

## DAILY CURRENT AFFAIRS (DCA)

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## INDIA-AUSTRALIA ECTA COMPLETES FOUR YEARS

### Context

- The **India–Australia Economic Cooperation and Trade Agreement (Ind-Aus ECTA)** has completed **four years** since its signing.

### About

- The agreement was signed on **2 April 2022** and has played a pivotal role in enhancing trade flows, fostering industry linkages, and creating new opportunities for businesses, entrepreneurs, and employment in both countries.
- **Key Provisions:** India granted **preferential market access** on 70.3% of its tariff lines, covering 90.6% of trade value, while Australia granted preferential market access on 100% of its tariff lines, corresponding to 100% of imports from India.
  - ♦ Of this, 98.3% of tariff lines became duty-free immediately upon implementation, while the remaining 1.7% are being phased out over five years.
  - ♦ From 1 January 2026, all Indian exports are eligible for zero-duty market access into Australia.
- **Bilateral Trade Post Signing of Agreement:** India's exports to Australia have more than doubled, rising from USD 4 billion in FY 2020–21 to USD 8.5 billion in FY 2024–25.
  - ♦ During 2024–25, total bilateral trade stood at USD 24.1 billion, while India's exports to Australia recorded an 8% growth over the previous year.
  - ♦ In FY 2025–26, India's total trade with Australia stood at USD 19.3 billion.

### Brief on India-Australia Ties

- India and Australia upgraded their bilateral relationship from a **'strategic partnership' in 2009 to a 'Comprehensive Strategic Partnership' in 2020**.
- **Bilateral mechanisms include:** 2+2 Defence and Foreign Ministers' Dialogue, Joint Trade & Commerce Ministerial Commission, Defence Policy Talks, Australia-India Education Council, Defence Services Staff Talks, Energy Dialogue, JWGs on different issues etc.
- **Bilateral Trade:** Bilateral trade reached \$24.1 billion in FY25, with India's exports valued at \$8.58 billion and imports at \$15.52 billion. India ranks as Australia's 8th largest trading partner, while Australia is India's 14th largest.

- ♦ Negotiations are underway for a more **comprehensive Comprehensive Economic Cooperation Agreement (CECA)** to further deepen trade relations.
- **Defence and Security:** The **'Quadrilateral Security Dialogue' (QSD)** is an **informal strategic forum** comprising four nations - **the United States of America (USA), India, Australia and Japan**.
  - ♦ Two Navies had signed the **'Joint Guidance for the India – Australia Navy to Navy Relationship' document in 2021**.
  - ♦ **Exercises:** In 2020, Australia participated in the MALABAR naval exercise and thus **joined India, the U S and Japan**.
    - **AUSINDEX:** It is a naval exercise between the Royal Australian Navy and the Indian Navy
    - **The Pitch Black exercise:** The Indian Air Force joined Exercise Pitch Black in Darwin in 2018.
  - ♦ **Mutual Logistic Support Arrangement and Defence Science & Technology Implementing Arrangement 2020:** The pact enables complex military engagement and excellent collective receptiveness to regional disasters.
- **Critical Minerals and Technology:** Australia-India Critical Minerals Investment Partnership was signed in 2022, establishing the Australia-India Critical Minerals Research Hub in late 2023.
  - ♦ The Hub aims to drive innovation in sustainable mining and processing, with government-approved funding of \$5 million for collaborative research and scholarships.
- In 2023, Australia and India entered into a **Migration and Mobility Partnership Arrangement (MMPA)**.
  - ♦ It is a bilateral framework that supports migration and mobility between the two countries, while addressing issues pertaining to illegal and irregular migration.
- **New Roadmap for Australia's Economic Engagement with India:** Australia launched it in 2025, identifying nearly 50 targeted opportunities across defence, sports, culture, space, and technology.
  - ♦ **Clean Energy:** Leveraging Australia's renewable energy expertise to support India's sustainability goals, including the establishment of the India-Australia Rooftop Solar Training Academy in 2025 to train 2,000 women and young people as solar technicians.

- ♦ **Education and Skills:** Strengthening academic partnerships and vocational training programs for knowledge exchange and workforce development.
- ♦ **Agribusiness:** Expanding agricultural trade to meet India's increasing demand and improve food security.
- ♦ **Tourism:** Promoting cultural exchanges and simplifying visa processes to strengthen people-to-people ties.

### Significance of Australia for India

- **Strategic Partner in the Indo-Pacific:** Australia is crucial for maintaining a free, open, and rules-based Indo-Pacific, aligning with India's maritime and regional security interests.



- **Key Source of Critical Minerals & Energy:** Australia supplies lithium, cobalt, rare earths, coal, and LNG, strengthening India's energy and industrial security.
- **Trade & Economic Partner:** Under the India–Australia ECTA (2022), bilateral trade is expanding with reduced tariffs, and negotiations toward a broader CECA are underway.
- **Education and Research Hub:** Australia is a major destination for Indian students, with growing collaboration in STEM, innovation, and mutual recognition of qualifications.
- **Geopolitical Convergence:** Close cooperation in QUAD, Indian Ocean Rim Association (IORA), East Asia Summit (EAS), and other multilateral forums helps India diversify partnerships and balance China's regional influence.

### Areas of Concerns

- **Trade Imbalance & Limited Diversification:** India's exports remain limited compared to Australia's resource-heavy exports, creating a persistent trade imbalance and slow progress on a Comprehensive Economic Cooperation Agreement (CECA).
- **Indian Diaspora & Safety Concerns:** Occasional incidents involving Indian students and community tensions raise concerns about safety and societal integration.

- **Visa, Mobility & Skill Recognition Issues:** Despite progress, challenges remain in mutual recognition of skills, work visas, and post-study opportunities for Indian students.
- **Agricultural Market Access Issues:** India faces barriers in exporting agricultural products due to Australia's stringent sanitary and phytosanitary (SPS) standards.
- **Slow Progress in Defence Tech Collaboration:** While exercises are strong, cooperation in defence manufacturing, technology transfer, and joint R&D remains underdeveloped.

### Way Ahead

- **Deepen Strategic & Defence Cooperation:** Expand collaboration in maritime security, intelligence sharing, joint defence production, and strengthen QUAD-driven initiatives in the Indo-Pacific.
- **Fast-Track CECA & Diversify Trade:** Conclude the Comprehensive Economic Cooperation Agreement (CECA) and promote diversification in goods, services, critical minerals, and digital trade.
- **Strengthen Critical Minerals & Clean Energy Ties:** Build long-term supply chains for lithium, rare earths, and collaborate on green hydrogen, renewable energy, and climate resilience projects.

Source: PIB

## INDIA AND AZERBAIJAN RESET TIES AFTER DIPLOMATIC STRAIN

### Context

- A year after tensions following Operation Sindoor, India and Azerbaijan have initiated efforts to normalise bilateral relations, with the 6th round of Foreign Office Consultations in Baku, marking the first such engagement since 2022.

### Background

- **Operation Sindoor Fallout:** Azerbaijan, along with Turkey, expressed support for Pakistan following the military operation of India, citing the "Three Brothers" bloc alliance.
- **Geopolitical Alignments:** Azerbaijan shares close strategic ties with Pakistan, as the latter supports Azerbaijan in the Nagorno-Karabakh conflict.
  - ♦ India, on the other hand, has strengthened ties with Armenia, including defence cooperation.
  - ♦ **Azerbaijan accused India of supporting Armenia militarily.**

### Recent Diplomatic Engagement

- **Both sides conducted a comprehensive review** of the entire spectrum of bilateral relations.
  - ♦ It covered trade, energy cooperation, technology, pharmaceuticals, tourism, cultural exchanges, people-to-people contacts and cooperation in addressing cross-border terrorism.
  - ♦ **Significance:** The inclusion of cross-border terrorism indicates a shift in Azerbaijan's earlier stance.
- Azerbaijan has **resumed crude oil exports to India**, and oil constitutes nearly **98 percent** of its exports to India.

### India-Azerbaijan Relations

- **Diplomatic Relations:** India recognised Azerbaijan as an independent country in December **1991**, soon after it declared independence from the Soviet Union.
  - ♦ Diplomatic relations were formally established in **February 1992**.
- **Economic Relations:** Bilateral trade between both the nations increased significantly from around **US\$ 50 million in 2005** to a peak of **US\$ 1.882 billion in 2022**, reflecting strong economic engagement.
  - ♦ The trade declined in subsequent years, **falling to US\$ 401 million in 2025**, mainly due to a reduction in crude oil imports by India.
  - ♦ India exports diversified goods such as **pharmaceuticals, rice, machinery, electronics, and construction materials** to Azerbaijan.
- **Energy cooperation: ONGC Videsh** maintains investments in oil and gas fields as well as pipeline projects in Azerbaijan. The company has acquired stakes in the **Azeri-Chirag-Gunashli oil field** and the **Baku-Tbilisi-Ceyhan pipeline**.
  - ♦ It contributes to India's efforts to diversify its energy sources and enhances its engagement in the strategically important **Caspian region**.
- **Cultural Relations:** Historical ties are highlighted by the 18th-century "**Ateshgah**" fire temple in Baku, which holds inscriptions in **Devanagiri and Gurmukhi**, reflecting historical trade links.
- **Humanitarian cooperation:** Azerbaijan facilitated the evacuation of more than 200 Indian nationals during the **U.S.-Israel strikes on Iran**.
- **The Indian community in Azerbaijan** comprises nearly 1,000 individuals engaged in diverse professional sectors.

### Way Ahead

- India's engagement with Azerbaijan reflects a pragmatic and multi-aligned foreign policy approach aimed at balancing diverse regional interests.
- The normalisation of ties highlights the importance of **dialogue and mutual accommodation** in resolving diplomatic tensions.
- Both countries are expected to **prioritise long-term strategic and economic interests** over past disagreements to build a stable and forward-looking partnership.

Source: TH

## REVISED CLASSIFICATION OF DISTRICTS AFFECTED BY LEFT-WING EXTREMISM

### Context

- The Ministry of Home Affairs has revised the classification of districts affected by Left-Wing Extremism (LWE), replacing the earlier category of "**most affected districts**" with a new three-tier categorization.

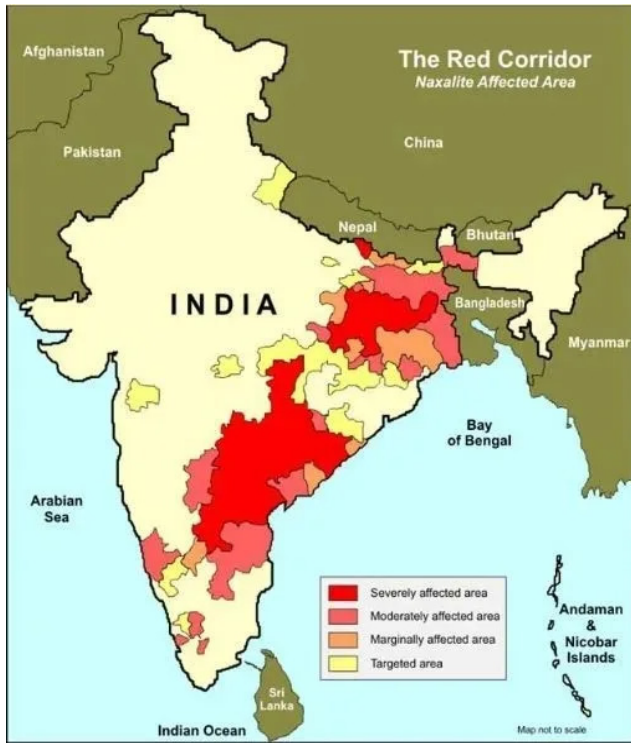
### New Classification of LWE-Affected Districts

- **LWE Affected Districts:** **Bijapur** in Chhattisgarh and **West Singhbhum** in Jharkhand.
- **Districts of Concern:** Kanker district in Chhattisgarh
- **Legacy & Thrust (L&T) Districts:** These **35 districts** are either no longer significantly affected but require continued support to prevent relapse (Legacy) or are vulnerable to potential Naxal expansion (Thrust).

### What is the Naxalite Movement?

- **Left Wing Extremism (LWE)**, often referred to as **Naxalism**, is one of India's most serious internal security challenges.
- **Origin:** The Naxalite movement began in **1967 in Naxalbari, West Bengal**, as a radical leftist uprising championing the rights of tribal and landless communities.
  - ♦ It was led by **Charu Majumdar, Kanu Sanyal and Jagan Santhal**.
- **Geographic Spread:** The insurgency spread across the **Red Corridor**, covering parts of Chhattisgarh, Jharkhand, Odisha, Maharashtra, West Bengal, Andhra Pradesh, Telangana, Madhya Pradesh, and Kerala.
- **Approach adopted:** Naxalites employ **guerrilla warfare**, target state institutions, extort local populations, and often recruit children.

- ◆ They claim to fight for marginalized communities but resort to violent methods.



### Consequences of Naxalism

- **Political Consequences:** It undermines state authority and weakens democratic institutions in affected areas. It also creates **governance vacuums**, making administration and law enforcement extremely difficult.
- **Economic Consequences:** Naxalism disrupts economic activities like mining, agriculture, and infrastructure development.
  - ◆ The increased government spending on security reduces funds available for development and hampers private investment.
- **Social Consequences:** It fosters fear, mistrust, and a sense of alienation among marginalized communities.
  - ◆ The disruption of education and health services, especially in remote areas, leads to significant human development losses.

### Government Initiatives

- **Security Related Expenditure (SRE) Scheme:** This Scheme is being implemented as a sub-scheme of the umbrella scheme 'Modernization of Police Forces'.
  - ◆ The Central Government reimburses security related expenditure for LWE affected districts and districts earmarked for monitoring.
- **SAMADHAN Strategy:** A comprehensive approach involving Smart Leadership, Aggressive Strategy, Motivation and Training, Actionable

Intelligence, Dashboard-Based KPIs and KRAs, Harnessing Technology, Action Plans for each Theatre, and No Access to Financing.

- **Surrender and Rehabilitation Scheme:** The policy has accelerated the collapse of Naxal cadres by offering attractive incentives and assured livelihood.
  - ◆ High-rank LWE cadres receive ₹5 lakh, middle/lower-rank cadres ₹2.5 lakh, and all surrenderers get a ₹10,000 monthly stipend for professional training lasting 36 months.
- **The National Policy and Action Plan to address LWE** was approved in 2015. It envisages a **multi-pronged strategy** involving security related measures, development interventions, ensuring rights and entitlements of local communities etc.
- **Educational Empowerment:** The Government has launched skill development initiatives in 48 LWE-affected districts by sanctioning **48 Industrial Training Institutes (ITIs)** with an investment of 495 crore and approving 61 Skill Development Centres (SDCs).
- **Operation Black Forest:** It was a massive 21-day counter-insurgency operation launched in April 2025, by Indian security forces to dismantle Naxalite-Maoist networks.
  - ◆ The mission targeted the **Karreguttalu Hills** (also known as the Black Hills), a strategic stronghold spanning approximately 1,200 sq km along the Chhattisgarh–Telangana border.

### Decline in Naxal Violence Over the Last Decade

Indicators	2004–2014	2014–2024	Decrease
Violent Incidents	16,463	7,744	53%
Security Personnel Deaths	1,851	509	73%
Civilian Deaths	4,766	1,495	70%

Source: Ministry of Home Affairs

### Way Ahead

- Development interventions must prioritise **last-mile delivery in tribal and remote regions**, particularly in infrastructure, healthcare, education, and digital connectivity.
- **Community participation and trust-building measures**, including effective local governance and grievance redressal, must be enhanced.
- **Continuous monitoring** of Legacy and Thrust Districts is essential to prevent relapse into violence and ensure long-term stability.

Source: TH

## NUCLEAR FUSION COST MODELS TOO OPTIMISTIC TO BE VIABLE: EXPERTS WARN

### Context

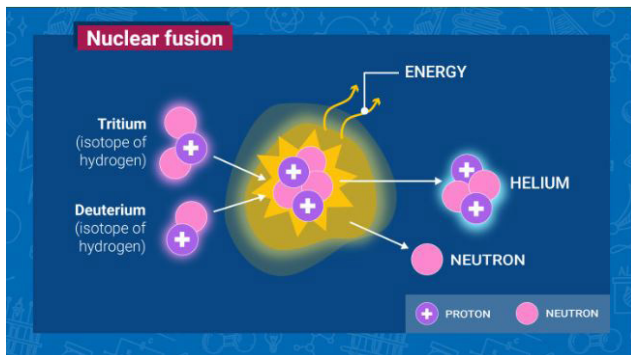
- Scientists have found that investors are overestimating the **experience rate of nuclear fusion**.

### About

- The **experience rate of nuclear fusion** refers to how the cost or efficiency of fusion technology improves with accumulated experience.
- Current nuclear fusion models often assume experience rates between 8% and 20%.
  - After examining the unit size, design complexity, and need for customisation, Scientists found that fusion power plants will likely see experience rates of 2% to 8%.

### 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.



### Challenges of Fusion Energy

- Extreme temperature requirement:** It needs ~100 million °C to initiate and sustain fusion.

- Plasma instability:** Hot plasma is highly unstable and difficult to confine.
- Magnetic confinement complexity:** Advanced systems like Tokamak are technically challenging and costly.
- Net energy gain issue:** Achieving sustained energy output greater than input is still difficult.
- Material degradation:** Reactor walls face intense neutron bombardment and heat damage.
- High cost & long gestation:** Projects like ITER require massive funding and decades of development.

### 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.

### Difference between Nuclear Fusion and Fission

NUCLEAR FISSION	NUCLEAR FUSION
A heavy nucleus breaks up to form two lighter nuclei.	Two light nuclei combine to form a heavy nucleus.
It involves a chain reaction.	Chain reaction is not involved.
The heavy nucleus is bombarded with neutrons.	Light nuclei are heated to an extremely high temperature.
We have proper mechanisms to control fission reaction for generating electricity.	Proper mechanisms to control fusion reaction are yet to be developed.
Disposal of nuclear waste is a great environmental problem.	Disposal of nuclear waste is not involved.
Raw material is not easily available and is costly.	Raw material is comparatively cheap and easily available.

Source: TH

## NEWS IN SHORT

### EL NIÑO

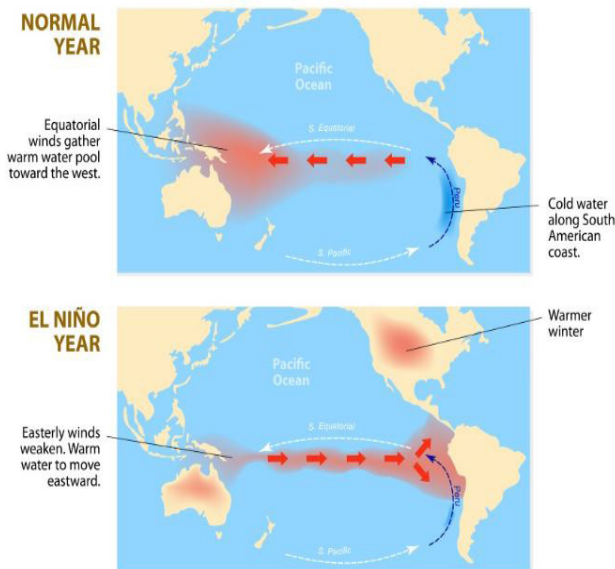
#### Context

- The possible emergence of El Niño conditions, along with global oil price shocks, has intensified concerns over rising inflation in India.

#### What is El Niño?

- 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: 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 NIÑO PHENOMENON



#### Impact of El Niño on Indian Economy

- Reduced rainfall** due to El Niño adversely affects kharif crops like rice, pulses, and oilseeds, leading to lower agricultural output and supply shortages.
- Decline in food supply** caused by El Niño conditions results in higher food prices, which in turn pushes up overall inflation due to the high weight of food in India's inflation basket.
- Poor agricultural output** under El Niño reduces farmers' incomes, thereby weakening rural demand and adversely impacting overall economic growth.

Source: IE

### INDONESIA

#### Context

- A magnitude 7.4 earthquake struck the Northern Molucca Sea off Indonesia's Ternate island.

#### About Indonesia

- Basic Geography:**
  - World's largest archipelagic state, located between the **Indian and Pacific Oceans**, off mainland Southeast Asia.
  - Major islands:** Sumatra, Java, Kalimantan (Borneo), Sulawesi, Papua.
  - It **shares land borders** with East Timor (Timor-Leste), Papua New Guinea, and Malaysia.
  - Capital:** Jakarta (on the island of Java); new capital being developed — **Nusantara in Kalimantan**
  - Largest Muslim-majority nation** by population in the world.
- Tectonic Setting:**
  - Located on the Pacific Ring of Fire**, the seismically active belt where ~90% of the world's earthquakes occur.
  - It hosts one of the world's highest densities of active volcanoes, stretching from **Sumatra through Java to the Lesser Sunda Islands**.
  - The **Molucca Sea** — where the recent earthquake originated — is a highly active tectonic zone in Indonesia's northern region.
- Global and Regional Role:**
  - Founding member of the **Non-Aligned Movement (NAM)** along with India.
  - Founding member of ASEAN (1967)** — ASEAN Secretariat is headquartered in Jakarta.
  - Indonesia became a full member of BRICS** at the 16th Summit held under Russia's chairship in Kazan.
  - Member of G20 and hosted the G20 Summit in Bali in 2022.
  - Member of **IONS (Indian Ocean Naval Symposium)** — a maritime cooperation platform conceptualised by India in 2008.



Source: TH

## NCERT GRANTED DEEMED UNIVERSITY TAG

### In News

- The Ministry of Education has declared the **National Council of Educational Research and Training (NCERT)** an **Institution Deemed to be a University**.

### About the Decision

- The deemed university status has been granted not only to NCERT headquarters, but also to its six **Regional Institutes of Education (RIEs)**, subject to certain conditions.

#### Deemed to be University

Higher education institutions, other than universities, functioning at a high level in a specified field of education, may be declared as an institution deemed to be a university by the Central Government on the advice of the University Grants Commission.

Institutions declared as deemed to be universities enjoy the academic standards and privileges of a university.

### Impact of the Decision

- NCERT can now start courses and academic programmes and also award degrees.
- It has also been asked to begin **research programmes, doctoral programmes, and innovative academic programmes**.
- NCERT should also gradually expand into other academic domains in line with UGC norms and regulations, and the National Education Policy (NEP) 2020.
- NCERT has been clearly **prohibited from engaging in commercial or profit-making activities**.
- NCERT can start new **academic programmes, off-campus centres, or offshore campuses** only in accordance with the guidelines issued by the UGC from time to time.
- NCERT has been directed to take steps for accreditation of its academic programmes by the **National Board of Accreditation (NBA)**, and institutional accreditation by the **National Assessment and Accreditation Council (NAAC)**.
- The government has also directed NCERT to participate in the **National Institutional Ranking Framework (NIRF)**.

- It must also compulsorily create **Academic Bank of Credits (ABC) IDs** for students, and upload their credit records to digital lockers so that they can be reflected on the ABC portal.

Source: TH

## YUVA SANGAM

### Context

- Registrations for institution-led exposure tours under **Yuva Sangam Phase-VI** were held, covering 22 States and Union Territories.

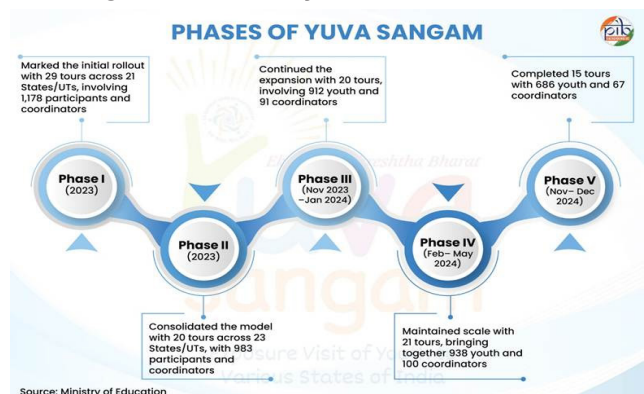
### About the Yuva Sangam

- It is an initiative by the Government of India to strengthen people-to-people connect between youth belonging to different States/UTs of India.
  - It was **conceptualised by the Ministry of Education** in collaboration with various other ministries and departments, and was launched under the banner of **Ek Bharat Shreshtha Bharat (EBSB)**.
    - Ek Bharat Shreshtha Bharat (EBSB)** launched on 31st October 2015 to strengthen national unity by deepening connections between States and Union Territories.
- It has been organised collaboratively **on the model of Kashi Tamil Sangamam (KTS)**.

The programme is guided by the Five P's framework:



### Programme Journey:



Source: PIB

## CABINET COMMITTEE ON SECURITY (CCS)

### Context

- PM Modi chaired a special meeting of the Cabinet Committee on Security to review the situation and mitigating measures in the context of the ongoing West Asia Conflict.

### About Cabinet Committee on Security (CCS)

- It is the apex decision-making body in India responsible for matters related to national security and defence expenditure, and strategic affairs.
  - It handles **crisis situations, defence issues, and high-stakes strategic decisions**.
- It is chaired by the **Prime Minister** and includes the Ministers of Defence, Home Affairs, Finance, and External Affairs, with the **National Security Advisor** acting as a coordinator.
- It is an **extra-constitutional body** created under the **Transaction of Business Rules, 1961** of the Government of India.

Source: AIR

## PURCHASING MANAGER'S INDEX (PMI)

### Context

- The West Asia crisis has led to **India's Manufacturing PMI** falling from 56.9 in February 2026 compared to 53.9 in March 2026.

### About Purchasing Managers' Index (PMI)

- PMI is a survey-based economic indicator that captures **changes in business conditions** compared to the previous month.
- It provides insights into **both current and near-term economic trends**.
- It is prepared separately for **manufacturing, services**, and also as a composite index.
- PMI is measured on a **scale of 0 to 100**. A reading above 50 indicates expansion, below 50 indicates contraction, and 50 indicates no change.
- PMI is compiled globally for many economies by IHS Markit, which is now part of S&P Global.

Source: TH

## AD VALOREM DUTY

### In Context

- The United States has announced a **100% ad valorem duty on imports** of patented pharmaceuticals and associated active pharmaceutical ingredients (APIs).

### India's Stake

- The **US is India's single largest pharmaceutical export destination**, absorbing nearly 40% of India's total pharma exports.
- India dominates the American generics market supplying approximately 47% of all generic medicines consumed in the US.

### What is Ad Valorem Duty?

- Ad valorem duty is a **customs tariff calculated as a fixed percentage of the declared value of imported goods** — as opposed to specific tariffs, which are levied on the basis of weight, volume, or quantity regardless of price.
- As the value of the imported product rises, the **absolute duty burden rises proportionally**.
- A 100% ad valorem duty effectively doubles the **landed cost of the imported product for the buyer**, making domestically produced alternatives significantly more competitive on price.

Source: IE

## COAL GASIFICATION INCENTIVE SCHEME

### In Context

- The Union Minister has unveiled India's roadmap to address this through domestic coal utilisation, with the Coal Gasification Incentive Scheme as a central instrument.

### About Coal Gasification

- Coal gasification is the process of converting coal into **syngas (synthesis gas)** — a mixture primarily of **hydrogen (H<sub>2</sub>)** and **carbon monoxide (CO)** — through a reaction with steam and oxygen at high temperatures. Syngas serves as a feedstock for producing:
  - Ammonia** → used in fertiliser manufacturing
  - Methanol** → used as fuel and chemical feedstock
  - Hydrogen** → clean energy carrier
  - Synthetic natural gas** → substitute for imported LNG.

Source: ET

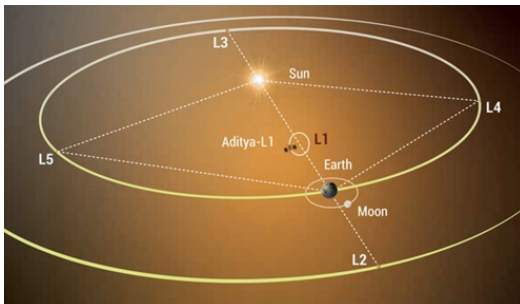
## ADITYA-L1 MISSION

### In News

- ISRO invites proposals from the Indian solar physics community to analyse data from the Aditya-L1 **mission**.

### Aditya-L1 Mission

- Launched in 2023, **Aditya-L1** is **India's first dedicated space-based solar mission**. It has been designed to study the **Sun and its outer atmosphere**.
- The mission's lifespan is 5 years.
- The spacecraft is positioned at the **Sun-Earth Lagrange Point 1 (L1)**, which allows it to continuously observe the Sun without frequent interruptions such as eclipses or occultation.
  - ♦ The **L1 (Lagrange Point 1)** lies between the **Earth and the Sun**, where the gravitational pull of the two bodies balances the orbital motion of the spacecraft.
  - ♦ This makes it an ideal location for **continuous solar observation**.



#### Key Instruments:

- ♦ **Visible Emission Line Coronagraph (VELC):** VELC is designed to observe the **solar corona**, which is the outermost layer of the Sun's atmosphere. It helps in studying **coronal heating, coronal mass ejections (CMEs)**, and other dynamic solar events.
- ♦ **Solar Ultra-violet Imaging Telescope (SUIT):** SUIT is used to observe the Sun in the **ultraviolet wavelength**. It helps in studying the **solar photosphere and chromosphere**, and in understanding **solar radiation and variability**.

Source: TH

## INS TARAGIRI

### Context

- INS Taragiri, a **Nilgiri-class stealth guided missile frigate**, has been commissioned into the Indian Navy.

### About

- INS Taragiri is the 4th of the 7 **Project 17A multi-mission stealth guided missile frigates**.
- It was built by **Mazagon Dock Shipbuilders Limited (MDL)**.
- It is named after the **Taragiri hill ranges of Uttarakhand**.
- About 75% of the ship is indigenously built.

### Key Features

- It is designed for multi-role operations across **air, surface** and **sub-surface warfare**.
- It can act as a screen for **Carrier Battle Groups** and can also undertake independent or small-group missions.
- It is equipped with **MF-STAR radar, MRSAM, Barak air defence missiles, and BrahMos missiles**.
- For anti-submarine warfare, it carries **HUMSA sonar, triple torpedo launchers, and Extended Range Anti-Submarine Rockets (ERASR)**.
- It uses a **Combined Diesel or Gas (CODOG)** propulsion system.
- It can achieve speeds of around 30 knots.
- It can carry at least one helicopter, including **Kamov or MH-60R**.

Source: PIB

## INS ARIDHAMAN

### In News

- **INS Aridaman**, part of India's Arihant-class ballistic missile submarine (SSBN) fleet, has been commissioned as a more advanced platform than its predecessors — **INS Arihant (commissioned 2016)** and **INS Arighaat (commissioned 2024)**.

### Key Features

- It is larger than INS Arihant and INS Arighaat, with a displacement of about 7,000 tonnes.
- It can carry up to **24 K-15 Sagarika missiles, or 8 K-4 / K-5 missiles**.
  - ♦ The K-4 missile has a range of about 3,500 km.
- These are nuclear-capable submarine-launched ballistic missiles (SLBMs).

### India's Nuclear Submarine Programme

- India's nuclear submarine effort is rooted in the **Advanced Technology Vessel (ATV) Programme** initiated over three decades ago as one of India's most classified strategic defence projects.
- It was developed through collaboration **between DRDO, the Department of Atomic Energy (DAE), the Navy, and private defence firms**, with technical assistance from Russia in the early phases.
- The programme's primary output is the **SSBN (Ship Submersible Ballistic Nuclear)**, a nuclear-propelled submarine capable of carrying Submarine-Launched Ballistic Missiles (SLBMs) armed with single or multiple nuclear warheads.

Source: TH