

## DAILY CURRENT AFFAIRS (DCA)

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## IMPACT OF LA NINA ON INDIAN MONSOON AND AGRICULTURE

### Context

- The Asia-Pacific Economic Cooperation (APEC) Climate Center, has forecast the return of the La Nina phenomenon in India.

### Monsoon forecast for India

- According to global weather agencies, India is likely to experience above-normal rains.
- It is predicted for the region spanning eastern Africa to the Arabian Sea, India, the Bay of Bengal, and Indonesia, the Caribbean Sea, the tropical North Atlantic, southern Australia, and the southern South Pacific.

### Ocean-Atmosphere system

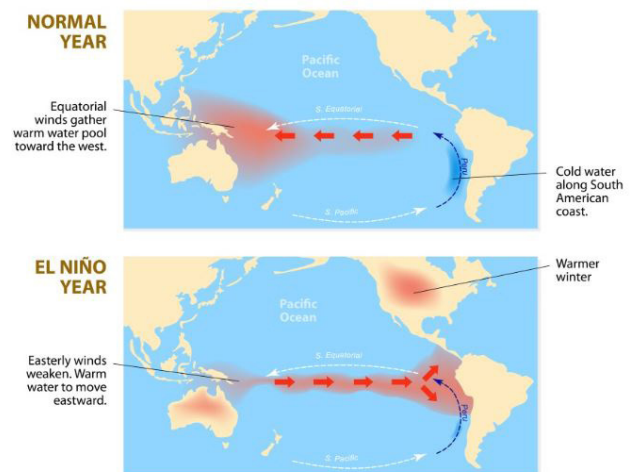
- Normal Conditions:** During normal conditions in the Pacific ocean, **trade winds** blow west along the equator, **taking warm water from South America towards Asia**.
  - To replace that warm water, cold water rises from the depths — a process called **upwelling**.
  - The warmer surface waters **near Indonesia create a region of low-pressure area**, causing the air to rise upwards. This also results in **formation of clouds and heavy rainfall**.
  - The air flow also helps in building up the monsoon system which brings **rainfall over India**.
- Abnormal Conditions:** Both El Nino and La Nina usually begin to develop in the **March to June season**, reach their peak strength in the winters and then begin to dissipate in the post winter season.
  - Both these phases typically **last for a year**, though La Nina, on an average, lasts longer than El Nino.
  - While these phases alternate over a period of **two to seven years**, with the neutral phase thrown in between, it is possible for two consecutive episodes of El Nino or La Nina to occur.

### What is El Nino?

- El Niño is the **warming of seawater** in the central-east Equatorial Pacific that occurs every few years.

- During El Niño, surface temperatures in the **equatorial Pacific rise**, and trade winds — east-west winds that blow near the Equator — weaken.
- Impact:** El Niño causes dry, **warm winters in the Northern U.S. and Canada** and increases the risk of flooding in the U.S. gulf coast and southeastern U.S. It also brings drought to Indonesia and Australia.

## THE EL NIÑO PHENOMENON



### What is La Nina?

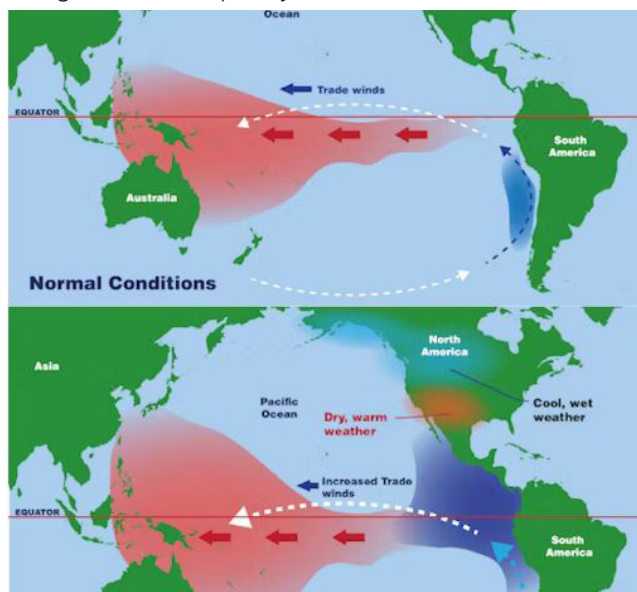
- La Niña is the opposite of El Niño. La Niña witnesses **cooler than average sea surface temperature (SST)** in the equatorial Pacific region.
  - Trade winds are stronger than usual, pushing warmer water towards Asia.
- Impact:** This leads to **drier conditions in the Southern U.S.**, and heavy rainfall in Canada. It has also been associated with heavy floods in Australia.

### How does it affect the Indian Monsoon?

- In El Niño years**, India faces **warmer temperatures and less rainfall**, causing droughts in some regions.
  - This affects agriculture, water resources, and ecosystems.
  - The El Nino phenomenon led to **1.4% decrease** in food grain production for the 2023-24 (July-June) crop year.
- La Niña** brings cooler sea surface temperatures, leading to increased rainfall in certain parts of India.

### How is La Nina beneficial for India?

- **Water resource management:** Higher rainfall during La Niña events can improve water availability for irrigation.
- **Increased agricultural productivity:** La Niña tends to bring above-average rainfall during the monsoon season, which is crucial for agriculture in India.
- **Lower food prices:** Higher crop yields resulting from favorable weather conditions during La Niña events increases food supplies in the market.
- **Power generation:** In India, hydropower contributes significantly to the energy mix. Increased rainfall during La Niña events boost water levels in reservoirs, improving hydropower generation capacity.



Source: MINT

## ISSUES OF FAKE NEWS AND DISINFORMATION

### Context

- According to the **International Fact-checking Network (IFCN)**, a range of threats like **misinformation, and deep fakes** are recognised amidst the Lok Sabha polls in India.

### Fake News and Disinformation

- It is defined as false news stories, meaning the story itself is fabricated and has no verifiable facts, sources or quotes.
  - ♦ Sometimes these stories may be propaganda, intentionally designed to mislead the reader, or they may be 'clickbait'.

- Some checks and balances exist in the mainstream media against fake news, but social media does not have such a mechanism.

### Misinformation and Disinformation

- **Misinformation** is false information, but the person who shares it online believes it to be true and shares it without any ill intention or personal agenda.
- **Disinformation**, on the other hand, is false information, and the person who is disseminating it knows it is false. It is a deliberate lie.

### Impact of Fake News and Disinformation

- **Threat to Democratic Processes:** Fake news and disinformation can influence public opinion, interfere with elections, and even incite violence.
  - ♦ Misinformation spread on social media platforms can sway voters' opinions.
- **Affects social & communal harmony:** By spreading extremists' ideologies especially in sensitive areas like radicalization of youths, inciting violence and hatred among the communities, swinging public opinions etc.
- **Role of Technology:** Artificial Intelligence (AI) and digital technology have been used to spread fake news and disinformation, posing threats to democracy.
  - ♦ South Korean President Yoon Suk Yeol, during a global summit, highlighted that fake news and disinformation based on AI and digital technology not only **violate individual freedom and human rights** but also **threaten democratic systems**.
- **Impact on Trust and Social Cohesion:** The prevalence of falsehoods heightens political polarisation, decreases trust in public institutions, and undermines democracy.
  - ♦ Misinformation can create divisions within society, fueling conflict and misunderstanding.

### Challenges in controlling the Fake News

- **No standard definition:** The term '**fake news**' is **vague** and there is **no official definition of what constitutes fake news**.
- **Lack of regulation:** Self-regulation by mainstream media has largely been ineffective.
  - ♦ Any direct effort by the government to control fake news is prone to be seen as an assault on the freedom of media which functions as the fourth pillar of democracy.



- **Difficult to achieve balance:** The efforts to control fake news should not threaten to cramp legitimate investigative and source-based journalism or freedom of expression as guaranteed in **Article 19 of the Constitution**.
  - ♦ Also, distinguishing between the **conscious fabrication of news** reports and news reports put out in the **belief that they are accurate**.
- **Tracking fake news on social media:** The vastness of the internet users and social media users makes tracing the origin of fake news almost impossible.

### Legal remedies available to tackle this menace

- **Indian Broadcast Foundation (IBF):** This body was created in **1999 to look into the complaints against content aired by 24x7 channels**.
- **The Press Council of India:** It is created by an Act of Parliament, is a statutory body and keeps vigil on fake news. It can **warn, admonish or censure the newspaper, the news agency**.
- **IPC Sections 153A and 295:** Under this action can be initiated against someone creating or **spreading fake news if it can be termed as hate speech**.
- **Broadcasting Content Complaint Council (BCCC):** A complaint relating to **objectionable TV content or fake news** can be filed to the Broadcasting Content Complaints Council.
- **Defamation Suit: IPC Section 499** makes defamation a criminal offence. Section 500 provides for punishment for criminal defamation.
- **The Information Technology (IT) Act:** It imposes an obligation on intermediaries such as search engine giant Google to remove any objectionable content pursuant to takedown notices by law enforcement agencies.
- **Contempt of Court laws:** False stories about judicial proceedings would be covered by contempt of court laws and false stories about Parliament and other legislative bodies would violate privilege.
- The **Constitution of India** provides a **long-term solution under Article 51A (h)**, which says, "It shall be the duty of every citizen to develop the scientific temper, humanism and the spirit of inquiry and reform."

### Suggestive Measure

- **Role of Artificial Intelligence:** AI has emerged as a powerful tool to fight the ever-growing menace of 'infodemic'.

- ♦ AI capabilities can detect fake news, identify forged videos, and disseminate the correct information through chatbots.
- **Tech Giants' Initiatives:** Tech giants like Google have announced their efforts to fight misinformation in India through their products, programs, and partnerships.
  - ♦ **Google** has introduced the **'About This Result'** feature that will let users evaluate the information and understand its source.
- **Homeland Security Advisory Council:** It has released a report on disinformation best practices and safeguards, presented an assessment and recommendations to address disinformation that poses a threat to the homeland while protecting civil rights and providing greater transparency across this work.

### The India Specific Measures:

- **AI-enabled COVID-19 Helpdesk:** It is the world's largest WhatsApp chatbot (**MyGov Corona Helpdesk**) to aid our fight against the pandemic by disseminating timely and right information.
- **MyGov Saathi:** It is an AI-driven agent, deployed to better prepare the citizens for the crisis and empower them to reduce their risk of contracting the virus.
- **The Fact Check Unit (FCU) under PIB:** It was established with a stated objective of acting as a deterrent to creators and disseminators of fake news and misinformation.
  - ♦ However, the **Supreme Court of India stayed FCU** as a **'deterrent'** against the creation and dissemination of fake news or misinformation regarding the **'business'** of the Centre.

### International Fact-checking Day (2nd April)

- It is a global initiative that recognises the role of accurate information in an interconnected world.
- It was first commemorated by the IFCN in 2016 to celebrate and highlight the important work of fact-checkers worldwide.

### What is fact-checking?

- It is a process of seeking to **'investigate (an issue) in order to verify the facts'**. It means that one has verified the facts they are asserting, say by checking the facts and figures one sees on social media before sharing it.

- False and misleading information can:
  - ♦ lead to polarisation or shifting of people's views towards more extreme ideas, often along religious or ethnic lines;
  - ♦ mislead people on important issues;
  - ♦ harden attitudes and stereotypes about individuals or groups;
  - ♦ trigger riots in extreme cases and add fuel to fire in violent situations.

Source: TH

## BIMSTEC CHARTER

### Context

- Recently, a majority in the Lower House of Nepal supported the proposal seeking endorsement of the BIMSTEC Charter.

### BIMSTEC

- The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is a regional organisation **comprising seven Member States** (five from South Asia, including Bangladesh, Bhutan, India, Nepal, and Sri Lanka, and two from Southeast Asia, including Myanmar and Thailand) lying in the littoral and adjacent areas of the Bay of Bengal.



- ♦ The region hosts **22% of the world population** (more than 1.68 billion people); and the member states have a combined GDP of more than US\$3.697 trillion/per year.

- It was **initially founded as BIST-EC** in 1997, with the adoption of the **Bangkok Declaration**, with **Bangladesh, India, Sri Lanka, and Thailand** as members.
  - ♦ It became BIMST-EC with the entry of Myanmar in late 1997, and eventually, it was named in its current form when Nepal and Bhutan became members in 2004.
- Unlike many other regional groupings, BIMSTEC is a **sector-driven cooperative organisation**. Six areas of focus under BIMSTEC are — **trade, technology, energy, transport, climate change** (added in 2008), **tourism and fisheries**.

### About the BIMSTEC Charter

- It was signed and adopted during the **Fifth BIMSTEC Summit** held in Colombo, Sri Lanka in 2022.
- It provides a **legal and institutional framework** for BIMSTEC, aiming to create an enabling environment for **rapid economic development** through the identification and implementation of specific cooperation projects in the agreed areas of cooperation and other areas that may be agreed upon by the Member States.
- It reaffirms the commitment to the principles and purposes of BIMSTEC as enshrined in the **Bangkok Declaration of 1997**.

### Significance of the BIMSTEC Charter

- The adoption of the BIMSTEC Charter formalises the grouping into an organisation made up of member states that are littoral to, and dependent upon, the Bay of Bengal.
- The Charter allows BIMSTEC to engage in external relations with non-member States, developmental partners, and regional as well as the UN and International Organisations.
- It stresses the need for a fair, just, equitable, and transparent international order and reaffirms faith in multilateralism with the United Nations at the centre and the rule-based international trading system.

### BIMSTEC and India

- **Alignment with Foreign Policy:** BIMSTEC aligns with India's 'Neighbourhood First' and 'Act East' policies.
  - ♦ It provides a natural platform for India to foster greater regional cooperation in South and Southeast Asia.

- **Economic Integration:** BIMSTEC is an important element in India's strategy for economic cooperation with South East Asian countries.
  - ♦ The **BIMSTEC Free Trade Area Framework Agreement**, signed in 2004, aims to increase trade and economic integration among member countries.
- **Security Cooperation:** India plays a significant role in BIMSTEC's security cooperation. Under the new changes adopted in the summit, India has become the 'security pillar' of BIMSTEC.
  - ♦ It includes cooperation in areas such as counter-terrorism and transnational crime.
- **Connectivity and Infrastructure Development:** The **BIMSTEC Master Plan for Transport Connectivity** seeks to connect several major transport projects in India, Bangladesh, Myanmar, and Thailand and establish a shipping network across the Bay of Bengal.
  - ♦ It aims to benefit the littoral states as well as the Bay of Bengal dependent states like Nepal and Bhutan.

### Challenges Associated with BIMSTEC for India

- **Uneven Progress:** Despite being in existence for over 25 years, the pace of cooperation within BIMSTEC has been somewhat uneven.
  - ♦ The progress across different sectors has been inconsistent, which has affected the overall effectiveness of the organisation.
- **Regional Conflicts among member states:** It can hamper the smooth functioning of BIMSTEC.
  - ♦ For instance, the Rohingya refugee crisis created tensions between Myanmar and Bangladesh, which affected the working of BIMSTEC.
- **Legal and Institutional Challenges:** Finalising legal instruments for various initiatives, such as coastal shipping and road transport, can be time-consuming and complex.
  - ♦ These can slow down the progress towards stronger trade relations among the member countries.
- **Security Concerns:** Terrorism remains a significant threat to peace and stability in the region.
  - ♦ While BIMSTEC has been working towards strengthening cooperation against terrorism, it continues to be a major challenge.

### Conclusion

- The BIMSTEC Charter represents a significant step forward in regional cooperation. It provides a robust framework for the organisation to work towards a peaceful, prosperous, and sustainable Bay of Bengal Region.
- As BIMSTEC enters a new era with the adoption of its Charter, it is poised to play a crucial role in fostering regional cooperation and integration.

Source: AIR

## DIRECTORATE OF ENFORCEMENT (ED)

### Context

- **The Supreme Court** endorsed the sweeping powers of the Directorate of Enforcement (ED), saying the Central agency could call **"anybody for any information"**.

### About

- The Tamil Nadu government and the Collectors informed the SC that they had written to the ED expressing **their inability to appear in person due to General Elections**.

### About Directorate of Enforcement (ED)

- **Established:** It was established in **1956** with the formation of an **'Enforcement Unit'** under the aegis of the **Department of Economic Affairs** and handles Exchange Control Laws violations under **Foreign Exchange Regulation Act, 1947 (FERA 1947)**.
  - ♦ A year later, the Enforcement Unit was renamed the Enforcement Directorate.
- It is a **multi-disciplinary organization** mandated with **investigation of the offence of money laundering and violations of foreign exchange laws**.

### The statutory functions of the Directorate include enforcement of following Acts:

- **The Prevention of Money Laundering Act, 2002 (PMLA):** It is a criminal law enacted to prevent money, ED has been given the responsibility to enforce the provisions of the PMLA.
  - ♦ It does so by **conducting investigation** to trace the assets derived from proceeds of crime, to provisionally attach the property and to ensure prosecution of the offenders and confiscation of the property by the Special court.

- **The Foreign Exchange Management Act, 1999 (FEMA):** It is a **civil law** enacted to consolidate and amend the laws relating to facilitate **external trade and payments**.
  - ♦ ED has been given the responsibility to conduct investigation into suspected contraventions of foreign exchange laws and regulations, to adjudicate and impose penalties on those adjudged to have contravened the law.
- **The Fugitive Economic Offenders Act, 2018 (FEOA):** This law was enacted to **deter economic offenders from evading the process of Indian law** by remaining outside the jurisdiction of Indian courts.
  - ♦ It is a law whereby the Directorate is mandated to attach the properties of the fugitive economic offenders who have escaped from India warranting arrest and provide for the confiscation of their properties to the Central Government.
- ♦ However, there have been instances of inadequate coordination and communication among these agencies, leading to inefficiencies and duplication of efforts.
- **Legal Challenges:** Legal challenges, including delays in court proceedings, interpretation of legal provisions, and limitations in the legal framework, impede the ED's efforts to prosecute economic offenders and recover proceeds of crime.
- **International Cooperation:** Given the global nature of financial crimes, international cooperation and mutual legal assistance are crucial for investigating cross-border transactions and recovering assets held abroad.
  - ♦ Challenges such as differences in legal systems, jurisdictional issues, and diplomatic complexities often hinder effective collaboration with foreign law enforcement agencies.

#### What Powers does the ED have?

- The ED has extensive powers to investigate and act against individuals violating enforced laws, including **special powers for confiscating disproportionate assets under the PMLA Act**.
- **Summon an individual** whose attendance is essential, whether to give evidence or to produce any records, during investigation or proceedings.

#### Challenges in the Functioning of ED

- **Overburdened and Lengthy Investigations:** Investigations conducted by the ED are relatively long in duration due to the **complexity of financial transactions** involved, legal hurdles, and the **need for coordination with other agencies**.
  - ♦ This leads to delays in timely action against economic offenders.
- **Political Interference:** There have been allegations of political interference in the functioning of the ED, particularly in high-profile cases involving influential individuals or organizations.
  - ♦ Political pressure undermines the independence and impartiality of the agency.
- **Lack of Coordination:** Coordination between various law enforcement agencies, such as the Central Bureau of Investigation (CBI), Securities and Exchange Board of India (SEBI), and state police forces, is crucial for effective investigation and prosecution of financial crimes.

#### Way Ahead

- Addressing the challenges requires concerted efforts by the government to strengthen the institutional capacity of the ED, enhance coordination with other agencies, ensure independence and autonomy, and provide adequate resources and training to its personnel.
- Additionally, reforms in the legal framework and international cooperation mechanisms can further enhance the ED's effectiveness in combating financial crimes and promoting financial integrity.

Source: TH

## SEASONAL OUTLOOK FOR HOT WEATHER SEASON: IMD

#### In News

- The **India Meteorological Department (IMD)** issued an updated Seasonal outlook for the hot weather season (April to June) 2024.

#### About

- **Above-normal temperatures** are likely to be recorded over most parts of the country
- During April May June hot weather season, **above normal heatwave** days are likely to occur over most parts of south peninsula, central India, east India and plains of northwest India.
- The **El Niño** however is likely to weaken during the upcoming season and eventually turn 'neutral'.



- Some models have even predicted the **possibility of La Niña conditions developing during the monsoon**, which can intensify rainfall across South Asia, particularly in India's northwest and Bangladesh.

### Issues and Concerns

- Above-normal maximum and minimum temperatures can cause heat-related illnesses in people as well as affect agricultural output, cause water scarcity, increase the demand for energy, and affect ecosystems and air quality.
- The announcement comes even as India is already struggling to keep up with its power demand, which increases significantly during summer season.
  - India's hydroelectricity output fell** at the steepest pace in at least 38 years in the year ending March 31, 2024.
  - Hydroelectric output will possibly remain low in the coming months as well, leading to a greater dependence on coal at a time when India has, in its Nationally Determined Contributions under the Paris Agreement, promised to reduce the emissions intensity of its GDP by 45% by 2030, compared to the 2005 level.

### What is a heat wave?

- Qualitatively**, a heat wave is a condition of air temperature which becomes fatal to the human body when exposed.
- Quantitatively**, it is defined based on the temperature thresholds over a region in terms of actual temperature or its departure from normal.
- Heat waves in India are typically recorded between March and June, and tend to peak in May.

### Criteria

- The IMD declares a heat wave if the maximum temperature of a weather station reaches at **least 40 degrees C in the plains** and at **least 30 degrees C in hilly regions**, with a departure of around **4.5-6.4 degrees C from the normal maximum temperature**.
- The IMD can also declare a heat wave if the actual maximum temperature crosses 45 degrees C, and a 'severe heat wave' if it crosses 47 degrees C.

### India Meteorological Department (IMD)

- It is an agency of the Ministry of Earth Sciences.
- It is the principal agency responsible for meteorological observations, weather forecasting and seismology.
- It is also one of the six Regional Specialised Meteorological Centres of the World Meteorological Organisation.
- IMD releases the long range forecast in two stages in April and June.

Source:ET

## ARTIFICIAL SUN PRODUCED HEAT OF 100 MILLION CELSIUS FOR A RECORD PERIOD

### Context

- South Korean scientists** have been able to **produce heat of 100 million Celsius** for a **record period of 48 seconds** through **Artificial Sun**.

### About

- The Korea Institute of Fusion Energy's (KFE) Korea Superconducting Tokamak Advanced Research (KSTAR) fusion reactor reached temperatures **seven times that of the Sun's core**.
- The temperature of the **core of the Sun** is **15 million degrees Celsius**.

### Artificial Sun

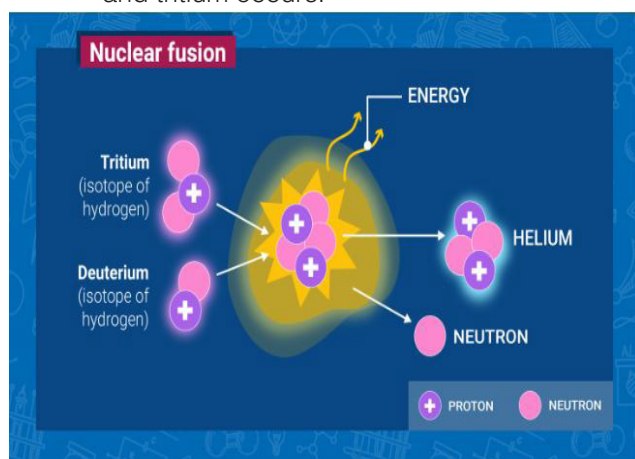
- It is a **nuclear fusion reactor facility**, and it is called an "artificial sun" because it **mimics the nuclear fusion reaction that powers the real sun** – which uses hydrogen and deuterium gases as fuel.
- Scientists generally use a **donut-shaped reactor called a tokamak** in which hydrogen variants are heated to extraordinarily high temperatures **to create a plasma**.

### What is Nuclear Fusion?

- Nuclear fusion is the process by which **two light atomic nuclei** combine to form **a single heavier one** while releasing **massive amounts of energy**.
- Fusion reactions take place in a **state of matter called plasma** — a hot, charged gas made of positive ions and free-moving electrons with **unique properties distinct from solids, liquids or gases**.



- The sun, along with all other stars, is powered by this reaction.
- **Process:** The **Deuterium (H-2)** and **Tritium (H-3)** atoms are combined to form **Helium (He-4)**. A free and fast neutron is also released as a result.
  - ♦ The neutron is powered by the kinetic energy converted from the 'extra' mass left over after the combination of lighter nuclei of deuterium and tritium occurs.



### Significance of Fusion energy?

- **Clean Energy:** Nuclear fusion — just like fission — does not emit carbon dioxide or other greenhouse gases into the atmosphere, so it could be a long-term source of low-carbon electricity from the second half of this century onwards.
- **More Efficient:** Fusion could generate four times more energy per kilogram of fuel than fission (used in nuclear power plants) and nearly four million times more energy than burning oil or coal.
- **Fusion fuel is plentiful and easily accessible:** Deuterium can be extracted inexpensively from seawater, and tritium can potentially be produced from the reaction of fusion-generated neutrons with naturally abundant lithium.
  - ♦ These fuel supplies would last for millions of years.
- **Safer to Use:** Future fusion reactors are also intrinsically safe and are not expected to produce high activity or long-lived nuclear waste.
  - ♦ Furthermore, as the fusion process is difficult to start and maintain, there is no risk of a runaway reaction and meltdown.

Source: ET

## NEWS IN SHORT

### KONDA REDDI TRIBE

#### Context

- **Konda Reddi tribe's indigenous knowledge** of **Indian laurel tree** has proven to be resourceful for Forest Department authorities.

#### About

- The Konda Reddi Tribe is a **Particularly Vulnerable Tribal Group** inhabiting the Papikonda hill range in the **Godavari region of Andhra Pradesh**.
- The Andhra Pradesh Forest Department authorities cut the bark of an Indian laurel tree (*Terminalia tomentosa*) found in the Papikonda National Park in the Alluri Sitharama Raju district to learn that the **tree indeed stores water**, particularly in the summer, as claimed by the tribe.
  - ♦ Known as **Indian Silver Oak**, the timber of the Indian laurel has great commercial value.

### Who are Particularly Vulnerable Tribal Groups (PVTGs)?

- In 1973, the **Dhebar Commission** set up a separate category for **Primitive Tribal Groups (PTGs)**.
  - ♦ In 1975, the Union identified 52 tribal groups as PTGs.
  - ♦ In 1993, 23 more groups were added to the list. Later, in 2006, these groups were named PVTGs.
- PVTGs are a **more vulnerable group** among tribal groups in India.
  - ♦ These groups have primitive traits, geographical isolation, low literacy, zero to negative population growth rate and backwardness.
  - ♦ Moreover, they are largely dependent upon hunting for food and a pre-agriculture level of technology.
- It is said that more developed tribal groups take advantage of the development funds, and thus, there is a **need to direct more funds towards PVTGs**.
- According to the 2011 Census, **Odisha** has the largest population of PVTGs followed by Madhya Pradesh.

Source: TH

## ONE VEHICLE, ONE FASTAG

### Context

- **The National Highways Authority of India (NHAI)** has enforced the 'One Vehicle, One FASTag' rule since 1st April 2024.

### About

- FASTag is an **electronic toll collection system** in India, operated by the NHAI.
- FASTag employs **Radio Frequency Identification (RFID) technology** for making toll payments directly from the prepaid or savings account linked to it or directly toll owner.
- **Aim:** To **enhance the efficiency of the electronic toll collection system** and provide **seamless movement at toll plazas**.
  - ♦ to discourage the use of single FASTag for multiple vehicles or linking multiple FASTags to a particular vehicle.

Source: **BS**

## DAMAGE TO CARDAMOM PLANTATION

### In News

- The drought has caused extensive damage to cardamom plantations across Kerala.

### About

- Indian Council of Agricultural Research, Krishi Vigyan Kendra (KVK) Idukki supporting small cardamom farmers through:
  - ♦ **Foliar application of Pigmented Facultative Methylophilic Bacteria (PPFM)** to small cardamom during summer period which enhance the plant growth and increase yield,
  - ♦ The PPFMs inoculation induced number of stomata, chlorophyll concentration and malic acid content and led to increased photosynthetic activity,
  - ♦ Screening of such kinds of bacteria having immense plant growth promotes activities like nitrogen fixation, Phytohormone production.
- PPFMs are **aerobic, Gram-negative bacteria** that use one-carbon compounds like formate, formaldehyde, and methanol as their sole carbon and energy source. They have been well studied in agricultural systems. They can be **applied to seeds and crops as a foliar spray**.

## Cardamom Plantation

- Cardamom belongs to the **ginger family (Zingiberaceae)**. It has a strong, warm flavour that is both spicy and sweet
- Native to the **Western Ghats of South India**. It is a perennial herbaceous plant.
- Cardamom thrives in a **warm and humid climate** with well-distributed rainfall ranging from 1500 to 2500 mm annually.
- The ideal temperature range is between 15°C to 35°C.
- The most suitable soil for cardamom plantation is deep, well-drained, and rich in organic matter.

Source: **TH**

## UTKALA DIBASA OR ODISHA DAY

### In News

- Recently, Utkal Divas or Utkala Dibasha was celebrated.

### About the day

- It is observed each year to commemorate the establishment of the state of Odisha.
  - ♦ Odisha is a state on the eastern coast of India, is divided into 30 administrative geographical units called districts.
- The state was originally called Orissa but the Lok Sabha passed the Orissa Bill, and Constitution Bill (113rd amendment), in March 2011 to rename it Odisha.
- **Historical Linkages :** Asoka the son of Vindusara invaded Kalinga in 261 B.C. and succeeded in occupying Kalinga to expand Mauryan rule.
  - ♦ The last independent Hindu King of Odisha was **Mukunda Deb**.
  - ♦ A few hundred years later, the British took over and divided the state into different parts.
  - ♦ Under British rule, Odisha was part of the Bengal presidency, which consisted of the present-day **Bihar, West Bengal, and Odisha**.
  - ♦ The new province of Odisha was formed after people's continued struggle, which finally paid off on April 1, 1936.
    - **Sir John Hubbak** was the **first governor of the state**.

Source: **IE**

## CARBON FIBRE

### In News

- India is planning to manufacture carbon fibre for use in aerospace, civil engineering and defence as an alternative to metal

### About Carbon Fibre

- Carbon fiber is made by heating a carbon-containing material, such as polyacrylonitrile (PAN), rayon, or pitch, to a very high temperature in an inert atmosphere.
- The main features include the high modulus and specific tensile strength calculated by the excellence of the graphite crystallites.
- Applications:** Carbon fiber composites are very strong and lightweight, and they are also corrosion-resistant and have a good electrical conductivity. This makes them ideal for use in a variety of applications, including:
  - Aircraft manufacturing
  - Automotive manufacturing
  - Sports equipment
  - Medical devices
- Status in India:** Currently, India does not produce any carbon fibre, relying entirely on imports from countries such as the US, France, Japan and Germany.

Source: LM

## ATOMIC CLOCK

### Context:

- Recently, India is willing to join an exclusive group of four other countries — the US, the UK, Japan, and South Korea — to have their own atomic clocks.

### About the Atomic Clock

- It is a type of clock that uses the **vibrations of atoms** to measure time with **extraordinary precision**.
- They are the **most accurate** timekeeping devices in the world, with the ability to measure **billionths of a second**.

### Working:

- Most modern clocks keep time using a quartz crystal oscillator.

- These devices take advantage of the fact that quartz crystals vibrate at a precise frequency when voltage is applied to them.
  - However, by space navigation standards, quartz crystal clocks aren't very stable.
- After only an hour, even the best-performing quartz oscillators can be off by a nanosecond (one billionth of a second), and after six weeks, they may be off by a full millisecond.
- Atomic clocks **combine a quartz crystal oscillator** with an **ensemble of atoms to achieve greater stability**.
- NASA's Deep Space Atomic Clock** will be off by less than a nanosecond after four days and less than a microsecond (one millionth of a second) after 10 years.

### Atomic Clocks in Space Navigation

- To determine a spacecraft's distance from Earth, navigators send a signal to the spacecraft, which then returns it to Earth.
- The time the signal requires to make that two-way journey reveals the spacecraft's distance from Earth, because the signal travels at a known speed (the speed of light).

### Atomic Clocks in India:

- India's NAVIC satellite navigation system** works on Indian atomic clocks.
- ISRO and the National Physical Laboratory (NPL)** have signed an **MoU** under which the latter will help authenticate precise timings for the space agency, and also **end its dependence on the US-built GPS**.

Source: LM

## NICES PROGRAMME

### Context:

- Recently, the National Information System for Climate and Environment Studies (NICES) programme invited Indian researchers to join in combating climate change.

### About the NICES Programme:

- It is a programme operated by the **Indian Space Research Organisation (ISRO)** and the **Department of Space**, along with other ministries and institutions under the framework of the **National Action Plan on Climate Change (NAPCC)**.



- It was **conceptualised in 2012** to meet the ongoing challenge of monitoring climate variability and climate change from space.
- It functions under the guidance of the **NICES - Programme Management Council (PMC)**.

**Objectives:**

- To generate and disseminate long-term **Essential Climate Variables (ECVs)**, derived from Indian

and other Earth Observation (EO) satellites, which are crucial for characterising Earth's climate.

- ♦ NICES has developed and made accessible over 70 geophysical variables related to **Terrestrial, Ocean, and Atmospheric conditions**.
- Key focus area are Space-based ECVs and Climate Indicators, Climate Change Challenges, Weather Extremes, Climate Services, etc

**Source: TH**

