

DAILY CURRENT AFFAIRS (DCA)

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Table of Content

Cloudburst-Triggered Landslide in Jammu and Kashmir

ISRO Satellites Forecast Wheat Production: Use of Space Technology in Agriculture Sector

Electronics Manufacturing

Kerala's Intellectual Property Rights policy to be revised after 17 years

News In Short

Ras Isa Port

ASI Documents Rock, Temple Inscriptions in T.N.'s Pudukkottai

Undertrial Period Cannot Be Counted for Remission

Jal Jeevan Mission

Tardigrades

India's first satellite, Aryabhata, completes 50 years

2D Semiconductors

Lucy Mission

Report by Commissioner of Railway Safety for Vande Bharat Express

Juvenile Colossal Squid Sighting

Exercise Desert Flag-10

CLOUDBURST-TRIGGERED LANDSLIDE IN JAMMU AND KASHMIR

Context

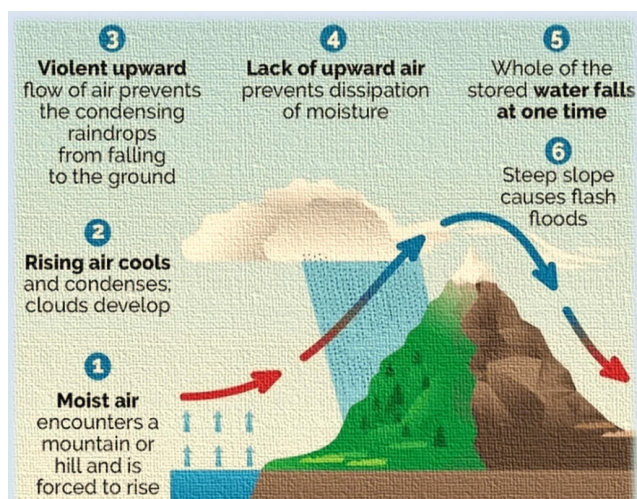
- Recently, a cloudburst event in the Ramban tehsil of Jammu and Kashmir led to torrential rains, hailstorms, and winds, causing widespread destruction.

About

- A cloudburst is a localized event** with intense rainfall activity. The phenomenon is most common in hilly regions, however it can occur in plains also.
- The rainfall of 10 cm or more in an hour over a roughly **10 km x 10 km** area is classified as a cloudburst event.
 - Also **5 cm of rainfall** in a **half-hour period** over the same area would also be categorized as a cloudburst.

Mechanism of Cloudbursts

- Cloudbursts are more common in hilly areas because of a phenomenon called '**orographic lift**'. When moist, warm air masses approach a mountain range, they are forced to ascend along the slope.
- As the air rises, it encounters lower atmospheric pressure, causing it to expand and cool.
- The cooling leads to condensation of water vapor, forming dense clouds and typically causing rainfall.



Orographic Rain and its Mechanism

Impact of Cloudbursts

- Flash Flood:** A flash flood happens quickly, when a lot of rain suddenly enters into the drainage systems (waterbodies, drains), and water overflows.

- Flash floods are more common in hills, because rocky terrain does not absorb water very well.
- Example:** The **2013 Kedarnath Disaster** involved a cloudburst followed by massive flash floods.
- Landslide:** Landslides are a geological phenomenon that involves the sudden and rapid movement of a mass of rock, soil, or debris down a slope under the influence of gravity.
- Loss of Life and Livelihood:** Sudden nature of cloudbursts leaves little time for evacuation. Destruction of homes, agricultural fields, and livestock affects livelihoods, especially in rural and tribal communities.
- Damage to Infrastructure:** Roads, bridges, power lines, and communication networks are often washed away.
- Social Impact:** Frequent disasters create trauma, displacement, and migration pressures. Affects education, healthcare, and access to essential services in remote regions.

Measures taken in India

- The Disaster Management Act, of 2005** provides a comprehensive legal and institutional framework for the management of various disasters in India.
- The National Institute of Disaster Management (NIDM)** has been providing capacity building and other support to various national and state-level disaster management authorities.
- Early Warning system:**
 - India Meteorological Department (IMD), implements the **Ensemble Prediction System (EPS)**, which uses multiple models to improve the accuracy of rainfall predictions.
 - Doppler Weather Radars (DWRs):** Installed in hilly and vulnerable regions to detect intense rainfall events in real-time.
 - Flash Flood Guidance System (FFGS):** Developed with WMO support to provide early warning for flash floods across South Asia, including India.
- Mobile-based Alert Systems:** IMD and NDMA use SMS and app-based alerts to inform people in real-time.

Way Ahead

- To effectively mitigate the impact of cloudbursts, India must adopt a comprehensive and proactive approach that combines scientific forecasting, infrastructural resilience, and community-based preparedness.
- Land use planning and zoning regulations** must be strictly enforced to prevent construction in high-risk zones.

- Urban and rural infrastructure should be designed to handle sudden surges in water flow, with emphasis on **stormwater drainage systems, slope stabilization, and rainwater harvesting.**
- Also there is a need to integrate climate change adaptation into disaster management planning as intensity of such extreme weather events has increased.

Source: IE

ISRO SATELLITES FORECAST WHEAT PRODUCTION: USE OF SPACE TECHNOLOGY IN AGRICULTURE SECTOR

In News

- ISRO's study using satellite data has estimated India's total wheat production for the 2024-25 Rabi season at 122.724 million tonnes from eight major wheat-growing states.

About the study

- It used the **Comprehensive Remote Sensing Observation on Crop Progress (CROP)** framework, which employs Optical and Synthetic Aperture Radar (SAR) datasets from **EOS-04, EOS-06, and Resourcesat-2A** to monitor wheat sowing and crop conditions in near real-time.
 - ♦ CROP is a semi-automated, scalable framework, developed by NRSC/ISRO that enables the near real-time monitoring of crop sowing and harvesting during the Rabi season across India.
- As of March 31, 2025, the wheat sown area was 330.8 lakh hectares, closely matching the Ministry of Agriculture's data.

Importance and Need of Space Technology in Agriculture Sector

- India's agricultural sector is vital for livelihoods but faces pressure from a growing population and shrinking natural resources.
 - ♦ To ensure sustainability, optimized planning and smart resource management are essential.
- Space-based technologies such as satellite imaging, remote sensing, GNSS, and geolocation offer powerful tools for **monitoring large, diverse areas.**
- It Improves crop monitoring, resource use, and weather forecasting.
- It supports informed decision-making for farmers, researchers, and policymakers.

Applications

- **Precision Agriculture** : Global Navigation Satellite Systems (GNSS) enables accurate field mapping and resource allocation.
 - ♦ It helps in precise irrigation, nutrient management, and crop planning.
 - ♦ It boosts yields and resource efficiency.
- **Improved Connectivity** : Satellite-based networks provide real-time access to weather, prices, and expert advice.
- **Remote Sensing & Satellite Imaging** : It tracks crop health, vegetation, and land use.
 - ♦ It detects disease early for targeted pest control and reduced pesticide use.
- **Hyperspectral Imaging**: It offers detailed plant health insights by detecting subtle physiological changes.
 - ♦ More effective than traditional spectral sensors.
- **Water & Soil Management**: It supports efficient irrigation, groundwater conservation, and soil moisture tracking.
 - ♦ It aids in combating erosion, land degradation, and promoting soil conservation.

Related steps

- The **Ministry of Agriculture and Farmers Welfare** has actively adopted space technology since the 1980s for improving agricultural planning and productivity.
- In 2012, the **Mahalanobis National Crop Forecast Centre (MNCFC)** was established to operationalize ISRO's space technology for crop forecasting.
- The **Soil and Land Use Survey of India (SLUSI)** uses satellite data for soil resource mapping.
- **Krishi-DSS is a first-of-its-kind geospatial platform** specifically designed for Indian agriculture. The platform provides seamless access to comprehensive data including satellite images, weather information, reservoir storage, groundwater levels and soil health information, which can be easily accessed from anywhere at any time.

Conclusion and Way Forward

- Space technology holds immense promise for the future of agriculture.
- By harnessing the power of satellite imagery and data, the agricultural sector can achieve significant improvements in productivity, sustainability, and economic value.
- Their growing adoption will play a crucial role in ensuring food security, economic development, and environmental sustainability.

Source :TH

ELECTRONICS MANUFACTURING

Context

- India has attracted **global smartphone makers like Apple and Samsung** due to a large talent pool, government subsidies, and geopolitical factors pushing companies to diversify from China.

About

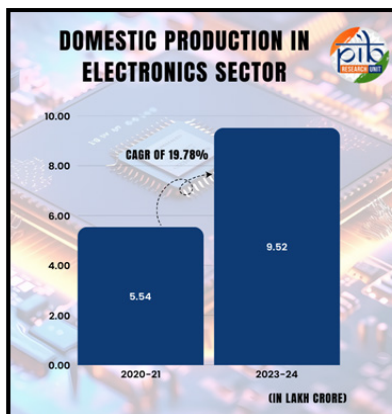
- After successfully being able to localise smartphone assembly in the country for domestic consumption and some exports, the government has **shifted its focus to deepening local value addition in the sector.**
- The key target:** Driving up local value addition in the sector, reducing India's import dependence on countries like China, and creating good quality jobs.
 - Currently, the domestic value addition stands at around 15-20%, with the government hoping to double that in the coming years (China's current value addition in the sector is around 38%).
 - Worryingly, India's trade deficit with China reached an all-time high in 2024-25, nearing \$100 billion.

Electronics Sector

- The electronics sector encompasses **the design, manufacturing, and marketing of electronic components and systems.**
- Electronics** is one of the highest-traded and fastest-growing industries globally and is expected to play a pivotal role in shaping the global economy.
 - Since electronics permeates all sectors of economy it has economic and strategic importance.

India's Electronic Sector

- Domestic Production:** It has increased from Rs.1.90 lakh crore in FY 2014-15 to Rs.9.52 lakh crore in FY 2023-24 at a CAGR of more than 17%.



- Exports:** The exports of electronic goods have also increased from Rs.0.38 lakh crore in FY 2014-15 to Rs.2.41 lakh crore in FY 2023-24 at a CAGR of more than 20%.
 - India is the **second largest mobile phone producer** in the world.
- India's semiconductor ecosystem** has gained significant momentum, with five landmark projects receiving approval with a total combined investment nearing Rs 1.52 lakh crores.
- Future Projections:** It indicates that India's electronics production will reach **USD 300 billion by 2026.**

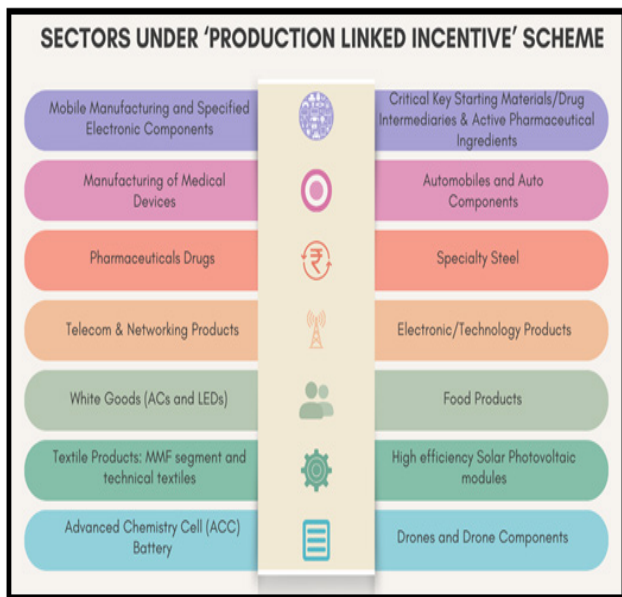
Challenges

- Dependence on Imports:** High reliance on imported components, especially semiconductors, increases costs and supply chain vulnerabilities.
- Infrastructure Gaps:** Inadequate infrastructure for large-scale manufacturing and logistics hampers efficiency.
- Skilled Labor Shortage:** Limited availability of skilled workers for advanced manufacturing processes and R&D.
- High Capital Investment:** Significant investment required for setting up world-class manufacturing facilities, making entry challenging for new players.
- Technology Gaps:** Lack of cutting-edge technology and innovation in certain segments of the electronic value chain.
- Competition from Global Players:** Intense competition from established global electronics manufacturers and countries with lower production costs.

Government schemes for the Electronics boom in India:

- Make in India: launched in 2014,** aimed at boosting India's manufacturing sector and economic growth.
 - Transform India into a global hub for design and manufacturing.
- Phased Manufacturing Programme (PMP):** Launched in 2017, aimed to promote domestic value addition in mobile phones and their parts.
 - Increased investment and set up significant manufacturing capacities in India.
- Production Linked Incentive (PLI) Scheme:** Introduced in 2020, aimed to boost domestic manufacturing in mobile phones, electronic components, and semiconductor packaging.
 - Incentives:** 3% to 6% on incremental sales (over base year) for eligible companies.

♦ **Duration: 5 years.**



- **Semicon India Program:** Launched in 2021 with a financial outlay of ₹76,000 crore, it is structured to promote the domestic semiconductor industry through incentives and strategic partnerships.
 - ♦ At Global Investors Summit 2025, it was announced that India's first indigenous semiconductor chip will be ready for production by 2025.
- **The Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS):** The scheme will provide financial incentive of 25% on capital expenditure for the identified list of electronic goods that comprise downstream value chain of electronic products.
- **Increased Budget:** Allocation for electronics manufacturing rose from 5,747 crore (2024-25) to 8,885 crore (2025-26), highlighting the government's commitment to industrial growth.
- **Electronics Component Manufacturing Scheme:** The Union Cabinet chaired by the PM approved the Electronics Component Manufacturing Scheme with a funding of Rs.22,919 crore to make India Atmanirbhar in the electronics supply chain.
 - ♦ Tenure of six years with a one-year gestation period.
 - ♦ **Expected Outcomes:**
 - Attract an investment of Rs.59,350 crore.
 - Result in production of Rs.4,56,500 crore.
 - Generate 91,600 direct jobs and numerous indirect jobs.

Conclusion

- India's rapid transformation into a global electronics manufacturing hub is a testament to the success of the Make in India initiative.

- With numerous schemes to support the manufacturing processes in India, the country has significantly boosted local manufacturing, exports, and investment.
- Aiming for USD 300 billion in electronics production by 2026, India is positioning itself as a major hub in the electronics and semiconductor industries.

Source: IE

KERALA'S INTELLECTUAL PROPERTY RIGHTS POLICY TO BE REVISED AFTER 17 YEARS

Context

- The Intellectual Property Rights (IPR) Policy of Kerala is set to **undergo a thorough overhaul after a gap of 17 years.**

About

- The Kerala State Council for Science, Technology and Environment (KSCSTE) has constituted a **six-member drafting committee** headed by **Chairman, Kerala State Biodiversity Board, for preparing the revised policy.**
- Kerala had first formulated an IPR policy in **2008**, which will now undergo **comprehensive revision.**

Key Highlights

- **The National IPR Policy 2016, and a 2024 direction** by the Centre's Department of Science and Technology to the States to prepare State-level policies in line with the national policy has necessitated the revision.
- The draft policy recommends, the **inclusion of IPR in school and university curricula as a mandatory subject.**
 - ♦ The establishment of an IPR Academy and a Kerala Traditional Knowledge Authority, the creation of a Traditional Knowledge Docketing System and a 'Mission IPR' for the IP administration of the State are other highlights of this draft.

Intellectual Property (IP) Rights

- Intellectual Property (IP) is generally defined as the **'Product of Mind'**.
 - ♦ It is a property that results from the **creations of intellect in industrial, scientific, literary or artistic fields.**
- **Intellectual Property Right (IPR)** is the **legally enforceable exclusive right** granted to the owner of the intellectual property for a limited period.

- ♦ IPR **rewards creativity & human endeavor** which fuel the progress of humankind.
- **Forms of IPR** : Patents, Copyrights, Trademarks, Industrial Designs, Geographical Indications, Layout Design of Integrated Circuits, Protection of Plant Varieties & Farmers' Rights, Protection of undisclosed information/ Trade Secrets.

Form of IPR	What it protects	Criteria	Duration
PATENTS	Inventions	Novelty Inventive Step Industrial Application	20 years from the date of filing the Patent
COPYRIGHTS	Expression of Ideas (Literary, Dramatic, Musical works, Computer Program per se, etc.)	Originality Fixation	Literary works: Lifetime of author + 60 years Cinematography films/records/ photographs/government works : 60 years Broadcasting : 25 years
TRADEMARKS	Identification symbols, logos, slogans, words/ letters	Distinctive Graphically representable Not deceptive	Indefinite Renewal after every ten years
INDUSTRIAL DESIGNS	External appearance of an article	Novel Original Significantly distinguishable	Initially for 10 years Renewal for 5 more years (maximum protection : 15 years)
GEOGRAPHICAL INDICATIONS	Goods of specific geographical origin	Quality Reputation Unique characteristics which are essentially attributable to the geographical area of origin	Indefinite Renewal after every ten years
LAYOUT DESIGN OF INTEGRATED CIRCUITS	Lay out of components in the integrated circuits	Original Distinctive Capable of distinguishing from any other lay-out design.	10 years
PROTECTION OF PLANT VARIETIES & FARMERS' RIGHTS	New varieties Farmers' varieties Extant varieties Essentially derived varieties	Novelty Distinctiveness Uniformity Stability Denomination	Trees and vines : 18 years Extant varieties & others : 15 years

Is an Indian Patent valid in other Countries?

- No. **Patent rights are territorial rights**, which will be **valid within the territory of the Country which has issued Patent**.
- Hence, an Indian Patent, which is granted by the Indian Government, will be **valid only in India**.

Patent Co-operation Treaty (PCT):

- Patent Laws differ from Country to Country and there is nothing like "World Patent" or "International Patent". However, there is an international filing system known as **Patent Cooperation Treaty (PCT) system**.
- When a PCT application is filed, an inventor of a member country of PCT can simultaneously obtain priority for his/her invention in all the PCT member countries.
- **India joined PCT in 1998.**
- All activities related to PCT are coordinated by the **World Intellectual Property Organization (WIPO)** situated in Geneva.

World Intellectual Property Organization (WIPO)

- It is a **self-funding agency of the United Nations**, that serves the world's innovators and creators, ensuring that their ideas travel safely to the market and improve lives everywhere.
- **History:** WIPO was established in **1967** by the **WIPO Convention**.
- **Members:** The organization has **193** member states including both developing and developed nations like India, Italy, Israel, Austria, Bhutan, Brazil, China, Cuba, Egypt, Pakistan, the U.S. and the U.K.
 - ♦ India joined WIPO in **1975**.
- **Headquarters:** Geneva, Switzerland.

Challenges in India's IP Regime

- **Patent Backlog:** Despite increasing filings, patent examination and grant delays remain a significant issue.
- **IP Infringement:** Weak enforcement mechanisms, leading to rampant counterfeiting and piracy.
- **Low Patent Commercialization:** Many patents filed in India do not get commercialized due to lack of industry-academia collaboration.
- **Global Competitiveness:** India's innovation is dominated by foreign applicants, reflecting low domestic R&D investments.

India's initiative

- **National IPR Policy 2016** encompassing all IPRs into a single vision document setting in place an institutional mechanism for implementation, monitoring and review of IP laws.
 - ♦ The policy encourages innovation and creativity by providing stronger protection and incentives for inventors, artists, and creators.
- **Cell for IPR Promotion and Management (CIPAM):** It has been set up to coordinate the implementation of the National IPR Policy.
- **National Intellectual Property Awareness Mission (NIPAM),** a flagship program to impart IP awareness and basic training in educational institutes.
- **Scheme for Facilitating Startups Intellectual Property Protection (SIPP):** It is introduced to foster innovation and entrepreneurship by providing a supportive ecosystem for startups to protect and manage their IP assets.
- **Atal Innovation Mission (AIM):** It was set up by **NITI Aayog in 2016** to promote a culture of innovation and entrepreneurship in India. AIM has created **four programs** to support these functions:
 - ♦ Atal Tinkering Labs
 - ♦ Atal Incubation Centers
 - ♦ Atal New India Challenges and Atal Grand Challenges
 - ♦ Mentor India.

Concluding remarks

- India's impressive IP growth, marked by significant advancements in patents, industrial designs, and trademarks, underlines its commitment to fostering innovation and reinforcing its global economic presence.
- This momentum supports India's broader goals of economic expansion and innovation-driven development.

Source: TH

NEWS IN SHORT

RAS ISA PORT

In News

- US air strikes on Yemen's Ras Isa oil port kill at least 80 people.

About Ras Isa Port

- It is a port located in the Ras al-Mashawn Peninsula, Yemen.
- It is situated on the Gulf of Aden, approximately 35 kilometers west of the city of Al Mahrah.
- The Marib-Ras Isa oil pipeline is a critical component of Yemen's energy infrastructure, linking the inland oil fields of Marib to the Ras Isa Marine Terminal on the Red Sea.

Source: TH

ASI DOCUMENTS ROCK, TEMPLE INSCRIPTIONS IN T.N.'S PUDUKKOTTAI

In News

- The Archaeological Survey of India's (ASI) Epigraphy Division recently documented inscriptions from **Malayadipatti** and **Ponnamaravathi** in Tamil Nadu's Pudukkottai district using the estampage method on maplitho paper.

Malayadipatti

- It is located near **Kudambeeswarar Temple** and is a **16th-century inscription**, though partially damaged, it records a **land partition agreement** between Sundara Chozhapuram and Sevvalur villages for excavating a pond (oorani).
- ♦ Near a spring (sunai), another inscription mentions King Raja Rajan Sundarapandyan and credits Udayan Perumal of Sevvalur for his contribution to the creation of the waterbody.

Ponnamaravathi

- It is an inscription on the western side of the sanctum dates to the 8th regnal year of Maravarman Kulasekara Pandiyan.
- It refers to the temple as **Chozheeswarar Udaya Nayanar Temple**, under Uzhavalai Nadu, and records a donation of 40 panam for lighting five temple lamps.
- ♦ Earlier inscriptions from the same temple, copied by ASI in 1909 and 2000, include

one from the 6th regnal year of Raja Raja III, placing the temple under **Rajendra Chola Vala Nadu**.

Importance

- These inscriptions offer valuable insights into regional governance, religious patronage, and community contributions to water management in historical Tamil Nadu.

Source :TH

UNDERTRIAL PERIOD CANNOT BE COUNTED FOR REMISSION

Context

- The Kerala High Court has observed that a convict cannot claim remission of sentence for the period during which he/she remained an undertrial prisoner prior to conviction.

About

- **Remission** refers to the reduction of the duration of a sentence without changing the nature of the sentence itself.
- It is granted by the appropriate government under provisions such as:
 - ♦ **Section 432 of the CrPC** (now Section 475 of BNSS).
 - ♦ Under **Articles 72 and 161** of the Constitution by the **President and Governors**, respectively.

Court ruling

- The court observed that entitlement of remission arises only when an accused is convicted and admitted to prison as part of undergoing the sentence of imprisonment.
- It drew a distinction between, **Remission of sentence and Set-off of pre-conviction detention** under Section 428 CrPC (now Section 468 of BNSS).

Source: TH

JAL JEEVAN MISSION

Context

- Jal Shakti Ministry seeks Rs 2.79 lakh crore more for **Jal Jeevan Mission**.

Jal Jeevan Mission

- It was launched by the Prime Minister in **2019**.
- **Aim:** To provide tap connections to about **16 crore rural households** to achieve **saturation coverage by 2028 (earlier 2024)**.

Mandatory components include:

- ♦ Source sustainability
- ♦ Greywater management
- ♦ Water conservation
- ♦ Rainwater harvesting

Mission Objectives:

- ♦ **Empowering Women:** Reduces the burden on mothers and sisters of fetching water.
 - Improves health, education, and socio-economic status of women.
- ♦ **Ease of Living:** Enhances the dignity and quality of life of rural families.

Community Approach:

- ♦ Focus on Information, Education, and Communication (IEC).
- ♦ Aims to create a Jan Andolan (people's movement) for water.

Achievements

- **Initial Coverage (2019):** Only 3.23 crore rural households (17%) had tap water connections.
- **Current Coverage (2025):** 12.20 crore additional rural households provided with tap water connections.
- **Total:** 15.44 crore households, covering 79.74% of rural households in India.

Source: IE

TARDIGRADES

Context

- ISRO is sending tardigrades to the International Space Station (ISS) as part of the Voyager Tardigrades experiment under the Axiom-4 mission.

About

- **Tardigrades, also called water bears or moss piglets**, are micro-animals known for their extraordinary resilience to extreme environmental conditions.
- They were first discovered in **1773** by German zoologist **Johann August Ephraim Goeze**.
- **Characteristics:** These creatures are usually between **0.3 mm to 0.5 mm long**.
 - ♦ They have **eight legs with claws** and segmented bodies protected by a cuticle.
 - ♦ Tardigrades can **survive extreme temperatures**, and can endure high radiation, desiccation, vacuum of space, and even intense pressure.



Source: IT

INDIA'S FIRST SATELLITE, ARYABHATA, COMPLETES 50 YEARS

Context

- India's first satellite, Aryabhata has completed 50 years.

About

- Launched in 1975**, the satellite was named after the **ancient Indian mathematician and astronomer, Aryabhata**.
- The satellite, built by the Indian Space Research Organisation, was launched from Kapustin Yar with the **assistance of the USSR**.
- Aim:** To explore areas including Solar Physics, Aeronomy, and X-ray Astronomy.
- Specifications:** Aryabhata was designed as a 26-sided polyhedron, measuring 1.4 metres in diameter and weighing 360 kilograms.
 - Except for the top and bottom, all the remaining 24 faces of the satellite were covered with solar panels.
- Aryabhata marked **India's entry into space exploration** and laid the foundation for the country's future space missions.
 - With its successful launch, **India was recognized as the 11th country in the world to send a satellite into orbit.**

Source: AIR

2D SEMICONDUCTORS

In News

- A team of 30 scientists from the Indian Institute of Science (IISc) has proposed the development of **angstrom-scale chips using 2D materials** like **graphene and transition metal dichalcogenides (TMDs)**.

Two-dimensional (2D) Semiconductors

- Two-dimensional (2D) semiconductors beyond graphene represent the thinnest stable known **nanomaterials**.
- They are regarded as promising candidates in many applications, including electronics and optoelectronics, because of their superior properties, including **atomic-level thickness, tunable bandgaps, large specific surface area, and high carrier mobility**.
- These ultra-thin materials could allow the creation of chips far smaller than current nanometer-scale chips, potentially one-tenth the size of the smallest chips in production today (3-nanometer nodes).

Global Scenario

- The global semiconductor industry is currently dominated by silicon-based technologies, with major players in the US, Japan, South Korea, and Taiwan.
- Global investments in 2D** material-based semiconductor research are significant, with Europe, South Korea, China, and Japan making substantial investments.

Status in India

- India's largest semiconductor project, involving Tata Electronics and Taiwan's PSMC, has an investment of Rs 91,000 crore.
- The IISc-led proposal focuses on 2D materials to replace silicon and is viewed as a potential area where India can gain leadership.
 - It aims to position India as a key player in the emerging field of post-silicon semiconductors.

Source :TH

LUCY MISSION

Context

- Nasa's Lucy spacecraft completed a close flyby of the small main belt asteroid **Donaldjohanson**.

About

- NASA's Lucy mission** was launched in **2021** to visit ten asteroids over 12 years — **two asteroids** in the main belt **between Mars and Jupiter**, and **eight Trojan asteroids** leading and trailing **Jupiter** in its orbit.
- Origin:** Named after an ancient fossil **3.2 million-year-old** ancestor who belonged to a species of hominins.
- Spacecraft and Instruments:**
 - L'LORRI:** High-resolution visible imager.
 - L'Ralph:** Optical and near-infrared imaging spectrometer.

- ♦ **L'TES:** Thermal infrared spectrometer.
- In **2023**, the Lucy mission conducted a flyby of asteroid **152830 Dinkinesh** and discovered that it has a small satellite named **Selam**.

Asteroids

- Asteroids, also known as **minor planets or planetoids**, are small, rocky bodies that orbit the Sun.
- They are **remnants of the solar system's formation**, composed primarily of rock and metal.
- **Location:** The majority of asteroids are found in the **main asteroid belt**, a region between the orbits of Mars and Jupiter.
 - ♦ Some asteroids go in front of and behind Jupiter, which are called **Trojans**.
 - ♦ Asteroids that come close to Earth are called **Near-Earth Objects (NEOs)**.

Source: IT

REPORT BY COMMISSIONER OF RAILWAY SAFETY FOR VANDE BHARAT EXPRESS

Context

- A recent safety report by the Commission of Railway Safety warns that the Vande Bharat Express is at risk of serious accidents from cattle collisions due to its lighter leading coach.

The Vande Bharat Express

- It was launched in February 2019 as part of the **Make in India initiative**, evolved from its precursor Train 18.
 - ♦ It is India's **first semi-high-speed trains**.
- Vande Bharat rakes are being manufactured at the Integral Coach Factory, Chennai; Rail Coach Factory, Kapurthala; and Modern Coach Factory, Kapurthala, and Raebareli.
- As on December 26, 2024, a total of 136 Vande Bharat train services are running across the railway network. In 2024 alone, 62 Vande Bharat train services were introduced.

Commission of Railway Safety

- It comes under the **Ministry of Civil Aviation**, and is responsible for ensuring the safety of rail travel and train operations in India.
- Its roles, defined by the **Railways Act (1989)** and the **Metro Railway (Operations and Maintenance) Act (2002)**, include inspection, investigation, and advisory duties.

- It operates based on **statutory rules** for accident investigations and executive instructions issued periodically.

Recent Recommendation

- The **report recommends several safety measures**, including installing sturdy fencing along tracks to prevent human and cattle trespassing, eliminating level crossings on high-speed routes, deploying **Railway Protection Force (RPF) personnel** at known trespassing zones, and sensitizing nearby residents.

Source :TH

JUVENILE COLOSSAL SQUID SIGHTING

Context

- A team of scientists, on board a research vessel in the South Atlantic, recorded a **juvenile colossal squid**, only a foot long, 2,000 feet under the ocean's surface.

About

- First identified in **1925** from arm fragments found in a sperm whale's stomach. Until now, no footage existed of a live colossal squid in its natural deep-sea environment.
- Despite being massive, the colossal squid has **rarely been seen in its natural habitat**.
 - ♦ Its large, light-sensitive eyes may make it avoid bright, noisy research equipment.
- Most knowledge about the species comes from **specimens found in whale stomachs or caught in trawl nets**.
- Sperm whales are the **only known predator of fully grown giant and colossal squid**.

Differences Between Giant and Colossal Squid

- Giant squid (*Architeuthis dux*) and colossal squid (*Mesonychoteuthis hamiltoni*), the largest cephalopods (class of marine animals including octopii and cuttlefish), and possibly the **largest invertebrates in the world**.
- **Colossal squid:** Up to 7 meters (23 feet) long.
 - ♦ Can weigh up to 500 kg.
 - ♦ Has a large, bulky body with shorter arms and tentacles.
 - ♦ The lifespan of colossal squid is still uncertain.
- **Giant squid:** Can grow up to 13 meters (43 feet).
 - ♦ Typically weighs up to 275 kg.
 - ♦ Has longer arms and tentacles but a narrower body.
 - ♦ Estimated lifespan of giant squid: 2–12 years.

Significance of the Sighting

- The juvenile sighting helps fill the knowledge gap between hatchling and adult stages.
- Could shed light on diet, mating behavior, migratory patterns, and lifespan.
- May influence conservation strategies and policies, especially regarding deep-sea mining.

Source: IE

EXERCISE DESERT FLAG-10**Context**

- A contingent of the Indian Air Force reached Al Dhafra Air Base in the United Arab Emirates (UAE) to participate in **Exercise Desert Flag-10**.

About the Exercise

- Exercise Desert Flag is an **annual multinational** air combat exercise hosted by the **UAE Air Force**.
- This year, it brings together the air forces of Australia, Bahrain, France, Germany, **India**, Qatar, Saudi Arabia, Republic of Korea, Turkey, **UAE**, United Kingdom, and the United States.
- The **aim of the exercise** is to undertake complex and diverse fighter engagements, with exchange of operational knowledge and best practices with some of the most capable Air Forces in the world.

Source: PIB

