidity that pushes patients to anxiety and depression which can worsen or delay the recovery process. Hence a holistic approach with supportive roles of mind control is very important.

Integrative approach: Integrative oncology and care centre (IORCC) represents a comprehensive multidisciplinary approach to cancer therapy that combines conventional cancer treatment with complementary therapies like yoga, physiotherapy, diet therapy, *panchakarma* and molecular biology under one roof.

The collaborative effort involves the government of Goa, TATA Memorial Centre and AIIA Goa. This integrative model seamlessly blends surgery, modern chemotherapy, radiation with evidence-based Ayurvedic therapy. The team includes clinical and academic experts, oncologists and specialists in integrative medicine. **The idea is to improve recovery, reduce treatment side effects and improve patient's immunity – all of which are bench marks for global cancer care.**

Panchakarma **is a series of five cleansing and rejuvenation therapies in Ayurveda designed to detoxify the body, restore balance to the *doshas* (the three energies of the body: *vata, pitta and kapha*), and promote overall well-being. These involve therapeutic vomiting, purgation, enema, nasal administration and bloodletting.**

Smt Archana Sundar

inspire Award 2025

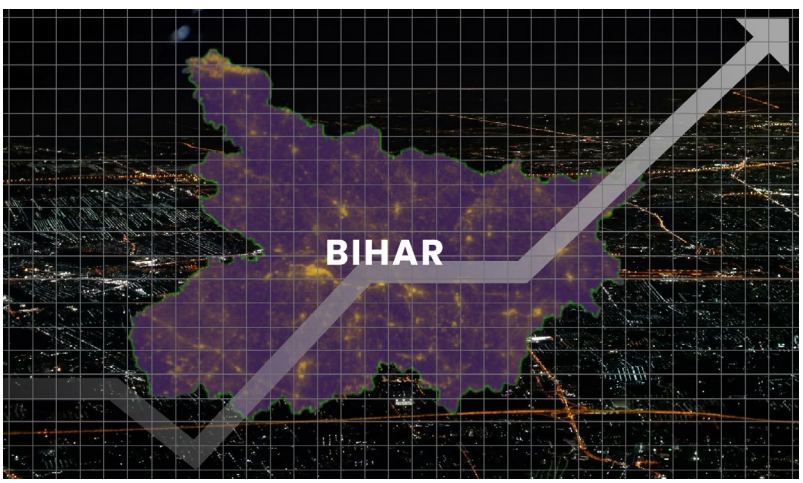
A grassroots lesson on innovation

Forget the tech hubs—the real innovation story of 2025 is unfolding in Muzaffarpur, Bihar. In a stunning upset, this district has catapulted to the Number One rank nationally in the prestigious Inspire Award – MANAK scheme. This proves the future of Indian science lies not just in urban centres, but in the hands of bright, motivated students everywhere.

Submitting an incredible 7,403 innovative student ideas, Muzaffarpur didn't just beat the competition; it dominated it. It surpassed giants like Bengaluru Urban (7,306 ideas), Jaipur and Lucknow, sending a clear signal: grassroots ambition and systematic execution beat complacency every single time. The rankings were officially released recently by the Department of Science and Technology (DST).

Bihar's expanding innovation map

Muzaffarpur's victory was matched by Vaishali's 6th rank finish (with 5,805 ideas), showcasing a potent Bihar model for innovation. It highlighted the growing emphasis on science education locally. This double success underscores the potential of focused, administrative effort in non-metro areas.



The national top five list itself reveals the democratic nature of this competition:

Rank	District (State)	Ideas submitted
1	Muzaffarpur (Bihar)	7,403
2	Bengaluru Urban (Karnataka)	7,306
3	Bagalkot (Karnataka)	6,826
4	Jaipur (Rajasthan)	6,311
5	Lucknow (Uttar Pradesh)	6,182

Furthermore, the significant presence of other Uttar Pradesh districts like Hardoi, Allahabad, Pratapgarh and Unnao in the top ten demonstrates a powerful regional momentum.

The secret behind Muzaffarpur's success

Muzaffarpur's victory was the result of meticulous planning and relentless dedication over a two-month period. The district adopted a systematic, grassroots approach to drive participation, focusing on

maximum outreach and effective guidance:

- **Dedicated sessions in all schools:** Both government and private schools actively participated, running special science innovation sessions led by headmasters and science teachers.
- **Administrative oversight:** Key support came from the District Education Officer (DEO), who took direct ownership of the programme's execution.
- **Grassroots coordination:** Nodal officers at the block and district levels played a critical, hands-on role in monitoring submissions and providing guidance.
- **Rigorous review:** The use of daily review mechanisms and follow-ups ensured maximum participation and quick resolution of technical issues, leading directly to the highest number of entries in India.

This focused, district-level execution offers a replicable blueprint for administrative success across the country.

INSPIRE-MANAK scheme - A talent pipeline

The 'Innovation in Science Pursuit for Inspired Research' (INSPIRE) scheme, specifically its MANAK (Million Minds Augmenting National Aspirations and Knowledge) component, is a flagship initiative by the DST in collaboration with the National Innovation Foundation (NIF).

Its core objective is simple yet profound: to motivate students aged 10 to 15 years (classes 6 to 10) to submit original ideas rooted in science and societal applications. The annual aim is to target one million original ideas/innovations to foster a culture of creativity.

The scheme works as a multi-stage pipeline:

1. **Financial support:** NIF shortlists the top 1,00,000 ideas, and the students receive an INSPIRE Award of ₹10,000 through Direct Benefit Transfer (DBT) to develop a prototype.
2. **Competition and mentoring:** The ideas compete at District (DLEPC - District Level Exhibition and Project Competition), State (SLEPC) and finally the National Level (NLEPC). At the higher stages, students receive mentoring support from NIF and reputed academic institutions.
3. **National showcase:** The top 60 innovations are considered for product/process development and displayed at the annual Festival of Innovation & Entrepreneurship (FINE).

Muzaffarpur delivered a critical mass of ideas, throwing down the gauntlet. Is this a flash of brilliance or a sustained fire? **The real challenge is transforming raw potential into impactful national innovations.** The future of Indian innovation isn't just brighter; it's waiting to be built by these young minds.

PM's launches

Armed Forces conference

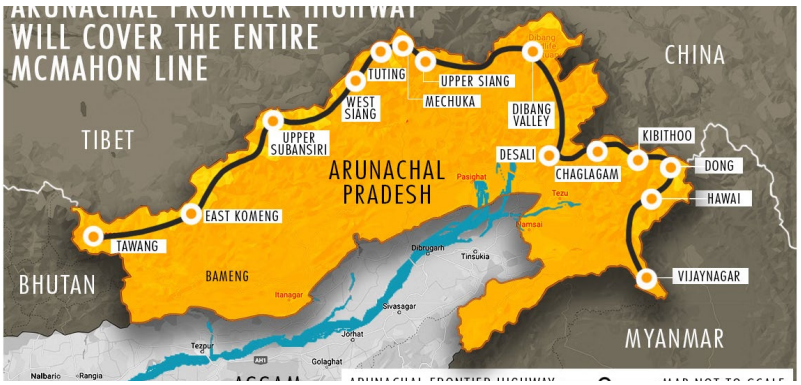
The Combined Commanders' Conference (CCC) was inaugurated by Prime Minister Modi recently in Kolkata. The theme for the conference was **"Year of Reforms – Transformation for the future"**. Held once in two years, CCC is the apex level brainstorming forum of the Armed Forces that brings together the nation's top military and civilian leadership to exchange views and lay the groundwork for the future development of India's military preparedness.

Prime Minister complimented the Armed Forces for the success of Operation Sindoor and instructed the Ministry of Defence to swiftly implement concrete steps to achieve greater jointness, **Atmanirbharta** and innovation to meet future challenges and to prevail against any eventuality.

He was briefed on the operational readiness of the Forces in the context of the new normal created by Operation Sindoor.

The conference conducted a holistic review of various structural, administrative and operational matters based on feedback from across the forces, preparedness of the armed forces in the face of increasing global uncertainties, as well as discussions to develop the roadmap for implementation of the vision of the Prime Minister.

The conference was attended by Defence Minister Rajnath Singh, National Security Advisor Ajit Doval, Chief of Defence Staff General Anil Chauhan, Defence Secretary Rajesh Kumar Singh, chiefs of the three forces and Lt Gen RC Tiwari, Eastern Army Commander, among others.



Arunachal Frontier Highway

Our PM launched the 1,840 km Arunachal Frontier Highway, which will have a two-lane track running parallel to the historic McMahon line separating India and China. The project cost is estimated to be ₹42,000 crores. The highway which will be called NH 913 will connect India's easternmost inhabited region and will be a strategic lifeline that will ease troop movement and strengthen our border preparedness. For decades the eastern Himalayas remained disconnected from the mainland, leaving frontier villages vulnerable and the armed forces constrained by terrain. The proposed highway aims to carve a high-altitude artery through some of the most security-sensitive and remote regions of Arunachal Pradesh. This highway will certainly prove to be a roadblock to China's dominance at the border.

RSS centenary stamp and coin

On 1st October 2025 Prime Minister Modi released a commemorative stamp and a ₹100 coin to mark the centenary of the Rashtriya Swayamsewak Sangh.

The coin features an image of ***Bharata Mata*** in *varad mudra*, the RSS motto and RSS volunteers saluting her. For the first time in the history of Indian currency the image of the Bharata Mata is featured. The RSS motto "*Rashtray swaha, idam rashtraya, idam na mama*" which translates to "everything is dedicated to the nation, everything is the nation's, nothing is mine", is inscribed on it. The obverse carries India's national emblem.

The ₹500 commemorative stamp depicts RSS volunteers in the 1963 Republic Day parade and in social service activities. This is a fitting recognition of the RSS – an organisation which is steeped in patriotism and service to the nation through its people.

Navi Mumbai airport

The Navi Mumbai International Airport (NMIA) which is one of India's most ambitious infrastructure projects was inaugurated on 8th October 2025 by PM Modi. NMIA is a public-private partnership (PPP) between **Mumbai International Airport Limited** (MIAL), **a subsidiary of Adani Airport Holdings Limited** (AAHL), and the **City and Industrial Development Corporation** (CIDCO). The project represents a major stride in India's infrastructure building, in tune with India's vision of a **Viksit Bharat 2047.**

The airport built on 1,160 hectares of land is planned to accommodate 90 million passengers per annum (MPPA) with four terminals ultimately. In the near term it will be at 20 MPPA with one terminal. It will also be capable of handling 3.2 million tonnes of cargo annually (currently it is 0.5 million). The NMIA has been designed by Zaha Hadid Architects. Inspired by the Lotus, the airport combines cultural identity, modern design, sustainability and robust cargo infrastructure. It is also a multimodal hub seamlessly connected to the Mumbai Trans Harbour Link, Navi Mumbai and Mumbai Metro, suburban rail

networks and planned waterways. This connectivity will reduce travel times, enhance regional connectivity and strengthen cargo and passenger movement.

NMIA took about two decades to come to fruition. Though the Union cabinet approved the project in 2007, it faced significant roadblocks in the form of complex resettlement, environmental clearances and engineering challenges between 2011 and 2017. In 2021, the Adani Group took over the ₹16,700 crore PPP, ensuring a single operator for Mumbai's twin-airport system. Thereafter the construction accelerated. The NMIA will play a major role in establishing the region as Asia's largest connectivity hub and it could rival Dubai, London and New York in terms of the aviation ecosystem it has created.

India Mobile Congress 2025

The 9th edition of the India Mobile Congress was inaugurated by PM Modi recently. This was organised by the **Department Of Telecommunications** (DoT) and the **Cellular Operators Association of India** (COAI) at Yashobhoomi, New Delhi. This event is Asia's largest Tech Fest and the theme for the event was **'Innovate to Transform'.**

IMC 2025 showcased the latest advancements in telecom and emerging technologies, bringing together global leaders, policymakers, industry experts and innovators. The areas of focus were optical communications, semiconductors in telecom, quantum communications, 6G and fraud risk indicators, reflecting India's strategic priorities in next-generation connectivity, digital sovereignty, security and global technology leadership.

The Congress featured an international symposium which brought together global thought leaders, policy makers, industry experts and academia that deliberated on next gen 6G technologies.

There was also an exhibition, with over 400 exhibitors, showcasing a diverse range of indigenous and global technologies and cutting edge innovations. The grand event successfully demonstrated India's commitment to leveraging technology and innovation for digital and societal transformation.

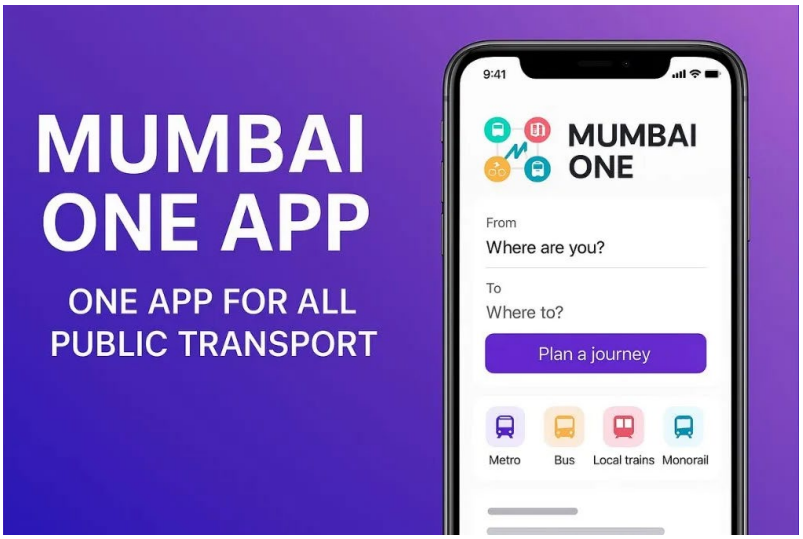
Mumbai One app

India's first integrated common mobility app, 'Mumbai One' was launched on 8th October 2025. Developed by the **Mumbai Metropolitan Regional Development Authority** (MMRDA), this app integrates 11 public transport operators including Mumbai Metro Lines 1, 2A, 3, and 7, Navi Mumbai Metro, Monorail, Mumbai Suburban Railways and major bus networks like BEST, TMT, NMMT, KDMT and MBMT. The app provides a multi modal journey planner that helps people find the fastest and the most cost effective routes and modes with real-time updates.

Highlights

- Cashless transactions
- No queues
- Multi modal connectivity
- Seamless ticketing - one QR-based ticket valid across all modes – Metro, Monorail, suburban trains and buses.
- Safety – This has an SOS feature for emergency assistance.

The 'Mumbai One' app is a major step in the direction of 'One Nation, One Mobility' that makes commuting faster and smarter.



Shri Sampath D

Visakhapatnam Declaration 2025

The declaration outlined an ambitious and inclusive path for India's digital transformation emphasising cutting-edge technologies, civil service reform, cybersecurity and grassroots empowerment.

India's digital governance journey took a major leap forward with the adoption of the Visakhapatnam Declaration at the 28th National Conference on e-Governance (NCeG). The two-day conference culminated in a strategic roadmap that aligns with the national vision for 2047. The declaration, unveiled in Visakhapatnam, outlined an ambitious and inclusive path for India's digital transformation, emphasising cutting-edge technologies, civil service reform, cybersecurity and grassroots empowerment.

The Conference was co-hosted by the Department of Administrative Reforms and Public Grievances (DARPG), Ministry of Electronics and IT (MeitY), and the Government of Andhra Pradesh. To ensure digital equity, the declaration emphasised on reaching underserved regions like the North-East and Ladakh, expanding the NeSDA (National e-Services Delivery Assessment) framework. Panchayat innovations from villages such as West Majlishpur, Suakati and Palsana will be scaled nationwide, ensuring that grassroots governance is digitally empowered.

The conference focused on the theme **"Viksit Bharat: Civil Service and Digital Transformation"** and the principle of **"Minimum Government, Maximum Governance."**

India's focus on AI and multilingual services was evident in the push to scale platforms like:

- **Digital India BHASHINI** – real-time translation and communication,

- **Digi Yatra** for seamless airport check-in,
- **NADRES V2** National Animal Disease Referral Expert System V2.

The declaration urged ethical, transparent AI deployment that respects user privacy and promotes inclusion.

Inclusive digital growth

Delegates called for the use of emerging technologies such as artificial intelligence, machine learning, blockchain, geospatial information systems, the internet of things and data analytics to support transparent, citizen focused governance.

Cybersecurity, digital trust and resilience in critical infrastructure were highlighted as national priorities.

The declaration committed to accelerating the rollout of the **National Agri Stack** to improve farmers' access to credit, advisory services and markets, while promoting climate-smart and sustainable farming practices.

The conference also pledged closer collaboration between government, industry, academia, start-ups and civil society to co-create scalable digital solutions.

Andhra Pradesh's plan to position Visakhapatnam as an IT and innovation hub, including development of special IT zones and support for industry-academia partnerships, was endorsed in the declaration.

Delegates recommended replicating successful projects including:

- **SAMPADA 2.0** (user-friendly app for E-registration of documents and Issuance) in Madhya Pradesh.
- **eKhata** (app for address, Photo and location details collection of property) in Bengaluru.
- **Rohini Gram Panchayat** (a model village in the Shirpur block of Dhule district, Maharashtra, known for its digital transformation and e-governance initiatives) in Maharashtra.
- **Drone Analytics Monitoring System** (a platform that uses drones to collect data and advanced software, including AI and machine learning, to process, analyze, and interpret that data into actionable insights) by the National Highways Authority of India.

Shri Ramaswamy R

Logistics is the science and art of managing the movement of goods from their origin to their destination so that the right goods reach the right place at the right time and at the lowest possible cost. It is one of the most important aspects of a country's economic growth because it ensures that food grains, medicines and industrial goods reach people and businesses efficiently. A strong logistics system keeps industries running smoothly and supports trade within and outside the country.

On 20th September 2025, Union Commerce and Industry Minister Piyush Goyal launched the **Logistics Ease Across Different States** (LEADS) 2025 initiative in New Delhi. This launch was part of the decade-long celebration of the **Make in India** campaign. LEADS 2025 is designed to assess and improve logistics performance across all States and Union Territories.

It aims to make India's logistics sector more efficient, competitive and environmentally responsible, supporting the goals of **Atmanirbhar Bharat and Viksit Bharat 2047.**

The LEADS 2025 initiative introduces a **data-driven and performance-based approach** to logistics improvement. One of its key features is **corridor performance assessment**, which studies 5–7 major national transport corridors **to evaluate journey time, truck speed and waiting periods.** By identifying bottlenecks, these assessments help reduce delays and improve the movement of goods. Another major feature is the use of API-enabled data, which provides real-time, section-wise information on road speeds. This helps policymakers and planners make better, faster decisions using accurate data.

LEADS 2025 also includes an **indicator-based evaluation** system that combines measurable data with feedback from stakeholders to assess infrastructure, regulations and logistics services. States and Union Territories are ranked as **Leaders, Achievers or Aspirers** based on their performance. This ranking encourages healthy competition and motivates states to adopt best practices. Additionally, a **digital dashboard** allows each state **to monitor its logistics performance continuously and track improvements in real time.**

Piyush Goyal highlighted that logistics is the backbone of manufacturing competitiveness. Efficient logistics can lower costs, save fuel, reduce carbon emissions and make Indian goods more globally competitive. Through LEADS 2025, the Government of **India aims to strengthen logistics infrastructure, improve coordination between states, and make India a global manufacturing and supply chain hub.**

Smt Laxmi A

Indians excel in sports

MIRABAI CHANU WINS SILVER AT 2025 WORLD CHAMPIONSHIPS

Mirabai Chanu made a resounding return to form by securing the silver medal in the women's 48 kg category at the 2025 World Weightlifting Championships in Førde, Norway.

Highlights

The women's 48 kg event saw participation from top lifters across 26 countries. The final results are:

Gold: Ri Song-gum (North Korea) – 213 kg (World Record)

Silver: Mirabai Chanu (India) – 199 kg (National Record)

Bronze: Thanyathon Sukcharoen (Thailand) – 198 kg

Mirabai's record-breaking performance started strong with a successful snatch lift of 84 kg, although she missed her next two attempts at 87 kg.

- The clean & jerk segment, however, showcased her grit and strength. She lifted, 109 kg in her first attempt, 112 kg in the second and 115 kg in her final lift — setting a new Indian national record.
- Her combined total of 199 kg not only earned her the silver medal but also set a national record for total lift in the 48 kg category.
- This marks Mirabai's third career medal at the World Championships, reinforcing her status as India's premier weightlifter.

INDIA'S BEST EVER MEDAL HAUL AT WORLD PARA ATHLETICS CHAMPIONSHIP

India achieved its best-ever performance at the World Para Athletics Championships 2025, held in New Delhi. This remarkable feat surpasses the country's previous record of 17 medals at the Kobe 2024 Championships, reaffirming India's growing dominance in global para-sports.

The championship, featuring over 2,000 athletes from 104 countries, marked a historic moment for Indian para-athletics and showcased the nation's commitment to inclusivity, excellence and sports empowerment.

India's medal tally

Gold - 6; **Silver** - 9; **Bronze** - 7;

This performance represents India's best-ever showing in the tournament's history and

DO YOU KNOW ?

- **Snatch - weightlifter picks up the barbell and lifts it above head in one singular motion.**
- **Clean and jerk- weightlifter is first required to pick up the barbell and bring it up to the chest (clean).**

demonstrates the success of its para-sports development programmes.

Six Indian athletes stood atop the podium with gold medals, displaying elite performance and resilience.

- **Simran Sharma** emerged as one of the stars of the championship, winning two medals — a gold in 100m T12 and a silver in 200m T12.
- **Double Medallists:** Simran Sharma & Preeti Pal (Silver – Women's 100m T35 ; Bronze – Women's 200m T35)

India's Rank: 10th overall

INDIA EXCELS IN WORLD ARCHERY PARA CHAMPIONSHIPS 2025

India's **Sheetal Devi** secured her maiden gold **medal in the Women's Compound Open category** at the 2025 World Para Archery Championships held in Gwangju, South Korea.

Simran Sharma	Women's 100m T12
Nishad Kumar	Men's High Jump T47
Sumit Antil	Men's Javelin Throw F64
Sandip Sanjay Sargar	Men's Javelin Throw F44
Rinku Hooda	Men's Javelin Throw F46
Shailesh Kumar	Men's High Jump T63

Three medals in a day

- Sheetal also earned **Silver** in Women's Compound Open Team with **Sarita,** after narrowly losing to Türkiye in the final.
- **Bronze** in Compound Mixed Team Open **with Toman Kumar**, defeating Britain's pair of Nathan MacQueen and Jodie Grinham.

India's overall performance

- Apart from Sheetal, **Toman Kumar won gold** in the men's compound.
- **Shyam Sunder Swami** narrowly missed out on bronze, losing to Britain's Nathan MacQueen.

These performances indicate India's growing depth in compound para archery and signal a strong preparation path for upcoming global tournaments.

Who is Sheetal Devi?

- Sheetal was born with phocomelia (absence of both arms).
- She learned to shoot using her legs and chin, making her technique unique and inspiring.
- Won bronze medal at the 2024 Paris Paralympics in mixed team compound.
- Won **Arjuna award in 2023** and **multiple international medals** at the Asian Para Games and continental championships.

INDIANS WIN AT SKATING WORLD CHAMPIONSHIP 2025

The Indian contingent made history at the recently concluded Speed Skating World Championships held recently in China.

The team bagged a record-breaking total of **three gold medals and two bronzes,** marking India's most successful outing at the global event to date.

Senior skater **Anandkumar Velkumar** led the charge with a sensational performance, becoming the **first Indian to win a gold medal at the World Championships in the senior men's 1,000 m sprint,** clocking a time of 1:24.924.

He followed up with another gold in the men's marathon event, and also secured a **bronze** medal in the **500 m sprint**, bringing his personal tally to three medals at the event.

Anandkumar's achievements marked a historic milestone for India in a sport traditionally dominated by European and East Asian countries.

Krish Sharma struck **gold** in the **junior men's 1,000 m sprint.**

Anish Raj claimed a **bronze** in the **junior men's one-lap sprint event.**

INDIA WINS 7TH SAFF U-17 FOOTBALL TITLE

India's U-17 football team

clinched the 7th SAFF U-17 Championship title in Colombo after a nail-biting final against Bangladesh.

The match ended 2-2 in regulation time before India held their nerve to win 4-1 in the penalty shootout at the Racecourse International Stadium.

This is India's 7th title in the SAFF U-17/U-16 Championship history.

The consistent success reflects India's growing youth football ecosystem and improved grassroots development programmes.

Over the years, India has produced several promising players through SAFF youth tournaments, many of whom have graduated to the senior national team.

11TH ASIAN AQUATICS CHAMPIONSHIPS

India made sporting history by hosting the 11th Asian Aquatics Championships for the first time at the Veer Savarkar Sports Complex, Ahmedabad, Gujarat.

This was the second time South Asia has hosted this prestigious aquatics meet.

The event was jointly organised by the Swimming Federation of India (SFI) and the Government of Gujarat. It featured 65 medal events across four disciplines, Swimming (42 events), Artistic Swimming (11 events), Diving (10 events), Water Polo (2 events).

More than 1,100 participants, including athletes, coaches and officials, competed over two weeks. The event also served as a qualifier for the 2026 Asian Games in Nagoya, Japan.

China topped the medal tally with **54** medals (**40 gold, 10 silver, 4 bronze**), showing dominance across all disciplines.

Kazakhstan came second with 23 Medals (8 Gold, 7 Silver, 8 Bronze)

Japan came third with 21 medals (5 Gold, 12 Silver, 4 Bronze)

India finished 11th, achieving its best-ever performance at the event, winning a total of 13 medals — 4 silver and 9 bronze.

Star performers

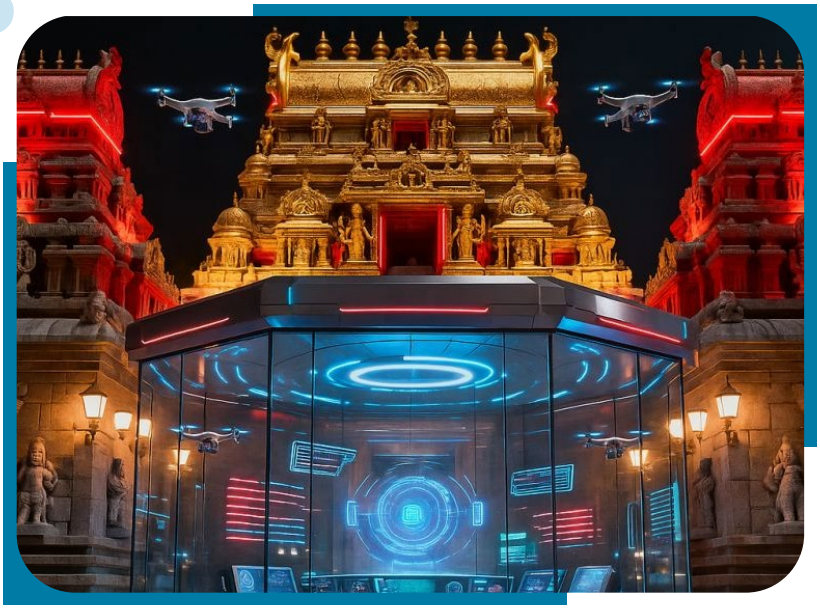
- **Srihari Nataraj** emerged as the standout athlete, securing **7 medals**—the highest for any Indian in a single edition.
- **Bhavya Sachdeva** made history by winning India's first women's medal (Bronze in **400m Freestyle).**
- **Kushagra Rawat** won **bronze** in the **men's 1500m Freestyle.**

National records

- **India's men's team—Aneesh Gowda, Sajan Prakash, Shoan Ganguly and Srihari Nataraj**—set a National record in the **4×200m Freestyle Relay,** clocking 7:23.38 and securing a silver.
- In **Diving,** India's **Willson Singh Ningthoujam and Indiver Sairem finished fourth in the Synchronised 10m Platform (Mixed)** with a score of 300.66.

Name	Medal	Event
Srihari Nataraj	Silver	200 m Freestyle 50 m Backstroke 4×200 m Freestyle Relay
	Bronze	100 m Freestyle 100 m Backstroke 4×100 m Medley 4×100 m Freestyle
Benediction R. Beniston	Silver	50 m Butterfly
Kushagra Rawat	Bronze	1500 m Freestyle
Rishabh Das	Bronze	200 m Backstroke
Bhavya Sachdeva	Bronze	400 m Freestyle
Sajan Prakash	Bronze	200 m Butterfly

Smt Meenakshi S



First AI-based command centre in Tirumala

Andhra Pradesh Chief Minister Chandrababu Naidu inaugurated India's first Artificial Intelligence-powered pilgrim **Integrated Command and Control Centre** (ICCC) recently at Tirumala which is the abode of Lord Venkateshwara in Tirupati district.

This pioneering facility that aims to enhance the pilgrimage experience through advanced technology is developed by the Tirumala Tirupati Devasthanam (TTD) in collaboration with Non-Resident Indian (NRI) philanthropists. The idea for the ICCC came from a discussions led by the Andhra Pradesh IT Minister with global technology experts in 2024. Inspired by smart city innovations, digital twin models and AI-driven public service tools, the state government pushed for similar integration in Tirumala. The goal of the project is to blend technology with tradition to handle the heavy footfall the temple receives, while ensuring devotee comfort and safety.

The ICCC integrates over 6,000 AI-enabled cameras, machine learning algorithms and high-performance computing infrastructure to monitor and manage the pilgrim flow in real time. The system processes approximately 3,60,000 data points per minute, generating 2.5 billion inferences daily to predict crowd density, optimise queue management and enhance safety protocols.

The ICCC provides a comprehensive view of the temple complex with 3D situational maps and live dashboards. The system can visualise congestion areas, predict wait times for the *'Sarva Darshanam'* (free darshan) and assist in emergency response through drone-assisted surveillance. Additionally, AI-powered facial recognition technology aids in identifying missing persons and detecting potential security threats. Beyond physical monitoring, ICCC also focuses on cybersecurity.

The system monitors online content related to TTD, detects inappropriate material and safeguards against cyberattacks, ensuring the integrity of the temple's digital presence.

The establishment of the ICCC reflects a successful public-private partnership. The project was completed in just 16 days, underscoring the collaborative efforts between the government, TTD and the global community. This ground breaking move that combines technology with spirituality, aims to revolutionise the way pilgrim traffic, safety and darshan management are handled at one of the world's busiest religious shrines.

This marks a significant leap in adopting Artificial Intelligence (AI) for smart governance in temple management, especially during peak seasons when millions of devotees converge on the holy hill.

Smt Sarada Devi Ravutu

Honours for India's top earth scientists

Minerals have played a crucial role in the development of human civilisation. Industrialisation would have been unimaginable without minerals like iron and coal.

President Droupadi Murmu presented the **National Geoscience Awards 2024** for outstanding contributions in the field of geoscience at the Rashtrapati Bhavan Cultural Centre. These awards were instituted by the Ministry of Mines, Government of India in 1966.This year, 20 eminent geoscientists were honoured with 12 awards under three categories.

Lifetime Achievement Award

Professor Shyam Sundar Rai: Honoured for a distinguished career and exceptional contributions to Solid Earth and Exploration Geophysics. His work includes significant seismological research across Peninsular India, the Himalayas and Ladakh.

National Young Geoscientist Award

Susobhan Neogi: Received the award for his ground breaking work on the tectonic evolution of Meghalaya, Jharkhand and the Bundelkhand craton.

National Geoscience Awards

Apart from individual recognitions, 10 awards were presented to individuals and teams for their achievements in mining technology, groundwater studies, applied geosciences, strategic mineral exploration, geo-environmental studies and sustainable mineral development.

The President urged them to develop technologies that can harness the resources beneath the seafloor while minimising damage to marine biodiversity.

She added that Rare Earth Elements (REEs) are the backbone of modern technology. They power everything from smartphones and electric vehicles to defence systems and clean energy solutions. Given the current geopolitical situation, India must become self-reliant in their production. REEs are considered rare not because they are scarce, but because the process of refining them and making them usable is extremely complex, so developing indigenous technology to accomplish this complex process would be a major contribution to the national interest.

Craton is a large stable block of the earth's crust forming the nucleus of a continent.

Shri Arpith Vijayan

Flora and fauna news

New eel species discovered in Tamil Nadu

Researchers from the National Bureau of Fish Genetic Resources (NBFGR) have identified a new marine species named ***Apterichtus kanniyakumari*** off the Colachel coast. This species is popularly known as **finless snake eels.** They represent an important addition to India's rich coastal biodiversity. The newly discovered eel has been named after Kanyakumari as a tribute to the region where it was first recorded.

The discovery was made during a marine biodiversity survey along the southeastern Arabian Sea.

Genetic analysis using the mitochondrial CO1 gene confirmed that ***Apterichtus kanniyakumari*** forms a distinct evolutionary lineage or clade, separate from its close relative ***Apterichtus nanjilnaduensis,*** another recently identified species from the same region. This highlights the growing importance of molecular tools in modern taxonomy and species identification.

Morphologically, the new species can be identified by its golden-yellow body, pale white ventral side of the head and yellow lines running along the lower jaw. It also exhibits three distinctive black blotches—one behind the eyes, one at the corner of the mouth (rictus) and another behind the origin of the rictus. These physical characteristics, together with genetic data, confirm its classification as a novel species.

Finless snake eels inhabit sandy or muddy seabeds in tropical and temperate waters, from shallow coastal zones to depths of nearly 800 metres. They are known for their ability to burrow backward into the seabed and for their cryptic lifestyle, spending most of their time hidden beneath the ocean floor to evade predators and ambush prey.

The discovery not only enriches India's marine taxonomy but also underscores the ecological diversity and unexplored potential of the southeastern Arabian Sea region.

Cold desert biosphere & new Ramsar sites

India achieved two major milestones in biodiversity conservation in 2025, highlighting its global environmental leadership. **The Cold Desert Biosphere Reserve (CDBR) in Himachal Pradesh** has been added to UNESCO's World Network of Biosphere Reserves, while **Bihar's Gokul Jalashay and Udaipur Jheel** have been recognised as new Ramsar Sites. With these inclusions, India now has 13

UNESCO-recognised biosphere reserves and 93 Ramsar sites and this is an indication of the country's growing commitment to ecological preservation and sustainable development.

The new UNESCO designation marks a first for India's high altitude ecosystems. CDBR, spanning 7,770 square kms in Himachal Pradesh's Lahaul-Spiti district, was recognised during the 37th session of UNESCO's International Coordinating Council. This area, with elevations ranging from 3,300 to 6,600 metres, includes glacial valleys, alpine lakes and windswept plateaus. The reserve encompasses protected zones such as Pin Valley National Park and Kibber Wildlife Sanctuary, providing refuge for the Snow leopard, Himalayan ibex and Himalayan wolf. Current management focuses on climate adaptation, sustainable tourism and community-led conservation, integrating traditional ecological knowledge with modern science.

Both Gokul Jalashay and Udaipur Jheel are oxbow lakes and these are water bodies formed from cut-off river meanders. Gokul Jalashay, spread across 448 hectares in Buxar district, serves as a natural flood buffer for nearby villages and sustains over 50 bird species. It also supports livelihoods through fishing and irrigation, with local participation in annual cleaning festivals reflecting deep rooted community stewardship. Udaipur Jheel, covering 319 hectares in West Champaran, borders Udaipur Wildlife Sanctuary and harbours over 280 plant species and 35 migratory bird species, including the vulnerable Common pochard. Its inclusion emphasises the Ramsar Convention's role in preserving both fauna and endemic flora.

India's biosphere reserves and Ramsar sites operate under distinct but complementary frameworks. Biosphere reserves, established under UNESCO's Man and the Biosphere (MAB) Programme, balance conservation and human development through a three-zone model: a strictly protected core, a buffer for controlled activities, and a transition zone supporting sustainable livelihoods. Ramsar Sites, by contrast, are protected under the 1971 Convention on Wetlands of International Importance, focusing on hydrological regulation, flood control and biodiversity conservation.

Despite progress, challenges remain. Encroachment, pollution and climate variability threaten wetland and mountain ecosystems. Strengthened legal frameworks such as the Wetlands (Conservation and Management) Rules, 2017 and the recent Supreme Court directives for wetland demarcation aim to improve enforcement. Meanwhile, innovative financing through the **Amrit Dharohar and Green Credit Programme**, along with AI-based monitoring and drone mapping is modernising conservation management.

India's recognition under UNESCO and Ramsar frameworks ensures its strategy of linking conservation with climate resilience, sustainable livelihoods and long-term ecological balance.

Mukhi becomes first India-born adult Cheetah at Kuno

India has achieved a major milestone in wildlife conservation as Mukhi, a female cheetah born in India has become the first India-born cub to reach adulthood. On 30th September 2025, Mukhi had turned 915 days old, marking the first successful transition from birth to maturity in the country's ambitious cheetah reintroduction programme.

Her survival is seen as a crucial step toward building a self-sustaining cheetah population in India.

Mukhi was born on 29th March 2023 to Jwala, a Namibian cheetah introduced at Kuno National Park in Madhya Pradesh. She had three siblings, but tragically, they died due to extreme summer heat, a common challenge in India's wildlife conservation efforts. Mukhi not only survived but also adapted well to local conditions, making her story a symbol of hope for Project Cheetah.

Project Cheetah was launched in 2022, when PM Modi released eight cheetahs from Namibia into Kuno National Park. The programme aimed to reintroduce cheetahs to India after more than 70 years of extinction. In 2023, India received 12 more cheetahs from South Africa, bringing the total number of imported cheetahs to 20. This project was the world's first intercontinental relocation of a large carnivore, making India a global leader in wildlife conservation innovation.

As of September 2025, 27 cheetahs live in India, of which 16 were born in the country. Nineteen cheetahs have died (nine adults brought from abroad and 10 India-born cubs). Currently, 24 cheetahs remain at Kuno National Park, while three have been relocated to Gandhi Sagar Wildlife Sanctuary. The cub survival rate at Kuno is 61%, higher than the global average of 40%. These numbers show that while challenges remain, the programme is making steady progress. Mukhi's survival demonstrates that cheetahs can adapt to Indian conditions and thrive, which is critical for creating a long-term, self-sustaining population.

Mukhi's journey is more than a conservation achievement. It is a symbol of India's commitment to restoring its natural heritage. Her survival proves that with careful planning, protection and patience, India can bring back species that were lost for decades. Mukhi's story inspires hope for the future of wildlife in India and highlights the importance of preserving habitats and protecting endangered species.

India launches 5 species projects

Wildlife Week 2025 in India focused on the theme **Human-Wildlife Coexistence** where the importance of protecting animals and living safely alongside them was highlighted. The celebrations were held at Indira Gandhi National Forest Academy in Dehradun, where Union Environment Minister Bhupender Yadav launched five important projects to conserve endangered species and reduce conflicts between humans and wildlife. The event brought together students, scientists, forest officers and young innovators from more than 20 states.

The five new projects focus on different species and ecosystems.

- **Project Dolphin Phase II** works to protect river and marine dolphins by improving their habitats and reducing threats like fishing, pollution and underwater noise.
- **Project Sloth Bear** aims to stop habitat loss, illegal poaching and human conflicts affecting sloth bears.
- **Project Gharial** focuses on conserving the critically endangered gharial through river ecosystem protection, nesting site restoration and breeding programmes.
- **A Centre of Excellence for Human-Wildlife Conflict** will be set up at Salim Ali Centre for Ornithology and Natural History (SACON) to use technology including AI to manage conflict-prone areas.
- **The Tigers outside Tiger Reserves initiative** will protect tigers living outside national parks using community participation and modern monitoring methods.

In addition to these projects, the government launched new wildlife monitoring programmes to track animal populations across the country. These include surveys of river dolphins, tigers, snow leopards and great Indian bustards, with manuals and guides to help scientists collect accurate data. These programmes will make it easier to understand population trends and plan better conservation strategies.

Wildlife Week also involved young people through a National Hackathon on human-wildlife coexistence. Over 400 students from 75 institutions participated using AI and mapping tools to design solutions for conflicts between people and wildlife. The top teams were awarded cash prizes, and all participants received certificates for their efforts.

The celebrations of Wildlife Week 2025 showed that protecting wildlife is a shared responsibility. By combining government support, technology, community involvement and youth innovation, India is taking important steps to conserve its rich biodiversity and ensure that humans and animals can live together safely.

Rajasthan's first Namo Biodiversity Park inaugurated

On 5th October 2025, India's Union Minister for Environment, Forest and Climate Change, Bhupender Yadav, opened Rajasthan's first Namo Biodiversity Park called '**Namo Van**,' at Pratap Bandh in Alwar. The event included a tree plantation ceremony. The park marks an important step for the state in protecting biodiversity, promoting climate resilience and encouraging community involvement in environmental conservation.

Namo Van has been created as a "green lung" for Alwar, aiming to improve air quality, increase urban greenery and restore the ecological balance of the region. The park is not just a recreational area but also a model of urban ecological development where humans and nature can coexist. It is designed to serve as a carbon sink, reduce local air pollution, preserve native plants and animals of the Aravalli ecosystem and educate citizens and students about the environment.

The park features native tree plantations, green walkways, eco-trails and educational zones to teach visitors about biodiversity, climate change and sustainable living. It also includes water conservation measures like rainwater harvesting and green landscaping. These design elements aim to combine ecology, education and sustainability in a way that is accessible to the public.

For Rajasthan, which faces challenges like deforestation, desertification and air pollution, Namo Van is especially important. It helps increase tree cover, reduce urban heat, support wildlife and pollinators and serve as a climate adaptation effort aligned with India's Paris Agreement commitments. The park also supports the Lifestyle for Environment movement, encouraging eco-friendly habits and responsible living.

Kaziranga Director Sonali Ghosh wins Global Sustainability Award

Sonali Ghosh, Director of Kaziranga National Park in Assam, has become the first Indian to win the **Kenton R. Miller Award.** This award, given by the World Commission on Protected Areas (part of IUCN), honours people who use new ideas to protect nature. She shared the award with a conservationist from Ecuador.

Dr. Ghosh is recognised for involving local communities in protecting wildlife. She mixes traditional knowledge, modern science and community participation to save animals and plants. Her work in Kaziranga and Manas has helped both nature and local people. As a forest officer, she manages wildlife, does research, works with communities and plans conservation strategies. Her recognition shows India's important role in protecting nature and can inspire similar projects in other areas.

Smt Kavya R

Bathukamma Festival

blooms into Guinness World Records

"Bathukamma embodies the spirit and identity of our people. These records are a tribute to the women of Telangana."

Telangana's vibrant floral festival, Bathukamma, has entered the global stage after setting two Guinness World Records during a grand celebration at Saroornagar Stadium in Hyderabad on 29th September.

The first record recognised the largest floral Bathukamma structure, a towering 63-foot arrangement made from more than 10 tonnes of seasonal flowers, while the second honoured the largest synchronised dance performance by women, featuring 1,354 participants performing traditional songs and Telangana's folk dance around the floral tower.

The event, organised by the Telangana government, brought together women from self-help groups across the state. Over 300 volunteers worked for three days to construct the floral monument. Officials from Guinness World Records were present to certify the achievements. State ministers and the Hyderabad Mayor attended the event and hailed the recognition as a proud moment for Telangana. "Bathukamma embodies the spirit and identity of our people. These records are a tribute to the women of Telangana," one official said.

The story behind Bathukamma

The word Bathukamma comes from Telugu, where ***bathuku*** means "life" and ***amma*** means "mother,"

together translating to "Mother, come alive." The festival is dedicated to Goddess Maha Gauri, representing life, femininity and the beauty of nature.

Several legends surround the origin of Bathukamma. One tells of Goddess Gauri, who after defeating the demon Mahishasura, fell into deep sleep. Women prayed for her to awaken, symbolising the renewal of life. Another legend speaks of a Chola king and queen who, after many years without a child, were blessed with a daughter named Bathukamma, meaning "living mother." The festival also echoes ancient traditions of offering flowers to the Goddess in gratitude for life and fertility.

Bathukamma reflects Telangana's agrarian culture. Celebrated after the monsoon, it coincides with the blooming of wild and seasonal flowers. For nine days, women create colourful flower stacks shaped like temple towers, sing folk songs and dance in circles around them each evening. The festival concludes with **Saddula Bathukamma,** when the flower arrangements are immersed in water bodies as an offering to nature and a symbol of renewal.

Staying eco-conscious while breaking records

Unlike previous failed Guinness record attempts that relied on chemicals and foam, this year's Bathukamma was built by around 300 workers with metal, bamboo and flowers. The entire floral structure took 72 hours to complete.

In an eco-friendly initiative, the flowers used for the massive Bathukamma will be repurposed into incense sticks, organic manure and bio-enzymes, promoting sustainability while celebrating tradition.

Smt Ramamani N

World's highest motorable road

La Pass

In the snowy mountains of eastern Ladakh, a new record has been set, marking an important moment in history. The Border Roads Organisation (BRO) has once again proved that no challenge is too great when determination, teamwork and engineering brilliance come together. With the completion of the world's highest motorable road at **Mig La Pass**, standing tall at **19,400 feet above sea level**, India has not only set a new world record but also demonstrated the true spirit of courage and perseverance.

The road at Mig La Pass, part of the **Likaru–Mig La–Fukche alignment,** surpasses BRO's own previous record set at Umling La in 2021, which stood at 19,024 feet. Constructed under **Project Himank** of the BRO and led by **Brigadier Vishal Srivastava**, this achievement is a shining example of human endurance and innovation. The BRO team proudly hoisted the national flag and the organisation's flag at the site, symbolising India's strength, resilience and unity.

A triumph against all odds

Building a road at such an altitude is no easy feat. The air at 19,400 feet contains barely half the oxygen found at sea level. The workers and engineers braved sub-zero temperatures, unpredictable weather and extreme isolation. Yet, their commitment never wavered. They worked with precision and courage, overcoming nature's toughest challenges to turn an impossible dream into reality.

This road is more than just a strip of tar—it is a symbol of

the indomitable spirit of the BRO and the nation it serves. It stands as a reminder that progress often demands patience, persistence and faith in one's mission.

Strategic strength and national pride

The **Likaru–Mig La–Fukche road** carries immense **strategic importance** for India. It forms a third vital axis connecting **Hanle to the border village of Fukche** near the **Line of Actual Control** (**LAC**). This new route enhances India's defence capabilities by facilitating the faster and safer movement of troops and supplies in a region that is both geographically challenging and strategically sensitive.

But the significance of this achievement extends beyond defence. The road will also help local communities by improving **all-season connectivity**. Villages that were once cut off during harsh winters will now remain accessible throughout the year. This connectivity will reduce isolation, enhance trade and make emergency services more reachable—offering a better quality of life for people who live in one of the world's toughest environments.

Boosting tourism and scientific exploration

Beyond its military and social benefits, the road to Mig La Pass opens new opportunities for **tourism and scientific research**. The breathtaking beauty of the **Indus Valley**, combined with easier access to remote regions, is expected to attract travellers and adventurers from around the world. It will also support India's scientific community, as the route connects to Hanle, home to the Indian Astronomical Observatory—one of the world's highest sites for astronomy.

The BRO's accomplishment, therefore, is not just about breaking records—it is about paving the way for discovery, development and human connection in places where few dared to venture.

An inspiration for young minds

The story of Mig La Pass is a powerful lesson. It teaches **that success is born out of perseverance** and that limits exist only until someone decides to challenge them. The engineers, soldiers and workers who built this road did not let the biting cold or the lack of oxygen stop them. Their achievement reflects qualities every young learner should aspire to—**discipline, teamwork, courage and innovation**.

As the tricolour flutters proudly at 19,400 feet, it carries a message for all: when dreams are fuelled by determination and guided by purpose, even the sky is not the limit.

Shri Bharath

India produces about 1.5 million engineering graduates annually and as per industry reports, only 45% of the graduates meet industry expectations for employment. With the rise of AI and the need for advanced technology skills, this figure may further drop to as low as 15%. While jobs do exist, the majority of the graduates are not able to access those because of their inability to meet the expectations of the technology-driven industry.

According to NASSCOM, India would need about one million skilled engineers within the next 2-3 years in the areas of AI and other advanced technologies. But reports suggest that the demand – supply gap for such talent is expected to widen from 25% to 30% in three years. While there is oversupply of general engineering graduates, their inability to fill such niche roles is a big concern. The root of the problem is the disconnect between the skills and competencies imparted in the academic institutions and those that are sought by employers.

It is to bridge this yawning gap that the IIT Madras has launched the **'National Internship, Placement Training and Assessment' (NIPTA)** initiative. This is a first-of-its-kind initiative that is designed to offer engineering and diploma students an accessible training programme to hone their essential skills followed by an assessment to enhance their employability.

NIPTA
IITM SHAASTRA

Highlights

Target Group: Engineering students (3rd and final year), graduates, final year Diploma students and Diploma holders.

Curated 10-12 weeks training in focused technical subjects, math aptitude, logical reasoning and communication skills followed by an assessment exam.

Three hour, in-person, proctored test at various centres across India.

Performance-based certificate issued by IIT Madras, which would serve as a credible and transparent indicator of skills and competencies.

Free video lectures and sample questions are provided.

Results are shared with companies.

Expected outcomes

This programme is expected to enable recruiters to identify the right talent in time, reducing the cost and inefficiencies of recruitment. The performance assessment is expected to be an objective indicator of a candidate's capabilities. The assessment that is shared with recruiters provides a window of opportunity for the aspirants.

IIT-M also plans to conduct **National Job and Internship Mela** (virtual or in-person) in early 2026. This platform will open up career opportunities by directly connecting the assessed students with potential employers. This shall not be a one – off test or exam but a platform for continuous engagement. This initiative is not only expected to improve employability of the youth but also boost their confidence and make them battle-ready for an ecosystem that is becoming increasingly competitive by the day. **While this is a much needed initiative at this point in time, the ultimate objective should be to improve our engineering curricula and make them dynamic to match the evolving industry needs and obviate the need for such initiatives.**

Shri Mrithyunjay GN

INS Androth - The submarine killer

On 6th October 2025, the Indian Navy commissioned INS Androth at Kochi, marking a new chapter in India's coastal defense strategy. Built by **Garden Reach Shipbuilders & Engineers** (GRSE), Kolkata, the ship is part of the eight-vessel Anti-Submarine Warfare Shallow Water Craft (ASW-SWC) programme—an entirely indigenous project designed to protect Indian shores from enemy submarines.

At 78 metres in length and weighing around 900 tonnes, INS Androth may be smaller compared to destroyers or frigates from navies around the world, but it is a purpose-built submarine hunter.

Because of its size and construction, It can reach speeds up to 25 knots and carries an array of lightweight torpedoes, anti-submarine rockets and depth charges – bombs that can detonate near underwater vessels and ships. The onboard combat management system integrates radar, sonar and weapon controls into one unified interface, allowing quick response to underwater threats.

The technology

The ship relies on state-of-the-art sound navigation and ranging system (SONAR) developed by Defence Research and Development Organisation developed (DRDO) for all of its navigation and war fighting capabilities. Sonar works by emitting sound waves underwater; when these waves hit an object like a submarine, they reflect back as echoes. By measuring the time delay and strength of these echoes, the system determines both distance and depth.

This hull-mounted sonar on INS Androth can pick up even quiet diesel-electric submarines operating in shallow waters.

The vessel's hull design minimises noise to prevent detection; an important factor in underwater warfare where silence often determines survival. Its compact size and high maneuverability make it ideal for coastal areas that are too shallow for larger warships to operate effectively.

Over 80% of the ship's components are sourced domestically, aligning with the **Aatmanirbhar Bharat** initiative. Operating under the Southern Naval Command, INS Androth is fully poised to strengthen the country's maritime surveillance and quick-reaction capability in the Indian Ocean Region.

Testing Agni-Prime Missile
from rail-based launcher

Shri Mrithyunjay GN

A significant milestone that was crossed in India's strategic defence was the successful test of the Agni-Prime (Agni-P) ballistic missile from a rail-based launcher on 22nd October 2025, at the Dr. A.P.J. Abdul Kalam Island test range in Odisha.

Also developed by the Defence Research and Development Organisation (DRDO), this marks India's first validation of a railway-deployable long-range missile system.

What makes this unique?

Agni-Prime is a new-generation, two-stage, solid-fuelled ballistic missile with a range of 1,000 to 2,000 kilometres. What does this mean?

These missiles are known for their solid propellant, which is stable and can be stored for long periods. Once they are launched, the missile splits in the middle of the flight, once fuel is depleted. This gives additional thrust to the top half of the missile to reach the target with greater accuracy.

This missile serves as a lighter, more efficient successor to the earlier Agni-I and Agni-II systems, using advanced composite materials and micro-navigation technology for enhanced accuracy.

Additionally, Agni-Prime employs a ring-laser gyroscope for guidance and features a fully digital autopilot system. Together, they ensure that the missile is able to hit targets even under dynamic conditions. The missile is also equipped with a canisterised design, allowing safer storage and quicker deployment.

Rail-based launcher system

Unlike traditional road-mobile or silo-based systems, a rail-based launcher allows missiles to be transported and launched from specially modified trains. These trains can move through India's vast railway network, making detection and targeting by adversaries far more difficult. The mobility also allows rapid redeployment to different regions in a short time.

The test demonstrated perfect flight performance, meeting all mission objectives. Data from radar, telemetry and electro-optical tracking stations confirmed accuracy and stability throughout the trajectory. DRDO scientists highlighted that the missile's compact form enables quick assembly and launch preparation, crucial in strategic response scenarios.

This test strengthens India's credible minimum deterrence policy and adds another layer to its nuclear triad capability. Following user trials with the Strategic Forces Command, Agni-Prime is expected to enter operational service by 2026.

Gyroscope is a device that uses a spinning wheel or disc to measure or maintain orientation and angular velocity. Gyroscopes are used in applications like smartphone sensors, automatic pilots for ships and aircraft and inertial guidance systems for spacecraft.

Ring laser gyroscopes are lightweight, compact and self-contained. This allows for no friction. This is a major benefit, especially for inertial navigation.

Inertial navigation is a system that uses accelerometers and gyroscopes to continuously track an object's position, orientation and velocity without external references.

Shri Mrithyunjay GN

On 10th October, 2025, the Indian Army unveiled the acquisition of SAKSHAM - System for Advanced Kinetic Surveillance and High-speed Aerial Mitigation.

SALSHAM is an anti-drone defence grid designed to detect, track and neutralise unmanned aerial threats. The system was developed jointly by the **Corps of Signals, Bharat Electronics Limited** (BEL) **and the Defence Research and Development Organisation** (DRDO).

A defence grid is an integrated network for protecting a country or area from attack.

The modern battlefield is no longer confined to the ground.

Control of the Air Littoral, the airspace immediately above troops, is now critical to tactical dominance.

These systems provide a unified "recognised drone picture" across the newly defined Tactical Battlefield Space (TBS) - a domain extending up to 3,000 metres above ground level.

SAKSHAM combines radar, electro-optical sensors and radio-frequency (RF) detectors to provide 360-degree coverage across a 10-kilometer radius. Once a drone is identified, it can employ two forms of countermeasures: soft-kill and hard-kill responses.

Soft-kill systems disrupt communication between the drone and its operator by jamming radio frequencies or spoofing GPS signals, forcing the drone to lose control or return to base. Hard-kill methods involve physical destruction of the drone, either by laser-based energy weapons or small projectiles aimed at the target midair.

The networked system can connect multiple detection nodes to a central command centre, creating a real-time defence grid capable of handling swarm attacks. SAKSHAM's modular design allows it to be deployed rapidly at forward bases, airfields or along border zones vulnerable to drone incursions.

More than 60% of its components are domestically produced and engineers have also ensured the system's compatibility with existing air defense assets for better integrated threat management.

SAKSHAM marks a timely evolution in India's electronic warfare strategy. Army officials emphasised that the system's indigenous design not only enhances operational security but also ensures adaptability for future upgrades and AI-assisted automation.

With growing focus on indigenous technology and modernisation, India is steadily building stronger defences on land, at sea and in the air and these new systems mark an important step in making sure the country can protect itself with advanced, home-grown solutions.

Smt Deepasri

Digital Personal Data Protection Act

The DPDP Act contemplates a data fiduciary which refers to any person, company or organisation that determines the purpose and means of processing personal data.

In continuation to the previous edition of this series, we will look into the Digital Personal Data Protection (**"DPDP"**) Act.

DATA FIDUCIARY

The DPDP Act contemplates a data fiduciary which refers to **any person, company or organisation that determines the purpose and means of processing personal data.** Further, the Central Government may notify any class of data fiduciaries as 'significant data fiduciaries' based on multiple factors.

Obligations of significant data fiduciaries include (a) appointing a data protection officer (b) appointing an independent data auditor, (c) ensuring accuracy of personal data and (d) conducting a data protection impact assessment.

DATA PRINCIPAL

Further, the Act defines data principals as **individuals to whom the personal data in question relates.** Such individuals shall have the right to

(a) seek information on how their data is processed,

(b) be notified,

(c) withdraw consent,

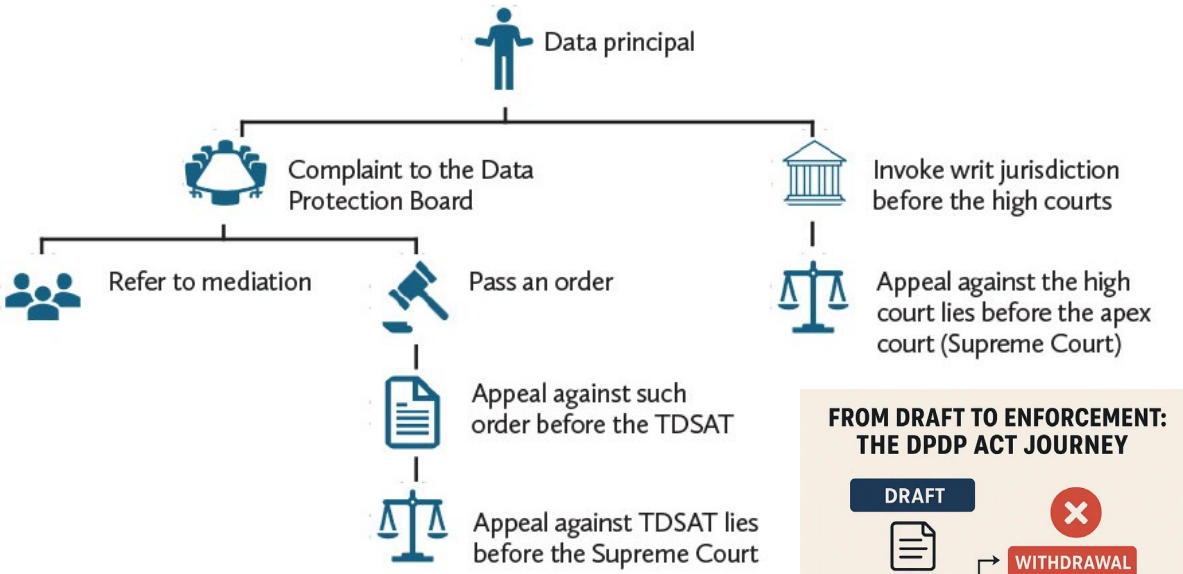
(d) correct and erase data,

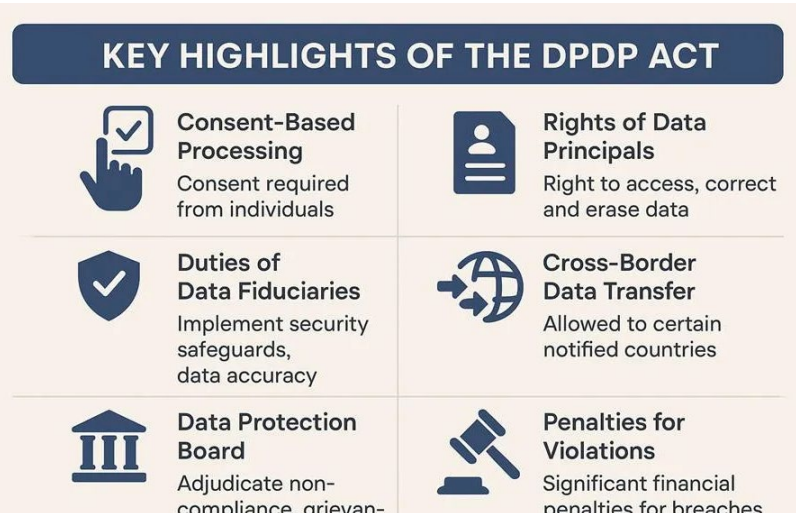
(e) raise grievances with the Data Protection Board and

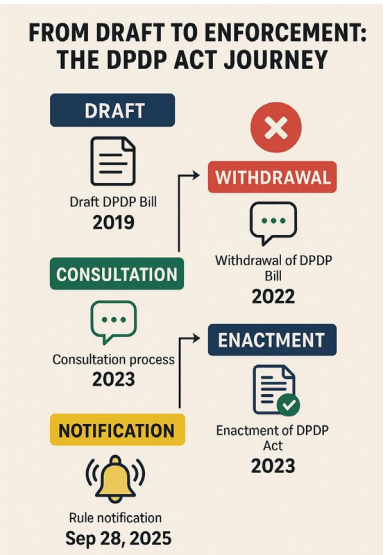
(f) nominate another individual to exercise rights in case of death or incapacity.

DATA PROTECTION BOARD

The DPDP Act contemplates a Data Protection Board to act as an enforcement authority, which will have powers to direct measures







for personal data breaches, impose penalties for non-compliances, inspect documents etc. An appeal against an order of the Data Protection Board may be preferred before the Telecom Disputes Settlement and Appellate Tribunal and subsequently the Supreme Court of India.

OTHER SALIENT PROVISIONS

(i) Lawful purpose: Personal data can only be processed for a lawful purpose for which the data principal has given consent.

(ii) Transborder transfer: Personal data can be transferred by a data fiduciary to any other country or territory for processing, unless restricted.

(iii) Consent for minors: Verifiable consent of parent or lawful guardians is required to process personal data of children and persons with disabilities.

(iv) Penalties: Monetary penalties of up to ₹250 crores may be levied by the Data Protection Board for non-compliances under the Act, depending on the nature of contravention, including not taking reasonable safeguards to prevent breaches and failure to give notice of breach to the Data Protection Board.

DRAFT DPDP RULES

The draft Digital Personal Data Protection Rules (**"DPDP Rules"**) were released for public consultation by the Ministry of Electronics and Information Technology earlier this year. The DPDP Rules lay down provisions including reasonable security safeguards, the process for giving notice to data principals, obligations of consent managers under the Board, additional obligations of significant data fiduciaries, rights of data principals and modalities of functioning of the Board.

Natural remedies for dry eyes

In the modern digital age, dry eye syndrome has emerged as one of the most common ocular complaints, affecting millions across the globe. **Characterised by irritation, burning sensation, redness and blurred vision, this condition arises when the eyes fail to produce adequate tears or when the tears evaporate too quickly.**

Causes of dry eyes from a naturopathic viewpoint

While conventional medicine identifies factors like screen exposure, aging and certain medications, Indian Naturopathy looks deeper into the root causes:

1. **Dehydration and inadequate water intake** – Insufficient hydration reduces overall moisture in tissues, including tear glands.
2. **Improper diet** – Excessive spicy, oily or processed foods generate body heat and imbalance pitta.
3. **Lack of rest and irregular sleep** – Overuse of eyes without adequate sleep disturbs nervous balance and tear regulation.
4. **Environmental factors** – Exposure to dust, heat, wind or air-conditioning leads to evaporation of natural moisture.
5. **Stress and emotional strain** – Mental fatigue affects the autonomic nervous system, reducing tear secretion.
6. **Systemic toxicity** – Accumulated toxins from constipation, indigestion or unhealthy habits manifest as eye dryness and irritation.

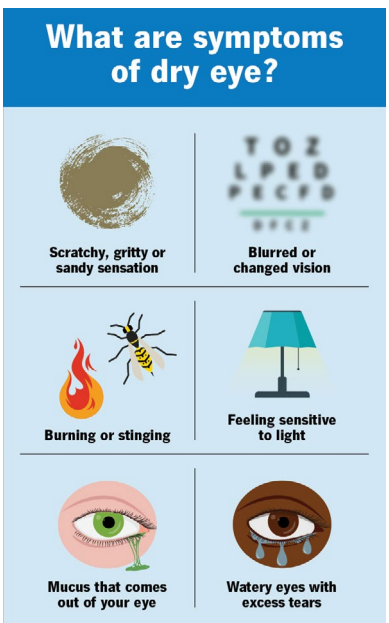
Addressing these factors holistically allows long-term relief and prevention rather than temporary suppression.

Naturopathic remedies

Eye hydration and external care

Cold compress

Soak a clean cloth in cold water or rose water and place it gently over the eyes for 10–15 minutes. It cools the nerves, reduces inflammation and soothes irritation.



Cucumber and aloe vera pads

Placing thin cucumber slices or aloe vera gel pads over the eyelids hydrates and nourishes the surrounding tissues. Aloe vera contains polysaccharides that support moisture retention.

Rose water drops

Pure, chemical-free rose water acts as a mild astringent and natural tear substitute. Two drops in each eye twice daily can relieve dryness and burning.

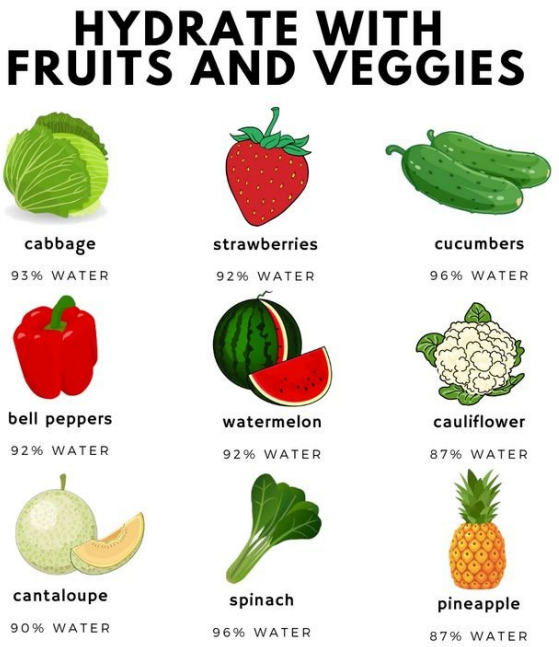
Castor oil application

Organic, cold-pressed castor oil (used externally on eyelids—not inside eyes) at bedtime helps improve the oil layer of tears and prevents evaporation.

Internal hydration

Hydration in naturopathy is not limited to drinking plain water but includes water-rich foods and fluids that nourish tissues.

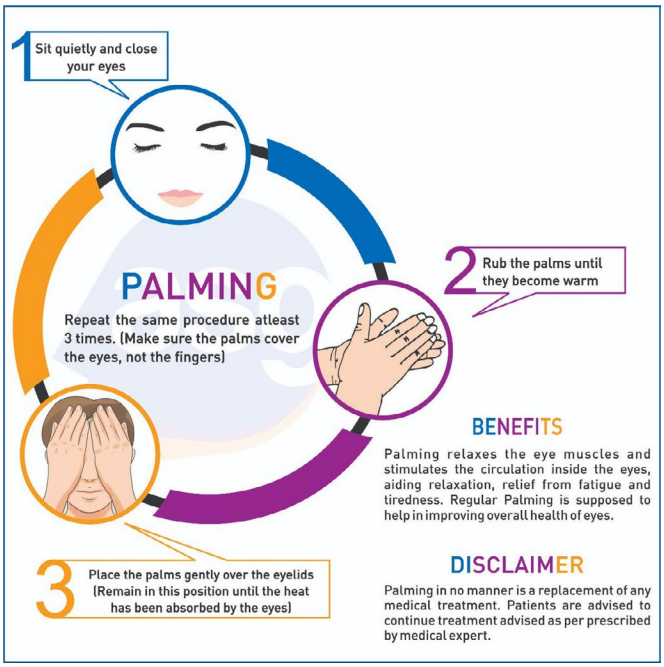
- **Lukewarm water therapy:** Begin the day with two glasses of lukewarm water to flush toxins and improve circulation.
- **Herbal infusions:** Herbal teas made from coriander seeds, fennel or mint help balance *pitta* and cool the system.
- **Fruits and vegetables:** Cucumber, bottle gourd, watermelon, amla, oranges, and papaya replenish body fluids and provide vitamin C and antioxidants crucial for eye health.
- **Coconut water and buttermilk:** These natural coolants hydrate and cool the body.



Eye exercises and relaxation

Overuse of digital devices has made ocular fatigue a daily issue. Naturopathy emphasises *Trataka (focused gazing),* palming and blinking practices to restore eye function.

- **Palming:** Rub the palms together to generate warmth, then gently cup them over the eyes. This relaxes eye muscles and improves circulation.



- **Blinking exercise:** Blink rapidly for 10–15 seconds every half hour during screen work to moisten the corneal surface.
- **Eye rotation:** Move eyes slowly in all directions to enhance flexibility and tear distribution.
- ***Trataka* (candle gazing):** Focusing on a flame with a steady gaze improves concentration and stimulates tear glands. Practised with caution (avoiding strain), it rejuvenates tired eyes.

Lifestyle modifications

- **Adequate sleep:** 7–8 hours of restful sleep restores tear balance and prevents fatigue.
- **Digital detox:** Limit screen exposure; use the 20-20-20 rule (every 20 minutes, look at something at least 20 feet away for 20 seconds) to blink and rest eyes periodically.
- **Environment management:** Use humidifiers, keep indoor plants and avoid direct air from fans or AC vents.
- **Stress management:** Practices like yoga, *pranayama* and meditation balance the nervous system and support tear secretion.

Herbal Remedies

- ***Triphala* eye wash:** A decoction made by boiling *triphala* (a blend of *amla, haritaki* and *bibhitaki*) in water, then cooling and filtering it, can be used to wash eyes. It detoxifies and soothes.
- **Aloe vera juice:** Taken internally (15–20 ml daily) hydrates and cools the body.
- **Ghee:** A few drops of pure cow's ghee applied on closed eyelids or consumed with warm milk nourishes ocular tissues from within.
- **Neem and tulsi:** These herbs purify blood and reduce inflammatory reactions contributing to eye discomfort.

Ultimately, the path to healing dry eyes lies not in dependence on chemical drops alone, but in harmonising with the body's innate intelligence. With consistent natural care and mindful living, the eyes - our windows to the world - can once again regain their calm, clarity and radiance.

Smt Uthra Dorairajan

Dr.Sulochana Gadgil

Despite studying in the Marathi medium during primary school, Sulochana Gadgil picked up English quickly and attended higher-level mathematics classes.

With independence, our country witnessed a fast growing trajectory of parents who emphasised on education for girls; and philanthropists who established institutions for them. Sulochana was born in Pune, as the third of four daughters in a family which believed that knowledge and growth go together. Her father was a medical practitioner, while her mother was a Marathi writer, graduating after two daughters were born. Her grandfather too was a physician as well as a freedom fighter (who took part in the **Mulshi Satyagraha**) who encouraged his grandchildren to follow this profession. Their house served as a shelter for everyone fighting for our freedom and their living room 'Liberty Hall' reverberated with strategies to attain *Swarajya*.

Impressed by the philosophy of Rishi Valley School, her parents sent little Sulochana there along with her cousins. Despite studying in the Marathi medium during primary school, she picked up English quickly and attended higher-level mathematics classes. After clearing SSLC exam, she joined Fergusson College in Pune. She studied chemistry, physics and mathematics as she wanted to pursue mathematics, though she was unclear about her future career. Later she did Masters at Pune University. Her would-be life partner Madhav Gadgil, an alumnus of Fergusson who did biology, later took up marine biology for his postgrad at Bombay. When he wanted to go abroad for his Ph.D., Madhav's mother wanted him to marry an Indian girl before leaving. She approached young Sulochana's family with their marriage proposal and they were more than happy to welcome an academically bright girl to their family.

Both Sulochana and Madhav got admission into Harvard University with scholarships. They got married in June 1965, and in a few months started their new life in the USA.

Sulochana Gadgil explored physical oceanography through applied mathematics as a tool at Harvard. She chose to wear sari and rode a bicycle, making her stand out. Her husband Madhav was of great support to her. Because of him, she developed an interest in mathematical ecology and evolutionary biology and began some work in that field. Amongst the many advanced courses she took, one was on planetary fluid dynamics, taught by Prof. Jules Charney, who has made fundamental contributions to tropical meteorology. After completing her Ph.D., in applied mathematics Dr.Sulochana Gadgil decided to focus on the monsoons, the most challenging problem in tropical meteorology. Being aware of how much this field is of prime importance to our country, she did her post-doc work with Prof. Charney at MIT. She attended talks and interacted constantly with an outstanding group of geophysical fluid dynamicists belonging to Harvard, MIT and Woods Hole Oceanographic Institute. She learnt the art and science of modelling complex systems from the stalwarts in the field. This gave her the confidence to undertake modelling studies of not only the monsoon, but also of crops and to develop simple models to assess the impact of pests and diseases on crops in our country later.

In 1971, Madhav and Sulochana came back to India and for two years she worked as a CSIR pool officer at the Indian Institute

of Tropical Meteorology. This gave her an opportunity to learn from the great tropical meteorologists like R. Ananthakrishnan and to work with the distinguished monsoon meteorologist Dev Raj Sikka. Thus began her lifelong passionate involvement with the monsoon. In fact, the word "Monsoon" has its origin from *mausam* referring to the seasonal winds of Indian ocean that European seafarers and traders were relying upon. Being a very crucial phenomenon involving man, materials and money, people were trying to understand this for ages. Her landmark paper reported the discovery of the important role played by the formation and northward propagations of the cloud band over the equatorial Indian Ocean. Her studies further demonstrated that the monsoon is a manifestation of the seasonal migration of a planetary scale system, debunking the idea that monsoon is just a gigantic land-sea breeze.

Fascinated by the nature of her work, with very relevant application in the subcontinent, Prof. Satish Dhawan recruited her as one of the members of the newly founded Centre for Theoretical Studies (CTS) comprising an interdisciplinary group of scientists engaged in modelling complex systems, including biological systems, the atmosphere and the oceans. Madhav was also hired as a mathematical ecologist at CTS. Out of these beginnings grew the Centre for Atmospheric and Oceanic Sciences (CAOS), which played a major role in the formulation and implementation of the Indian Climate Research Programme, providing leadership for major observational experiments over the Bay of Bengal, the Arabian Sea and Indian monsoon zone.

Along with the "Monsoon Man" Sikka, she analysed the satellite images that NOAA (National Oceanic and Atmospheric Administration) had distributed, identified the rain bands using infrared techniques and began looking at the impact over the Indian longitudes.

- **1985** Fellow of Indian Academy of Sciences
- **1995** Fellow of Indian National Science Academy
- **1996** Norman Borlaug Award
- **2008** Lifetime Achievement Award from MoES
- **2016** Life Time Excellence Award in Earth System Science

She was among the first to analyse satellite-derived cloudiness over tropical oceans and demonstrated the importance of sea surface temperature for convection. Her studies of the inter-annual variation of the Indian monsoon have shown the strong link with the equatorial Indian Ocean Oscillation (EQUINOO), in addition to the well-known link with El Nino and Southern Oscillation (ENSO).

Prof.Sulochana was also involved in projects such as the Monsoon Trough Boundary Layer Experiment (MONTBLEX, 1990) and the Bay of Bengal Monsoon Experiment (BOBMEX, 1999), collecting atmospheric data on the Indian climate.

She led research teams engaging in collaboration with agricultural scientists, ecologists, economists, oceanographers, meteorologists along with farmers to identify farming strategies tailored to rainfall variability so as to maximise long-term average returns. Her contributions are crucial to our country that had witnessed drought and food shortage due to monsoon failure in the previous decade. **One of her significant contributions has been bringing together perspectives and data from disparate fields**. She correlated the impact of droughts with the GDP. **Till then, no economist had quantitatively assessed the impact of the monsoon on agriculture and the GDP**. She worked with farmers of various states extensively to understand various practices and validated their crop models through the rainfall and satellite data collected. She was of the opinion that there was not much collaborative work happening between farmers and scientists in our country during her times, as many agricultural scientists had moved to research on climate change.

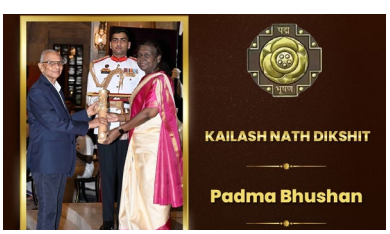
With her life resonating with Rishi Valley School's philosophy, she chose not to participate in the scientific rat race of publications. She further believed that active encouragement from Madhav, who always had more faith in her abilities than she herself did, had played a crucial role in her achievements. She was a Fellow of the Indian National Science Academy, the Indian Academy of Sciences, the Indian Meteorological Society and received several awards including the **Vikram Sarabhai Award and Norman Borlaug Award.** In recognition of her outstanding contribution, the Ministry of Earth Sciences of honoured her with the **Life Time Excellence Award in Earth System Science (2016).**

"I have always been treated as a capable scientist who happens to be a woman rather than as a woman scientist, and never experienced any gender discrimination. Over the last three decades, as a working scientist in India, I have never witnessed any discrimination against women whether in selection of students or for jobs, or in assessment for promotion. In this congenial atmosphere, I believe that women have every opportunity to achieve their potential as scientists," wrote Prof.Sulochana in her memoir.

DR. KAILASH NATH DIKSHIT

Born in Lucknow in 1936, Kailashnath Dikshit's fascination with history began early. After earning his Master's degree in Ancient Indian History and Archaeology, he joined the Archaeological Survey of India (ASI) in 1957. From that moment, his journey became one of relentless curiosity and devotion to India's cultural heritage.

Over nearly four decades, Dikshit explored and excavated some of India's most important historical sites. He led excavations at places like Ujjain, Kalibangan, Bairat, Hulas (a key Harappan site), Shringaverpura (associated with the Ramayana), Bhardwaj Ashram, etc., that revealed fascinating details about India's ancient civilisation. His work helped trace the roots of Indian culture to the lost river Saraswati, showing how deeply the country's civilisation extends into prehistory.



Dikshith's contributions didn't stop with excavations. He also worked on preserving great monuments such as Konark Sun Temple, Ajanta and Ellora Caves and Lord Jagannath Temple in Puri.

He shared his knowledge generously—delivering lectures around the world, guiding research students and editing important journals like ***Puratattva*** and ***Purapravaha***. Even after retirement, his passion never faded. He continued to teach, write and inspire new archaeologists to explore India's past with pride and precision.

Awards and felicitations

Other than the Padma Bhushan (2025), he was also conferred with the following:

- The Govt. of Madhya Pradesh conferred 'Dr. Vishnu Sridhar Wakankar, Rashtriya Samman, as the best archaeologist for the year 2010-11.
- Central Government Museum, Allahabad, honoured him as an outstanding Archaeologist of the year at Allahabad in 2017.
- Museums Association of India, Chennai, felicitated the Life-Time Achievement Award in 2015.
- Draupadi Trust, New Delhi, felicitated him for contribution as the Best Archaeologist of the year in 2014.
- M.S. University, Baroda felicitated him in recognition of his contribution to South Asian Archaeology in 2012.
- Archaeological Survey of India, Ministry of Culture, Government of India, felicitated him for his outstanding contribution in the field of Archaeology on its 150th anniversary in 2012.

Kailashnath Dikshit's life is a lesson for every young learner: **curiosity, dedication and love for one's culture can uncover wonders hidden beneath the surface.** His story reminds us that understanding our past is the first step towards building a meaningful future.

Smt Vaishnavi V

CURIOSITY CORNER

Pulses of India

I Quick Five

1. World's largest producer of pulses - (India, Myanmar, China)
2. Largest producer of pulses in India - (Madhya Pradesh, Rajasthan, Uttar Pradesh)
3. Most produced pulse in India - (Chickpeas, Green Gram, Red Gram)
4. Pulses naturally fix this essential nutrient in the soil - (Calcium, Carbon dioxide, Nitrogen)
5. Pulses are rich in this nutrient - (Fat, Carbohydrate, Protein)

II Given are statements with respect to pulses. Are these correct? Justify your answer.

1. Pulses help improve soil fertility.
2. Pulses are mainly grown in coastal regions of India.
3. Pulses are the edible, dried seeds of legume plants.
4. Pulses require intensive irrigation facilities.
5. Pulses help manage blood sugar levels.

III Given below are some of the common pulses that we use in our kitchen. Can you find the regional term for them? Few languages are tabulated. You can write in your language in the last column.

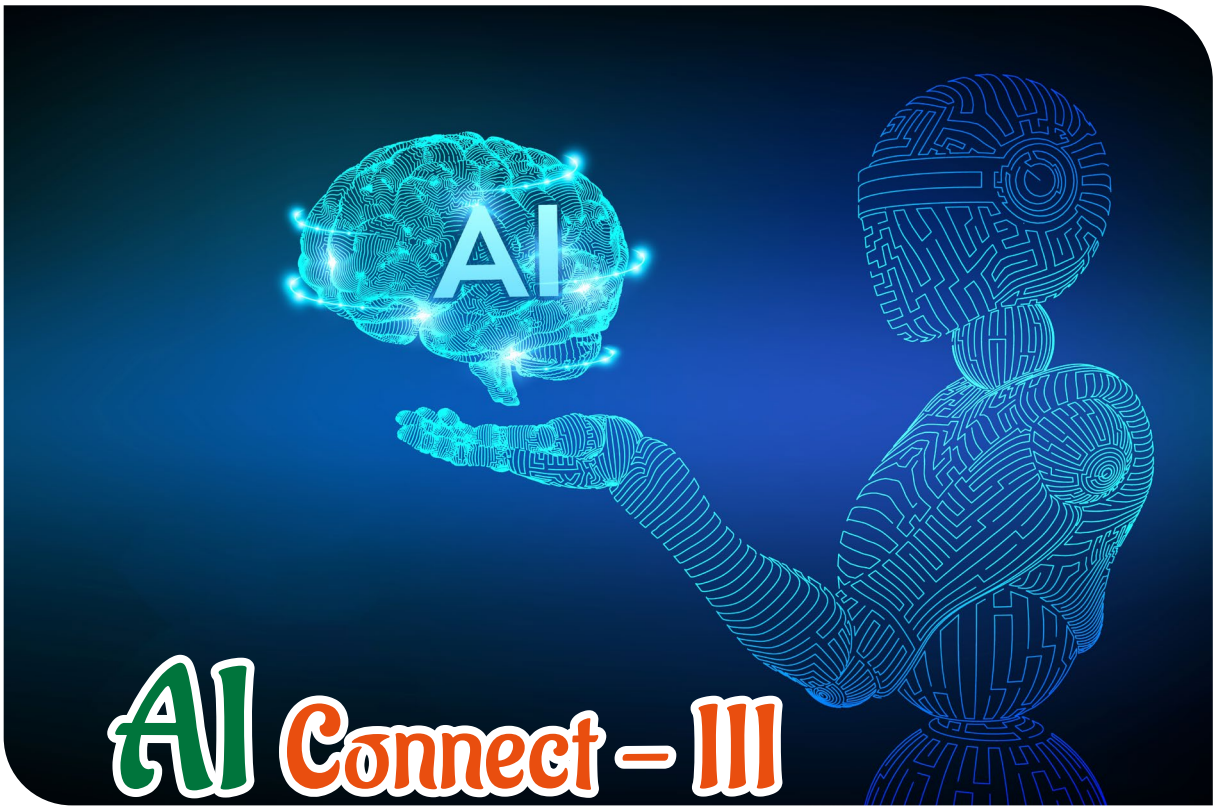
Common Name	Hindi	Tamil	Telugu	Malayalam	Your regional language
Pigeon Pea / Red Gram		Thuvaram Paruppu			
Black Gram	Urad				
Green Gram			Pesara		
Lentil				Parippu	
Horse Gram		Kollu			
Cowpea	Lobia				
Field Bean / Hyacinth Bean	Sem	Mochai			

IV GI (Geographical Index) tag guarantees a product's characteristics, authenticity and origin and protects the product's name from misuse or imitation. Here are a few notable Indian pulses that got the GI tag. Can you match the states with its pulse?

	Pulses with GI Tag		State it belongs to
1	Gulbarga Toor Dal	A	Uttarakhand
2	Tandur Toor Dal	B	Karnataka
3	Munsiyari Rajma	C	Uttarakhand
4	Pahari Toor Dal	D	Telengana

Answers on page 66

Shri Natarajan Raman



AI Connect – III

Vyas: Ved, in the last discussion, we discussed the various layers of CNN and how CNNs are used for image detection.

Ved: Yes Vyas, tell me a bit more about the layers of CNN and how it helps in processing?

Vyas: Sure. The **input layer** is where one feeds the image into the network. The image to be trained is passed on to this layer. CNN sees every image as just a grid of numbers.

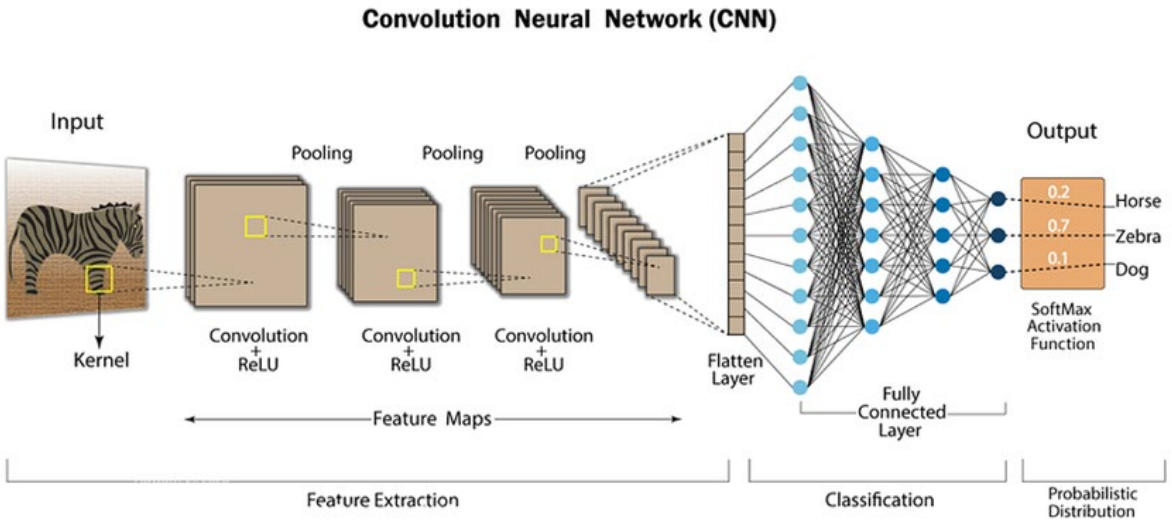
Each pixel has intensity value from 0-255. A colour image has 3 such grids. One each for red, green and blue channels. Example, let us say the image is, 32×32 pixels with 3 colour channels Red, Green and Blue (RGB), then the input layer has a shape of 32×32×3 = 3072 numbers.

So fundamentally, an image is nothing but a **matrix (array of numbers)** that is suitable for mathematical operations.

The input layer does not do any processing, rather this passes the pixel values to the next layer.

Ved: So a network sees image as matrix of numbers. Sounds interesting. Can I say that the input layer acts as the "eye" of the CNN, just see what the pixel values are and pass on?

Vyas: You said it right, it "sees" the raw image as it is. Following the input layer, we have the **Convolutional Layer** – the core of a CNN. The objective of this layer is to apply filters to detect various features of the image. Here, the network applies **filters** that slide over the image to identify

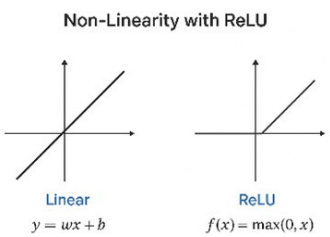


various features like edges, textures or colour gradients etc. This layer helps in understanding the image in detail by the features present in the image.

Ved: Does each filter extract one type of feature or one filter can extract multiple features?

Vyas: Good question Ved, each filter extracts **one** type of feature. We can have many convolutional layers in a CNN network. The early layers help in detection of simple features – say things like edges, curves etc. While the deeper ones help in identifying complex ones like faces or wheels or complex objects. Each filter is like a lens of its own capturing different "view" of the image.

Ved: So as of now, we know the input layer takes the raw image and passes on to convolutional layer which extract the features. What next?

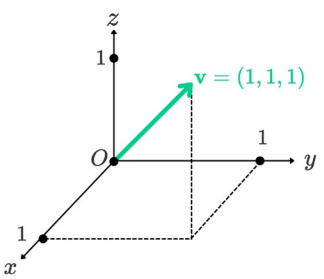


Vyas: Post the convolutional layer, typically we apply an **activation function** to introduce non linearity by replacing negative values with zero, most often we use **ReLU (Rectified Linear Unit).**

Ved: That sounds too complex! Explain it in a simple language, please.

Vyas: Sure. You can consider **ReLU** as another filter that tells CNN – "Hey, if something is negative or not useful, I am going to ignore that and get you only what is needed."

By replacing all the negative values with zero, ReLU helps the network become non-linear. Otherwise all would have been single linear transformation drawing straight lines. In other words, the network will not be able to learn complex patterns like curves or spirals by having a linear network without an activation function.



Vyas: Once the image passes through the activation function, it goes on to the **pooling layer**, which helps in reducing the size of the feature maps.

Ved: Why reduce? Won't that result in data loss? More the better right?

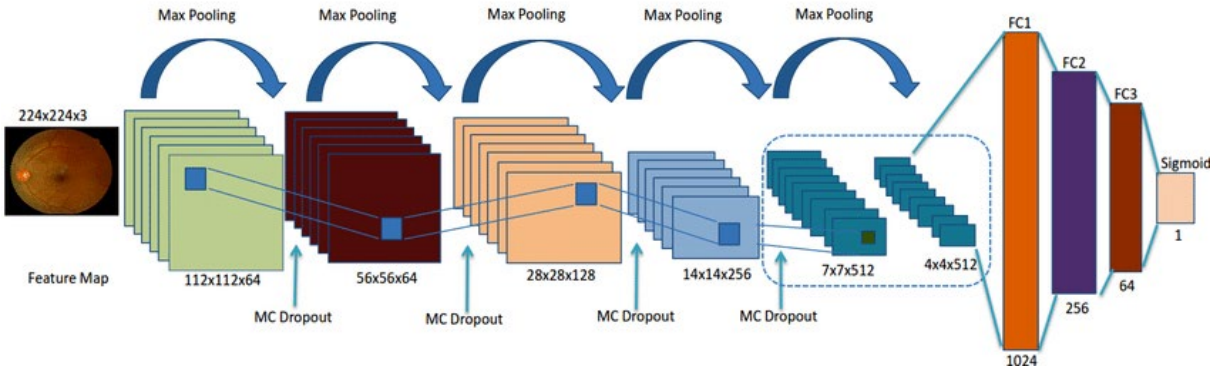
Vyas: A valid question, but while more features are good, it is important to ensure we focus on the dominant features of the image rather than having insignificant features that do not help the network identify patterns. Additionally, it is also important that we prevent overfitting of the model.

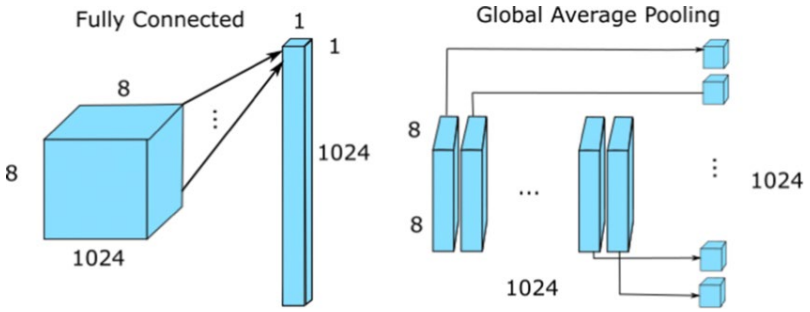
Ved: Overfitting? what is that?

Vyas: With model training, we need to make sure the model does not come under – overfitting or underfitting.

In **under fitting** – model does not learn enough from the training samples. It performs poorly to recognise even the samples used to train. It is like some one appearing for exams without even studying the syllabus or questions present in the text book.

In **over fitting** – model just memorises the training data – it





works great on the trained samples, but when a new sample is given, it struggles and fails to recognise as it has not learned the patterns. Here it is like a student who has memorised exactly what is given in the book and even a slight twist in the question stumps him from answering.

We should aim for a "good fit" model training. Here, the model learns the patterns and recognises new data.

So pooling layer reduces or eliminates the unwanted features and at the same time helps preventing overfitting.

Also, note that reduction of the features helps in reducing the computational needs as well.

Ved: Got it. So pooling layer ensures the summary is kept without losing out the important elements and helps in reducing the computational needs.

Vyas: Yes. Following the pooling layer is what we call as **fully connected layers**. Typically, post several convolution and pooling layers, we derive a single vector that gets passed on to the fully connected layer.

Ved: What is that?

Vyas: In machine learning, data is represented as Vector – each image, word or a sentence gets represented as a vector of numbers. This helps the model to apply computation on them.

Ved: What does the fully connected layer do with the vector?

Vyas: The fully connected layers learn to map the features to specific classes of objects we target to classify the input data into. While the early layers acts as feature extractors, this one acts as a classifier.

Ved: So, is this the layer that decides on what the input object is?

Vyas: Yes. Once the fully connected layer classifies the input data, it sends to the **output layer** which gives the predictions.

In some cases, you would also see an important layer called – **Dropout layer**. This layer helps in preventing **overfitting**. It ensures the model learns the pattern rather than memorise the training data.

We also have **batch normalisation layer**; this helps in normalising the output from one layer to other to ensure model can be trained faster and bring stability.

For example, if the input data given is an image of a "cat," it passes on a "raw image" to the input layer, flows into convolutional layer where features are extracted. The activation function ReLU helps in introduction of non-linearity helping the network to learn features like faces etc. Further the pooling layer reduces the number of features by eliminating unwanted features and passes on to fully connected layer. The dropout and batch normalisation layers help to avoid overfitting and giving faster processing ability respectively. The classification from fully connected layer gets passed onto output layer which predicts the object – here it predicts the figure is a cat.

Ved: Wow, thanks a lot Vyas, I have got a grip on the various layers of CNN. Can't wait to discuss more on the rest.

Vyas: Happy to be of help!

Kumbharwada diyas

Kumbharwada (potter's colony) is known as "Asia's largest settlement of traditional potters". The potter's community crafts diyas for Diwali every year, bringing tradition to life. The lamps that light up our lives and homes during Diwali come from inside the dark homes of the Kumbharwada in Dharavi.

In the heart of Mumbai's Dharavi lies Kumbharwada — a vibrant settlement that has kept the ancient craft of pottery alive for generations. Home to hundreds of potter families originally from Gujarat, this "potter's colony" is a world of its own, where narrow lanes open into courtyards filled with earthen diyas, pots and kilns (an insulated chamber used for high-temperature processes like firing clay). During the festival of Diwali, the air buzzes with activity — the potter's wheels spin tirelessly and the kilns glow with freshly baked diyas ready to illuminate homes across the country.

Pottery in Kumbharwada is not just an occupation but a way of life. The craft follows a traditional rhythm — men mould the clay on their wheels, while women paint, decorate and package the finished diyas. The diyas, made from red clay brought from Gujarat and Maharashtra are baked in handmade kilns and painted in bright hues, making them sturdier and more appealing than machine-made ones. Despite modern competition, these handcrafted diyas remain in high demand for their natural charm and affordability.

Life here, however, is not without challenges. Space constraints, health issues from kiln smoke and the younger generation's waning interest in the craft threaten the continuity of this heritage. Yet, the Kumbhars remain proud of their art and identity. Their colourful homes, community spirit and commitment to craftsmanship continue to reflect their Gujarati roots even after a century in Mumbai.

Today, Kumbharwada stands as one of Dharavi's most prosperous artisanal hubs, blending tradition with resilience. The flicker of earthen lamps from Kumbharwada reminds us that true artistry lies in the hands of this dedicated and committed society.

Ravi Muthuswamy

Jane Goodall

Jane Goodall, the famous primatologist died recently at a ripe old age of 91 and left the world a poorer place. However her work has made us richer. Even at that age she hadn't stopped her work and was on a talk tour in USA, when she died.

During her career spanning 60+ years, Goodall shattered a few myths regarding animal behaviour and intelligence.

Goodall was interested in animal behaviour right from an early age. She couldn't pursue her studies after she finished schooling at the age of eighteen presumably due to financial constraints. For some time she worked as a secretary and as a film production assistant, until Louis and Mark Leakey, paleontologists and anthropologists, chose her to assist in study of chimpanzees. The Leakeys had been looking for a primate behaviour researcher for years, to help them better understand how extinct hominins lived and they thought a study of living apes like chimpanzees would help in this regard.

They helped fund Goodall's first research trip to Tanzania's Gombe National Park in 1960. During Goodall's first field season at Gombe the same year, she got the opportunity to study a friendly male chimpanzee bending over a termite mound and pushing grass stalks into the termite holes. She noticed that when the grass was pulled out, it was covered with termites, which the chimp gleefully snacked on. Later she also noticed a number of chimps removing leaves from twigs and using them instead of grass stalks to harvest termites from inside the mound.

During the years she studied at Gombe Stream National Park, she made three observations that challenged conventional scientific ideas:

- chimps are omnivores, not

herbivores and even hunt for meat;

- chimps use tools; and
- chimps make their tools. And they have a set of complex and highly developed social behaviours.

Jane Goodall faced lot of criticism for suggesting that chimpanzees thought and felt. Other animal behaviour researchers accused Goodall of losing her scientific objectivity for seeing human traits in animals. She was even accused of teaching the chimps how to harvest termites. They also found fault with her propensity for giving names to her subjects instead of the convention prevalent then of just referring to study subjects with numbers.

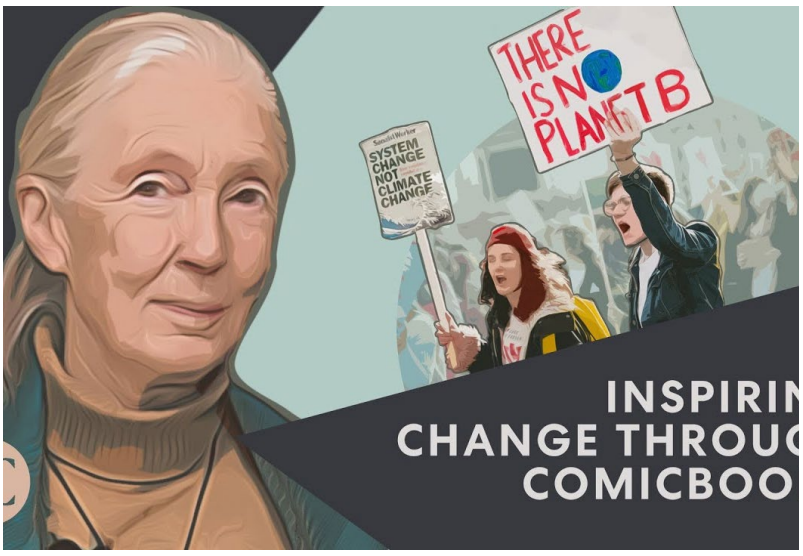
Colleagues also disparaged her for talking of "personalities" of her subjects and indicating that animals have intelligence and are capable of solving problems. And above all, they emphatically disagreed that chimps had emotions.

But Jane Goodall did not allow herself to be provoked or let her work be hindered by the negativity. She diligently gathered scientific data to prove her claims.

Thanks to years of fieldwork, her exhaustive observations, her painstaking and scrupulous notes, we now know that chimpanzees — and many other animal species — do make tools, solve problems and display emotions. She said "you cannot share your life in a meaningful way with animals and not know that they have emotions similar to ours and that they have minds that can sometimes solve problems."

Subsequently other researchers and scientists have found that a number of other animals use tools. To give an interesting example, Veined Octopus collects discarded coconut shells and assembles them to create a shelter for protection. Octopuses have also been observed piling stones as barriers in front of their dens. And they use their siphon to blow jets of water to clear sand and debris from their shelters.

It is interesting that Goodall did not have a degree in science when she started her fieldwork in 1960. But two years later she registered for a Doctoral programme in Cambridge University - supposedly only the 8th person at that time to be accepted for Doctoral programme without having a Bachelor's Degree.



She hastened through her B.A in Natural Sciences and completed her Doctorate in 1966.

There are few interesting things about Goodall - which have nothing to do with her study of chimps. In an interview she mentioned that dogs are her favourite animals.

As a young child, Jane was enamoured of Tarzan's adventures and she dreamt of going to Africa to be with the apes. Burrough's stories of the African forests fuelled her love for the wild. She had a great sense of humour and thought she would have been a much better partner for Tarzan than the Jane he chose. "He married the wrong Jane," she said once!

In August 1987, Gary Larson published a cartoon of a female chimpanzee plucking a blond hair from the fur of her male partner and accusing him of spending too much time with a certain primatologist. Goodall was in Africa when the cartoon was published, doing fieldwork with her chimpanzees. But when she got home, she enjoyed the cartoon. The Jane Goodall Institute sold T-shirts featuring the comic for years, to raise funds for its work.

Goodall also contributed to a comics project, **The Most Important Comic Book on Earth: Stories to Save the World,** with 120 visually inspiring stories, which uses comics to fight climate change and champion for biodiversity.

Jane Goodall had a disability known as prosopagnosia or "face blindness," which is the inability to recognise familiar faces. This condition can make it difficult to recognise people, but she compensated by recognising people through other features like their voices, gait etc.

She had consulted Dr Oliver Sacks, who himself suffered from prosopagnosia. In an essay on face-blindness, Sacks describes Dr. Goodall's face blindness. "Her problems extend to recognising chimpanzees as well as people," writes Sacks. "Thus, she says, she is often unable to distinguish individual chimps by their faces. Once she knows a particular chimp well, she ceases to have difficulties; similarly, she has no problem with family and friends. But, she says, 'I have huge problems with people with average faces. I have to search for a mole or something. I find it very embarrassing! I can be all day with someone and not know them the next day.'"

When she was one year old, she was gifted a toy chimp by her father. Its name was Jubilee, and it is supposed to have remained on Goodall's dresser till the end.

Goodall loved observing animals from a very young age. Once when she was four years old, she hid in a henhouse for almost four hours to find out how a chicken lays an egg, oblivious to the fact that no one knew where she was. And the whole household searched for her and even called the police to report her missing!

When she first travelled to Tanzania, it was not considered appropriate for a lady to travel alone and authorities insisted she must have an escort. Ironically, a person who spent all her life in the wild, had to take her mother along for travel to Tanzania.

As one of the three most prominent researchers on primates, Goodall is known as a 'Trimate', along with Dian Fossey and Birute Galdikas, who studied gorillas and orangutans respectively.

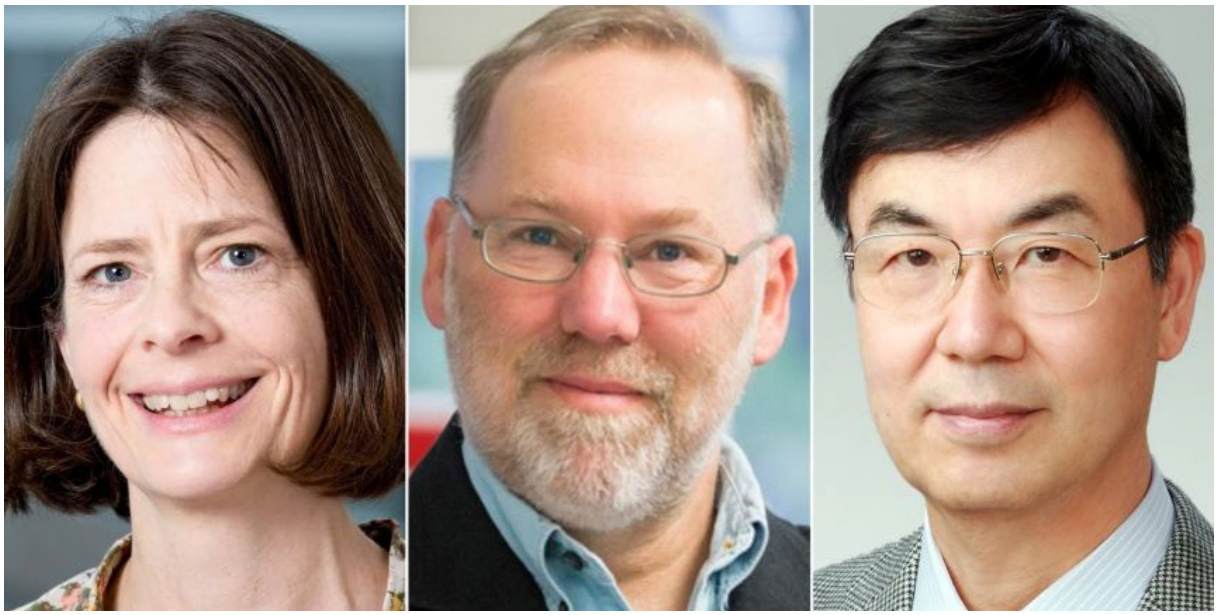
Except for short periods of absence, Goodall remained in Gombe until 1975, often overseeing the fieldwork of other doctoral candidates. In 1977 she cofounded the **Jane Goodall Institute for Wildlife Research, Education and Conservation** (commonly called the Jane Goodall Institute) in California. She also created various other initiatives, including **Jane Goodall's Roots & Shoots** (1991), a youth service programme.

Goodall wrote a number of books and articles, notably ***In the Shadow of Man*** (1971). She summarised her years of observation in ***The Chimpanzees of Gombe: Patterns of Behavior*** (1986). In 2002 she became a UN Messenger of Peace.

The recipient of numerous honours, Goodall was conferred Dame Commander of the **Order of the British Empire** (DBE) in 2003. She also was awarded the **Templeton Prize** (2021), the **Stephen Hawking Medal for Science Communication** (2022), and the **Presidential Medal of Freedom** (2025).

Jane Goodall said, **"I think I'd like to be remembered as someone who really helped people to have a little humility and realise that we are a part of the animal kingdom, not separated from it,"** in an interview in 2015. And she was a living example of that humility.

Shri Sridhar P

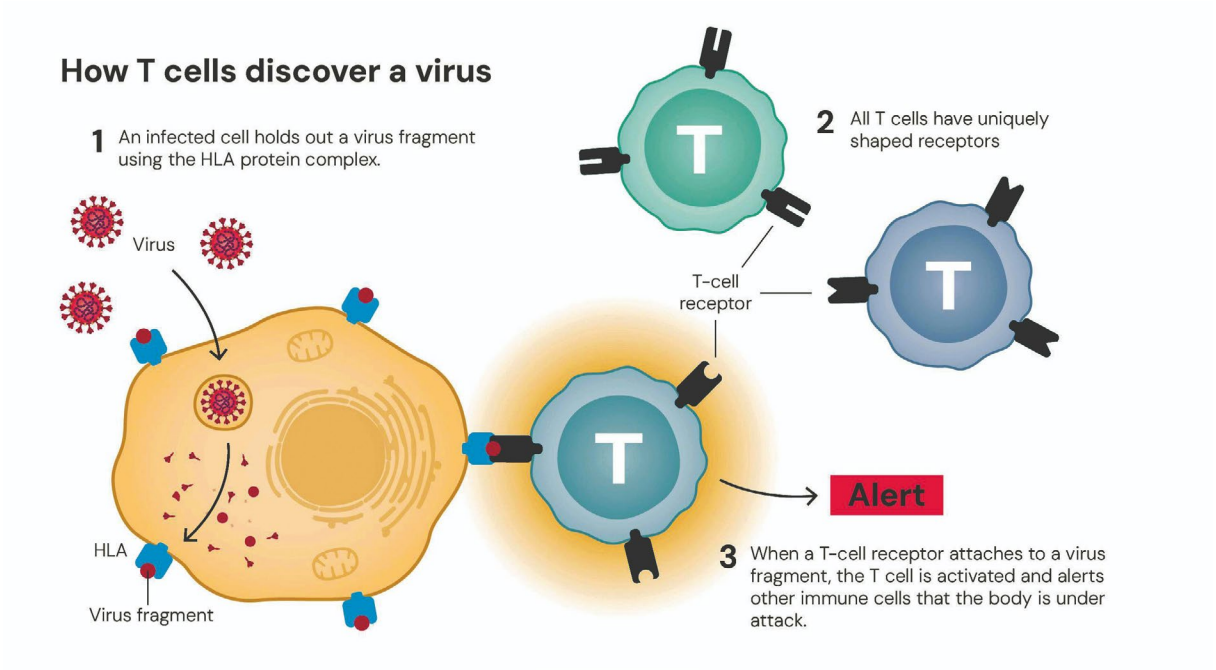


Nobel Prize for medicine 2025

The Nobel Prize for medicine for the year 2025 has been awarded jointly to Americans **Mary. E.Brunkow** and **Fred Ramsdell** and **Japan's Shimon Sakaguchi** for their discoveries on peripheral immune tolerance. Their work provides great insight into how the immune system works and how it is regulated.

Immunity: Immunity is the natural biological process that helps an organism fight invading viruses, bacteria or harmful substances. Immunity is crucial for life to sustain itself. Immunity is of two types - adaptive and innate. As the terminology suggests, innate immunity is present already and adaptive immunity is learnt immunity. There are several layers of immunity, each one with different tools and different tasks. The feedback systems, checks and balances with fortified guardrails, immunity functions with exquisite precision are evolving all the time. If we look deeper, evolution may not be what meets our eyes always, it may well be quietly building efficient systems from within. The immune system in humans is driven by several mechanisms and perhaps the most important are that of lymphocytes, produced by the bone marrow, and mature in the thymus gland. T cells are a form of lymphocytes that play a crucial role in immunity.

Nobel Laureates' discovery: Sometimes the body's immunity attacks the various organs of the body. It doesn't happen to everybody or someone all the time. So there seems to be something that keeps the T cells in check.



The Nobel Laureates working independently identified the immune systems "Regulatory T cells" which perform the precise task of preventing the immune cells from launching an attack on the body. The Nobel Committee opined that the laureates' discovery was fundamental in our understanding as to why not all of us develop serious auto immune diseases.

Receptors on T cells: Like all cellular functions with respect to the entry of nutrients, drugs, proteins etc., T cell action is also receptor-driven. T cells have special proteins called T cell receptors on their surface which act like sensors. They help the T cells assess if the body is under attack. T cells also have receptors that attach to human tissues and cause harm, like auto immune diseases.

Nobel Laureate Sakaguchi's observation: Sakaguchi theorised that the immune system should possess some kind of a filter, security guard that prevents T cells from attacking the cells and tissues of the body. A system that keeps the T cells in check. In 1995 he postulated of the presence of a new kind of T cell called **Regulatory T cell**. These Regulatory T cells carry an extra protein on their surface called CD25. Around the same time Nobel Laureates Brunkow and Ramsdell with their experiments on mice observed that mutations in some genes makes them susceptible to auto immune diseases. They named this faulty mutant gene as **Foxp3**. Two years later Sakaguchi and others confirmed that Foxp3 gene controls the development of Regulatory T cells. This helps preventing the normal T cells from attacking the body's own tissue in a process termed as peripheral immune tolerance.

Research involving Regulatory T cells: Over 200 studies involving regulatory T cells are in progress. Interestingly, research is going on to inhibit the action of regulatory T cells, so that immunity can work on cancerous cells and tumours as programmed. Alternatively, research is going on to grow more Regulatory T cells within the body and outside of it which theoretically can be used to treat auto immune diseases. With the confluence of molecular biology, CRISPR like technologies exciting new therapies and diagnostic tools can be expected in the field of oncology and auto immune diseases

Answers

Answers of page 56

I Quick Five

1. India
2. Madhya Pradesh
3. Chickpeas
4. Nitrogen
5. Protein

II True or False

1. True (Through nitrogen fixation and by adding organic matter to the soil)
2. False (Pulses require moderate, well drained conditions)
3. True (Legumes are the entire plant, but pulses are the dried seeds)
4. False (Pulses are drought resistant and can also survive on less moisture compared to other crops)
5. True (High fibre content, slow digestion and low glycemic index stabilises blood sugar and insulin levels)

III Pulses and their local name

English Name	Hindi	Tamil	Telugu	Malayalam
Pigeon Pea / Red Gram	Arhar / Toor	Thuvaram Paruppu	Kandhi Pappu	Thuvara Parippu
Black Gram (Whole)	Urad	Ulundu	Minumulu	Uzhunnu
Green Gram (Whole)	Moong	Pachai Payaru	Pesara	Payar
Lentil	Masoor	Masoor Paruppu	Masoor Pappu	Parippu
Horse Gram	Kulthi	Kollu	Ulavalu	Muthira
Cowpea	Lobia	Karamani	Bobbarlu	Van Payar
Field Bean / Hyacinth Bean	Sem	Mochai	Avaralu	Avara

IV GI Tags

1. B. Karnataka
2. D. Telangana
3. A. Uttarakhand
4. C. Uttarakhand

WORLD STANDARDS DAY

14th October

Let's raise awareness about the responsibility and role that standards play in the international economy.

INTERNATIONAL RED PANDA DAY

21ST SEPTEMBER

Red pandas, found in the Eastern Himalayas (Nepal, Bhutan and China), are endangered due to habitat loss, poaching and illegal fur trade. Conservation groups like WWF and Red Panda Network work to protect them and raise awareness about their survival.