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PCS Special:	13 January 2026
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5. Hamnet and One Battle After Another reign supreme at 83rd Golden Globes

83वें गोल्डन ग्लोब्स में हैमनेट और वन बैटल आफ्टर अनदर का दबदबा

Despite ban, high-stake rooster fights thrive during Sankranti in Anakapalli

PCS

V. Kamalakara Rao
ANAKAPALLI

Despite the judicial ban and strict prohibitions in place, the district of Anakapalli in Andhra Pradesh is gearing up for the high-stakes rooster fights during the three-day Sankranti festival, starting with *Bhogi* on Wednesday. Tensions between deep-rooted traditions and the rule of law has reached a boiling point across the region.

In a strategic shift, to evade law enforcement, rooster fight organisers have moved the venues away from traditional village squares. Secluded layouts are being prepared near farm fields, and mango and cashew orchards, far away from the main roads, said sources.



During fights, roosters are fitted with razor-sharp blades that result in the death of the losing bird within minutes. K.V.S. GIRI

Unlike previous years, punters this year are bracing for stakes ranging between ₹5 lakh and ₹15 lakh per match. The demand for high-performance fighting roosters such as *Nemali*, *Dega*, *Kaaki*, *Rasangi*, and *Peruvian* have seen prices soar, with birds

fetching between ₹10,000 and ₹25,000 each. "These breeds are fighters, jump higher, and are much more aggressive than local varieties," says P. Swami Naidu (name changed), a resident of Anakapalli.

The roosters are fed a diet of almonds, cashews,

and meat to build stamina. During fights, they are fitted with razor-sharp blades that result in the death of the losing rooster within minutes.

Rooster fighting remains a punishable offence under the Prevention of Cruelty to Animals Act, 1960, and the Andhra Pradesh Gaming Act, 1974. The Andhra Pradesh High Court recently reiterated its directive to the State government to enforce the ban strictly, even suggesting the imposition of prohibitory orders near known rooster fight venues, said Anakapalli Additional Superintendent of Police M. Deva Prasad. Police records indicate that about 50 cases of rooster fights have been booked this month in Anakapalli.

Despite ban, high-stake rooster fights thrive during Sankranti in Anakapalli प्रतिबंध के बावजूद, अनाकापल्ली में संक्रांति के दौरान उच्च-दांव मुर्गा लड़ाइयाँ फल-फूल रही हैं

- Unlike previous years, punters this year are bracing for stakes ranging between ₹5 lakh and ₹15 lakh per match.
पिछले वर्षों के विपरीत, इस वर्ष सट्टेबाज प्रति मैच ₹5 लाख से ₹15 लाख तक के दांव के लिए तैयार हैं।
- The demand for high-performance fighting roosters such as **Nemali**, **Dega**, **Kaaki**, **Rasangi**, and **Peruvian** have seen prices soar, with birds fetching between ₹10,000 and ₹25,000 each.
नेमली, **डेगा**, **काकी**, **रसांगी**, और **पेरुवियन** जैसी उच्च-प्रदर्शन लड़ाकू नस्लों की मांग बढ़ने से कीमतें आसमान छू रही हैं, जहाँ एक-एक पक्षी ₹10,000 से ₹25,000 तक बिक रहा है।
- "These breeds are fighters, jump higher, and are much more aggressive than local varieties," says P. Swami Naidu (name changed), a resident of Anakapalli.
"ये नस्लें लड़ाकू होती हैं, ऊँचा कूदती हैं, और स्थानीय किस्मों से कहीं अधिक आक्रामक होती हैं," अनाकापल्ली के निवासी पी. स्वामी नायडू (नाम बदला हुआ) कहते हैं।
- During fights, they are fitted with **razor-sharp blades** that result in the death of the losing rooster within minutes.
लड़ाई के दौरान, उन्हें **रेज़र-तेज ब्लेड** लगाए जाते हैं, जिनसे हारने वाला मुर्गा कुछ ही मिनटों में मर जाता है।
- Rooster fighting remains a punishable offence under the **Prevention of Cruelty to Animals Act, 1960**, and the **Andhra Pradesh Gaming Act, 1974**.
मुर्गा लड़ाई **पशु क्रूरता निवारण अधिनियम, 1960** और **आंध्र प्रदेश गेमिंग अधिनियम, 1974** के तहत दंडनीय अपराध बनी हुई है।



Probe under way into Trinamool MP's 'use of e-cigarette' in Lok Sabha: Birla

PCS
The Hindu Bureau
NEW DELHI

Lok Sabha Speaker Om Birla on Monday said investigations were under way into a complaint alleging that a Trinamool Congress MP was "openly using" an e-cigarette inside the House during proceedings. Punishment would be meted out strictly in accordance with parliamentary rules and procedures, he said.

"No one has the right to undermine the dignity and sanctity of the Parliament," Mr. Birla told presspersons, adding that the rules do not permit smoking in the House.

He was addressing a press conference ahead of the 28th Conference of Speakers and Presiding Officers of the Commonwealth (CSPO), to be hosted by Parliament. The conference will be inaugurated by Prime Minister



Om Birla

Narendra Modi and is expected to draw one of the largest gatherings in its history, Mr. Birla said.

BJP MP's complaint

The issue arose after Bharatiya Janata Party member Anurag Thakur submitted a complaint to the Speaker alleging that a Trinamool MP was "openly using" an e-cigarette during proceedings, despite such devices being banned across the country.

"No one has the right to

undermine the sanctity of the House," Mr. Birla reiterated. The complaint was being examined and would subsequently be referred to the appropriate committee of the House, he said. "We will act on the recommendation of the committee. Everyone will have to maintain decorum in the House. A member could even lose his membership," he said.

"Nobody will be allowed to lower the dignity of the House," the Speaker added.

"It is a responsibility. You will have to maintain decorum inside the House, and the one who does not maintain decorum will be punished under the rules and procedures of the Parliament. Action will be taken according to the rules," Mr. Birla said.

The CSPO conference will, among other issues, discuss the use of artificial

intelligence in the functioning of legislatures.

Participating countries

Responding to queries, the Lok Sabha Speaker said Pakistan would not participate, while Bangladesh currently did not have a Speaker, with general elections scheduled for February in that country. He noted that at least 42 countries had confirmed participation.

The 27th edition of the CSPO was hosted by Uganda in January 2024, after which Deputy Chairman of Rajya Sabha Harivansh formally took over the responsibility for hosting the 28th edition to be held in India in 2026.

Efforts were under way to make all parliamentary papers, including Standing Committee reports and bulletins, available in all 22 scheduled languages, Mr. Birla said.

Probe under way into Trinamool MP's 'use of e-cigarette' in Lok Sabha: Birla लोकसभा में तृणमूल सांसद द्वारा 'ई-सिगरेट के उपयोग' की जांच जारी: बिड़ला

- He was addressing a press conference ahead of the 28th Conference of Speakers and Presiding Officers of the Commonwealth (CSPO), to be hosted by Parliament. The conference will be inaugurated by Prime Minister Narendra Modi and is expected to draw one of the largest gatherings in its history, Mr. Birla said.

वह संसद द्वारा आयोजित होने वाले कॉमनवेल्थ के अध्यक्षों और पीठासीन अधिकारियों के 28वें सम्मेलन (सीएसपीओ) से पहले एक प्रेस वार्ता को संबोधित कर रहे थे। श्री बिड़ला ने कहा कि सम्मेलन का उद्घाटन प्रधानमंत्री नरेंद्र मोदी करेंगे और इसके इतिहास की सबसे बड़ी सभाओं में से एक होने की उम्मीद है।

- The 27th edition of the CSPO was hosted by Uganda in January 2024, after which Deputy Chairman of Rajya Sabha Harivansh formally took over the responsibility for hosting the 28th edition to be held in India in 2026.



Modi, Merz launch annual kite festival in Ahmedabad

PM and German Chancellor get grand welcome with music and dance performances; the leaders visit exhibit reflecting Ahmedabad's architectural heritage, watch demonstrations on kite-making

PCS

Abhinay Deshpande
AHMEDABAD

Prime Minister Narendra Modi on Monday inaugurated the International Kite Festival, 2026 on the Sabarmati riverfront in Ahmedabad, with German Chancellor Friedrich Merz attending as the chief guest. The two leaders launched the festival by flying kites.

Chief Minister Bhupendra Patel and Deputy Chief Minister Harsh Sanghavi were present, along with members of the State Cabinet, MLAs, municipal corporation office-bearers, and senior State government officials.

Mr. Modi and Mr. Merz were welcomed with music and dance performances. Cultural presentations included Gujarati folk dance Beda Raas, Kuchipudi, Bharatanatyam, and Mallakhamb.

The two leaders visited an exhibit reflecting the architectural heritage of Ahmedabad's *pol*s and *havelis* (traditional houses and grand residences).

As part of a heritage walkway, a kite museum and a photo wall have been



Bonhomie: Narendra Modi greets Friedrich Merz at the International Kite Festival in Ahmedabad. MEAINDIA/PTI

135 kite-flyers from 50 countries and 65 from 13 Indian states are participating in the festival

set up. The dignitaries were briefed on kites from different Indian States, made using various materials and techniques. They observed demonstrations by artisans on kite-making.

The festival on the Sabarmati riverfront draws inspiration from kite-flying celebrations held across Gujarat annually ahead of

Uttarayan, also known as *Makar Sankranti*, which falls on Wednesday this year.

It celebrates the sun's northward journey and the transition towards summer. The festival is being organised by Gujarat Tourism.

At 7 p.m. on Tuesday, a musical ensemble by 108 artists from Gujarat and Rajasthan featuring instruments such as sitar, sarangi, violin, mandolin, harmonium, flute, dholak, tabla, and mridang will perform.

The performance in-

cluded *Vande Mataram*, *Vaishnav Jan*, and German compositions. Folk singer Kinjal Dave will perform and illuminated kites will light up the night sky.

This year, the festival boasts 135 international kite-flyers representing 50 countries and 65 kite-flyers from 13 Indian States. In addition, 871 kite-flyers from 16 districts of Gujarat are participating.

The countries are Algeria, Argentina, Australia, Belarus, Belgium, Brazil, Bulgaria, Cambodia, Canada, Chile, China, Colombia, Costa Rica, Denmark, Egypt, France, Germany, Greece, Guatemala, Hungary, Indonesia, Ireland, Israel, Italy, Japan, South Korea, Lebanon, Lithuania, Malaysia, Mauritius, Mexico, New Zealand, the Philippines, Poland, Portugal, Russia, Singapore, Slovakia, South Africa, Spain, Sri Lanka, Sweden, Thailand, Turkmenistan, Ukraine, the U.K., the United States, Vietnam, Slovenia, Bahrain, Nepal, Turkey, and Jordan.

To introduce visitors to Gujarati cuisine and handicrafts, 25 handicraft stalls and 15 food stalls have been set up at the venue.

Modi, Merz launch annual kite festival in Ahmedabad मोदी, मर्ज़ ने अहमदाबाद में वार्षिक पतंग महोत्सव का शुभारंभ किया

- **Cultural presentations** included **Gujarati folk dance Beda Raas, Kuchipudi, Bharatanatyam, and Mallakhamb.** सांस्कृतिक प्रस्तुतियों में गुजराती लोक नृत्य बेड़ा रास, कुचिपुड़ी, भरतनाट्यम और मल्लखंब शामिल थे।
- **It celebrates the sun's northward journey and the transition towards summer.** The festival is being organised by **Gujarat Tourism.** यह सूर्य के उत्तरायण गमन और ग्रीष्म ऋतु की ओर संक्रमण का उत्सव है। इस महोत्सव का आयोजन गुजरात पर्यटन द्वारा किया जा रहा है।



Author who

Author who made ancient alien theories popular dies

PCS
Reuters

Best-selling Swiss author Erich von Daeniken, who built a lucrative career on his argument, rubbished by scientists and archaeologists, that humanity owes much of its development to the intervention of extraterrestrial beings, has died aged 90.

Chariots of the Gods?, published in 1968, sold millions of copies with its thesis that advanced aliens had repeatedly visited the earth, leaving their mark in the form of Inca and Egyptian ruins, cave drawings and other physical monuments.

"It took courage to write this book, and it will take courage to read it," the work begins.

It acknowledged that scholars would dismiss it as nonsense, but insisted that "the past teemed with unknown gods who visited the primeval earth in manned spaceships".

Chariots of the Gods? sold millions of copies with its thesis that advanced aliens had visited the earth, leaving their mark in Inca and Egyptian ruins

Academics wrote books refuting his theories, criticising him as a purveyor of some of the more fantastical notions of pseudoscience. German news magazine *Der Spiegel* even had a 1973 cover story titled "The Daeniken Hoax".

Nevertheless, legions of fans snapped up his more than 40 books and watched his television specials and documentary films. His books were translated into more than 30 languages.

Von Daeniken spent the early part of his working life managing a hotel in eastern Switzerland, where a fraud conviction landed him in jail for 18 months. But as his book took off, he emerged from prison as a best-selling author.

Still, he never presented the smoking gun to fulfill astronomer Carl Sagan's famous adage that "extraordinary claims require extraordinary evidence".

"He ... says that the astonishing astronomical information ancient civilizations, such as the Mayan, had is proof that there were some space travellers around to teach it to them. This fits in with his general questioning of the ability of the Egyptians to build the pyramids, or the Easter Islanders to erect those massive stone heads," the *New York Times* wrote in 1974.

'Method is to use a negative'

"His method is to use a negative - ancient peoples couldn't have done or thought all the things they did - to prove a positive - that the ancient people were the beneficiaries of some kind of cosmological Point 4 (development assistance) programme."

Such criticism never knocked von Daeniken off his stride. "We owe it to our self-respect to be rational and objective," he wrote. "At some time or other every daring theory seemed to be a Utopia. How many Utopias have long since become everyday realities!"

Television specials about his books made him a well-known figure in Europe and in the U.S. In 2003, he opened a *Mysteries of the World* theme park in Switzerland that went bust after three years.

In a treatise on his website, von Daeniken said he was not an esoteric, and that his work served to debunk "a world of religious and unfortunately often scientific humbugs".

unfortunately often **scientific humbugs**".

अपनी वेबसाइट पर एक लेख में, वॉन डैनिकेन ने कहा कि वे **रहस्यवादी** नहीं हैं और उनका काम "धार्मिक और दुर्भाग्य से अक्सर **वैज्ञानिक ढोंग** की दुनिया" को बेनकाब करता है।

made ancient alien theories popular dies

प्राचीन एलियन सिद्धांतों को लोकप्रिय बनाने वाले लेखक का निधन

• Best-selling Swiss author **Erich von Daeniken**, who built a lucrative career on his argument, rubbished by **scientists and archaeologists**, that humanity owes much of its development to the intervention of **extraterrestrial beings**, has died aged 90.

सर्वाधिक बिकने वाले स्विस लेखक **एरिच वॉन डैनिकेन**, जिन्होंने यह तर्क देकर एक लाभदायक करियर बनाया कि मानवता का बहुत सा विकास **एलियन हस्तक्षेप** के कारण हुआ है, जिसे **वैज्ञानिकों और पुरातत्वविदों** ने खारिज किया, उनका निधन 90 वर्ष की आयु में हो गया है।

• **Chariots of the Gods?**, published in 1968, sold millions of copies with its thesis that advanced aliens had repeatedly visited the earth, leaving their mark in the form of **Inca and Egyptian ruins, cave drawings and other physical monuments**.

• "His method is to use a negative - ancient peoples couldn't have done or thought all the things they did - to prove a positive - that the ancient people were the beneficiaries of some kind of **cosmological Point 4 (development assistance) programme**."

• 2003 में, उन्होंने **स्विट्ज़रलैंड** में **Mysteries of the World** थीम पार्क खोला, जो **तीन साल** बाद बंद हो गया।

• In a treatise on his website, von Daeniken said he was not an **esoteric**, and that his work served to debunk "a world of **religious** and



Hamnet and One Battle After Another reign supreme at 83rd Golden Globes

PCS
Associated Press

Paul Thomas Anderson's ragtag revolutionary saga *One Battle After Another* took top honours at Sunday's 83rd Golden Globes in the comedy category, while Chloe Zhao's Shakespeare drama *Hamnet* pulled off an upset over *Sinners* to win best film, drama. *Hamnet* star Jessie Buckley won best female actor.

One Battle After Another won best film, comedy, supporting female actor for Teyana Taylor, best director and best screenplay for Mr. Anderson



Sara Murphy, Teyana Taylor, Paul Thomas Anderson and Chase Infiniti pose with the award for *One Battle After Another*. REUTERS

Sinners won for best score and cinematic and box-office achievement.

Timothee Chalamet won his first Golden Globe for *Marty Supreme*.

The Globes held in California began with a pointedly political opening from host Nikki Glaser.

"Yes, the Golden Globes, without a doubt

the most important thing happening in the world right now," she said.

Winners included Rose Byrne for best female actor in a comedy or musical in *If I Had Legs I'd Kick You*, and Wagner Moura, the Brazilian star of *The Secret Agent*, for best male actor in a drama. Kleber Mendonça Filho's period political thriller also won best international film. Supporting actor front-runner Stellan Skarsgard won for the Norwegian family drama *Sentimental Value*. It was the first major Hollywood movie award for the 74-year-old veteran actor.

Hamnet and One Battle After Another reign supreme at 83rd Golden Globes 83वें गोल्डन ग्लोब्स में हैमनेट और वन बैटल आफ्टर अनदर का दबदबा

- Paul Thomas Anderson's ragtag revolutionary saga *One Battle After Another* took top honours at Sunday's 83rd Golden Globes in the comedy category, while Chloe Zhao's Shakespeare drama *Hamnet* pulled off an upset over *Sinners* to win best film, drama. *Hamnet* star Jessie Buckley won best female actor.

पॉल थॉमस एंडरसन की अव्यवस्थित क्रांतिकारी गाथा वन बैटल आफ्टर अनदर ने रविवार को हुए 83वें गोल्डन ग्लोब्स में कॉमेडी श्रेणी में शीर्ष सम्मान हासिल किया, जबकि क्लोए झाओ की शेक्सपियर ड्रामा हैमनेट ने सिनर्स को पछाड़ते हुए सर्वश्रेष्ठ फ़िल्म, ड्रामा का पुरस्कार जीता। हैमनेट की स्टार जेसी बकले ने सर्वश्रेष्ठ अभिनेत्री का पुरस्कार जीता।

- *One Battle After Another* won best film, comedy, supporting female actor for Teyana Taylor, best director and best screenplay for Mr. Anderson.

वन बैटल आफ्टर अनदर ने सर्वश्रेष्ठ फ़िल्म, कॉमेडी, टेयाना टेलर के लिए सर्वश्रेष्ठ सहायक अभिनेत्री, और मिस्टर एंडरसन के लिए सर्वश्रेष्ठ निर्देशक तथा सर्वश्रेष्ठ पटकथा के पुरस्कार जीते।

- *Sinners* won for best score and cinematic and box-office achievement.

सिनर्स ने सर्वश्रेष्ठ संगीत और सिनेमैटिक एवं बॉक्स-ऑफ़िस उपलब्धि के लिए पुरस्कार जीते।

- Timothee Chalamet won his first Golden Globe for *Marty Supreme*.

टिमोथी शैलामे ने मार्टी सुप्रीम के लिए अपना पहला गोल्डन ग्लोब जीता।

- The Globes held in California began with a pointedly political opening from host Nikki Glaser.

कैलिफ़ोर्निया में आयोजित ग्लोब्स की शुरुआत मेज़बान निक्की ग्लेज़र के स्पष्ट रूप से राजनीतिक उद्घाटन से हुई।

- Winners included Rose Byrne for best female actor in a comedy or musical in *If I Had Legs I'd Kick You*, and Wagner Moura, the Brazilian star of *The Secret Agent*, for best male actor in a drama.

विजेताओं में रोज़ बर्न शामिल रहीं, जिन्हें इफ़ आई हैड लेग्स आइड किक यू के लिए कॉमेडी या म्यूज़िकल में सर्वश्रेष्ठ अभिनेत्री चुना गया, और वैगनर मौरा, द सीक्रेट एजेंट के ब्राज़ीलियाई स्टार, जिन्हें ड्रामा में सर्वश्रेष्ठ अभिनेता का पुरस्कार मिला।



- **Kleber Mendonça Filho's** period political thriller also won **best international film**.
क्लेबर मेंडोन्सा फ़िल्हो की पीरियड राजनीतिक थ्रिलर ने भी **सर्वश्रेष्ठ अंतरराष्ट्रीय फ़िल्म** का पुरस्कार जीता।
- Supporting actor front-runner **Stellan Skarsgard** won for the Norwegian family drama **Sentimental Value**.
सहायक अभिनेता के प्रबल दावेदार **स्टेलन स्कार्सगार्ड** ने नॉर्वेजियन पारिवारिक ड्रामा **सेंटिमेंटल वैल्यू** के लिए जीत हासिल की।
- It was the **first major Hollywood movie award** for the **74-year-old** veteran actor.
यह **74 वर्षीय** अनुभवी अभिनेता के लिए **पहला प्रमुख हॉलीवुड फ़िल्म पुरस्कार** था

GS Paper 1: History,

TOPICS COVERED

13 January 2026

1. QUIZ



Visual question: **GS 1: History**
Which ancient site in Somaliland's capital is known for its exceptionally well-preserved rock art, estimated to be around 5,000 years old? FILE PHOTO

Which ancient site in Somaliland's capital is known for its exceptionally well-preserved rock art, estimated to be around 5,000 years old?

Laas Geel

- Located near **Hargeisa**, the capital of **Somaliland**.
- Features some of the **best-preserved prehistoric rock paintings in Africa**.
- The art mainly depicts **cattle, humans, and ritual scenes**, showing early pastoral life.
- Discovered internationally in **2002** by a French archaeological team.
- The paintings date back to around **3000 BCE**.

Questions and Answers to the previous day's daily

- quiz: 1. Swami Vivekananda played this instrument proficiently. **Ans: Pakhawaj**
2. Before meeting Sri Ramakrishna Paramahansa, Vivekananda was deeply influenced by this reform movement. **Ans: Brahmo Samaj**
3. The suggestion Ajit Singh of Khetri asked Vivekananda to embrace. **Ans: Change his name to Vivekananda**
4. Narendranath and other disciples decided to make a new math after the passing of Sri Ramakrishna here. **Ans: Baranagar**
5. This three-word Mahavakya (Great Saying) formed the metaphysical backbone of Vivekananda's understanding of Advaita Vedanta. **Ans: 'Tat tvam asi' ('Thou art That')**
6. This was unusual about Vivekananda's prediction about his own death. **Ans: He predicted that he won't cross 40 and he died at 39**

Visual: Name this visionary and the institution he started. **Ans: Jamsetji Tata and Indian Institute of Science**

Early Birds: Suchit Narottam| Arun Kumar Singh| Ambarin Aslam| Sadhan Panda| Gaurav Deshmukh

- Global shipping
- Western and allied naval presence

QUIZ: Strategic Context of Israel–Somaliland Engagement

- **Somaliland** declared independence from Somalia in **1991**, but remains **unrecognised by the UN** and most states
 - It controls a **strategic coastline on the Gulf of Aden, close to the Bab-el-Mandeb Strait**
 - Since **2023–2025**, media and strategic circles have debated whether **Israel may seek closer ties** with Somaliland for regional security and geopolitical leverage
 - The two objectives attributed to Israel are **analytical claims**, not officially confirmed policies.
 - Establishing a Military Base to Counter the Houthis.
 - The **Houthi movement** in Yemen has targeted **Red Sea shipping** since late **2023**
 - Houthis are aligned with the **Iran-led "Axis of Resistance"**, hostile to Israel
 - Their operations threaten
 - Israeli trade routes



- Israel already operates
 - In **Eritrea** and
 - With partners in the **Red Sea corridor**
- Expansion to Somaliland would fit its
 - **Forward defence doctrine**
 - **Iran-containment strategy**

What “Forced Transfer” Means in International Law

- Defined under
 - **Fourth Geneva Convention**
 - **Rome Statute of the International Criminal Court**
- Refers to
 - Removal of a population
 - Without genuine consent
 - From occupied territory

Why Somaliland Enters This Debate

- After the **Gaza war (2023 onwards)**, discussions emerged about
 - External relocation of Palestinians
 - Under the label of “temporary humanitarian evacuation”
- Some reports speculated about
 - **African locations** being considered
 - Including **Somaliland**, due to
- Political isolation
- Economic vulnerability
- Desire for recognition

Southern Transitional Council (STC) and Its External Backing

- The **Southern Transitional Council (STC)** is a political-military organisation in **southern Yemen**
 - It seeks the **restoration of an independent South Yemen**, which existed until **1990**
- The STC is one of the most powerful non-state actors in the Yemeni conflict
- It is **strongly backed by the United Arab Emirates (UAE)**
- Its leader is **Aidarous al-Zubaidi**, former governor of Aden

Modern Political Identity of Somaliland

The 1960 Moment of Sovereignty

- Somaliland’s contemporary political identity is rooted in the events of **1960**, when
 - **British Somaliland** and
 - **Italian Somaliland**gained independence and **voluntarily united** to form the **Somali Republic**
 - This brief moment of unity later became the **legal and historical basis** for Somaliland’s claim that it had once been a **sovereign state** and therefore retains the right to reclaim that status

British Somaliland

- Came under British control in **1884**
- Administered as a **British Protectorate**
- Had its own
 - Administrative system
 - Legal institutions
 - Political elite



Italian Somaliland

- Came under Italian colonial rule in **1889**
- Later administered as a **UN Trust Territory under Italy** from **1950 to 1960**
- Prepared for independence under international supervision
- **26 June 1960**
 - **British Somaliland became independent**
 - Recognised by more than **35 countries**, including permanent members of the UN Security Council
- **1 July 1960**
 - **Italian Somaliland became independent**
 - Immediately united with the former British Somaliland
 - Formation of the **Somali Republic**

Official Name of South Yemen before 1990

- Before the unification of North and South Yemen in **1990**, South Yemen was officially known as the **People's Democratic Republic of Yemen (PDRY)**
- It was the **only Marxist–Leninist state in the Arab world**
- The PDRY existed from **1967 to 1990** with its capital at **Aden**
- The territory of South Yemen was earlier known as the **Aden Protectorate** under British rule
- Britain controlled the port of **Aden from 1839**
- Anti-colonial movements intensified in the **1960s**
- **30 November 1967**
 - Britain withdrew from Aden
 - The territory became independent as the **People's Republic of South Yemen**
- **1970**
 - The state was renamed the **People's Democratic Republic of Yemen**
 - Marked the formal adoption of
 - **Scientific socialism**
 - **One-party rule** under the Yemeni Socialist Party

Declaration of Independence of Somaliland

- **Somaliland declared independence in 1991** after the collapse of the Somali state
- The declaration was made on **18 May 1991** in the city of **Burao**
- Since then, Somaliland has functioned as a **de facto independent state**, though it is **not internationally recognised**

Riyadh Agreement (2019)

- The **Riyadh Agreement** is a political accord signed in **2019** to end fighting between
 - The **internationally recognised Government of Yemen** and
 - The **Southern Transitional Council (STC)**
- Its main purpose was to
 - **Reconcile southern separatists with Yemen's government**
 - Restore unity within the anti-Houthi camp
- The agreement was **brokered by Saudi Arabia**



GS Paper II: Governance,	
TOPICS COVERED	13 January 2026
2. Cuts and ratings कट्स और रेटिंग्स	
3. Bhoomi, a governance success भूमि, शासन की एक सफलता	

GS II: Governance

Cuts and ratings

CBFC procedures must be transparent, have clear timelines

Popular films that raise uncomfortable political questions or involve actors with stakes in active politics seem to invariably get caught up in issues related to certification and release. The controversies surrounding the release of two Tamil films, *Parasakthi* (a historical-fictional retelling of events coinciding with the anti-Hindi agitation in Tamil Nadu in the 1960s) and *Jana Nayagan* (featuring actor-politician Vijay), are cases in point. Their releases have again highlighted the need for procedural reforms in India's certification process to allow creative expression to flourish within constitutional limits rather than being subject to ad hoc restrictions. The case of *Parasakthi*, with its numerous cuts suggested by the Central Board of Film Certification (CBFC) in a rushed manner to meet its release date, raises concerns about the possible suppression of historical narratives. The CBFC is mandated to check content against issues such as integrity of the state and public order according to the Cinematograph Act. But changes to and removal of dialogues and scenes that pertain to a pivotal chapter in Tamil Nadu's political and India's history of federalism, suggest possible over-censorship. Freedom of expression makes it imperative that such cuts must be reasoned and done in a manner that ensures that film-makers have adequate time to negotiate them than under duress. After all, the certification framework is designed to safeguard, and not stifle, creativity.

The travails of the producers of *Jana Nayagan*, a high-budget film also timed for release during the Pongal festival, highlight the other peril of an ad hoc approach in the certification process. Despite the CBFC's Examining Committee's initial recommendation of a "UA 16+" certificate, the Chairman's decision to refer the film to a Revising Committee just days before its scheduled release, ostensibly due to fresh objections by an Examining Committee member, showed a disregard for the economic realities of film-making. While the Cinematograph (Certification) Rules, 2024, technically empower the Chairman to intervene, exercising such powers at the last minute appears arbitrary, as this affects producers and distributors who bank on the Pongal period to maximise returns. The release has been delayed after a Madras High Court Division Bench stayed a Single Judge's order to issue the certificate, holding that the urgency of a release date cannot act as pressure to deny the Board an opportunity to file its counter-affidavit. While this accords with legal procedure, it has also prevented timely legal recourse for the producers. As actor-politician Kamal Haasan has argued, clarity on regulation and certification is a must for unconstrained creativity and related economic activity. The CBFC must institute greater transparency and establish clearer timelines in its certification processes.

Cuts and ratings कट्स और रेटिंग्स

- Parasakthi is a historical-fictional retelling of events coinciding with the **anti-Hindi agitation in Tamil Nadu in the 1960s**.

पराशक्ति 1960 के दशक में तमिलनाडु में हुए हिंदी-विरोधी आंदोलन से जुड़े घटनाक्रम का ऐतिहासिक-काल्पनिक चित्रण है।

- Jana Nayagan* features **actor-politician Vijay**.

जना नायकन में अभिनेता-राजनेता विजय प्रमुख भूमिका में हैं।

- The **CBFC is mandated to check content against issues such as integrity of the state and public order according to the Cinematograph Act**.

सिनेमेटोग्राफ अधिनियम के अनुसार, CBFC को राज्य की अखंडता और सार्वजनिक व्यवस्था जैसे मुद्दों के आधार पर सामग्री की जाँच करनी होती है।

- Jana Nayagan* is a **high-budget film** also timed for release during the **Pongal festival**.

जना नायकन एक उच्च बजट की फ़िल्म है, जिसे पोंगल त्योहार के दौरान रिलीज़ करने की योजना थी।

- While the **Cinematograph (Certification) Rules, 2024**, technically empower the Chairman to intervene, exercising such powers at the **last minute appears arbitrary**.

यद्यपि सिनेमेटोग्राफ (प्रमाणन) नियम, 2024 तकनीकी रूप से अध्यक्ष को हस्तक्षेप का अधिकार देते हैं, लेकिन अंतिम क्षण में इन शक्तियों का प्रयोग मनमाना प्रतीत होता है।



Bhoomi, a governance success

The project offers lessons for other States rushing to digitise land records

GS II: Governance

STATE OF PLAY

Kumara

For decades, access to land records was one of rural India's most persistent governance failures. Karnataka's Bhoomi project, now completing 25 years, offers an instructive counterpoint showing how administrative reform can reshape the relationship between governance and the people.

Until the late 1990s, land administration in Karnataka relied almost entirely on handwritten records maintained by village accountants. Farmers seeking a Record of Rights, Tenancy, and Crops (RTC) often had to repeatedly visit revenue offices, navigate complex procedures, and rely on intermediaries. Errors in records were common, and corrections took months. In an agrarian State where land disputes routinely spilt into civil courts, the costs of administrative inefficiency were borne disproportionately by small and marginal farmers.

Launched in 2000, Bhoomi was a bold departure from this legacy. Its immediate goal was simple: computerise land records and make them accessible. Its greater ambition was to replace discretion with rules, delay with timelines, and opacity with transparency. The legal recognition of computerised RTCs and the abolition of handwritten records marked a historic shift. Over the last 25 years, more than 39.8 crore RTCs have been issued, fundamentally altering how land records are accessed across the State.

Many revenue officials were initially hesitant to abandon familiar manual systems. Karnataka responded with large-scale capacity building, train-



ing nearly 9,000 village accountants, 8,000 revenue inspectors, and 1,000 computer operators. The establishment of 204 Bhoomi Kendras at the taluk level enabled the digitisation of nearly 2.5 crore land records covering about 3.5 crore farmers. What followed was not merely digitisation, but a cultural shift within the administration.

Initially, the Bhoomi project in Karnataka began as a modest effort to computerise only manual RTCs. But today, it functions as a comprehensive digital ecosystem that integrates land and revenue administration with multiple welfare services. The integration of Bhoomi with the Kaveri registration system changed the face of land registration in Karnataka. By linking registration with land records, the State sharply reduced fraudulent transactions and eliminated middlemen. Mutation, once a source of endless delay, became automatic and transparent. Survey and boundary disputes, another chronic problem, were addressed through the introduction of the Mojini (Survey) software in 2007. For the first time, land measurement and survey processes were brought under a digital, time-bound framework. The IIE Sketch, a pre-conversion map introduced by Karnataka, further improved accuracy in land boundaries and area measurement. The result has been a visible reduction in

land-related disputes.

Bhoomi's evolution also reflects Karnataka's broader approach to governance: using administrative reform to strengthen welfare delivery. Since 2016, crop compensation has been credited directly to farmers' bank accounts, bypassing intermediaries. During the 2018 loan waiver programme, Bhoomi data enabled the waiver of loans for nearly 20 lakh farmers. The integration with PM-Kisan, the Agriculture Department's FRUITS platform, and Aadhaar seeding of over 2.17 crore farmer accounts has improved targeting and reduced leakages. By ensuring accurate and up-to-date records, Bhoomi has helped convert entitlement on paper into benefits on the ground.

Perhaps Bhoomi's most significant achievement is not technological but experiential. Farmers no longer have to travel from village to taluk and taluk to district offices for routine services. The scope for discretionary abuse has narrowed. The relationship between citizens and the revenue administration has become more predictable. In a State where land remains emotionally and economically central, this shift has strengthened trust in public institutions.

As Karnataka reflects on Bhoomi at 25, the project offers lessons for other States rushing to digitise land records. Technology alone does not deliver reform. Bhoomi worked because it was embedded in administrative restructuring, legal change, and continuous institutional learning. It shows that digital governance succeeds when it is incremental, inclusive, and grounded in local realities.

Dr. Kumara IAS is Deputy Commissioner, Mandya District

Bhoomi, a governance success
भूमि, शासन की एक सफलता



- Karnataka's **Bhoomi project**, now completing **25 years**, offers an instructive counterpoint showing how **administrative reform** can reshape the relationship between governance and the people.
- Farmers seeking a **Record of Rights, Tenancy, and Crops (RTC)** often had to repeatedly visit revenue offices, navigate complex procedures, and rely on intermediaries.
अधिकार, पट्टेदारी और फसलों का रिकॉर्ड (RTC) पाने के लिए किसानों को बार-बार राजस्व कार्यालयों के चक्कर लगाने पड़ते थे, जटिल प्रक्रियाओं से जूझना पड़ता था और बिचौलियों पर निर्भर रहना पड़ता था।
- **Errors in records were common, and corrections took months.**
- Its immediate goal was simple: **computerise land records and make them accessible.**
इसका तात्कालिक लक्ष्य सरल था: **भूमि अभिलेखों का कम्प्यूटरीकरण** करना और उन्हें सुलभ बनाना।
- Its greater ambition was to replace **discretion with rules, delay with timelines, and opacity with transparency.**
- The integration of Bhoomi with the **Kaveri registration system** changed the face of land registration in Karnataka.
- Since **2016, crop compensation** has been credited directly to farmers' **bank accounts**, bypassing intermediaries.
2016 से **फसल मुआवज़ा** सीधे किसानों के **बैंक खातों** में जमा किया जा रहा है, जिससे बिचौलियों की भूमिका समाप्त हो गई।
- During the **2018 loan waiver programme**, Bhoomi data enabled the waiver of loans for nearly **20 lakh farmers.**
2018 के **ऋण माफ़ी कार्यक्रम** के दौरान, भूमि परियोजना के आँकड़ों ने लगभग **20 लाख किसानों** के ऋण माफ़ करने में मदद की।
- The integration with **PM-Kisan**, the Agriculture Department's **FRUITS platform**, and **Aadhaar seeding** of over **2.17 crore farmer accounts** has improved targeting and reduced leakages.

GS Paper II: International Relations

TOPICS COVERED

13 January 2026

- | | |
|----|---|
| 2. | India to be invited to join U.S-led initiative Pax Silica, says envoy
दूत के अनुसार भारत को अमेरिकी नेतृत्व वाली पहल पैक्स सिलिका में शामिल होने का निमंत्रण मिलेगा |
| 3. | How Trump is violating international law
ट्रंप अंतरराष्ट्रीय कानून का उल्लंघन कैसे कर रहे हैं |
| 4. | Japan sets sail for rare earth on China supply issue
चीन की आपूर्ति समस्या के बीच जापान ने दुर्लभ पृथ्वी तत्वों के लिए अभियान शुरू किया |



India to be invited to join U.S-led initiative **Pax Silica**, says envoy

India was not included in the original launch of the arrangement for cooperation on semiconductors, critical minerals, AI; Gor 'takes charge' of U.S. Embassy with music and fanfare, says both countries continue to actively engage over trade deal

Sahasini Haidar
NEW DELHI

India will be invited to join "Pax Silica", the U.S.-led eight-nation arrangement to cooperate on semiconductors, critical minerals, and artificial intelligence, next month, incoming U.S. Ambassador Sergio Gor announced on Monday. He added that both countries hoped to make progress on long-delayed trade negotiations soon.

Mr. Gor, who is yet to present his credentials to President Droupadi Murmu, projected a positive outlook for India-U.S. ties after months of tensions over trade, tariffs, and India's import of Russian oil.

"The United States and India are bound not just by shared interests, but by relationship anchored at the highest levels," Mr. Gor said in an unprecedented "arrival speech", delivered with much fanfare from the steps of the U.S. Embassy on Shantipath in Delhi.

"Real friends can disagree but always resolve their differences in the end," he added. He said the two sides "continue to actively engage" over the trade deal that had been initially launched nearly a year ago when Prime Minister Narendra Modi visited Washington. Subsequently, the deal lost momentum as the U.S. imposed 50% tariffs on Indian goods, and has seen six official rounds of nego-



New beginning: U.S. Ambassador to India Sergio Gor receives a warm welcome as he marks his first day at the U.S. Embassy in New Delhi on Monday. ANI

tiations and three visits to the U.S. by Commerce Minister Piyush Goyal.

"Remember, India is the world's largest nation, so it's not an easy task to get this across the finish line, but we are determined to get there," he said.

India was not included in the original launch of "Pax Silica" in Washington in December, though fellow Quad members Japan and Australia, I2U2 countries, Israel and the UAE, and others including South Korea, Singapore, the U.K., and the Netherlands were invited.

Trump's visit

Mr. Gor said he hoped U.S. President Donald Trump would visit India "soon, hopefully in the next year or two". Mr. Trump was ex-

pected to visit India last year to attend the Quad Summit, and India is hoping to host the summit this year.

Unconventional arrival

The Ambassador's statement, made to hundreds of U.S. Embassy staffers in Delhi and Indian media, was unconventional as Mr. Gor is expected to present his credentials later this week. According to diplomatic protocol, Ambassadors are expected to make public appearances only after the credentials are presented. Mr. Gor arrived at the Embassy with his Ambassadorial convoy, including a special armoured car with red and blue blinking lights. As he alighted, the Embassy officials who had gathered

there more than two hours before, along with the press, greeted him with loud applause, and as he walked up the steps, a special playlist of songs, reportedly chosen by Mr. Gor, that included the 1960s soul song *Hold on, I'm Coming* and Mr. Trump's favourite YMCA were played over loudspeakers. The ceremony, which included dozens of media outlets, was telecast live – a break from the past. His predecessor, Biden-appointed Eric Garcetti, had arrived to take up his assignment in a colourful autorickshaw in April 2023, but without the media or the large welcoming assembly.

Mr. Gor begins with his tasks cut out, given spiralling ties between New Delhi

and Washington, particularly over a number of statements, including Mr. Trump's repeated claim that he mediated the India-Pakistan conflict in May 2025, which the government has strenuously denied.

Last week, the External Affairs Ministry rejected a claim by U.S. Commerce Secretary Howard Lutnick that the trade deal had fallen through as Prime Minister Narendra Modi had not called Mr. Trump to finalise it, pointing out that the two leaders had spoken eight times during the year.

Mr. Gor said that India-U.S. trade negotiators would hold another call on Tuesday.

In addition, the government has been uncomfortable with the U.S. President's contention that Mr. Modi had promised to cut India's imports of Russian oil "to make him happy", stressing that any decisions are led by market conditions.

Special envoy

Mr. Gor, who has also been appointed Mr. Trump's Special Envoy for South and Central Asia, has taken a few months to arrive, after being named for the post in August 2024, and confirmed by the U.S. Senate in October.

Alongside bilateral issues, his travels in the region, particularly to Pakistan and Bangladesh, will be watched most closely in New Delhi.

India to be invited to join U.S-led initiative Pax Silica, says envoy

दूत के अनुसार भारत को अमेरिकी नेतृत्व वाली पहल पैक्स सिलिका में शामिल होने का निमंत्रण मिलेगा

- India was not included in the original launch of the arrangement for cooperation on **semiconductors, critical minerals, AI**; Gor 'takes charge' of **U.S. Embassy** with music and fanfare, says both countries continue to actively engage over **trade deal**
भारत को **सेमीकंडक्टर्स, महत्वपूर्ण खनिजों, एआई** पर सहयोग की व्यवस्था के मूल लॉन्च में शामिल नहीं किया गया था; संगीत और धूमधाम के साथ गोर ने **अमेरिकी दूतावास** का कार्यभार संभाला, दोनों देशों के **व्यापार समझौते** पर सक्रिय बातचीत जारी रहने की बात कही गई
- India will be invited to join "**Pax Silica**", the **U.S.-led eight-nation arrangement** to cooperate on semiconductors, critical minerals, and artificial intelligence.
- India was not included in the original launch of "**Pax Silica**" in Washington in **December**, though fellow **Quad members Japan and Australia**, **I2U2 countries Israel and the UAE**, and others including **South Korea, Singapore, the U.K.**, and the **Netherlands** were invited.
- Mr. Gor, who has also been appointed Mr. Trump's **Special Envoy for South and Central Asia**, has taken a few months to arrive, after being named for the post in **August 2024**, and confirmed by the **U.S. Senate** in **October**.

श्री गोर, जिन्हें श्री ट्रंप का **दक्षिण और मध्य एशिया के लिए विशेष दूत** भी नियुक्त किया गया है, **अगस्त 2024** में पद के लिए नामित और **अक्टूबर** में **अमेरिकी सीनेट** द्वारा पुष्टि के बाद, कुछ महीनों बाद पहुंचे हैं।



How Trump is violating international law

The breakdown of the balance of power principle has led to the U.S. employing unchecked power

ESS II IR
Thomas Mathew

U.S. President Donald Trump's macho disposition was on full display when he took to the podium at Mar-a-Lago, his Florida retreat, to announce U.S. military action against Venezuela. He said that the capture of Nicolas Maduro, the President of Venezuela and his wife, Cilia Flores, to face trial on charges of "narco-terrorism" in New York was a "spectacular assault". He announced that the U.S. would "run" the country and use its oil wealth to compensate U.S. companies whose corporations had been nationalised some two decades back.

Was U.S. military action in Venezuela actually about countering narco-terrorism? Since 2000, drug overdoses have claimed almost a million and a quarter U.S. lives. But, nearly 69% were on account of fentanyl – precursor chemicals of which are produced in

China. Venezuela is only a "modest" source of cocaine in the U.S. However, Venezuela does have the largest proven oil reserves in the world. Mr. Trump's declaration that U.S. oil companies, which are the "biggest anywhere in the world," would now enter the South American nation, left little need for further confirmation of his intentions.

Violation of international law
The U.S.'s action in Venezuela is one of the most flagrant violations of international law. It hardly needs emphasis that the action has violated the core of the UN Charter [Article 2(4)] which prohibits the "threat or use of force against the territorial integrity or political independence of any State" except with the approval of the UN Security Council or in self-defence (Article 51).

This event signals the breakdown of the balance of power in international relations. Originally a European construct

to maintain peace among several nations, it underwent radical change in the 20th century. After World War II, it attained a bipolar architecture with the U.S. and the Soviet Union as the main actors. During this period, neither country could employ power unhindered. One balanced the other, maintaining a tenuous peace.

A balance of power
The attack on Venezuela calls to mind how power dynamics played out in the Indian subcontinent during the Bangladesh War in December 1971. It frustrated the machinations of the visceral anti-Indian administration of President Richard Nixon. When Washington moved the US Seventh Fleet Task Force TF-74 to intimidate New Delhi into submission, a Soviet counter-deployment of cruisers, destroyers, and submarines neutralised the threat. It was the typical countervailing of a superpower by another in a classical play

of the balance-of-power concept. Similarly, when the third army of Egypt was threatened with annihilation in the 1973 Yom Kippur War at the hands of Israel, Soviet leader Leonid Brezhnev moved airborne divisions to staging grounds, as Egypt was a close ally of Moscow. A worried U.S. declared DEFCON 3 (a U.S. defence readiness/threat alert). Israel capitulated, and the Soviet warning saved the Egyptian army.

However, with the collapse of the Soviet Union in 1991, the world lost the sole power capable of challenging the unchecked exercise of power by the U.S. Emboldened, Washington has given itself the right to engage in pre-emptive war. It has toppled regimes in Iraq, Egypt, Libya and Syria either through direct action or supported movements.

In the immediate future, only China can emerge as a counter-balance to the U.S. A loose axis between Russia and China could challenge the existing unipolar structure, though differences between the major powers may prevent an enduring partnership.

With the U.S. proving yet again that it is insensitive to India's security interests, New Delhi needs to go a long way before it can be a counter-balancer. It needs to evolve an imaginative and out-of-the-box strategy to build its military-industrial complex and strengthen its defence.

Thomas Mathew is a *retd. civil servant who has served in the Indian Defence Ministry.*

THE GIST

The U.S.'s action in Venezuela is one of the most flagrant violations of international law.

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How Trump is violating international law

ट्रंप अंतरराष्ट्रीय कानून का उल्लंघन कैसे कर रहे हैं

- The breakdown of the balance of power principle has led to the U.S. employing unchecked power

सत्ता-संतुलन के सिद्धांत के टूटने से अमेरिका द्वारा बिना रोक-टोक शक्ति के प्रयोग की स्थिति बनी है

- Was U.S. military action in Venezuela actually about countering narco-terrorism? क्या वेनेजुएला में अमेरिकी सैन्य कार्रवाई वास्तव में नार्को-आतंकवाद से निपटने के लिए थी?
- Since 2000, drug overdoses have claimed almost 1.25 million U.S. lives. 2000 के बाद से नशीली दवाओं की अधिक मात्रा से लगभग 12.5 लाख अमेरिकी नागरिकों की जान जा चुकी है।
- But, nearly 69% were on account of fentanyl, precursor chemicals of which are produced in China.

लेकिन इनमें से लगभग 69% मौतें फेंटानिल के कारण हुईं, जिसके अग्रद्रव्य रसायन चीन में बनते हैं।

- Venezuela is only a "modest" source of cocaine in the U.S. वेनेजुएला अमेरिका में कोकीन का केवल एक "सीमित" स्रोत है।
- However, Venezuela does have the largest proven oil reserves in the world. हालाँकि, वेनेजुएला के पास दुनिया के सबसे बड़े प्रमाणित तेल भंडार हैं।
- Mr. Trump's declaration that U.S. oil companies, which are the "biggest anywhere in the world," would now enter the South American nation, left little need for further confirmation of his intentions.

ट्रंप की यह घोषणा कि अमेरिकी तेल कंपनियाँ, जो दुनिया में "सबसे बड़ी कहीं भी" हैं, अब इस दक्षिण अमेरिकी देश में प्रवेश करेंगी, उनके इरादों की और पुष्टि की आवश्यकता नहीं छोड़ती।

- It hardly needs emphasis that the action has violated the core of the UN Charter [Article 2(4)], which prohibits the "threat or use of force" against the territorial integrity or political independence of any State, except with the approval of the UN Security Council or in self-defence (Article 51).

इस पर ज़ोर देने की आवश्यकता नहीं कि इस कार्रवाई ने संयुक्त राष्ट्र चार्टर [अनुच्छेद 2(4)] के मूल सिद्धांत का उल्लंघन किया है, जो किसी भी राज्य की क्षेत्रीय अखंडता या राजनीतिक स्वतंत्रता के विरुद्ध "बल के प्रयोग या धमकी" को रोकता है, सिवाय संयुक्त राष्ट्र सुरक्षा परिषद की अनुमति या आत्मरक्षा (अनुच्छेद 51) के मामलों के।

- This event signals the breakdown of the balance of power in international relations. यह घटना अंतरराष्ट्रीय संबंधों में सत्ता-संतुलन के टूटने का संकेत देती है।



- Originally a European construct to maintain peace among several nations, it underwent radical change in the **20th century**.
शुरुआत में कई देशों के बीच शांति बनाए रखने के लिए बना यह यूरोपीय विचार **20वीं सदी** में बुनियादी रूप से बदल गया।
- After **World War II**, it attained a **bipolar architecture** with the U.S. and the **Soviet Union** as the main actors.
द्वितीय विश्व युद्ध के बाद यह **द्विध्रुवीय संरचना** में बदल गया, जिसमें अमेरिका और **सोवियत संघ** मुख्य खिलाड़ी थे।
- During this period, neither country could employ power unhindered; one balanced the other, maintaining a **tenuous peace**.
इस दौर में कोई भी देश निरंकुश रूप से शक्ति का प्रयोग नहीं कर सकता था, एक दूसरे को संतुलित करता रहा और एक **नाजुक शांति** बनी रही।

A balance of power सत्ता का संतुलन

- The attack on Venezuela calls to mind the power dynamics in the **Indian subcontinent** during the **Bangladesh War of December 1971**.
वेनेजुएला पर हमला **दिसंबर 1971 के बांग्लादेश युद्ध** के दौरान **भारतीय उपमहाद्वीप** में सत्ता संतुलन की याद दिलाता है।
- It frustrated the machinations of the anti-Indian administration of **President Richard Nixon**.
इसने **राष्ट्रपति रिचर्ड निक्सन** के भारत-विरोधी प्रशासन की साजिशों को विफल कर दिया।
- When Washington moved the **U.S. Seventh Fleet Task Force TF-74** to intimidate New Delhi, a Soviet counter-deployment of **cruisers, destroyers, and submarines** neutralised the threat.
जब वाशिंगटन ने **यू.एस. सेवेंथ फ्लीट टास्क फोर्स TF-74** को नई दिल्ली को डराने के लिए आगे बढ़ाया, तो सोवियत संघ की ओर से **क्रूज़र, विध्वंसक और पनडुब्बियों** की तैनाती ने इस खतरे को निष्प्रभावी कर दिया।
- It was the classical play of the **balance-of-power concept**.
यह **सत्ता-संतुलन की अवधारणा** का पारंपरिक उदाहरण था।
- Similarly, during the **1973 Yom Kippur War**, when Egypt's third army faced annihilation, Soviet leader **Leonid Brezhnev** moved airborne divisions to staging grounds.
इसी तरह **1973 के योम किप्पुर युद्ध** में जब मिस्र की तीसरी सेना विनाश के कगार पर थी, तो सोवियत नेता **लियोनिद ब्रेज़नेव** ने हवाई टुकड़ियों को आगे बढ़ाया।
- A worried U.S. declared **DEFCON 3**; Israel capitulated, and the Soviet warning saved the Egyptian army.
चिंतित अमेरिका ने **DEFCON 3** घोषित किया, इज़राइल पीछे हटा और सोवियत चेतावनी ने मिस्र की सेना को बचा लिया।
- However, with the collapse of the **Soviet Union in 1991**, the world lost the sole power capable of challenging unchecked U.S. dominance.
लेकिन **1991 में सोवियत संघ के पतन** के साथ दुनिया उस एकमात्र शक्ति से वंचित हो गई जो अमेरिका की निरंकुश शक्ति को चुनौती दे सकती थी।
- Emboldened, Washington has given itself the right to engage in **pre-emptive war**.
उत्साहित होकर वाशिंगटन ने खुद को **पूर्व-प्रहार युद्ध** का अधिकार दे दिया।
- It has toppled regimes in **Iraq, Egypt, Libya, and Syria** through direct action or supported movements.
उसने **इराक, मिस्र, लीबिया और सीरिया** में प्रत्यक्ष कार्रवाई या समर्थित आंदोलनों के जरिए सरकारें गिराईं।
- In the immediate future, only **China** can emerge as a counter-balance to the U.S.
निकट भविष्य में केवल **चीन** ही अमेरिका के लिए एक प्रतिरोधक शक्ति बन सकता है।
- A loose axis between **Russia and China** could challenge the existing **unipolar structure**, though differences may prevent a lasting partnership.
रूस और चीन के बीच एक ढीला गठजोड़ मौजूदा **एकध्रुवीय ढांचे** को चुनौती दे सकता है, हालाँकि मतभेद स्थायी साझेदारी में बाधा बन सकते हैं।
- With the U.S. proving yet again that it is insensitive to **India's security interests**, New Delhi needs to go a long way before it can be a counter-balancer.



अमेरिका के एक बार फिर **भारत की सुरक्षा चिंताओं** के प्रति असंवेदनशील होने से यह स्पष्ट है कि नई दिल्ली को प्रतिरोधक बनने के लिए अभी लंबा रास्ता तय करना है।

- It needs to evolve an **imaginative, out-of-the-box strategy** to build its **military-industrial complex** and strengthen its **defence**.

इसके लिए भारत को अपने **सैन्य-औद्योगिक ढांचे** को मजबूत करने और **रक्षा क्षमता** बढ़ाने हेतु एक **रचनात्मक और अभिनव रणनीति** विकसित करनी होगी।

Japan sets sail for **rare earth** on China supply issue

GS II: IR

Reuters
SHIZUOKA, JAPAN

A Japanese mining ship departed on Monday for a remote coral atoll to probe mud rich in rare earths, part of Tokyo's drive to curb its reliance on China for critical minerals as Beijing tightens supply.

The month-long mission of the test vessel **Chikyu** near **Minamitori Island** some 1,900 km (1,200 miles) southeast of Tokyo, will mark the world's first attempt to continuously lift rare-earth seabed sludge from 6 km (4 miles) deep onto a ship.

Japan, like its Western allies, has been reducing its dependence on China for the minerals vital to the production of cars, smartphones and military equipment, an effort that has ta-



First step: Japan's drilling research vessel Chikyu departs from Shimizu port for test recovery of rare-earth-rich mud. REUTERS

ken on urgency amid a major diplomatic dispute with Beijing.

"After seven years of steady preparation, we can finally begin the confirmation tests. It's deeply moving," Shoichilshii, the head of the government-backed project told Reuters, as the vessel departed the port ci-

ty of Shizuoka on a bright sunny day, with a snow-capped Mount Fuji in the background.

"If this project succeeds, it will be of great significance in diversifying Japan's rare earth resource procurement," he said, adding that recovering the key minerals from 6 km be-

low sea level would be a major technological achievement. The vessel, with 130 crew and researchers, is scheduled to return to the port on February 14.

Wont be easy

Last week, China banned exports of items destined for Japan's military that have civilian and military uses, including some critical minerals. The Wall Street Journal reported Beijing has also begun restricting rare-earth exports to Japan more broadly.

Japan has condemned China's dual-use ban but declined to comment on the report of a broader ban, which China has not confirmed or denied. Chinese State media, though, have said Beijing was weighing the measure.

Finance Ministers from the Group of Seven industrial powers will discuss rare-earth supplies at a meeting in Washington on Monday, sources familiar with the matter told Reuters.

Japan is no stranger to facing China's wrath over rare earths. In 2010, China held back exports following an incident near disputed islands in the East China Sea.

Reducing reliance

Since then, Japan has reduced its reliance on China to 60% from 90% by investing in overseas projects like trading house Sojitz's tie-up with Australia's Lynas Rare Earths, and promoting rare-earths recycling and manufacturing processes that rely less on the minerals.

The Minamitori Island project, however, is the first to attempt to source rare earths domestically.

Make in Japan

"The fundamental solution is to be able to produce rare earths inside Japan," said Takahide Kiuchi, executive economist at Nomura Research Institute.

"If this new round of export controls ends up covering a lot of rare earths, Japanese companies will again make efforts to move away from China, but I don't think it will be easy," he said.

For some heavy rare earths, such as those used for magnets in electric- and hybrid-vehicle motors, Japan is almost totally dependent on China, analysts say - a major risk for its key automotive industry.

Japan sets sail for rare earth on China supply issue

चीन की आपूर्ति समस्या के बीच जापान ने दुर्लभ पृथ्वी तत्वों के लिए अभियान शुरू किया

- A Japanese mining ship departed on Monday for a remote coral atoll to probe mud rich in **rare earths**, part of Tokyo's drive to curb its reliance on **China** for **critical minerals** as Beijing tightens supply.

एक जापानी खनन जहाज़ सोमवार को एक दूरस्थ प्रवाल द्वीप की ओर रवाना हुआ ताकि **दुर्लभ पृथ्वी तत्वों** से भरपूर कीचड़ की जांच की जा सके, यह **चीन** पर **महत्वपूर्ण खनिजों** की निर्भरता कम करने के टोक्यो के प्रयास का हिस्सा है क्योंकि बीजिंग आपूर्ति सख्त कर रहा है।

- The month-long mission of the test vessel **Chikyu** near **Minamitori Island** some 1,900 km (1,200 miles) southeast of Tokyo, will mark the world's first attempt to continuously lift rare-earth seabed sludge from 6 km (4 miles) deep onto a ship.

टोक्यो से दक्षिण-पूर्व में लगभग 1,900 किमी (1,200 मील) दूर **मिनामितोरी द्वीप** के पास परीक्षण पोत **चिक्यु** का एक महीने का मिशन दुनिया का **पहला प्रयास** होगा जिसमें 6 किमी (4 मील) गहराई से दुर्लभ पृथ्वी समुद्री तल की गाद को लगातार जहाज़ पर उठाया जाएगा।

- Japan, like its Western allies, has been reducing its dependence on **China** for the **minerals vital to the production of cars, smartphones and military equipment**, an effort that has taken on urgency amid a major **diplomatic dispute** with Beijing.

जापान, अपने पश्चिमी सहयोगियों की तरह, **कारों, स्मार्टफोनों और सैन्य उपकरणों** के उत्पादन के लिए



आवश्यक खनिजों के लिए **चीन** पर अपनी निर्भरता कम कर रहा है, और बीजिंग के साथ एक बड़े **कूटनीतिक विवाद** के बीच यह प्रयास और अधिक तात्कालिक हो गया है।

- “If this project succeeds, it will be of great significance in diversifying Japan’s **rare earth resource procurement**,” he said, adding that recovering the key minerals from **6 km below sea level** would be a major **technological achievement**.
उन्होंने कहा, “यदि यह परियोजना सफल होती है, तो यह जापान की **दुर्लभ पृथ्वी संसाधन प्राप्ति** में विविधता लाने के लिए अत्यंत महत्वपूर्ण होगी,” और जोड़ा कि **समुद्र तल से 6 किमी नीचे** से प्रमुख खनिजों को निकालना एक बड़ी **तकनीकी उपलब्धि** होगी।
- Since then, Japan has reduced its reliance on China to **60% from 90%** by investing in overseas projects like trading house **Sojitz’s tie-up with Australia’s Lynas Rare Earths**, and promoting **rare-earth recycling** and manufacturing processes that rely less on the minerals.
“The fundamental solution is to be able to produce **rare earths inside Japan**,” said **Takahide Kiuchi**, executive economist at **Nomura Research Institute**.
नोमुरा रिसर्च इंस्टीट्यूट के कार्यकारी अर्थशास्त्री **ताकाहिदे किउची** ने कहा, “मूल समाधान यह है कि **दुर्लभ पृथ्वी तत्वों का उत्पादन जापान के भीतर** किया जा सके।”
- “If this new round of **export controls** ends up covering a lot of rare earths, Japanese companies will again make efforts to move away from China, but I don’t think it will be easy,” he said.
उन्होंने कहा, “यदि **निर्यात नियंत्रणों** का यह नया दौर बहुत से दुर्लभ पृथ्वी तत्वों को कवर करता है, तो जापानी कंपनियां फिर से चीन से दूर जाने के प्रयास करेंगी, लेकिन मुझे नहीं लगता कि यह आसान होगा।”
- For some **heavy rare earths**, such as those used for **magnets in electric- and hybrid-vehicle motors**, Japan is almost totally dependent on **China**, analysts say — **a major risk for its key automotive industry**.
विश्लेषकों का कहना है कि कुछ **भारी दुर्लभ पृथ्वी तत्वों** के लिए, जैसे **इलेक्ट्रिक और हाइब्रिड वाहन मोटरों के मैग्नेट** में उपयोग होने वाले, जापान लगभग पूरी तरह **चीन** पर निर्भर है — जो उसकी प्रमुख **ऑटोमोबाइल उद्योग** के लिए एक बड़ा जोखिम है।

GS Paper III: Economy,	
TOPICS COVERED	13 January 2026
1.	Retail inflation at 3-month high of 1.33% in December दिसंबर में खुदरा महंगाई 3-महीने के उच्च स्तर 1.33% पर



Retail inflation at 3-month high of **1.33%** in December

Increased figure still below RBI's lower comfort level of 2%; data show broad-based decline in price levels across sectors as reason for low figure; **core inflation** at 28-month high of 4.8%, says expert

GS III: Economy

T.C.A. Sharad Raghavan
NEW DELHI

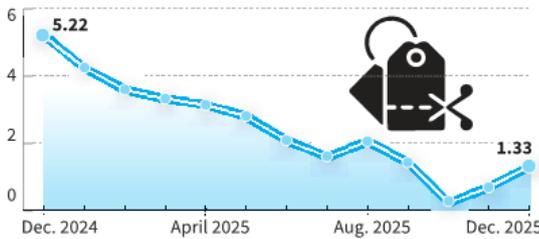
India's retail inflation quickened to a three-month high of **1.33%** in December 2025, which is still significantly below the lower comfort level of 2% set by the Reserve Bank of India (RBI), official data released on Monday showed.

Data on the **Consumer Price Index** for December 2025, released by the Ministry of Statistics and Programme Implementation, show that the low levels of retail inflation are a result of a broad-based decline in price levels across sectors. The RBI targets an inflation rate of 4%, with a comfort band of 2% above and below that.

The food and beverages category saw a contraction

Quickening again

The chart shows retail price inflation (in %), measured by the Consumer Price Index, from December 2024 to December 2025



of 1.85% in prices in December 2025, a moderation from the contraction of 2.8% seen in November. This is likely due to a high base effect as inflation in this category stood at 7.7% in December last year.

"However, inflation was high at over 5% for meat products, oils, and fruits and will continue to exert upward pressure in the

coming months," Madan Sabnavis, chief economist at the Bank of Baroda said.

Inflation in the 'pan, tobacco, and intoxicants' category remained unchanged at 2.96% in December 2025 as compared to November. The clothing and footwear category saw inflation easing marginally to 1.44% in December 2025 from 1.49% in

the previous month. Inflation in this category had been 2.7% in December 2024. The housing sector, too, saw inflation easing to 2.86% in December 2025 from 2.95% in the previous month. The fuel and light category saw inflation ease to 1.97% in December 2025, as compared to 2.3% in November.

"Core inflation (CPI excluding food and beverages, fuel and light, and petrol and diesel for vehicles) jumped to a 28-month high of 4.8% in December 2025 from 4.4% in November 2025," Aditi Nayar, chief economist and head, research & outreach at ICRA Limited said. "However, this was largely led by precious metals; core CPI excluding gold and silver remained unchanged at 2.4% between these months."

Retail inflation at 3-month high of 1.33% in December दिसंबर में खुदरा महंगाई 3-महीने के उच्च स्तर 1.33% पर

- Increased figure still below RBI's lower comfort level of 2%; data show broad-based decline in price levels across sectors as reason for low figure; **core inflation at 28-month high of 4.8%**, says expert
बढ़ा हुआ आंकड़ा अभी भी RBI के 2% के निचले आराम स्तर से नीचे; आंकड़े बताते हैं कि सभी क्षेत्रों में कीमतों के स्तर में व्यापक गिरावट कम आंकड़े का कारण; विशेषज्ञ के अनुसार कोर महंगाई 28-महीने के उच्च स्तर 4.8% पर
- Data on the **Consumer Price Index for December 2025**, released by the **Ministry of Statistics and Programme Implementation**, show that the low levels of retail inflation are a result of a **broad-based decline in price levels across sectors**.
सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय द्वारा जारी दिसंबर 2025 के उपभोक्ता मूल्य सूचकांक के आंकड़े दिखाते हैं कि खुदरा महंगाई का कम स्तर सभी क्षेत्रों में कीमतों के स्तर में व्यापक गिरावट का परिणाम है
- The **RBI targets an inflation rate of 4%**, with a **comfort band of 2% above and below** that.
RBI का लक्ष्य 4% की महंगाई दर है, जिसके साथ ऊपर और नीचे 2% का आराम बैंड है
- The **food and beverages** category saw a contraction of **1.85%** in prices in **December 2025**, a moderation from the contraction of **2.8%** seen in **November**.



खाद्य और पेय पदार्थ श्रेणी में दिसंबर 2025 में कीमतों में 1.85% की गिरावट दर्ज की गई, जो नवंबर में देखी गई 2.8% की गिरावट से कम है

- This is likely due to a high **base effect** as inflation in this category stood at 7.7% in **December last year**.
यह संभवतः उच्च बेस इफेक्ट के कारण है क्योंकि इस श्रेणी में महंगाई पिछले वर्ष दिसंबर में 7.7% थी
- “However, inflation was high at over 5% for **meat products, oils, and fruits** and will continue to exert **upward pressure** in the coming months,” **Madan Sabnavis**, chief economist at the **Bank of Baroda** said.
“हालांकि, मांस उत्पादों, तेलों और फलों के लिए महंगाई 5% से अधिक रही और आने वाले महीनों में ऊपर की ओर दबाव बनाए रखेगी,” बैंक ऑफ बड़ौदा के मुख्य अर्थशास्त्री मदन सबनवीस ने कहा
- Inflation in the ‘**pan, tobacco, and intoxicants**’ category remained unchanged at **2.96% in December 2025** as compared to **November**.
‘पान, तंबाकू और मादक पदार्थ’ श्रेणी में महंगाई दिसंबर 2025 में 2.96% पर नवंबर की तुलना में अपरिवर्तित रही
- “**Core inflation** (CPI excluding food and beverages, fuel and light, and petrol and diesel for vehicles) jumped to a 28-month high of 4.8% in **December 2025** from 4.4% in **November 2025**,” **Aditi Nayar**, chief economist and head, research & outreach at **ICRA Limited** said.

GS Paper III: S&T,	
TOPICS COVERED	13 January 2026
1.	PSLV-C62 strays from flight path, fails to launch satellite PSLV-C62 उड़ान पथ से भटका, उपग्रह प्रक्षेपण विफल
2.	What do two PSLV mission failures in a row mean for ISRO? लगातार दो पीएसएलवी मिशन विफलताओं का इसरो के लिए क्या अर्थ है?
3.	Centre steps in as two Nipah cases detected in Bengal बंगाल में दो निपाह मामले सामने आने पर केंद्र ने हस्तक्षेप किया
4.	China’s reactor pushes density limit; widens path to power चीन का रिएक्टर घनत्व सीमा को आगे बढ़ाता है; ऊर्जा उत्पादन का मार्ग विस्तृत करता है
5.	QUIZ
6.	Troubling repeat चिंताजनक दोहराव
7.	Solar panels yield far more energy per acre than biofuels सोलर पैनल प्रति एकड़ बायोफ्यूल्स की तुलना में कहीं अधिक ऊर्जा देते हैं



PSLV-C62 strays from flight path, fails to launch satellite

GS III, S&T
Heranin C.S.
Vasudevan Mukunth
BENGALURU/CHENNAI

The Indian Space Research Organisation (ISRO)'s PSLV-C62 mission carrying the EOS-N1 earth observation satellite and 15 co-passenger satellites failed to finish its intended trajectory on Monday after an anomaly was detected during the end of the third stage of the launch vehicle, resulting in the loss of the satellites and prompting a detailed analysis.

The PSLV-C62 lifted off from the Satish Dhawan Space Centre in Sriharikota at 10.18 a.m. on Monday. The launch of the vehicle, which has four stages, went as expected till the third stage, but showed "disturbance in the vehicle roll rates" close to the end of the third stage, ISRO chairman V. Narayanan said. "The performance of the vehicle up to the end of the third stage was as expected. Close to the end of the third stage, we saw some disturbance in the vehicle roll rates, and subsequently, a deviation was observed in the flight path. We are analysing the data, and we shall come back at the earliest," Mr. Narayanan said.

Monday's outcome is seen as a big setback for the space agency as the PSLV, its workhorse rocket, has suffered back-to-back failures now.

On May 18, 2025, ISRO's attempted launch of the EOS-09 satellite aboard the PSLV-C61 mission could not be completed, also due to an anomaly in the third stage of the rocket. The EOS-N1 earth observation satellite is said to be built for strategic purposes.

"It is a commercial mission of NewSpace India Limited (NSIL). EOS-N1 and 14 co-passenger satellites will be injected into a Sun



Synchronous Orbit, and the KID Capsule into a re-entry trajectory," ISRO had said in a statement.

It added that after the injection of the EOS-N1 and 14 satellites, the PS4 stage would be restarted to de-boost and enter a re-entry trajectory, followed by the KID Capsule separation.

"Both PS4 stage and KID capsule will re-enter Earth's atmosphere and the impact will be in the South Pacific Ocean," the statement added.

Financial fallout

The financial burden for the satellites lost in the failed PSLV-C62 mission falls on different parties, depending on the nature of the satellite. In the space industry, there is no single payer for a failed mission; instead, the loss is absorbed by a mix of state funding and insurance claims. Governments typically do not purchase commercial insurance for their own strategic or military satellites because the premiums are very high. In the present instance, the direct financial loss of the EOS-N1 satellite, developed by DRDO, will be borne by the state, and DRDO may

have to seek fresh budgetary approval to build a replacement.

The co-passenger satellites from private enterprises, including Indian startups and international entities, would have purchased policies that pay out a lump sum in the event of a 'total loss' during the launch phase. If a specific entity didn't purchase insurance, that company must absorb the total loss itself.

The NSIL is likely to have had contracts with the private customers. While the NSIL generally doesn't pay for the satellite itself, the contract might include a re-flight guarantee or a refund of the launch fee if the mission fails. This said, the ISRO or NSIL is not liable for the value of the customer's satellite unless gross negligence is proven, which is rare. The standard industry practice is a 'waiver of liability' where both the launcher and the satellite owner agree not to sue each other for damages.

EDITORIAL
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PSLV-C62 strays from flight path, fails to launch satellite

PSLV-C62 उड़ान पथ से भटका, उपग्रह प्रक्षेपण विफल

The Indian Space Research Organisation (ISRO)'s PSLV-C62 mission carrying the EOS-N1 earth observation satellite and 15 co-passenger satellites failed to finish its intended trajectory on Monday after an anomaly was detected during the end of the third stage of the launch vehicle, resulting in the loss of the satellites and prompting a detailed analysis.

भारतीय अंतरिक्ष अनुसंधान संगठन (ISRO) का PSLV-C62 मिशन, जो EOS-N1 पृथ्वी अवलोकन उपग्रह और 15 सह-यात्री उपग्रह लेकर जा रहा था, सोमवार को अपने निर्धारित प्रक्षेपण पथ को पूरा करने में विफल रहा, क्योंकि प्रक्षेपण यान के तीसरे चरण के अंत में एक विसंगति पाई गई, जिसके कारण उपग्रह नष्ट हो गए और विस्तृत विश्लेषण शुरू किया गया

The PSLV-C62 lifted off from the Satish Dhawan Space Centre in Sriharikota at 10.18 a.m. on Monday.

PSLV-C62 ने सोमवार को सुबह 10.18 बजे श्रीहरिकोटा स्थित सतीश धवन अंतरिक्ष केंद्र से उड़ान भरी

The launch of the vehicle, which has four stages, went as expected till the third stage, but showed "disturbance in the vehicle roll rates" close to the end of the third stage, ISRO chairman V. Narayanan said.

चार चरणों वाले इस प्रक्षेपण यान की उड़ान तीसरे चरण तक अपेक्षा के अनुसार रही, लेकिन तीसरे चरण के अंत के पास "वाहन के रोल रेट में गड़बड़ी" देखी गई, ISRO अध्यक्ष वी. नारायणन ने कहा

On May 18, 2025, ISRO's attempted launch of the EOS-09 satellite aboard the PSLV-C61 mission could not be completed, also due to an anomaly in the third stage of the rocket.

18 मई 2025 को PSLV-C61 मिशन के तहत EOS-09 उपग्रह का प्रक्षेपण भी रॉकेट के तीसरे चरण में आई विसंगति के कारण पूरा नहीं हो सका

The EOS-N1 earth observation satellite is said to be built for strategic purposes.

बताया गया है कि EOS-N1 पृथ्वी अवलोकन उपग्रह रणनीतिक उद्देश्यों के लिए बनाया गया है

"It is a commercial mission of NewSpace India Limited (NSIL). EOS-N1 and 14 co-passenger satellites will be injected into a Sun Synchronous Orbit, and the KID Capsule into a re-entry trajectory," ISRO had said in a statement.

ISRO ने एक बयान में कहा था, "यह न्यूस्पेस इंडिया लिमिटेड (NSIL) का एक व्यावसायिक मिशन है।

EOS-N1 और 14 सह-यात्री उपग्रहों को सन सिंक्रोनस ऑर्बिट में और KID कैप्सूल को री-एंट्री ट्राजेक्टरी में प्रविष्ट कराया जाएगा"

It added that after the injection of the EOS-N1 and 14 satellites, the PS4 stage would be restarted to de-boost and enter a re-entry trajectory, followed by the KID Capsule separation.

इसमें जोड़ा गया कि EOS-N1 और 14 उपग्रहों के इंजेक्शन के बाद PS4 चरण को डी-बूस्ट करने और री-एंट्री पथ में प्रवेश के लिए पुनः चालू किया जाएगा, जिसके बाद KID कैप्सूल को अलग किया जाएगा

"Both PS4 stage and KID capsule will re-enter Earth's atmosphere and the impact will be in the South Pacific Ocean," the statement added.

बयान में कहा गया, "PS4 चरण और KID कैप्सूल दोनों पृथ्वी के वायुमंडल में पुनः प्रवेश करेंगे और उनका प्रभाव दक्षिण प्रशांत महासागर में होगा"

Financial fallout वित्तीय प्रभाव



- The financial burden for the satellites lost in the failed **PSLV-C62 mission** falls on different parties, depending on the nature of the satellite.
विफल **PSLV-C62 मिशन** में खोए गए उपग्रहों का वित्तीय बोझ उपग्रह की प्रकृति के आधार पर अलग-अलग पक्षों पर पड़ता है
- In the space industry, there is no single payer for a failed mission; instead, the loss is absorbed by a mix of **state funding** and **insurance claims**.
अंतरिक्ष उद्योग में किसी विफल मिशन के लिए कोई एकमात्र भुगतानकर्ता नहीं होता, बल्कि नुकसान **राज्य वित्तपोषण** और **बीमा दावों** के मिश्रण से वहन किया जाता है
- Governments typically do not purchase **commercial insurance** for their own **strategic or military satellites** because the premiums are very high.
सरकारें आम तौर पर अपने **रणनीतिक या सैन्य उपग्रहों** के लिए **व्यावसायिक बीमा** नहीं खरीदती क्योंकि प्रीमियम बहुत अधिक होता है
- In the present instance, the direct financial loss of the **EOS-N1 satellite**, developed by **DRDO**, will be borne by the **state**, and **DRDO** may have to seek fresh **budgetary approval** to build a replacement.
वर्तमान मामले में, **DRDO** द्वारा विकसित **EOS-N1 उपग्रह** का प्रत्यक्ष वित्तीय नुकसान **राज्य** वहन करेगा और **DRDO** को प्रतिस्थापन बनाने के लिए नया **बजटीय अनुमोदन** लेना पड़ सकता है
- The co-passenger satellites from private enterprises, including **Indian startups** and **international entities**, would have purchased policies that pay out a lump sum in the event of a '**total loss**' during the launch phase.
भारतीय स्टार्टअप्स और **अंतरराष्ट्रीय संस्थाओं** सहित निजी उद्यमों के सह-यात्री उपग्रहों ने ऐसे बीमा पॉलिसी ली होंगी जो प्रक्षेपण चरण में '**पूर्ण क्षति**' होने पर एकमुश्त राशि का भुगतान करती हैं
- While the **NSIL** generally doesn't pay for the satellite itself, the contract might include a **re-flight guarantee** or a **refund of the launch fee** if the mission fails.
हालांकि **NSIL** आम तौर पर उपग्रह की लागत नहीं चुकाता, लेकिन अनुबंध में मिशन विफल होने पर **री-फ्लाइट गारंटी** या **प्रक्षेपण शुल्क की वापसी** शामिल हो सकती है
- This said, the **ISRO** or **NSIL** is not liable for the value of the customer's satellite unless **gross negligence** is proven, which is rare.
इसके बावजूद, जब तक **गंभीर लापरवाही** सिद्ध न हो, जो दुर्लभ है, तब तक **ISRO** या **NSIL** ग्राहक के उपग्रह के मूल्य के लिए उत्तरदायी नहीं होते
- The standard industry practice is a '**waiver of liability**' where both the **launcher** and the **satellite owner** agree not to sue each other for damages.
उद्योग की मानक प्रथा '**दायित्व त्याग**' की है, जिसमें **प्रक्षेपक** और **उपग्रह स्वामी** दोनों एक-दूसरे पर क्षतिपूर्ति के लिए मुकदमा न करने पर सहमत होते हैं

What do two PSLV mission failures in a row mean for ISRO? लगातार दो पीएसएलवी मिशन विफलताओं का इसरो के लिए क्या अर्थ है?

- To understand the recent failure, it's necessary to examine the **C61 mission**, whose **primary payload** was the **EOS-09 satellite**.
हालिया विफलता को समझने के लिए **C61 मिशन** की जांच आवश्यक है, जिसका **मुख्य पेलोड** **EOS-09 उपग्रह** था।
- While the **first two stages** performed correctly, **telemetry data** showed a sudden, **unexpected drop in chamber pressure** within the **third stage motor** around **203 seconds** into the flight.
जहाँ पहले दो चरण सही ढंग से कार्य कर रहे थे, वहीं **टेलीमेट्री डेटा** ने उड़ान के लगभग **203 सेकंड** बाद तीसरे चरण के मोटर में **चैम्बर प्रेशर** में अचानक और अप्रत्याशित गिरावट दिखाई।
- Because the **PS3** is a **solid-fuel motor**, a pressure drop of this nature may indicate a serious **structural failure**, such as a **casing breach** or a **nozzle blowout**.
क्योंकि **PS3** एक **ठोस ईंधन मोटर** है, इस प्रकार की प्रेशर गिरावट किसी गंभीर **संरचनात्मक विफलता** का संकेत हो सकती है, जैसे **केसिंग में दरार** या **नोज़ल का फटना**।



What do two PSLV mission failures in a row mean for ISRO?

GS III: S&T

NEWS ANALYSIS

Vasudevan Mukunth
CHENNAI

On May 18, 2025, the Indian Space Research Organisation (ISRO) suffered a rare failure with its PSLV-C61 mission. The PSLV rocket has long been considered the agency's "work-horse" due to its history of reliable launches. However, on January 12, the PSLV-C62 mission also failed. Indian Space Research Organisation Chairman V. Narayanan confirmed that the rocket's third stage (PS3) experienced an anomaly, marking two consecutive failures for the vehicle.

To understand the recent failure, it's necessary to examine the C61 mission, whose primary payload was the EOS-09 satellite.

While the first two stages performed correctly, telemetry data showed a sudden, unexpected drop in chamber pressure within the third stage motor around 203 seconds into the flight. Because the PS3 is a solid-fuel motor, a pressure drop of this nature may indicate a serious structural failure, such as a casing breach or a nozzle blowout. Without the necessary pressure, the engine would not have been able to generate enough thrust.

Data withheld

Following the C61 incident, a Failure Analysis Committee (FAC) investigated the root cause. However, the FAC's report submitted to the Prime Minister's Office has not been released to the public.

The reasons are not clear. One possibility is to protect sensitive information about the payload; this said, it is also possible to release a technical failure report regarding the rocket while redacting sensitive information about any satellites.

Commercial protection is another possibility: ISRO is aggressively pushing the PSLV as a commercial product through NewSpace India, Ltd (NSIL). The PS3 motor is a technologically mature component that should not fail. If the failure was caused by simple negligence or a manufacturing defect, admitting this publicly could damage the rocket's reputation and increase the cost of insuring its launches. Keeping the report classified may be a way to avoid admitting whether the issue was one bad batch of materials or a deeper lapse in quality assurance.

Reason for failure

Either way, the overall lack of transparency sets the context for the outcome of the PSLV-C62 mission. Once the third stage anomaly became clear, Mr. Narayanan stated that the mission failed due to a "roll rate disturbance", meaning the rocket began spinning uncontrollably. The PS3 stage lacks its own roll control thrusters and instead banks on the stage above it, the fourth stage, to remain stable.

If the PS3 motor suffered a leak and vented gas from the side of the nozzle, it could create a twisting force strong enough to overpower the fourth stage stabilisers.

That the third stage motor was affected in both missions suggests the two modes of failure could be related. By keeping the PSLV-C61 investigation internal, the ISRO and the Department of Space avoided external scrutiny of the organisation's "return to flight" criterion.

If independent experts had been able to review the initial findings, they may have been able to verify the quality of the fixes ISRO implemented before the second launch.

But the agency launched again eight months later and faced the same result.

- Without the necessary pressure, the engine would not have been able to generate enough thrust.

आवश्यक दबाव के बिना, इंजन पर्याप्त थ्रस्ट उत्पन्न नहीं कर सकता था।

- Following the C61 incident, a Failure Analysis Committee (FAC) investigated the root cause.

C61 घटना के बाद, एक विफलता विश्लेषण समिति (FAC) ने मूल कारण की जांच की।

- However, the FAC's report submitted to the Prime Minister's Office has not been released to the public.

हालांकि, प्रधानमंत्री कार्यालय को सौंपी गई FAC की रिपोर्ट को सार्वजनिक नहीं किया गया है।

- The reasons are not clear. इसके कारण स्पष्ट नहीं हैं।

- One possibility is to protect sensitive information about the payload; this said, it is also possible to release a technical failure report regarding the rocket while redacting sensitive information about any satellites.

एक संभावना पैलोड से जुड़ी संवेदनशील जानकारी की सुरक्षा हो सकती है; हालांकि, उपग्रहों से संबंधित संवेदनशील जानकारी हटाकर रॉकेट पर एक तकनीकी विफलता रिपोर्ट जारी की जा सकती है।

- Commercial protection व्यावसायिक संरक्षण

- Commercial protection is another possibility: ISRO is aggressively pushing the PSLV as a commercial product through NewSpace India, Ltd (NSIL).

व्यावसायिक संरक्षण एक और संभावना है: इसरो, न्यूस्पेस इंडिया लिमिटेड (NSIL) के माध्यम से पीएसएलवी को एक व्यावसायिक उत्पाद के रूप में सक्रिय रूप से आगे बढ़ा रहा है।

- The PS3 motor is a technologically mature component that should not fail.

PS3 मोटर एक तकनीकी रूप से परिपक्व घटक है, जिसे विफल नहीं होना चाहिए।

- If the failure was caused by simple negligence or a manufacturing defect, admitting this publicly could damage the rocket's reputation and increase the cost of insuring its launches.

यदि विफलता साधारण लापरवाही या निर्माण दोष के कारण हुई, तो इसे सार्वजनिक रूप से स्वीकार करने से रॉकेट की प्रतिष्ठा को नुकसान हो सकता है और बीमा लागत बढ़ सकती है।

- Keeping the report classified may be a way to avoid admitting whether the issue was one bad batch of materials or a deeper lapse in quality assurance.

रिपोर्ट को गोपनीय रखना यह स्वीकार करने से बचने का तरीका हो सकता है कि समस्या खराब सामग्री के एक बैच की थी या गुणवत्ता आश्वासन में

गहरी चूक की।

Reason for failure विफलता का कारण

- Either way, the overall lack of transparency sets the context for the outcome of the PSLV-C62 mission.

किसी भी स्थिति में, पारदर्शिता की समग्र कमी पीएसएलवी-C62 मिशन के परिणाम की पृष्ठभूमि तय करती है।



- Once the **third stage anomaly** became clear, Mr. Narayanan stated that the mission failed due to a “**roll rate disturbance**”, meaning the rocket began **spinning uncontrollably**.
जब तीसरे चरण की असामान्यता स्पष्ट हुई, तो श्री नारायणन ने कहा कि मिशन “रोल रेट डिस्टर्बेंस” के कारण विफल हुआ, यानी रॉकेट अनियंत्रित रूप से घूमने लगा।
- The **PS3 stage lacks its own roll control thrusters** and instead banks on the stage above it, the **fourth stage**, to remain stable.
PS3 चरण में अपने रोल कंट्रोल थ्रस्टर नहीं हैं और यह ऊपर के चौथे चरण की स्थिरता पर निर्भर करता है।
- If the **PS3 motor** suffered a **leak** and vented gas from the side of the **nozzle**, it could create a **twisting force** strong enough to overpower the **fourth stage stabilisers**.
यदि **PS3 मोटर** में लीक हुआ और नोज़ल के किनारे से गैस निकली, तो इससे इतनी मजबूत मरोड़ने वाली शक्ति उत्पन्न हो सकती है जो चौथे चरण के स्टेबलाइज़र पर भारी पड़ जाए।
- That the **third stage motor** was affected in both missions suggests the two **modes of failure** could be related.
दोनों मिशनों में तीसरे चरण की मोटर का प्रभावित होना दर्शाता है कि दोनों विफलता के तरीके आपस में जुड़े हो सकते हैं।
- By keeping the **PSLV-C61 investigation** internal, **ISRO** and the **Department of Space** avoided **external scrutiny** of the organisation’s “**return to flight**” criterion.
PSLV-C61 जांच को आंतरिक रखकर, **इसरो** और **अंतरिक्ष विभाग** ने संगठन के “रिटर्न टू फ्लाइट” मानदंड पर बाहरी जांच से बचाव किया।
- If **independent experts** had been able to review the **initial findings**, they may have been able to verify the **quality of the fixes** ISRO implemented before the second launch.
यदि स्वतंत्र विशेषज्ञ प्रारंभिक निष्कर्षों की समीक्षा कर पाते, तो वे दूसरे प्रक्षेपण से पहले इसरो द्वारा लागू किए गए सुधारों की गुणवत्ता की पुष्टि कर सकते थे।
- But the agency launched again **eight months later** and faced the **same result**.
लेकिन एजेंसी ने आठ महीने बाद फिर से प्रक्षेपण किया और उसे वही परिणाम झेलना पड़ा।
- Now, **international insurers** operating in this market will reassess the **PSLV’s risk profile** and the **insurance premiums** could skyrocket, rendering the vehicle less affordable — a **strategic embarrassment** for a country aspiring to be a net provider in space.
अब इस बाज़ार में काम करने वाले अंतरराष्ट्रीय बीमाकर्ता पीएसएलवी के जोखिम प्रोफाइल का पुनर्मूल्यांकन करेंगे और बीमा प्रीमियम तेज़ी से बढ़ सकते हैं, जिससे यह यान कम किफायती हो जाएगा — जो अंतरिक्ष में नेट प्रदाता बनने की आकांक्षा रखने वाले देश के लिए एक रणनीतिक शर्मिंदगी होगी।
- The **tenure of ISRO Chairman V. Narayanan** has been characterised by a continued shift away from ISRO’s traditional culture of **scientific openness** toward a more guarded, **bureaucratic posture**.
- Fortunately for Mr. Narayanan, ISRO has also demonstrated the increasing reliability of its **LVM-3 rocket** in his time, most recently with the **M6 mission in December 2025**.
सौभाग्य से श्री नारायणन के लिए, उनके कार्यकाल में इसरो ने अपने **LVM-3 रॉकेट** की बढ़ती विश्वसनीयता भी दिखाई है, हाल ही में **दिसंबर 2025 के M6 मिशन** के साथ।



Centre steps in as two Nipah cases detected in Bengal

CS III: S&T
Shrabana Chatterjee
KOLKATA

Two healthcare workers suspected of being infected by **Nipah virus** in Barasat city in North 24 Parganas district of West Bengal are undergoing treatment, officials said on Monday. The cases were detected at the **All India Institute of Medical Sciences, Kalyani in Nadia district** on Sunday night.

"Patients are under treatment and observation. Contact-tracing and treatment plans have already been made," Chief Secretary Nandini Chakraborty said. Both patients are employed at the hospital they are being treated in. Officials have not disclosed the name of the facility.

Ms. Chakraborty urged people to remain alert and not to panic. She appealed to people to avoid spreading misinformation and follow hygiene precautions. The State government has

launched the helpline numbers 033 23330180; 9874 708858; and 9836 046212 for the public.

Health Secretary Narayan Swaroop Nigam was present at the briefing held by Ms. Chakraborty, but both declined to share details about the patients to protect their privacy.

State government officials said the two patients had travelled to Purba Bardhaman on personal work. Contact-tracing is, therefore, being done across North 24 Parganas, Purba Bardhaman, and Nadia districts. They said the patients had not travelled outside West Bengal in the recent past and that authorities are in touch with their families.

Meanwhile, the Union Health Ministry said a national joint outbreak response team has been deployed to support the State government in containment and public health response measures.

"Given the serious nature



Officials have asked the public not to panic. They have said the patients have not travelled outside West Bengal. FILE PHOTO

of **Nipah virus infection, which is a zoonotic disease with high mortality and potential for rapid spread**, the situation is being handled with utmost priority," a senior Health Ministry official said. The official added that the Ministry immediately contacted the West Bengal government upon receiving the information to review the situation and ensure

swift and coordinated action.

Centre promises help

Central guidelines on the disease have been shared with the State Integrated Disease Surveillance Programme (IDSP). The Public Health Emergency Operations Centre (PHEOC) at the National Centre for Disease Control (NCDC), Delhi, has been activated to

coordinate the national response.

Union Health Minister J.P. Nadda has written to West Bengal Chief Minister Mamata Banerjee promising full support from the Centre. "He also spoke to the Chief Minister over telephone and reiterated the Centre's commitment to extend all necessary assistance to the State in managing the situation," an official source said.

The Centre said it is providing comprehensive technical, logistical and operational support, including laboratory services, enhanced surveillance, case management, infection prevention and control measures, and expert guidance. The State has been advised to ensure close coordination with the deployed teams and to carry out meticulous contact-tracing and containment measures.

Ms. Banerjee visited the hospital late on Sunday night, sources said.

Nipah virus is a bat-borne disease. However, Subarna Goswami, a senior public health specialist with expertise in epidemiology, said **it can also spread from pigs in certain cases.** He also added that the **incubation period was between four and 14 days**, so all primary and secondary contacts of patients must be traced.

Dr. Goswami said the State must publish a route map of the two patients to help in tracing the people who may have come into contact with the two patients.

"Sometimes bats sit on date palm trees which produce date sap that is consumed by people across West Bengal during winter. This can be a source of infection. It is advisable not to have the raw sap, but boiled sap and processed jaggery are not a problem," Dr. Goswami told *The Hindu*.

(With inputs from Bindu Shujan Perappadan)

Centre steps in as two Nipah cases detected in Bengal बंगाल में दो निपाह मामले सामने आने पर केंद्र ने हस्तक्षेप किया

- "Given the serious nature of **Nipah virus infection, which is a zoonotic disease with high mortality and potential for rapid spread**, the situation is being handled with utmost priority," a senior Health Ministry official said.
"निपाह वायरस संक्रमण की गंभीर प्रकृति को देखते हुए, जो एक ज़ूनोटिक रोग है और जिसमें उच्च मृत्यु दर तथा तेज़ी से फैलने की क्षमता है, स्थिति को सर्वोच्च प्राथमिकता के साथ संभाला जा रहा है," एक वरिष्ठ स्वास्थ्य मंत्रालय अधिकारी ने कहा।
- Central guidelines on the disease have been shared with the **State Integrated Disease Surveillance Programme (IDSP)**.
रोग से संबंधित केंद्रीय दिशानिर्देश राज्य एकीकृत रोग निगरानी कार्यक्रम (IDSP) के साथ साझा किए गए हैं।
- The **Public Health Emergency Operations Centre (PHEOC)** at the **National Centre for Disease Control (NCDC), Delhi**, has been activated to coordinate the national response.
राष्ट्रीय प्रतिक्रिया के समन्वय के लिए राष्ट्रीय रोग नियंत्रण केंद्र (NCDC), दिल्ली में लोक स्वास्थ्य आपातकालीन संचालन केंद्र (PHEOC) सक्रिय कर दिया गया है।
- The Centre said it is providing **comprehensive technical, logistical and operational support, including laboratory services, enhanced surveillance, case management, infection prevention and control measures, and expert guidance**.
केंद्र ने कहा कि वह तकनीकी, लॉजिस्टिक और परिचालन सहायता प्रदान कर रहा है, जिसमें प्रयोगशाला सेवाएँ, उन्नत निगरानी, केस प्रबंधन, संक्रमण रोकथाम और नियंत्रण उपाय तथा विशेषज्ञ मार्गदर्शन शामिल हैं।
- The State has been advised to ensure close coordination with the deployed teams and to carry out meticulous **contact-tracing and containment measures**.
राज्य को तैनात टीमों के साथ निकट समन्वय सुनिश्चित करने और सावधानीपूर्वक कॉन्टैक्ट-ट्रेसिंग और नियंत्रण उपाय लागू करने की सलाह दी गई है।
- **Nipah virus is a bat-borne disease.** However, **Subarna Goswami**, a senior public health specialist with expertise in epidemiology, said **it can also spread from pigs in certain cases.**
निपाह वायरस एक चमगादड़-जनित रोग है। हालांकि, महामारी विज्ञान में विशेषज्ञ वरिष्ठ सार्वजनिक स्वास्थ्य विशेषज्ञ सुबर्ण गोस्वामी ने कहा कि कुछ मामलों में यह सूअरों से भी फैल सकता है।



- He also added that the **incubation period was between four and 14 days**, so all primary and secondary contacts of patients must be traced.
उन्होंने यह भी जोड़ा कि **इनक्यूबेशन अवधि चार से 14 दिन** के बीच होती है, इसलिए मरीज़ों के सभी प्राथमिक और द्वितीयक संपर्कों का पता लगाया जाना चाहिए।
- Dr. Goswami said the State must publish a **route map of the two patients to help in tracing the people who may have come into contact with the two patients**.
डॉ. गोस्वामी ने कहा कि राज्य को दोनों मरीज़ों का **रूट मैप** प्रकाशित करना चाहिए ताकि उनके संपर्क में आए लोगों की पहचान में मदद मिल सके।
- **“Sometimes bats sit on date palm trees which produce date sap that is consumed by people across West Bengal during winter. This can be a source of infection. It is advisable not to have the raw sap, but boiled sap and processed jaggery are not a problem,”** Dr. Goswami told *The Hindu*.
“कभी-कभी चमगादड़ **खजूर के पेड़ों** पर बैठते हैं, जिनसे निकलने वाला **खजूर का रस** सर्दियों में पूरे पश्चिम बंगाल में लोग पीते हैं। यह संक्रमण का स्रोत हो सकता है। **कच्चा रस** न लेने की सलाह दी जाती है, लेकिन **उबला हुआ रस और प्रसंस्कृत गुड़** समस्या नहीं हैं,” डॉ. गोस्वामी ने *द हिंदू* से कहा।

PATRIOTIC IAS



China's reactor pushes density limit; widens path to power

In nuclear fusion reactors, the magnetic vessels designed to hold superhot plasma run into a density limit beyond which the plasma could collapse. But on January 1, a team reported it had achieved stable plasmas that were up to 65% more dense, a breakthrough for burning plasma fusion devices

CS III: S&T
Vasudevan Mukunth
CHENNAI

Scientists at a nuclear fusion reactor in China recently surmounted an important obstacle in operating reactor vessels at high density. They pushed plasma density 65% beyond a special threshold, entering a stable state that overcomes a long-standing barrier to achieving burning plasma, the stage where a fusion reaction becomes self-sustaining.

Fusion power mimics what happens inside the sun. Hydrogen atoms slam together so hard that they fuse into helium, releasing copious amounts of energy. But this reaction only works when the atoms are packed into a small space at an extreme temperature, typically more than 100,000,000° C.

Greenwald limit

In the reactors designed to sustain these reactions, scientists measure success using the triple product: the density multiplied by the temperature multiplied by the confinement time. All three numbers need to be very high for engineers to reach ignition, a state in which a fusion reaction sustains itself. Density is the number of fuel particles that can be squeezed into the reactor. More density means more collisions and more fusion.

But there's a catch. For decades, tokamaks, the donut-shaped magnetic vessels designed to hold the superhot plasma, ran into the Greenwald density limit. Beyond this limit, the plasma collapses in a disruption that could damage the reactor. The Greenwald formula links this limit to the plasma current and the reactor's size.

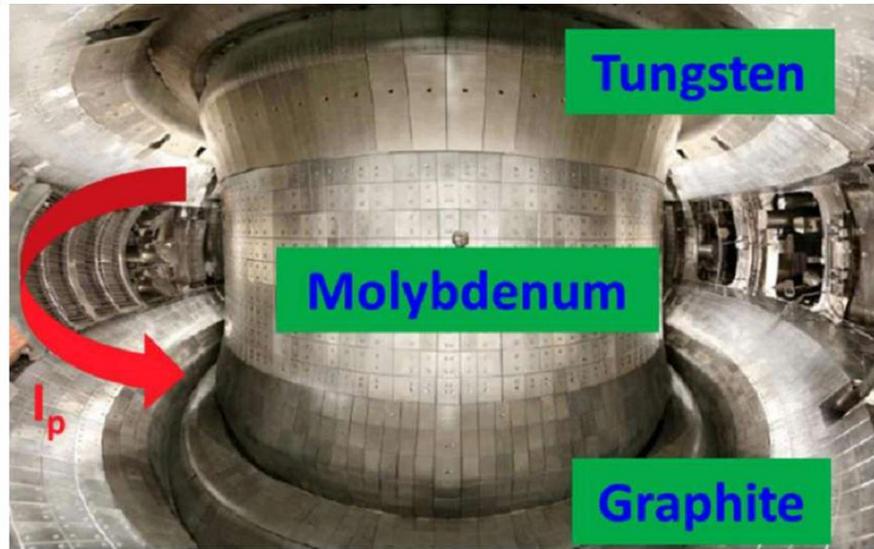
The EAST fusion reactor in Hefei in China has typically operated between 80% and 100% of this limit. But in a January 1 paper in *Science Advances*, the EAST team reported it had achieved stable plasmas at densities 1.3x to 1.65x of the limit.

Temperature at divertor

The team achieved this by combining two techniques. First, they used electron cyclotron resonance heating (ECRH) during start-up. In ECRH, microwave beams are shot into the plasma, heating electrons to millions of degrees. This happens before ramping up the plasma current, a large electric current that flows through the plasma to heat it and help create the magnetic cage. Second, the team started with more deuterium gas in the chamber, then fed hydrogen fuel as the plasma heated up.

For the experiments, EAST's tungsten surfaces were also coated with a thin layer of lithium to condition them and reduce impurities. The overall combination changed how the plasma interacted with the reactor walls. When the plasma touches the walls, tungsten atoms from the walls are released into the plasma. Tungsten is an impurity that radiates a lot of heat away, potentially causing the plasma to collapse.

This creates a vicious cycle. Hot plasma strikes the walls, releases impurities, the impurities radiate heat, the plasma gets hotter in the spots that try to compensate, those hot spots hit the walls harder,



A view of the EAST tokamak. The upper divertor plates are made of tungsten. The red arrow on the left shows the direction of the plasma current.
DOI:10.1088/1741-4326/AA626C

releasing more impurities. Eventually the system may spiral into disruption.

In 2021, physicist Dominique Escande and colleagues at the Aix-Marseille University in France developed the plasma-wall self-organisation (PWSO) theory to predict this behaviour mathematically.

The theory says two stable states exist: a density-limit regime near the Greenwald limit and a density-free regime where the density limit shoots past the limit.

The difference between the two states is the temperature at the divertor, the part of the reactor where plasma meets the walls.

A cooler divertor means more gentle collisions between particles and the wall, fewer impurities, and thus cleaner plasma, which can pack hydrogen atoms more densely.

Less sputtering

The EAST team ran two sets of experiments. In the first, they held the ECRH power at 600 kW and varied the gas pressure. In the second, they fixed the gas pressure and varied the ECRH power.

This way, the team found that more gas in the chamber led to a cooler divertor and less tungsten contamination. Varying the ECRH power had a smaller effect; in the paper, researchers wrote that that could be because they used relatively low gas pressure in tests.

One unexpected finding emerged from repeated ECRH shots with identical settings. The later experiments reached higher densities than the first ones, even with the same power and gas inputs.

The team found this was because the wall's conditions improved over time as multiple high-density plasmas 'conditioned' its tungsten surface, making it less prone to sputtering.

The experiments were able to achieve densities of up to 5.6×10^{20} particles per cubic metre, around 65% higher than the



The findings suggest a practical and scalable pathway for extending density limits in tokamaks and next-generation burning plasma fusion devices

ZHU PING
Professor at the Huazhong University of Science and Technology

EAST reactor's normal 3.4×10^{20} . The plasma temperature near the divertor target also dropped by roughly a third, from about 1.1 million to 0.7-0.8 million degrees C. The plasma also had fewer heavy atoms mixed in.

Beyond the limit

The measurements matched the predictions of the PWSO theory remarkably well.

The team tested both a simplified zero-dimensional model and a more complex one-dimensional model to simulate the way temperature and density of impurities changed in the plasma.

Both models placed EAST's results squarely in the density-free regime, the stable state in which the plasma density exceeds the Greenwald limit.

Previous experiments in the J-TEXT tokamak in Wuhan stayed in the density-limit regime. The difference could be the J-TEXT reactor's carbon walls.

While tungsten sputters by bombarding the plasma, carbon undergoes additional chemical reactions and releases more impurities.

The new advance doesn't 'solve' fusion energy. The EAST tests ran at relatively low power and plasma current, and lasted several seconds rather than the hours needed for a power plant.

The density-free regime also isn't truly unlimited. At extreme density, different

types of turbulence and instabilities can arise independent of the divertor. As density increases, engineers will also need more power to keep the plasma hot enough to fuse. But those constraints arise far beyond the Greenwald limit.

In future experiments, per the paper, engineers could further lower the divertor temperature by increasing both the ECRH power and the gas pressure, possibly reaching full detachment, a condition in which the plasma barely touches the walls. Detached plasmas could operate at densities several times the Greenwald limit.

Matters for ITER

"The findings suggest a practical and scalable pathway for extending density limits in tokamaks and next-generation burning plasma fusion devices," Zhu Ping, Professor at the Huazhong University of Science and Technology in Wuhan and a co-lead of the new study, said in a release.

Fusion researchers often focus on temperature and confinement time while treating density as constrained by the Greenwald limit. The new experiments challenge that assumption.

The potential implication is that if a reactor can be run at twice the fuel density, it might achieve the conditions for ignition at lower temperatures or with shorter confinement times.

This matters for ITER, the large international fusion experiment under construction in France, and in which India has invested.

"Density limit is one of the critical issues in tokamak plasma for a fusion power plant. Plasma-wall self-organisation theory proposed in the ... paper should be validated to overcome the density limit in ITER," Ryoji Hiwatari of the Japan National Institutes for Quantum and Radiological Science and Technology wrote on X.

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China's reactor pushes density limit; widens path to power चीन का रिएक्टर घनत्व सीमा को आगे बढ़ाता है; ऊर्जा उत्पादन का मार्ग विस्तृत करता है

- In nuclear fusion reactors, the magnetic vessels designed to hold superhot plasma run into a density limit beyond which the plasma could collapse.
न्यूक्लियर फ्यूजन रिएक्टरों में, अत्यधिक गर्म प्लाज़्मा को संभालने के लिए बनाए गए चुंबकीय पात्र एक घनत्व सीमा तक ही काम कर पाते हैं, जिसके आगे प्लाज़्मा के ढहने का खतरा होता है।
- But on January 1, a team reported it had achieved stable plasmas that were up to 65% more dense, a breakthrough for burning plasma fusion devices.
लेकिन 1 जनवरी को एक टीम ने बताया कि उसने स्थिर प्लाज़्मा हासिल किया है जो 65% अधिक घना था, जो बर्निंग प्लाज़्मा फ्यूजन उपकरणों के लिए एक बड़ी उपलब्धि है।

Scientists at a nuclear fusion reactor in China recently surmounted an important obstacle in operating reactor vessels at high density.
चीन के एक परमाणु संलयन रिएक्टर में वैज्ञानिकों ने हाल ही में उच्च घनत्व पर रिएक्टर वेसल्स को संचालित करने में एक महत्वपूर्ण बाधा को पार किया है।

- They pushed plasma density 65% beyond a special threshold, entering a stable state that overcomes a long-standing barrier to achieving burning plasma, the stage where a fusion reaction becomes self-sustaining.
उन्होंने प्लाज़्मा घनत्व को एक विशेष सीमा से 65% अधिक तक बढ़ाया, जिससे एक स्थिर अवस्था प्राप्त हुई जिसने बर्निंग प्लाज़्मा हासिल करने की पुरानी बाधा को पार कर लिया, यह वह चरण है जहाँ संलयन अभिक्रिया स्व-निर्भर बन जाती है।
- But this reaction only works when the atoms are packed into a small space at an extreme temperature, typically more than 100,000,000°C.
लेकिन यह अभिक्रिया तभी काम करती है जब परमाणुओं को बहुत कम जगह में अत्यधिक तापमान पर रखा जाए, जो आम तौर पर 100,000,000°C से अधिक होता है।
- For decades, tokamaks, the donut-shaped magnetic vessels designed to hold the superhot plasma, ran into the Greenwald density limit.
दशकों से, टोकामक, जो अत्यधिक गर्म प्लाज़्मा को पकड़ने के लिए बनाए गए डोनट आकार के चुंबकीय पात्र हैं, ग्रीनवाल्ड घनत्व सीमा से टकराते रहे हैं।
- Beyond this limit, the plasma collapses in a disruption that could damage the reactor.
इस सीमा से आगे जाने पर प्लाज़्मा एक डिसरप्शन में ढह जाता है, जो रिएक्टर को नुकसान पहुँचा सकता है।
- The Greenwald formula links this limit to the plasma current and the reactor's size.
ग्रीनवाल्ड सूत्र इस सीमा को प्लाज़्मा करंट और रिएक्टर के आकार से जोड़ता है।
- The EAST fusion reactor in Hefei in China has typically operated between 80% and 100% of this limit.
चीन के हेफेई में स्थित EAST फ्यूजन रिएक्टर आम तौर पर इस सीमा के 80% से 100% के बीच संचालित होता रहा है।
- In ECRH, microwave beams are shot into the plasma, heating electrons to millions of degrees.
ECRH में माइक्रोवेव किरणें प्लाज़्मा में भेजी जाती हैं, जिससे इलेक्ट्रॉनों का तापमान लाखों डिग्री तक पहुँच जाता है।
- This happens before ramping up the plasma current, a large electric current that flows through the plasma to heat it and help create the magnetic cage.
यह प्रक्रिया प्लाज़्मा करंट बढ़ाने से पहले होती है, जो एक बड़ी विद्युत धारा है और प्लाज़्मा को गर्म करने तथा चुंबकीय पिंजरा बनाने में मदद करती है।
- Second, the team started with more deuterium gas in the chamber, then fed hydrogen fuel as the plasma heated up.
दूसरे चरण में टीम ने चैम्बर में अधिक ड्यूटेरियम गैस से शुरुआत की और जैसे-जैसे प्लाज़्मा गर्म हुआ, हाइड्रोजन ईंधन डाला।
- For the experiments, EAST's tungsten surfaces were also coated with a thin layer of lithium to condition them and reduce impurities.



प्रयोगों के लिए EAST की टंग्स्टन सतहों पर लिथियम की एक पतली परत भी चढ़ाई गई ताकि उन्हें कंडीशन किया जा सके और अशुद्धियाँ कम हों।

- This matters for **ITER**, the large international fusion experiment under construction in **France**, and in which **India** has invested.

यह ITER के लिए महत्वपूर्ण है, जो फ्रांस में निर्माणाधीन एक बड़ा अंतरराष्ट्रीय संलयन प्रयोग है और जिसमें भारत ने निवेश किया है।

- “Density limit is one of the **critical issues** in tokamak plasma for a fusion power plant. “घनत्व सीमा संलयन बिजलीघर के लिए टोकामक प्लाज़्मा में एक महत्वपूर्ण मुद्दा है।

Answers to January 8 quiz:

1. Heat propagating as a wave rather than by diffusion – Ans: **Second sound**

2. Light emitted by particles moving faster than light in a medium –

Ans: **Cherenkov radiation**

3. Collective burst of light from identical emitters acting together –

Ans: **Superradiance**

4. Ripples of magnetism moving through a material – Ans: Spin wave

5. When sound waves travel long distances through the air –

Ans: **Global ducting**

Visual: **Refractive index**

First contact: Tamal Biswas | K.N.

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QUIZ: Second Sound: Heat Propagating as a Wave

- When **heat propagates as a wave rather than by diffusion**, the phenomenon is called **Second Sound**.

This is a **well-established concept in physics**, especially in the study of **low-temperature matter and quantum fluids**.

- In everyday life, **heat usually spreads by diffusion**.
- This means **thermal energy moves slowly from hot to cold regions, following Fourier’s law of heat conduction**.
- But in some special materials and conditions, **heat moves like a wave**, similar to sound waves.
- This wave-like propagation of heat is called **Second Sound**.

Cherenkov Radiation: Light from Superfast Particles

- **Light emitted by particles moving faster than light in a medium is called Cherenkov radiation**.

- In vacuum, **nothing can move faster than light**.
- But in a **material medium** like water or glass, light travels **slower than in vacuum**.
- If a charged particle (like an electron) moves **faster than light in that medium**, it produces a visible glow called **Cherenkov radiation**.

Why the Light is Blue

- **Cherenkov radiation is most intense in the blue and ultraviolet region of the spectrum**.
- That is why nuclear reactors submerged in water show a **characteristic blue glow**.

Where Cherenkov Radiation is Seen

- **Nuclear reactors** – blue glow in cooling water.
- **Particle detectors** – to identify high-speed particles.
- **Astrophysics** – detection of cosmic rays.
- **Medical science** – advanced imaging and radiation therapy monitoring.

Superradiance: Collective Burst of Light

- The phenomenon where **identical emitters act together to produce a powerful, collective burst of light** is called **Superradiance**.

- Normally, atoms or molecules emit light **independently**.
- In **superradiance**, many **identical excited emitters** (atoms, molecules, or quantum dots)
- Act **coherently**



- Emit light **simultaneously**
- This produces a **short, intense flash of radiation**, much stronger than ordinary emission.

Spin Waves: Ripples of Magnetism in Materials

- **Ripples of magnetism moving through a material are called Spin Waves.**
- In magnetic materials, each atom behaves like a tiny **magnet** because of the **spin of electrons**.
- When these spins are **disturbed**, the disturbance does not remain local.
- Instead, it **travels through the material as a wave**.
- This traveling disturbance of aligned spins is called a **Spin Wave**.

Global Ducting: Long-Distance Travel of Sound Waves

- When **sound waves travel long distances through the air**, the phenomenon is called **Global Ducting**.
- Normally, sound waves spread out and **lose energy quickly** in the air.
- But under certain atmospheric conditions, sound can become **trapped in layers of the atmosphere**.
- These layers act like a **natural channel or duct**, guiding the sound waves over **very long distances**.
- This long-range transmission of sound is called **Global Ducting**.

PATRIOTIC IAS



Solar panels yield far more energy per acre than biofuels

GS III: S&T

A Poland-sized area is dedicated to liquid biofuels. Is there a more efficient way to generate energy?

DATA POINT

Hannah Ritchie
Pablo Rosado

Electric vehicles might be promoted as the key technological solution for low-carbon transport today, but they were not always the obvious option. Back in the early 2000s, it was biofuels. Rather than extracting and burning oil, we could grow crops like cereals and sugarcane, and turn them into viable fuels.

While we might expect biofuels to be a solution of the past due to the cost-competitiveness and rise of electric cars, the world produces more biofuels than ever. And this rise is expected to continue.

In this article, we give a sense of perspective on how much land is used to produce biofuels, and what the potential of that land could be if we used it for other forms of energy. We will focus on what would happen if we used that land for solar panels, and then how many electric vehicles could be powered as a result. We will mostly focus on road transport, as that is where 99% of biofuels are currently used.

To be clear: we are not proposing that we should replace all biofuel land with solar panels. There are many ways we could utilise this land, whether for food production, some biofuel production, or rewilding. Maybe some combination of all of the above. But to make informed decisions about how to use our land effectively, we need to get a perspective on the potential of each option. That is what we aim to do here for solar power and electrified transport.

Source and impacts

Most of the world's biofuels come from sugarcane (mostly grown in Brazil), cereal crops such as corn (mostly grown in the United States and the European Union), and oil crops such as soybean and palm oil (which are grown in the U.S.,



A man rides a motorcycle in Gujarat Solar Park at Patan district in Gujarat. REUTERS

Brazil, and Indonesia). Collectively, these biofuels produce around 4% of the world's energy demand for transport. While that does push some oil from the energy mix, the climate benefits of biofuels are not always as clear as people might assume.

Once we consider the climate impact of growing the food and manufacturing the fuel, the carbon savings relative to petrol can be small for some crops. But more importantly, when the opportunity costs of the land used to grow those crops are taken into account, they might be worse for the climate. That is because agricultural land use is not "free". If we chose not to use it for agriculture, then it could be rewilded and reforested, which would sequester carbon from the atmosphere.

From a climate perspective, freeing up that cropland from biofuels would be one alternative. However, another option is to utilise it for another form of energy, which could offer a much greater climate benefit.

A recent analysis from researchers at Cerulus estimated that biofuels are grown on 61 million hectares of land. But when they split this allocation between land for

biofuels and land for animal feed, the land use for biofuels alone was 32 million hectares. There are much higher published figures too. For this article, we are going to assume a net land use of 32 million hectares. This is conservative, and that is deliberate. For context, that is about the size of Germany, Poland, the Philippines, Finland, or Italy.

Solar power equivalent

How much solar power could you produce on that land, and how many cars could you run? Could we use those 32 million hectares of land differently to produce even more energy than we currently get from biofuels?

The answer is yes. If we put solar panels on that land, we could produce roughly 32,000 terawatt-hours of electricity each year. That is 23 times more than the energy that is currently produced in the form of all liquid biofuels. 32,000 terawatt-hours is a big number. The world generated 31,000 TWh of electricity in 2024. So, these new solar panels would produce enough to meet the world's current electricity demand.

Again, our proposal is not that we should cover all of this land in

solar panels, or that it could easily power the world on its own. We don't account for the fact that we would need energy storage and other options to make sure that power is available where and when it is needed (not just when the sun is shining). We are just trying to get a sense of perspective for how much electricity could be produced by using that land in more efficient ways.

These comparisons might seem surprising at first. But they can be explained by the fact that growing crops is a very inefficient process. Plants convert less than 1% of sunlight into biomass through photosynthesis. Even more energy is then lost when we turn those plants into liquid fuels. Crops such as sugarcane tend to perform better than others, like maize, but even they are still inefficient.

By comparison, solar panels convert 15% to 20% of sunlight into electricity, with some recent designs achieving as much as 25%. That means replacing crops with solar panels will generate a lot more energy.

Solar versus biofuels

Now, you might think that we are comparing very different things

here: energy from liquid biofuels meant to decarbonise transport, and solar, which could decarbonise electricity. But with the rise of affordable and high-quality electric vehicles, solar power can be a way to decarbonise transport, too.

Run the numbers, and we find that you could power all of the world's cars and trucks on this solar energy if transport were electrified. Of course, these vehicles would need to be electrified in the first place. This is happening – electric car sales are rising, and electric trucks are now starting to get some attention – but it will take time for most vehicles on the road to be electric. For now, we will imagine that they are.

We estimate that the total electricity needed to power all cars and trucks is around 7,000 TWh per year, comprising 3,500 TWh for cars and a similar amount for trucks. You could power all of the world's cars and trucks on this solar energy if transport were electrified.

That is less than one-quarter of the 32,000 TWh that solar panels could produce on biofuel land. Consider those options. The world could meet 3% or 4% of transport demand with biofuels. Or it could meet all road transport demand on just one-quarter of that land. The other three-quarters could be used for other things, such as food production, biofuels for aviation, or it could be left alone to rewild.

Land use comes at a cost, so we should think carefully about how to use it well. Our point here is not that we should cover all of our biofuel land in solar panels. What we do want to challenge is how we think and talk about land use. People rightly question the impact of solar or wind farms on landscapes, but rarely consider the land use of existing biofuel crops, which do very little to decarbonise our energy supplies.

Hannah Ritchie and Pablo Rosado are associated with Our World In Data, a project of Global Change Data Lab

Solar panels yield far more energy per acre than biofuels

सोलर पैनल प्रति एकड़ बायोफ्यूलस की तुलना में कहीं अधिक ऊर्जा देते हैं

- Rather than extracting and burning oil, we could grow crops like **cereals and sugarcane**, and turn them into viable fuels.
तेल निकालने और जलाने के बजाय हम **अनाज और गन्ने** जैसी फसलें उगा सकते थे और उन्हें उपयोगी ईंधन में बदल सकते थे।
- While we might expect biofuels to be a solution of the past due to the **cost-competitiveness and rise of electric cars**, the world produces more biofuels than ever.
भले ही **लागत-प्रतिस्पर्धा** और **इलेक्ट्रिक कारों** के बढ़ते उपयोग के कारण जैव-ईंधन को अतीत का समाधान माना जाए, फिर भी दुनिया आज पहले से कहीं अधिक जैव-ईंधन का उत्पादन कर रही है।
- And this rise is expected to continue.
और यह वृद्धि आगे भी जारी रहने की संभावना है।
- In this article, we give a sense of perspective on **how much land is used to produce biofuels, and what the potential of that land could be if we used it for other forms of energy**.
इस लेख में हम यह दृष्टिकोण देते हैं कि जैव-ईंधन उत्पादन में कितनी भूमि उपयोग होती है और यदि उसी भूमि का उपयोग अन्य ऊर्जा रूपों के लिए किया जाए तो उसकी क्या संभावनाएँ हो सकती हैं।
- We will focus on what would happen if we used that land for **solar panels**, and then how many **electric vehicles** could be powered as a result.



हम इस पर ध्यान देंगे कि यदि उस भूमि का उपयोग **सौर पैनलों** के लिए किया जाए तो क्या होगा और इसके परिणामस्वरूप कितने **इलेक्ट्रिक वाहन** चलाए जा सकते हैं।

- We will mostly focus on **road transport**, as that is where **99% of biofuels** are currently used. हम मुख्यतः **सड़क परिवहन** पर ध्यान देंगे, क्योंकि वर्तमान में **99% जैव-ईंधन** वहीं उपयोग होते हैं।
- **Most of the world's biofuels come from sugarcane, cereal crops such as corn, and oil crops such as soybean and palm oil.**
दुनिया के अधिकांश जैव-ईंधन **गन्ने, अनाज फसलों** जैसे मक्का और **तेल फसलों** जैसे सोयाबीन तथा पाम ऑयल से आते हैं।
- **Collectively, these biofuels produce around 4% of the world's energy demand for transport.**
कुल मिलाकर ये जैव-ईंधन परिवहन के लिए दुनिया की **लगभग 4% ऊर्जा मांग** पूरी करते हैं।
- More importantly, when the **opportunity costs of land** used to grow those crops are taken into account, they might be worse for the climate.
और अधिक महत्वपूर्ण यह है कि जब उन फसलों के लिए उपयोग की गई भूमि की **अवसर लागत** को देखा जाता है, तो यह जलवायु के लिए और भी हानिकारक हो सकती है।
- **That is because agricultural land use is not free.**
इसका कारण यह है कि कृषि भूमि का उपयोग **निःशुल्क** नहीं होता।
- **If we chose not to use it for agriculture, then it could be rewilded and reforested, which would sequester carbon from the atmosphere.**
यदि हम इसे कृषि के लिए उपयोग न करें, तो इसे **पुनः प्राकृतिक** और **वनरोपित** किया जा सकता है, जिससे वातावरण से **कार्बन का अवशोषण** होगा।
- **From a climate perspective, freeing up that cropland from biofuels would be one alternative.**
जलवायु दृष्टिकोण से, उस कृषि भूमि को जैव-ईंधनों से मुक्त करना एक विकल्प हो सकता है।
- A recent analysis from researchers at **Cerulogy** estimated that **biofuels are grown on 61 million hectares of land.**
सेरुलॉजी के शोधकर्ताओं के एक हालिया विश्लेषण के अनुसार जैव-ईंधन **61 मिलियन हेक्टेयर** भूमि पर उगाए जाते हैं।
- **But when they split this allocation between land for biofuels and land for animal feed, the land use for biofuels alone was 32 million hectares.**
लेकिन जब इस भूमि को जैव-ईंधन और **पशु चारे** के बीच बाँटा गया, तो केवल जैव-ईंधन के लिए भूमि उपयोग **32 मिलियन हेक्टेयर** रहा।
- This is **conservative**, and that is deliberate.
यह अनुमान **संयमी** है और यह जानबूझकर किया गया है।
- **For context, that is about the size of Germany, Poland, the Philippines, Finland, or Italy.**
तुलना के लिए, यह क्षेत्रफल लगभग **जर्मनी, पोलैंड, फिलीपींस, फिनलैंड या इटली** के बराबर है।
- **If we put solar panels on that land, we could produce roughly 32,000 terawatt-hours of electricity each year.**
यदि उस भूमि पर **सौर पैनल** लगाए जाएँ, तो हम हर साल लगभग **32,000 टेरावॉट-घंटे** बिजली पैदा कर सकते हैं।
- **That is 23 times more than the energy that is currently produced in the form of all liquid biofuels.**
यह सभी तरल जैव-ईंधनों से वर्तमान में पैदा होने वाली ऊर्जा से **23 गुना अधिक** है।
- **32,000 terawatt-hours** is a big number.
32,000 टेरावॉट-घंटे एक बहुत बड़ा आँकड़ा है।
- **The world generated 31,000 TWh of electricity in 2024.**
दुनिया ने **2024** में **31,000 टीडब्ल्यूएच** बिजली पैदा की थी।
- **So, these new solar panels would produce enough to meet the world's current electricity demand.**
इसलिए ये नए सौर पैनल दुनिया की मौजूदा **बिजली की मांग** पूरी करने के लिए पर्याप्त ऊर्जा पैदा कर सकते हैं।
- **Plants convert less than 1% of sunlight into biomass through photosynthesis.**
पौधे **प्रकाश संश्लेषण** के ज़रिये सूर्य के प्रकाश का **1% से भी कम** जैव-द्रव्यमान में बदलते हैं।



- By comparison, **solar panels** convert **15% to 20%** of sunlight into electricity, with some recent designs achieving as much as **25%**.
- We estimate that the total electricity needed to power all cars and trucks is around **7,000 TWh per year**.
हमारा अनुमान है कि सभी कारों और ट्रकों को चलाने के लिए कुल **7,000 टीडब्ल्यूएच प्रति वर्ष** बिजली की ज़रूरत होगी।
- This comprises **3,500 TWh for cars** and a similar amount for **trucks**.
इसमें **कारों के लिए 3,500 टीडब्ल्यूएच** और लगभग उतनी ही मात्रा **ट्रकों** के लिए शामिल है।
- That is less than **one-quarter** of the **32,000 TWh** that solar panels could produce on biofuel land.
- The world could meet **3% or 4%** of transport demand with biofuels.
दुनिया जैव-ईंधनों से परिवहन की केवल **3% या 4%** मांग ही पूरी कर सकती है।
- Or it could meet **all road transport demand** on just **one-quarter** of that land.
या फिर उसी भूमि के केवल **एक-चौथाई हिस्से** से पूरी सड़क परिवहन मांग पूरी की जा सकती है।
- The other **three-quarters** could be used for other things, such as **food production, biofuels for aviation**, or it could be left alone to **rewild**.

In a first, Rajasthan panchayat gets certified for going fully organic

GS III: Environment

Mohammed Iqbal
BAMANWAS KANKAR

By taking decisive steps to secure a sustainable future, **Bamanwas Kankar panchayat in Rajasthan has become the first village body in the State to be certified as fully organic.**

The panchayat, comprising seven hamlets in the newly formed Kotputli-Behror district, took measures not only to resolve issues of soil degradation and declining groundwater level but also to address health concerns linked to chemical-based farming.

All farming activities in Bamanwas Kankar are free of chemical pesticides and synthetic fertilizers while animal husbandry practices follow ecological and health-conscious standards. "This integrated ap-



Taking firm stands: Villagers taking a pledge against chemical-based agriculture at Bamanwas Kankar on January 2. SPECIAL ARRANGEMENT

proach has ensured that agriculture, livestock management, and environmental protection will move forward together," sarpanch Ganesh Jat said.

The move towards organic farming was initiated through collective discussions among villagers in the past year. Farmers had begun noticing declining soil fertility, rising input

costs, and health issues associated with exposure to chemical inputs. Mr. Jat said these concerns shifted the community's mindset from focusing on short-term yields to achieving long-term sustainability.

The transition was supported by Cofarmin Federation of Organic Societies and Producer Companies (COFED), a group working

in the areas of natural resource conservation, sustainable farming, and women's empowerment.

'Farmer-friendly model'

Farmers have begun observing increased biodiversity, including beneficial insects and soil microorganisms. The certification has opened access to premium markets and reduced dependence on costly chemical inputs. For livestock owners, organic practices have led to better animal health and safer dairy products, enhancing their market value.

Mukesh Gujjar of Nangalhedhi village said chemical-free farming has given villagers "safe food and a healthier lifestyle". "By choosing organic methods, we have moved towards a farmer-friendly

model of agriculture."

Mahaveer Bokan of Bhandana Ki Bhaal village said stopping the use of chemical pesticides improved soil health, crop quality, and well-being of rural families. "Organic farming is the foundation for a healthy future," he said.

To mark the milestone, the panchayat organised a ceremony to take a pledge against chemical-based agriculture and animal husbandry on January 2. The event brought together farmers, cattle owners, local leaders, and COFED representatives.

COFED founder Jeetendra Sevawat said the panchayat's achievement was a community-driven movement rather than a bureaucratic exercise. He said the Bamanwas Kankar experiment demonstrated

how sustainable agriculture becomes achievable when communities take ownership of change. "By this year-end, we aim to convert 300 panchayats across the districts of Bikaner, Alwar, Kotputli-Behror, and Bhilwara into fully organic village bodies," he said.

COFED has collated the data of farms and cattle from these places and issuance of certificates for crops and livestock for the first cycle is in progress.

As policymakers search for techniques of sustainable agriculture, Bamanwas Kankar seems to have offered a model rooted in community participation, ecological responsibility, and collective vision.

The panchayat's transformation has indicated that meaningful change often begins at the grassroots.

GS Paper III: Environment,	
TOPICS COVERED	13 January 2026
1.	In a first, Rajasthan panchayat gets certified for going fully organic पहली बार, राजस्थान की पंचायत को पूरी तरह जैविक बनने का प्रमाणन मिला
2.	Why Article 6 is a powerful tool for India भारत के लिए अनुच्छेद 6 क्यों एक शक्तिशाली उपकरण है
3.	If data is the new oil, what does that make data centres? अगर डेटा नया तेल है, तो डेटा सेंटर क्या बनते हैं?

In a first, Rajasthan panchayat gets certified for going fully organic पहली बार, राजस्थान की पंचायत को पूरी तरह जैविक बनने का प्रमाणन मिला

- By taking decisive steps to secure a **sustainable future**, **Bamanwas Kankar panchayat in Rajasthan has become the first village body** in the State to be certified as **fully organic**.



Why Article 6 is a powerful tool for India

GS III: Environment

To strengthen the delivery and efficiency of climate finance, the carbon markets under Article 6 (A6) of the Paris Agreement were made fully operational at COP29. According to the A6 Implementation Partnership, there are 89 cooperation arrangements made under Article 6.2 across 58 Parties, reflecting the growing momentum and acceleration of bilateral and plurilateral carbon market collaborations. The adoption of the Paris Agreement Crediting Mechanism (Article 6.4) at COP29 marked a milestone in the transition from the Clean Development Mechanism. This step has paved the way for a more rigorous, transparent, and globally aligned crediting framework under the Paris Agreement.

After years of anticipation and careful deliberation, in August 2025, India entered a new era of carbon markets by signing the Joint Crediting Mechanism (JCM). This effectively operationalised Article 6.2 of the Paris Agreement and signalled a new chapter in international climate cooperation.

The potential of Article 6

Why does participation of India in the A6 mechanism hold critical significance for India? Partnerships within A6 can translate into transfer of advanced tech, support to research and development, strengthen bilateral relations and channel much-needed climate finance into the economy. This can be a lever for socio-economic transformation that aligns with domestic climate goals, especially for a rapidly growing country such as India.

Critically, the potential of A6 market mechanisms (both 6.2 and 6.4) is not just restricted to generating climate finance through the exchange of carbon credits, known as internationally transferred mitigation outcomes. Instead, the real prize lies in using this mechanism to accelerate a low-carbon industrial and technological transformation,



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India's first step under Article 6 marks more than a technical milestone; it is an opportunity to access advanced technologies, attract climate-aligned finance, and deepen international partnerships

while building resilient trade relationships in a carbon-constrained world.

The Paris Agreement's Rule book sets out the architecture for A6. It allows countries to cooperate bilaterally or multilaterally, transferring emissions reductions while ensuring rigorous accounting to avoid double counting. India's new JCM partnership with Japan is an early example of how this cooperation can work.

To operationalise both Article 6.2 and 6.4, the Indian government has already strategically identified a first set of 13 eligible activities keeping both developmental and climate goals in balance. These are high-end, emerging technologies that can fundamentally shift the country's emissions profile and significantly contribute to the acceleration of India's economic growth trajectory. For the next three years, credits can be generated in sectors which hold most attention for the country in all fronts. These include renewable energy with storage; solar thermal power plants and offshore wind; green hydrogen and compressed bio-gas; emerging mobility solutions like fuel cells; high-end energy-efficiency technologies; and sustainable aviation fuel.

The current Indian list of activities reflects a deliberate and forward-looking strategy that aligns with India's long-term goals of sustainable growth and deep decarbonisation. As India continues to depend on coal for power generation, emerging solutions such as offshore wind, large-scale energy storage, and marine energy can accelerate diversification of its energy mix. Green hydrogen, particularly in industrial applications like steelmaking, offers a pathway to significantly lower emissions intensity across critical sectors. In hard-to-abate industries such as cement, carbon capture, utilisation, and storage provides a credible route to deep decarbonisation. Each of these

technologies complements national priorities while strengthening the foundation for a low-carbon economy.

From intent to action

However, to unlock these opportunities, India must now move from intent to action. Key policy priorities stand out. First, strengthen the domestic framework. India has appointed a Designated National Authority for A6, but so far it is yet to detail the scope of the activities to be implemented. This necessitates the articulation of rules governing the issuance of Letters of Authorisation, the application of corresponding adjustments, and the establishment of a stable legal and regulatory framework for carbon trading.

Second, streamline project clearances. A steering committee could be created at the Cabinet level to offer broader guidelines and regularly take stock. CEEW research shows that voluntary carbon projects in India take over 1,600 days to register for Agriculture, Forestry and Other Land Use projects, compared to less than 400 days elsewhere in Asia. For A6 projects, where land and multiple stakeholders are often involved, a single-window clearance system is essential.

Third, build and strengthen the removals market. The global demand for carbon removals is rising. Article 6 provides an ideal platform to build a domestic market for activities like Biochar and Enhanced Rock Weathering, positioning India as a supplier of high-quality removal credits.

Fourth, strengthen South-South collaboration. India can take the lead in building shared systems, knowledge networks, and financing models across developing countries.

India's first step under A6 marks more than a technical milestone; it is an opportunity to access advanced technologies, attract climate-aligned finance, and deepen international partnerships.

Why Article 6 is a powerful tool for India

भारत के लिए अनुच्छेद 6 क्यों एक शक्तिशाली उपकरण है

- To strengthen the delivery and efficiency of **climate finance**, the carbon markets under **Article 6 (A6)** of the **Paris Agreement** were made fully operational at **COP29**.



जलवायु वित्त की आपूर्ति और दक्षता को मज़बूत करने के लिए पेरिस समझौते के अनुच्छेद 6 (A6) के तहत कार्बन बाज़ारों को COP29 में पूरी तरह क्रियाशील किया गया।

- According to the **A6 Implementation Partnership**, there are **89 cooperation arrangements** made under **Article 6.2** across **58 Parties**, reflecting the growing momentum and acceleration of bilateral and plurilateral carbon market collaborations.
- A6 इम्प्लीमेंटेशन पार्टनरशिप** के अनुसार, **अनुच्छेद 6.2** के तहत **58 देशों** में **89 सहयोग समझौते** किए गए हैं, जो द्विपक्षीय और बहुपक्षीय कार्बन बाज़ार सहयोग की बढ़ती गति को दर्शाते हैं।

- The adoption of the **Paris Agreement Crediting Mechanism (Article 6.4)** at COP29 marked a milestone in the transition from the **Clean Development Mechanism**.

COP29 में पेरिस समझौता क्रेडिटिंग मैकेनिज़्म (अनुच्छेद 6.4) को अपनाया जाना क्लीन डेवलपमेंट मैकेनिज़्म से संक्रमण का एक महत्वपूर्ण पड़ाव है।

- This step has paved the way for a more **rigorous, transparent and globally aligned crediting framework** under the Paris Agreement.
- इस कदम ने पेरिस समझौते के तहत एक अधिक कठोर, पारदर्शी और वैश्विक रूप से समन्वित क्रेडिटिंग ढाँचे का मार्ग प्रशस्त किया है।
- After years of anticipation and careful deliberation, in **August 2025**, India entered a new era of carbon markets by signing the **Joint Crediting Mechanism (JCM)**.
- वर्षों की प्रतीक्षा और सावधानीपूर्ण विचार-विमर्श के बाद, अगस्त 2025 में भारत ने **जॉइंट क्रेडिटिंग मैकेनिज़्म (JCM)** पर हस्ताक्षर कर कार्बन बाज़ारों के नए युग में प्रवेश किया।

- Why does **participation of India in the A6 mechanism** hold critical significance for India.
- A6 तंत्र** में भारत की भागीदारी भारत के लिए महत्वपूर्ण क्यों है।

- **Partnerships within A6** can translate into transfer of **advanced technology**, support to **research and development**, strengthen **bilateral relations** and channel much-needed **climate finance** into the economy.

A6 के तहत साझेदारियाँ **उन्नत तकनीक** के हस्तांतरण, **अनुसंधान और विकास** के समर्थन, **द्विपक्षीय संबंधों** को मज़बूती और अर्थव्यवस्था में आवश्यक **जलवायु वित्त** के प्रवाह में बदल सकती हैं।

- Instead, the real prize lies in **using this mechanism to accelerate a low-carbon industrial and technological transformation**, while building **resilient trade relationships** in a carbon-constrained world.

वास्तव में, असली लाभ इस तंत्र का उपयोग कर **निम्न-कार्बन औद्योगिक और तकनीकी परिवर्तन** को तेज़ करने और कार्बन-सीमित दुनिया में **लचीले व्यापारिक संबंध** बनाने में है।

- The **Paris Agreement's Rulebook** sets out the architecture for **A6**.
- पेरिस समझौते का नियम-पुस्तक A6** के लिए ढाँचा निर्धारित करती है।

- It allows countries to cooperate **bilaterally or multilaterally**, transferring emissions reductions while ensuring **rigorous accounting to avoid double counting**.

यह देशों को **द्विपक्षीय या बहुपक्षीय सहयोग** की अनुमति देती है, जिसमें उत्सर्जन कटौती का हस्तांतरण होता है और **दोहरी गणना** से बचने के लिए **कठोर लेखांकन** सुनिश्चित किया जाता है।

- **India's new JCM partnership with Japan** is an early example of how this cooperation can work.

जापान के साथ भारत की नई **JCM साझेदारी** इस सहयोग के कार्यान्वयन का प्रारंभिक उदाहरण है।

- These include **renewable energy with storage; solar thermal power plants and offshore wind; green hydrogen and compressed bio-gas; emerging mobility solutions like fuel cells; high-end energy-efficiency technologies; and sustainable aviation fuel**.

इनमें **भंडारण के साथ नवीकरणीय ऊर्जा; सौर तापीय विद्युत संयंत्र और ऑफ़शोर पवन; ग्रीन हाइड्रोजन और कंप्रेसड बायो-गैस; फ़्यूल सेल** जैसी उभरती गतिशीलता समाधान; **उन्नत ऊर्जा-दक्षता तकनीकें**; और **सतत विमानन ईंधन** शामिल हैं।

- As India continues to depend on **coal** for power generation, **emerging solutions such as offshore wind, large-scale energy storage, and marine energy** can accelerate **diversification of its energy mix**.

जब भारत अभी भी बिजली उत्पादन के लिए **कोयले** पर निर्भर है, तब **ऑफ़शोर पवन, बड़े पैमाने की ऊर्जा भंडारण, और समुद्री ऊर्जा** जैसे उभरते समाधान इसके ऊर्जा मिश्रण में विविधता को तेज़ कर सकते हैं।

- **Green hydrogen**, particularly in industrial applications like **steelmaking**, offers a pathway to significantly lower emissions intensity across critical sectors.



ग्रीन हाइड्रोजन, विशेषकर इस्पात निर्माण जैसे औद्योगिक उपयोगों में, महत्वपूर्ण क्षेत्रों में उत्सर्जन तीव्रता को काफी कम करने का मार्ग प्रदान करता है।

- In hard-to-abate industries such as **cement, carbon capture, utilisation, and storage** provides a credible route to deep decarbonisation.
सीमेंट जैसे कठिन-से-घटने वाले उद्योगों में **कार्बन कैप्चर, उपयोग और भंडारण** गहन डीकार्बनाइज़ेशन का एक विश्वसनीय रास्ता प्रदान करता है।
- Each of these technologies complements **national priorities** while strengthening the foundation for a **low-carbon economy**.
इनमें से प्रत्येक तकनीक **राष्ट्रीय प्राथमिकताओं** को पूरा करती है और **निम्न-कार्बन अर्थव्यवस्था** की नींव को मज़बूत करती है।
- **India has appointed a Designated National Authority for A6, but so far it is yet to detail the scope of the activities to be implemented.**
भारत ने **A6** के लिए एक **नामित राष्ट्रीय प्राधिकरण** नियुक्त किया है, लेकिन अब तक लागू की जाने वाली गतिविधियों का दायरा स्पष्ट नहीं किया गया है।
- **CEEW research** shows that **voluntary carbon projects in India take over 1,600 days to register for Agriculture, Forestry and Other Land Use projects, compared to less than 400 days elsewhere in Asia.**
CEEW के शोध के अनुसार, भारत में स्वैच्छिक कार्बन परियोजनाओं को **कृषि, वानिकी और अन्य भूमि उपयोग** परियोजनाओं के लिए पंजीकरण में **1,600 दिनों से अधिक** लगते हैं, जबकि एशिया के अन्य हिस्सों में यह **400 दिनों से कम** है।
- **For A6 projects, where land and multiple stakeholders are often involved, a single-window clearance system is essential.**
A6 परियोजनाओं के लिए, जहाँ भूमि और कई हितधारक शामिल होते हैं, **सिंगल-विंडो क्लियरेंस प्रणाली** अत्यंत आवश्यक है।
- Third, build and strengthen the **removals market**.
तीसरा, **रिमूवल्स बाज़ार** का निर्माण और सुदृढ़ीकरण।
- The global demand for **carbon removals** is rising.
कार्बन रिमूवल्स की वैश्विक मांग बढ़ रही है।
- **Article 6** provides an ideal platform to build a domestic market for activities like **Biochar and Enhanced Rock Weathering**, positioning India as a supplier of **high-quality removal credits**.
अनुच्छेद 6 बायोचार और **एन्हांस्ड रॉक वेदरिंग** जैसी गतिविधियों के लिए घरेलू बाज़ार बनाने का आदर्श मंच देता है, जिससे भारत **उच्च-गुणवत्ता वाले रिमूवल क्रेडिट्स** का आपूर्तिकर्ता बन सकता है।



If data is the new oil, what does that make data centres?

India is a reasonably high-risk candidate for 'data dumping'. This has raised environmental concerns over resource strains, emphasising the urgent need for sustainable development practices in the sector

SS III: Environment

Vasudevan Mukunth

Many think the idea of 'dumping' in global trade is a red herring. The reason is obvious: if country A is able to dump certain goods in country B, it's not because A has smuggled them in. It's because someone in country B was interested in receiving those goods, and B's laws allowed for them to be imported.

This said, it's possible to argue that dumping is a legitimate concern, and not a red herring, if a country's government and its people are at odds on a policy yet the government enforces it to pander to a few commercial interests – a situation not unheard of in modern democracies. India in particular has seen this often with its national and international commitments as well as its domestic priorities, ranging from including commercial plantations in forest surveys to pad afforestation numbers to importing oil for cultivating itself as a growth market for global fossil fuel producers forced to move away from richer countries that are decarbonising.

Good versus bad data centres

Today, data is the new oil, and it's possible the country is at similar risk of being 'dumped' with poorly designed data centres making inefficient use of energy, guzzling large quantities of water, and polluting the environment. To be sure, data centres are not implicitly bad and can be run efficiently, and in the larger scheme of things be a net benefit for the national economy.

But ensuring they have precisely that effect requires every data centre to be located in a place where power supply is reliable as well as where the project pays for required grid upgrades. The centre should also be designed for high utilisation, meaning the servers should not be idle; this requires properly estimating the capacity and scheduling workloads. Second, the centre must incorporate efficient cooling as a core component rather than as an afterthought, including in the form of efficient airflow management and allowing higher inlet temperatures within the established thermal envelopes and reducing the demand for mechanical cooling. In fact, where it's feasible, centres should also use naturally cool ambient air or water and, for intensive AI workloads, use liquid cooling. At the same time, they should minimise their dependence on potable water and use recycled water where available, and minimise the use of backup power. Finally, the data centre should measure every relevant parameter that it's expected to optimise over time.

Conversely, a bad data centre is often one that's efficient on paper but inefficient on the ground because it's been installed in the wrong place and/or with the wrong design. For instance, it could be located in a water-stressed area and be designed to use evaporative cooling, which requires a lot of water. Or it could be running older cooling setups without basic airflow controls, thus increasing the energy overhead.

Google's proposed Cerrillos data centre in Santiago, Chile, offers a real-world example. Local opposition to the project focused on the project's consequences on



Careful planning: Conduits for fibre to connect superclusters of data centres are under construction during a tour of the OpenAI data centre in Abilene, Texas, U.S., on September 23, 2025. REUTERS

an increasingly water-stressed region. A Chilean environmental court subsequently required Google to account for the effects of climate change on the aquifer and to consider alternative cooling methods, causing the Big Tech company to switch to an air-cooled design.

Brooking resistance

India is widely cited as a market with great potential to host these facilities. While the U.S. is far ahead of India, it has also started to show outward signs of popular resistance to these facilities. India can learn from this to avoid taking on a bad proposition itself, especially when local governments are prepared to cut corners and developers try to hide behind opaque contracts.

Of late, a surge in proposals for data centres in the U.S. has met with organised local resistance, with municipal boards having to decide whether energy- and water-intensive facilities fit their zoning rules and residents anxious that the projects will endanger property values and local water supply. In North Carolina, a mayor signalling that a proposal for a data centre would fail unanimously, prompted developers to rescind it even after it promised environmentally friendly features. In another town in Minnesota, a proposal for a large data centre was put on hold after residents complained about the inadequacy of the environmental review. They said local officials and utilities had known about the proposal for nearly a year before disclosing it, with the secrecy intensifying the conflict.

Industry groups and consultants have said that such pushback is increasingly becoming the norm but that it has also been pushing developers to rethink how early and how transparently they need to

engage communities.

Given these issues, it's salient that countries in the Global South have poor zoning in practice, a less than satisfactory record of governments involving community members in planning construction projects, lacklustre enforcement of environmental regulations, and aspirations of growth in the IT sector. When the capital for data centre projects faces sustained, organised resistance and local approval processes that are more participatory, it can be more tempting to look for jurisdictions where land is cheaper and political friction is lower. Data centres can't be dumped anywhere – they still need reliable power, network connections, minimally uncertain land titles, and geopolitical predictability – but it's possible the most resource-intensive and least locally beneficial ones could disproportionately target places where the costs can be more easily externalised. Many governments are in fact explicitly courting data centres as a part of their AI or IT industrialisation strategy through land and power concessions and expedited clearances. In India itself, multiple State policies offer sizable fiscal and infrastructure incentives and promise streamlined approvals.

Latin America like the U.S. has already had multiple disputes where communities have argued that governments advanced projects without proper environmental review, particularly in water-stressed areas. Many cases in Chile have been particularly emblematic, leading to vehemently contested litigation and protests. It hasn't helped that while data centres are capital-intensive, they're also relatively low on permanent jobs, leaving governments without one of their

favourite bargaining chips.

Signs to watch for

India itself is a reasonably high-risk candidate for 'data dumping'. The country is actively positioning itself as a major data-centre hub and multiple independent forecasts have projected rapid capacity growth in this decade. JLL projected it would expand by around 77%, reaching 1.8 GW by 2028. Ratings agency CRISIL said it would increase to 2.3-2.5 GW by the end of the 2028 fiscal. Colliers has predicted that capacity is likely to surpass 4.5 GW by 2030. The policy environment is also swimming in incentives at present. Together with relative geopolitical stability and a large domestic market, India seems like a more credible market for global firms than many other alternatives.

Compounding the 'dumping' risk is the fact that the chief externalities are also unusually pronounced. Many basins and cities in the country are already highly water-stressed. The consequences of the power system are similarly non-trivial, with large, clustered loads requiring grid upgrades and clearer rules about which consumer type will pay what rate. And as for environmental regulation: the Comptroller and Auditor General, the Supreme Court, and the National Green Tribunal have all recorded several lacunae in institutional mechanisms, post-clearance monitoring, and in enforcing mitigation measures.

This doesn't mean India will inevitably become a dumping ground, however, for three reasons. First, hyperscale data centres still demand substantial grid capacity, substations, fibre-optic routes, etc. so they can't be set up to the exclusion or ignorance of what the existing system can handle, which in turn could force public sector coordination even in areas with weak zoning. Second, India has relatively strong judicial and tribunal pathways compared to many peer states. Even if they're imperfect and often slow, they've been known to create credible deterrence pressure.

Third, India has strong and vocal civil society organisations. Given that the answer is not to ban data centres but for developers to engage with local governments and communities at a very early stage of the project, here are some signs of potentially bad governance that civilians can watch for:

(i) Incentives that race to the bottom: this includes large land and power subsidies, accelerated permits, exemptions from routine building and environmental processes, and loose sustainability requirements. Zoning rules must designate data centres as heavy infrastructure and must come with buffer areas and noise limits.

(ii) When a jurisdiction adds large power loads quickly without clear rules about costs, data centres can avoid paying for upgrades to the grid and instead push that expense to households. Data centres must disclose the expected peak load, their water sources, method of cooling, and times of day when they use backup generators. There must also be rules to keep households from cross-subsidising.

(iii) Situating facilities in arid or seasonally stressed areas can significantly worsen the stress if each facility doesn't also have a binding water budget and contingency plans in the public domain. Each data centre should have a water use ceiling that's derived from the conditions of the local basin, including for non-potable or waterless cooling requirements.

(iv) Finally, beware non-disclosure agreements involving public utilities, disclosure windows, shell entities or environmental filings that are hard to access. There must be a public registry that records audits and incidents.

If data is the new oil, what does that make data centres? अगर डेटा नया तेल है, तो डेटा सेंटर क्या बनते हैं?

- India is a reasonably high-risk candidate for 'data dumping'. भारत 'डेटा डंपिंग' के लिए एक काफी उच्च-जोखिम वाला उम्मीदवार है।



- This has raised **environmental concerns** over **resource strains**, emphasising the **urgent need for sustainable development practices** in the sector.
इससे संसाधनों पर दबाव को लेकर पर्यावरणीय चिंताएँ बढ़ी हैं, जो इस क्षेत्र में सतत विकास प्रथाओं की तत्काल आवश्यकता पर ज़ोर देती हैं।

Dumping in global trade and data centres वैश्विक व्यापार में डंपिंग और डेटा सेंटर

- Many think the idea of '**dumping**' in global trade is a **red herring**.
कई लोग मानते हैं कि वैश्विक व्यापार में 'डंपिंग' की अवधारणा एक भ्रामक मुद्दा है।
- The reason is obvious: if country A is able to dump certain goods in country B, it's not because A has smuggled them in.
इसका कारण स्पष्ट है कि यदि देश A कुछ वस्तुएँ देश B में डंप कर पाता है, तो ऐसा इसलिए नहीं कि उसने उन्हें तस्करी से पहुँचाया है।
- It's because someone in country B was interested in receiving those goods, and B's laws allowed for them to be imported.
ऐसा इसलिए होता है क्योंकि देश B में कोई उन वस्तुओं को लेना चाहता था और B के कानूनों ने उनके आयात की अनुमति दी।
- This said, it's possible to argue that **dumping is a legitimate concern**, and not a red herring, if a country's government and its people are at odds on a policy yet the government enforces it to pander to a few commercial interests.
यह तर्क दिया जा सकता है कि **डंपिंग एक वास्तविक चिंता** है, यदि किसी नीति पर सरकार और जनता के बीच मतभेद हों, फिर भी सरकार कुछ व्यावसायिक हितों को साधने के लिए उसे लागू करे।
- This situation is not unheard of in **modern democracies**.
ऐसी स्थिति **आधुनिक लोकतंत्रों** में अनसुनी नहीं है।
- India in particular has seen this often with its **national and international commitments** as well as its **domestic priorities**.
भारत ने विशेष रूप से इसे अपने **राष्ट्रीय और अंतरराष्ट्रीय दायित्वों** तथा **घरेलू प्राथमिकताओं** में बार-बार देखा है।
- This ranges from including **commercial plantations** in forest surveys to pad **afforestation numbers**.
यह **व्यावसायिक बागानों** को वन सर्वेक्षणों में शामिल कर **वनीकरण के आँकड़े** बढ़ाने तक फैला हुआ है।
- It also includes importing **oil for cultivating itself** as a growth market for global **fossil fuel producers** forced to move away from richer countries that are **decarbonising**.
इसमें **तेल आयात** कर स्वयं को वैश्विक **जीवाश्म ईंधन उत्पादकों** के लिए विकास बाजार बनाना भी शामिल है, जिन्हें **डीकार्बोनाइजेशन** कर रहे समृद्ध देशों से हटना पड़ रहा है।

Good versus bad data centres अच्छे बनाम खराब डेटा सेंटर

- Today, **data is the new oil**, and it's possible the country is at risk of being '**dumped**' with **poorly designed data centres**.
आज **डेटा नया तेल** है और देश पर **खराब डिज़ाइन वाले डेटा सेंटरों** से 'डंप' किए जाने का खतरा हो सकता है।
- Such centres make **inefficient use of energy**, **guzzle large quantities of water**, and **pollute the environment**.
ऐसे सेंटर **ऊर्जा का अक्षम उपयोग** करते हैं, **बहुत अधिक पानी** खपत करते हैं और **पर्यावरण को प्रदूषित** करते हैं।
- To be sure, **data centres are not implicitly bad** and can be run **efficiently**, and can be a **net benefit** for the national economy.
निस्संदेह, **डेटा सेंटर स्वभाव से खराब नहीं** होते और **कुशलता से चलाए** जा सकते हैं तथा राष्ट्रीय अर्थव्यवस्था के लिए **कुल मिलाकर लाभकारी** हो सकते हैं।
- But ensuring this effect requires every data centre to be located where **power supply is reliable** and where the project **pays for required grid upgrades**.



लेकिन यह सुनिश्चित करने के लिए हर डेटा सेंटर ऐसी जगह होना चाहिए जहाँ बिजली आपूर्ति विश्वसनीय हो और परियोजना आवश्यक ग्रिड उन्नयन का खर्च वहन करे।

- The centre should be designed for **high utilisation**, meaning the servers should not be **idle**. सेंटर को उच्च उपयोगिता के लिए डिज़ाइन किया जाना चाहिए, ताकि सर्वर निष्क्रिय न रहें।
- This requires properly **estimating capacity and scheduling workloads**. इसके लिए क्षमता का सही अनुमान और कार्यभार की उचित समय-सारिणी आवश्यक है।
- **Second, the centre must incorporate efficient cooling as a core component, not as an afterthought.**
दूसरे, सेंटर में कुशल शीतलन को मुख्य घटक के रूप में शामिल किया जाना चाहिए, न कि बाद की सोच के रूप में।
- This includes **efficient airflow management**, allowing **higher inlet temperatures** within thermal envelopes, and **reducing mechanical cooling demand**. इसमें प्रभावी एयरफ्लो प्रबंधन, थर्मल सीमाओं के भीतर अधिक इनलेट तापमान की अनुमति और यांत्रिक कूलिंग की मांग में कमी शामिल है।
- **Where feasible, centres should use naturally cool ambient air or water, and for intensive AI workloads, use liquid cooling.**
जहाँ संभव हो, सेंटर को प्राकृतिक ठंडी हवा या पानी का उपयोग करना चाहिए और गहन AI कार्यभार के लिए लिक्विड कूलिंग अपनानी चाहिए।
- **At the same time, they should minimise dependence on potable water, use recycled water where available, and minimise backup power use.**
साथ ही उन्हें पीने योग्य पानी पर निर्भरता कम करनी चाहिए, जहाँ उपलब्ध हो रीसाइकल पानी का उपयोग करना चाहिए और बैकअप पावर का उपयोग न्यूनतम रखना चाहिए।
- **Finally, the data centre should measure every relevant parameter that it is expected to optimise over time.**
अंततः, डेटा सेंटर को उन सभी महत्वपूर्ण मानकों का मापन करना चाहिए जिन्हें समय के साथ अनुकूलित किया जाना है।
- **Conversely, a bad data centre is often efficient on paper but inefficient on the ground because it is in the wrong place and/or has the wrong design.**
इसके विपरीत, खराब डेटा सेंटर अक्सर कागज़ पर कुशल होते हैं लेकिन व्यवहार में अक्षम, क्योंकि वे गलत स्थान पर होते हैं और/या गलत डिज़ाइन के साथ बने होते हैं।
- **For instance, it could be located in a water-stressed area and designed to use evaporative cooling, which requires a lot of water.**
उदाहरण के लिए, यह जल-संकटग्रस्त क्षेत्र में स्थित हो सकता है और इवैपोरेटिव कूलिंग पर आधारित हो सकता है, जिसमें बहुत अधिक पानी लगता है।
- **Or it could be running older cooling setups without basic airflow controls, increasing the energy overhead.**
या फिर यह पुराने कूलिंग सिस्टम पर चल रहा हो सकता है जिनमें मूल एयरफ्लो नियंत्रण नहीं होते, जिससे ऊर्जा खर्च बढ़ जाता है।
- **Google's proposed Cerrillos data centre in Santiago, Chile, offers a real-world example. सैंटियागो, चिली में प्रस्तावित गूगल का सेरिल्लोस डेटा सेंटर इसका वास्तविक उदाहरण प्रस्तुत करता है।**
- **Local opposition focused on the project's impact on an increasingly water-stressed region. स्थानीय विरोध इस परियोजना के बढ़ते जल-संकटग्रस्त क्षेत्र पर पड़ने वाले प्रभाव पर केंद्रित था।**
- **A Chilean environmental court required Google to account for the effects of climate change on the aquifer and to consider alternative cooling methods. एक चिली पर्यावरण अदालत ने गूगल को जलभूत पर जलवायु परिवर्तन के प्रभाव का आकलन करने और वैकल्पिक शीतलन विधियों पर विचार करने का निर्देश दिया।**
- **This caused the company to switch to an air-cooled design. इसके परिणामस्वरूप कंपनी ने एयर-कूल्ड डिज़ाइन अपनाया।**

Brooking resistance ब्रूकिंग प्रतिरोध

- India is widely cited as a market with **great potential** to host these facilities. भारत को इन सुविधाओं की मेज़बानी के लिए बेहद संभावनाशील बाज़ार के रूप में व्यापक रूप से उद्धृत किया जाता है।



- While the **U.S. is far ahead** of India, it has also started to show outward signs of **popular resistance** to these facilities.
हालाँकि **अमेरिका भारत से काफ़ी आगे** है, फिर भी वहाँ इन सुविधाओं के खिलाफ़ **जन-प्रतिरोध** के स्पष्ट संकेत दिखाई देने लगे हैं।
- India can learn from this to avoid taking on a **bad proposition**, especially when **local governments cut corners** and developers hide behind **opaque contracts**.
भारत इससे सीख लेकर **ख़राब प्रस्तावों** को अपनाने से बच सकता है, खासकर तब जब **स्थानीय सरकारें नियमों में ढील** देती हों और डेवलपर्स **अपारदर्शी अनुबंधों** की आड़ लेते हों।
- Of late, a surge in proposals for **data centres in the U.S.** has met with **organised local resistance**.
हाल के समय में **अमेरिका में डेटा सेंटरों** के प्रस्तावों में बढ़ोतरी को **संगठित स्थानीय विरोध** का सामना करना पड़ा है।
- **Municipal boards now decide whether energy- and water-intensive facilities fit their zoning rules**.
अब नगर निकाय यह तय कर रहे हैं कि **ऊर्जा और जल-गहन सुविधाएँ** उनके **ज़ोनिंग नियमों** में फिट बैठती हैं या नहीं।
- Data centres cannot be **dumped anywhere**.
डेटा सेंटरों को **कहीं भी डंप नहीं** किया जा सकता।
- They still need **reliable power, network connections, certain land titles, and geopolitical predictability**.
उन्हें अब भी **विश्वसनीय बिजली, नेटवर्क कनेक्टिविटी, स्पष्ट भूमि अधिकार और भू-राजनीतिक स्थिरता** चाहिए।
- Many governments are **explicitly courting data centres** as part of their **AI or IT industrialisation strategy**.
कई सरकारें अपनी **AI या IT औद्योगिकीकरण रणनीति** के तहत **डेटा सेंटरों को सक्रिय रूप से आकर्षित** कर रही हैं।
- They do so through **land and power concessions** and **expedited clearances**.
वे यह **भूमि और बिजली में रियायतें** देकर तथा **तेज़ मंजूरीयाँ** देकर करती हैं।
- In **India**, multiple State policies offer **sizable fiscal and infrastructure incentives** and promise **streamlined approvals**.
भारत में भी कई राज्य नीतियाँ **बड़े वित्तीय और बुनियादी ढाँचे के प्रोत्साहन** देती हैं और **सरलीकृत मंजूरी प्रक्रियाओं** का वादा करती हैं।
- India itself is a reasonably **high-risk candidate** for 'data dumping'.
भारत स्वयं 'डेटा डंपिंग' के लिए एक **काफ़ी उच्च-जोखिम वाला उम्मीदवार** है।
- The country is actively positioning itself as a **major data-centre hub**.
देश खुद को सक्रिय रूप से एक **प्रमुख डेटा-सेंटर हब** के रूप में स्थापित कर रहा है।
- Compounding the '**dumping**' risk is the fact that the chief **externalities** are unusually pronounced.
'डंपिंग' **जोखिम** को बढ़ाने वाली बात यह है कि मुख्य **बाह्य प्रभाव** असामान्य रूप से गंभीर हैं।
- **On environmental regulation, the CAG, the Supreme Court, and the NGT have recorded several lacunae**.
पर्यावरणीय नियमन के मामले में **CAG, सुप्रीम कोर्ट और NGT** ने कई **कमियाँ दर्ज** की हैं।
- These include gaps in **institutional mechanisms, post-clearance monitoring, and enforcement of mitigation measures**.
इनमें **संस्थागत तंत्र, मंजूरी के बाद निगरानी, और निवारक उपायों के प्रवर्तन** में खामियाँ शामिल हैं।
- This doesn't mean India will **inevitably** become a dumping ground.
इसका यह अर्थ नहीं कि भारत **अनिवार्य रूप से** डंपिंग का केंद्र बन जाएगा।
- **First**, hyperscale data centres demand substantial **grid capacity, substations, and fibre-optic routes**.
पहला, हाइपरस्केल डेटा सेंटरों को पर्याप्त **ग्रिड क्षमता, सब-स्टेशन और फाइबर-ऑप्टिक मार्गों** की आवश्यकता होती है।
- They cannot be set up ignoring what the **existing system** can handle.
उन्हें इस बात की अनदेखी करके स्थापित नहीं किया जा सकता कि **मौजूदा प्रणाली** कितना संभाल सकती है।



- This can force **public sector coordination** even in areas with weak zoning. इससे कमजोर ज़ोनिंग वाले क्षेत्रों में भी **सार्वजनिक क्षेत्र का समन्वय** अनिवार्य हो सकता है।
- **Second, India has relatively strong judicial and tribunal pathways.** दूसरा, भारत में तुलनात्मक रूप से **मज़बूत न्यायिक और अधिकरण मार्ग** हैं।
- Even if imperfect and slow, they create **credible deterrence pressure.** भले ही वे अपूर्ण और धीमे हों, फिर भी वे **विश्वसनीय निवारक दबाव** बनाते हैं।
- **Third, India has strong and vocal civil society organisations.** तीसरा, भारत में **मज़बूत और मुखर नागरिक समाज संगठन** मौजूद हैं।
- **The answer is not to ban data centres, but for developers to engage early with governments and communities.** समाधान **डेटा सेंटरों पर प्रतिबंध** नहीं, बल्कि डेवलपर्स का सरकारों और समुदायों से **शुरुआती चरण में संवाद** है।
- Zoning rules must treat data centres as **heavy infrastructure with buffer areas and noise limits.** ज़ोनिंग नियमों में डेटा सेंटरों को **भारी अवसंरचना** मानते हुए **बफ़र क्षेत्र** और **शोर सीमा** तय होनी चाहिए।
- When jurisdictions add **large power loads** without clear **cost rules**, households may end up paying. जब क्षेत्र स्पष्ट **लागत नियमों** के बिना **बड़े बिजली लोड** जोड़ते हैं, तो अंततः **घर-परिवारों** पर बोझ पड़ सकता है।
- **Data centres must disclose peak load, water sources, cooling methods, and backup generator use.** डेटा सेंटरों को **पीक लोड, जल स्रोत, शीतलन विधियाँ, और बैकअप जनरेटर उपयोग** का खुलासा करना चाहिए।
- **There must be rules to prevent cross-subsidisation by households.** **क्रॉस-सब्सिडीकरण** से घरों को बचाने के लिए स्पष्ट नियम होने चाहिए।
- Each facility must have a **binding water budget** and **public contingency plans.** हर सुविधा के पास **बाध्यकारी जल बजट** और **सार्वजनिक आपात योजनाएँ** होनी चाहिए।
- Each data centre should have a **water-use ceiling** based on **local basin conditions.** हर डेटा सेंटर के लिए **स्थानीय बेसिन की परिस्थितियों** के अनुसार **जल-उपयोग सीमा** तय होनी चाहिए।
- Finally, beware **non-disclosure agreements** involving **public utilities, shell entities, or hard-to-access environmental filings.** अंत में, **सार्वजनिक उपयोगिताओं, शेल संस्थाओं, या कठिन पहुँच वाले पर्यावरणीय दस्तावेज़ों** से जुड़े **गोपनीयता समझौतों** से सावधान रहें।
- **There must be a public registry that records audits and incidents.** **ऑडिट और घटनाओं** को दर्ज करने के लिए एक **सार्वजनिक रजिस्ट्री** अनिवार्य होनी चाहिए।