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# PATRIOTIC IAS

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## THE HINDU NEWSPAPER

## 30 OCTOBER 2025

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<b>PCS Special:</b>	<b>30 October 2025</b>
<b>1.</b>	<b>Ritwik Ghatak to receive centenary tribute at 31st Kolkata International Film Festival</b> <b>31वें कोलकाता अंतर्राष्ट्रीय फिल्म महोत्सव में रित्विक घटक को शताब्दी श्रद्धांजलि मिलेगी</b>

**Address :** 3rd Floor, KV Tower, Padleyganj Road, Gorakhpur  
**Email Id :** info@patrioticias.in  
**Contact Number :** 9971932488  
**Website :** patrioticias.in



2.

**Indians to be repatriated from Thailand after raids**  
**छापों के बाद थाईलैंड से भारतीयों को वापस लाया जाएगा**

## Ritwik Ghatak to receive centenary tribute at 31st Kolkata International Film Festival

**PCS**  
**Moyurie Som**  
KOLKATA

The 31st edition of the Kolkata International Film Festival (KIFF) is set to highlight films by maestro Ritwik Ghatak, with screenings of six of his films during the festival between November 6 and November 13.

The KIFF is scheduled to be held across 21 venues. A total of 215 films from 39 countries have been selected for screening during the festival.

Of the 215 films, half a dozen films by Ritwik Ghatak are set to be screened as part of a centenary tribute, in honour of the director's 100th birth anniversary. The films include *Ajantrik* (1958), *Bari Theke Paliye* (1958), *Meghe Dhaka Tara* (1960), *Komal Gand-*



**Artistic appeal:** People visiting a Durga Puja pandal themed on filmmaker Ritwik Ghatak's iconic movies in Kolkata last month. PTI

*har* (1961), *Titas Ekti Nadir Naam* (1973), and *Subarnarekha* (1965).

Centenary tributes are also being held in honour of Welsh actor Richard Burton, American filmmaker Sam Peckinpah, and actor Santosh Dutta, music director Salil Chowdhury, and filmmaker Raj Khosla. The works of

Shyam Benegal, David Lynch, Claudia Cardinale, Robert Redford, Arun Roy, Raja Mitra and Shashi Anand are also set to be screened in the KIFF as part of a special tribute.

### Inaugural film

"The 35mm celluloid of Raja Mitra's 1997 film *Nayan-tara* is scheduled to be

screened on November 12 at Kolkata's Radha Studio as part of the KIFF," West Bengal Minister Aroop Biswas said.

Mr Biswas announced that the inaugural ceremony will be held on November 6 at the Dhono Dhanyo Auditorium. The 1961 Bengali classic, *Saptapadi*, directed by Ajoy Kar and starring Suchitra Sen, U-tam Kumar, Chhabi Biswas and others, will be screened as the inaugural film of the KIFF. Film lovers will also get to watch five films by Filipino filmmaker Brillante Mendoza as part of a retrospective.

Additionally, director of the celebrated film *Sholay*, Ramesh Sippy, will be delivering the Satyajit Ray Memorial Lecture as part of festival at Kolkata's Sisir Mancha on November 7.

### Ritwik Ghatak to receive centenary tribute at 31st Kolkata International Film Festival

**31वें कोलकाता अंतर्राष्ट्रीय फिल्म महोत्सव में रित्विक घटक को शताब्दी श्रद्धांजलि मिलेगी**

- The **31st edition of the Kolkata International Film Festival (KIFF)** is set to highlight films by maestro **Ritwik Ghatak**, with screenings of six of his films during the festival between **November 6 and November 13**.  
कोलकाता अंतर्राष्ट्रीय फिल्म महोत्सव (केआईएफएफ) का 31वां संस्करण महान निर्देशक रित्विक घटक की फिल्मों को केंद्र में रखेगा, जिसमें 6 से 13 नवंबर के बीच उनकी छह फिल्मों का प्रदर्शन किया जाएगा।
- The **KIFF** is scheduled to be held across **21 venues**. A total of **215 films from 39 countries** have been selected for screening during the festival.  
केआईएफएफ का आयोजन 21 स्थलों पर किया जाएगा। कुल 39 देशों की 215 फिल्मों को महोत्सव में प्रदर्शन के लिए चुना गया है।



- Of the 215 films, **half a dozen films by Ritwik Ghatak** are set to be screened as part of a **centenary tribute**, in honour of the director's **100th birth anniversary**.  
215 फिल्मों में से, रित्विक घटक की आधा दर्जन फिल्में उनके 100वें जन्म शताब्दी वर्ष के उपलक्ष्य में शताब्दी श्रद्धांजलि के रूप में प्रदर्शित की जाएंगी।
- The films include **Ajantrik (1958), Bari Theke Paliye (1958), Meghe Dhaka Tara (1960), Komal Gandhar (1961), Subarnarekha (1965), and Titas Ekti Nadir Naam (1973)**.  
इन फिल्मों में अजन्त्रिक (1958), बारी थेके पालिये (1958), मेघे ढाका तारा (1960), कोमल गंधार (1961), सुवर्णरेखा (1965) और तीतास एकटी नदीर नाम (1973) शामिल हैं।
- **Centenary tributes** are also being held in honour of **Welsh actor Richard Burton, American filmmaker Sam Peckinpah, actor Santosh Dutta, music director Salil Chowdhury, and filmmaker Raj Khosla**.  
शताब्दी श्रद्धांजलि कार्यक्रम के अंतर्गत वेल्श अभिनेता रिचर्ड बर्टन, अमेरिकी फिल्मकार सैम पेकिंपा, अभिनेता संतोष दत्ता, संगीत निर्देशक सलील चौधरी और फिल्म निर्देशक राज खोसला को भी सम्मानित किया जाएगा।
- The works of **Shyam Benegal, David Lynch, Claudia Cardinale, Robert Redford, Arun Roy, Raja Mitra and Shashi Anand** are also set to be screened in the KIFF as part of a **special tribute**.  
श्याम बेनेगल, डेविड लींच, क्लाउडिया कार्डिनेल, रॉबर्ट रेडफोर्ड, अरुण रॉय, राजा मित्रा और शशि आनंद के कार्यों को भी विशेष श्रद्धांजलि के रूप में केआईएफएफ में प्रदर्शित किया जाएगा।

### Inaugural Film उद्घाटन फिल्म

- "The **35mm celluloid of Raja Mitra's 1997 film Nayantara** is scheduled to be screened on **November 12 at Kolkata's Radha Studio** as part of the KIFF," **West Bengal Minister Aroop Biswas** said.  
"राजा मित्रा की 1997 की फिल्म 'नयनतारा' का 35 मिमी सेलुलॉयड 12 नवंबर को कोलकाता के राधा स्टूडियो में केआईएफएफ के तहत प्रदर्शित किया जाएगा," यह जानकारी पश्चिम बंगाल के मंत्री अरूप विश्वास ने दी।
- Mr. Biswas announced that the **inaugural ceremony** will be held on **November 6** at the **Dhono Dhanyo Auditorium**.  
श्री अरूप विश्वास ने घोषणा की कि उद्घाटन समारोह 6 नवंबर को धनो धान्य ऑडिटोरियम में आयोजित किया जाएगा।
- The **1961 Bengali classic Saptapadi**, directed by **Ajoy Kar** and starring **Suchitra Sen, Uttam Kumar, Chhabi Biswas** and others, will be screened as the **inaugural film** of the KIFF.  
1961 की बंगाली क्लासिक फिल्म 'सप्तपदी', जिसका निर्देशन अजय कर ने किया था और जिसमें सूचित्रा सेन, उत्तम कुमार, छबी विश्वास आदि ने अभिनय किया था, को केआईएफएफ की उद्घाटन फिल्म के रूप में प्रदर्शित किया जाएगा।
- Film lovers will also get to watch **five films by Filipino filmmaker Brilliante Mendoza** as part of a **retrospective**.  
फिल्म प्रेमी फिलिपीनी फिल्म निर्माता ब्रिलिएंटे मेंडोज़ा की पांच फिल्मों को भी रेट्रोस्पेक्टिव सेक्शन में देख सकेंगे।
- Additionally, **director of the celebrated film Sholay, Ramesh Sippy**, will be delivering the **Satyajit Ray Memorial Lecture** as part of the festival at **Kolkata's Sisir Mancha on November 7**.  
इसके अतिरिक्त, प्रसिद्ध फिल्म 'शोले' के निर्देशक रमेश सिप्पी सत्यजीत रे स्मृति व्याख्यान देंगे, जो 7 नवंबर को कोलकाता के सिसिर मंच पर आयोजित किया जाएगा।



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## Indians to be repatriated from Thailand after raids

**PCS**  
**500** More than 1,500 people from 28 countries had crossed into Thailand between the start of the crackdown on one of the most notorious scam hubs, KK Park in Myanmar, and Tuesday evening. Many people staffing the fraud factories say they were trafficked.

## Indians to be repatriated from Thailand after raids छापों के बाद थाईलैंड से भारतीयों को वापस लाया जाएगा

- More than 1,500 people from 28 countries had crossed into Thailand between the start of the crackdown on one of the most notorious scam hubs, KK Park in Myanmar, and Tuesday evening. 28 देशों के 1,500 से अधिक लोग म्यांमार के कुख्यात घोटाला केंद्र 'केके पार्क' पर कार्रवाई शुरू होने और मंगलवार शाम के बीच थाईलैंड में प्रवेश कर चुके थे।
- Many people staffing the fraud factories say they were trafficked. धोखाधड़ी केंद्रों में काम करने वाले कई लोगों ने कहा कि उन्हें मानव तस्करी के माध्यम से लाया गया था।

### GS Paper 1: History, Society and Geography

TOPICS COVERED

30 October 2025

1. Number of Naxalites who surrendered in Chhattisgarh's Bijapur  
छत्तीसगढ़ के बीजापुर में आत्मसमर्पण करने वाले नक्सलियों की संख्या
2. How do cyclones form and how are they measured?  
चक्रवात कैसे बनते हैं और उन्हें कैसे मापा जाता है?
3. The Indus conundrum: when water is both a lifeline and a faultline  
सिंधु दुविधा: जब जल जीवनरेखा भी है और विभाजन रेखा भी
4. QUIZ
5. U.S. will cut troops in Europe: Romania  
अमेरिका यूरोप में सैनिकों की संख्या घटाएगा: रोमानिया



## Number of Naxalites who surrendered in Chhattisgarh's Bijapur

GS I: Mapping

**51** As many as 51 Naxalites, 20 of them carrying a collective bounty of ₹66 lakh, surrendered in the Bijapur district of Chhattisgarh on Wednesday, police said. The cadres have returned to the mainstream citing that they were impressed by the State government's rehabilitation policy.

## Number of Naxalites who surrendered in Chhattisgarh's Bijapur

छत्तीसगढ़ के बीजापुर में आत्मसमर्पण करने वाले नक्सलियों की संख्या

• **51 Naxalites**, as many as 51 Naxalites, **20 of them carrying a collective bounty of ₹66 lakh**, surrendered in the **Bijapur district of Chhattisgarh** on Wednesday, police said.

**51 नक्सलियों में से 20 पर कुल ₹66 लाख का इनाम था**, जिन्होंने बुधवार को छत्तीसगढ़ के बीजापुर जिले में आत्मसमर्पण किया, पुलिस ने कहा।

• The cadres have **returned to the mainstream** citing that they were **impressed by the State government's rehabilitation policy**.

नक्सली राज्य सरकार की पुनर्वास नीति से प्रभावित होकर मुख्यधारा में लौट आए हैं।

## How do cyclones form and how are they measured?

How can high wind shear disrupt the formation of a cyclone? What is an eyewall?

GS II Geography  
Vasudevan Mukunth

The story so far:

If you think of a cyclone as a machine, it would be an incredibly powerful entity – an engine that draws heat from the earth's tropical waters to drive destructive winds, heavy rainfall, and storm surges. Similar storms are known variously as hurricanes in the Atlantic and eastern Pacific Oceans, and typhoons in the western Pacific Ocean.

How do cyclones form?

A tropical cyclone begins as an area of low pressure, often associated with clusters of thunderstorms. For such a disturbance to develop into a cyclone, several atmospheric and oceanic conditions must come together. The most important is warm sea surface temperature, generally above 26.5°C and up to a depth of at least 50 m. When moist air near such a water surface rises,

it releases its latent heat, cools, and condenses to form clouds. The released heat warms the surrounding air, causing it to rise even further and drawing in more moist air from below, setting up a self-reinforcing cycle of convection.

A second important condition is that the atmosphere must be unstable, that is, rising air must continue to rise rather than being forced back down, and there must be a sufficient Coriolis force (a deflection of circulating air due to the earth's rotation, causing it to curve right in the Northern Hemisphere and left in the Southern Hemisphere) to induce rotation. As the Coriolis effect is weakest at the equator, cyclones rarely form within about five degrees of latitude from it. At the same time, the vertical wind shear, which is the difference in wind speed and direction between the lower and the upper levels of the atmosphere, must be low. High wind shear can disrupt a cyclone's organised circulation and

keep it from building in strength.

As the cyclone develops, a well-defined centre called the 'eye' may form. This is a calm, clear region surrounded by a ring of towering thunderstorms that produce the most intense winds and heaviest rainfall, called the eyewall.

Air spirals in towards the low-pressure centre at the surface and rises rapidly near the eyewall, while at higher altitudes it flows outwards, completing the circulation.

How are cyclones classified?

Since the storm draws energy from the ocean through evaporation, it can intensify as long as it remains over warm water. Cyclones are primarily classified by their maximum sustained wind speed and central pressure. Different ocean basins use slightly different classification schemes but the principle is the same. In the North Indian Ocean, the India Meteorological Department classification

ranges from a 'depression' (31-49 km/hr) to 'super cyclonic storm' (>222 km/hr).

For measurements, meteorologists use ground-based observations, aircraft reconnaissance, satellite data, and ocean buoys. Satellites play a crucial role in monitoring cyclones over remote ocean areas: infrared images help estimate the temperature of cloud tops, indicating storm intensity, while visible and microwave sensors reveal structure, rainfall distribution, and eye formation.

In the North Atlantic, specialised aircraft called hurricane hunters fly directly into storms to measure wind speeds, pressure, humidity, and temperature. Instruments called dropsondes are released into the storm, transmitting data as they fall. In the Indian Ocean, satellites and automated buoys provide most of the data.

How well are cyclones forecast?

Forecasting the path and intensity of cyclones remains a complex challenge. Sophisticated numerical weather models simulate atmospheric and oceanic conditions, but even small errors in initial data can lead to large uncertainties. Advances in computing power, remote sensing, and data assimilation have improved forecasts significantly over the last few decades. Today, most meteorological agencies can predict a cyclone's track three to five days in advance with reasonable accuracy.

### THE GIST

A tropical cyclone begins as an area of low pressure, often associated with clusters of thunderstorms.

Since the storm draws energy from the ocean through evaporation, it can intensify as long as it remains over warm water.

Sophisticated numerical weather models simulate atmospheric and oceanic conditions, but even small errors in initial data can lead to large uncertainties.

## How do cyclones form and how are they measured? चक्रवात कैसे बनते हैं और उन्हें कैसे मापा जाता है?

- If you think of a **cyclone** as a machine, it would be an incredibly powerful entity — an engine that **draws heat from the earth's tropical waters to drive destructive winds, heavy rainfall, and storm surges**.

यदि आप **चक्रवात** को एक मशीन के रूप में सोचें, तो यह एक अत्यंत शक्तिशाली इकाई होगी — एक ऐसा इंजन जो पृथ्वी के **उष्णकटिबंधीय जल से ऊष्मा खींचकर विनाशकारी हवाओं, भारी वर्षा और तूफानी लहरों** को उत्पन्न करता है।

- Similar storms are known variously as **hurricanes** in the **Atlantic and eastern Pacific Oceans**, and **typhoons** in the **western Pacific Ocean**.

इसी प्रकार के तूफानों को **अटलांटिक और पूर्वी प्रशांत महासागर में हैरिकेन (Hurricane)** और **पश्चिमी प्रशांत महासागर में टाइफून (Typhoon)** कहा जाता है।



## How do cyclones form?

### चक्रवात कैसे बनते हैं?

- A **tropical cyclone** begins as an area of **low pressure**, often associated with clusters of thunderstorms.  
एक उष्णकटिबंधीय चक्रवात कम दबाव वाले क्षेत्र (Low Pressure Area) के रूप में शुरू होता है, जो प्रायः बिजली के तूफानों (Thunderstorms) के समूह से जुड़ा होता है।
- For such a disturbance to develop into a cyclone, several **atmospheric and oceanic conditions** must come together.  
ऐसे विक्षोभ को चक्रवात में विकसित होने के लिए कई वायुमंडलीय और महासागरीय परिस्थितियों का एक साथ आना आवश्यक होता है।
- The most important is **warm sea surface temperature, generally above 26.5°C and up to a depth of at least 50 m.**  
सबसे महत्वपूर्ण है गर्म समुद्री सतह तापमान (Warm Sea Surface Temperature), जो आमतौर पर 26.5°C से अधिक और कम से कम 50 मीटर गहराई तक होना चाहिए।
- When **moist air near such a water surface rises, it releases latent heat, cools, and condenses to form clouds.**  
जब ऐसी सतह के पास की आर्द्र वायु (Moist Air) ऊपर उठती है, तो यह गुप्त ऊष्मा (Latent Heat) छोड़ती है, ठंडी होती है और बादलों (Clouds) में संघनित हो जाती है।
- The released heat warms the surrounding air, causing it to rise even further and drawing in more moist air from below, setting up a **self-reinforcing cycle of convection.**  
छोड़ी गई ऊष्मा आसपास की हवा को गर्म करती है, जिससे वह और ऊपर उठती है तथा नीचे से और आर्द्र वायु को आकर्षित करती है, जिससे एक स्वयं को सुदृढ़ करने वाला संवहन चक्र (Self-reinforcing Convection Cycle) बनता है।
- The atmosphere must also be **unstable**, meaning rising air must continue to rise rather than being forced back down.  
वायुमंडल का अस्थिर (Unstable) होना भी आवश्यक है, अर्थात् उठने वाली हवा को ऊपर ही बढ़ते रहना चाहिए, नीचे नहीं लौटना चाहिए।
- There must be sufficient **Coriolis force** (deflection due to earth's rotation) to induce rotation — **right in the Northern Hemisphere and left in the Southern Hemisphere.**  
पर्याप्त कोरिओलिस बल (Coriolis Force) भी होना चाहिए (जो पृथ्वी के घूर्णन के कारण वायु को विक्षेपित करता है) — उत्तरी गोलार्ध में दाईं ओर और दक्षिणी गोलार्ध में बाईं ओर।
- As the **Coriolis effect is weakest at the equator, cyclones rarely form within about five degrees of latitude** from it.  
चूंकि कोरिओलिस प्रभाव भूमध्य रेखा (Equator) के पास सबसे कमजोर होता है, इसलिए चक्रवात प्रायः भूमध्य रेखा से पाँच डिग्री अक्षांश के भीतर नहीं बनते।
- The **vertical wind shear** (difference in wind speed and direction between upper and lower atmosphere) must be **low.**  
ऊर्ध्वाधर पवन कतराव (Vertical Wind Shear) — यानी ऊपरी और निचली परतों में पवन की गति और दिशा का अंतर — कम होना चाहिए।
- High wind shear disrupts a cyclone's organised circulation and prevents it from strengthening.  
उच्च पवन कतराव चक्रवात के संगठित परिसंचरण को बाधित करता है और उसे शक्तिशाली बनने से रोकता है।
- As the cyclone develops, a well-defined **eye** may form — a **calm, clear region** surrounded by **towering thunderstorms** called the **eyewall.**  
जैसे-जैसे चक्रवात विकसित होता है, एक स्पष्ट आंख (Eye) बन सकती है — जो एक शांत और साफ क्षेत्र होता है, जिसे ऊँचे बादलों के घेरे (Eyewall) ने घेर रखा होता है।
- **Air spirals in towards the low-pressure centre at the surface, rises near the eyewall, and flows outward at higher altitudes — completing the circulation.**  
हवा सतह पर कम दबाव केंद्र की ओर घूमती हुई जाती है, आंख की दीवार के पास ऊपर उठती है और ऊँचाई पर बाहर की ओर बहती है — जिससे पूर्ण परिसंचरण (Circulation) पूरा होता है।

## How are cyclones classified?

### चक्रवातों को कैसे वर्गीकृत किया जाता है?



- Since the storm draws energy from the **ocean through evaporation**, it can **intensify** as long as it remains over **warm water**.  
क्योंकि तूफान अपनी ऊर्जा महासागर से वाष्पीकरण (Evaporation) के माध्यम से प्राप्त करता है, इसलिए जब तक यह गर्म जल पर रहता है, यह तेज़ (Intensify) हो सकता है।
- Cyclones are classified by **maximum sustained wind speed** and **central pressure**.  
चक्रवातों को अधिकतम निरंतर पवन गति और केंद्रीय दबाव के आधार पर वर्गीकृत किया जाता है।
- In the **North Indian Ocean**, the **India Meteorological Department (IMD)** classification ranges from a **'Depression' (31–49 km/hr)** to a **'Super Cyclonic Storm' (>222 km/hr)**.  
उत्तरी हिंद महासागर में, भारत मौसम विज्ञान विभाग (IMD) का वर्गीकरण 'दबाव' (31–49 किमी/घंटा) से लेकर 'सुपर चक्रवाती तूफान' (>222 किमी/घंटा) तक होता है।
- **Measurements** are made using **ground observations, aircraft reconnaissance, satellite data, and ocean buoys**.  
मापन (Measurements) भूमि आधारित अवलोकन, विमान सर्वेक्षण, उपग्रह डेटा, और महासागरीय बॉय (Buoys) के माध्यम से किया जाता है।
- **Satellites** play a crucial role — **infrared images estimate cloud-top temperature, while visible and microwave sensors show structure, rainfall distribution, and eye formation**.  
उपग्रह (Satellites) महत्वपूर्ण भूमिका निभाते हैं — इन्फ्रारेड चित्र बादलों के शीर्ष का तापमान दर्शाते हैं, जबकि दृश्यमान और माइक्रोवेव सेंसर संरचना, वर्षा वितरण और आंख के निर्माण को दिखाते हैं।
- In the **North Atlantic**, aircraft called **Hurricane Hunters** fly directly into storms to measure **wind speed, pressure, humidity, and temperature** using **dropsondes**.  
उत्तर अटलांटिक में, हैरिकेन हंटर्स (Hurricane Hunters) नामक विमान सीधे तूफानों में उड़ान भरते हैं और ड्रॉपसॉन्ड (Dropsondes) उपकरणों का उपयोग करके पवन गति, दबाव, आर्द्रता और तापमान मापते हैं।
- In the **Indian Ocean**, **satellites and automated buoys** provide most of the data.  
हिंद महासागर में, अधिकांश डेटा उपग्रहों और स्वचालित बॉय (Automated Buoys) से प्राप्त होता है।



### How well are cyclones forecast?

#### चक्रवातों का पूर्वानुमान कितना सटीक होता है?

- Forecasting the **path and intensity** of cyclones is a **complex challenge**.  
चक्रवातों के मार्ग और तीव्रता का पूर्वानुमान लगाना एक जटिल चुनौती (Complex Challenge) है।
- **Numerical weather models** simulate **atmospheric and oceanic conditions**, but **small errors can cause large uncertainties**.  
संख्यात्मक मौसम मॉडल (Numerical Weather Models) वायुमंडलीय और महासागरीय परिस्थितियों का अनुकरण करते हैं, लेकिन छोटे त्रुटियाँ बड़ी अनिश्चितताएँ पैदा कर सकती हैं।
- **Advances in computing, remote sensing, and data assimilation** have improved **forecasts** significantly in recent decades.  
हाल के दशकों में कम्प्यूटिंग, रिमोट सेंसिंग और डेटा समाकलन (Data Assimilation) में प्रगति ने पूर्वानुमानों में सुधार किया है।
- **Today, most meteorological agencies can predict a cyclone's track 3–5 days in advance with reasonable accuracy**.  
आज, अधिकांश मौसम एजेंसियाँ किसी चक्रवात के मार्ग का 3–5 दिन पहले तक का सटीक पूर्वानुमान कर सकती हैं।



# The Indus conundrum: when water is both a lifeline and a faultline

Writers are beginning to explain the ramifications of the suspension of the Indus Water Treaty, which was a shared heritage between India and Pakistan. Others map how global warming is impacting the balance in nature, and take stock of the fallout of political decisions on all rivers

GS I: Geography  
GS III: Environment

**D**o rivers have stories to tell? As he prepared to map the Chenab, “a river of diplomacy enshrined in the Indus Waters Treaty”, Danesh Rana was reminded of a Bashir Badr couplet: “*Agar fursat mile paani ki tahriron ko padh lena, har ek dariya haazaron saal ka afsana likhta hai.*” (If you get the time, do read the writing of the water. Every river writes a tale of thousand years.)

In his memoir and travelogue, *The Dark Coloured Waters (Juggernaut)*, Rana, who has served as an IPS officer in the erstwhile State of Jammu & Kashmir, profiles the river with the help of myths, legends, anecdotes and photographs, including one of the highest railway bridges in the world across the Chenab in Reasi district. He also describes the state of the river post-the Pahalgam massacre when India suspended the Indus Water Treaty, brokered by the World Bank in 1960.

“A day after the suspension of the treaty, the sluices at Baghlihar and Salal Hydroelectric Projects were closed,” he writes. Soon, the water receded rapidly, “turning the roar of the river to a whimper,” and people began to walk across the river.

Is it possible to halt or divert rivers? Rivers are the proverbial natural arteries of ecological systems. They are also worshipped, navigated and dammed. From the ancient ecosystems of Egypt to the sinking cities of Shanghai, rivers are valued differently. No wonder, some of our major river systems are also dying, and ultimately dying. Despite such

ambiguity, rivers have remained intertwined with humanity.

## Water history

A river determines water history in any region, seasonal variation in its flow being the prime determinant. With the bulk of water in the system coming from rainfall and snow melt in the mountains, a river finally flows to the sea to complete its essential hydrological cycle. Of all rivers that have tried to complete the hydrological cycle, the story of the Indus basin stands as one of modern history’s great stories of large-scale environmental transformation. It is also a story of changing relationships between society and the state.

In 2015, Prof. David Gilmartin of North Carolina State University argued that a large-scale environmental history of the Indus basin was yet to be written (*Blood and Water*, University of California Press). The Indus basin’s history has long been the subject of historical attention.

Although a largely arid region, the Indus basin became one of the globe’s most heavily irrigated river basins. Though the flow in the river in the six months from October to March is just 16% of the total annual flow, floods in the summer months have been historically significant.

It is claimed that the Indus basin supplies 80% of the water for Pakistan’s irrigated agriculture – that it employs nearly two-thirds of the labour force and generates a quarter of the national GDP. Such a linear relationship has been climatically challenged. Triggered by extremely heavy rains, the July-August 2010 Indus floods affected some 20 million people; two million homes were

destroyed; 1.6 million head of livestock died and the economic losses amounted to \$43 billion. Though the consensus was that it was a once-in-a-hundred years event, the fact remains that thanks to rapid global warming, a greater climatic uncertainty surely looms.

## Floods and irrigation

No message is more powerfully conveyed by the floods’ damage than that massive human development has vastly increased the system’s vulnerability. Together with this, large-scale irrigation projects have become a tool to dominate nature. Erik P. Eckholm had noted in the 1970s that “the greater irrigation works in modern times had come to dramatise the dangers inherent in efforts to expand large-scale control over nature without sufficient attention to the ‘ecological requisites’ of nature itself.”

The Indus basin is not bereft of such transformation or vulnerability, and it is in this light that the river ought to be studied. The Indus Water Treaty was a shared heritage between India and Pakistan, till its suspension in April 2025. Consequently, the future of the water-sharing treaty between upper riparian India and lower riparian Pakistan remains shrouded in mystery writes Uttam Kumar Sinha in *Trial by Water* (Penguin, 2025). As per the treaty, the water of the five rivers of Punjab used to flow into the Indus. It may not in future. All these rivers show similar patterns of flow, and their vicissitudes have dictated much of the basin’s hydrogeography. However, all this is going to change if river water is diverted (over time) by the upper riparian state.

At this moment, is it apposite to delineate the fundamental hydrogeography of the Indus basin and its complex flow patterns? How water becomes both a lifeline and a faultline in the contested south-Asian landscape is the lingering question. Under the changing situation, can the river be allowed to flow its course to fulfil its ecological obligations of flowing to the sea to complete the hydrological cycle?

## Mounting stress

However, to focus solely on bilateral tensions is to miss the larger picture. “The Indus Basin must be seen as a single, interconnected whole – its challenges not confined to legal frameworks or diplomatic flashpoints but rooted in deeper ecological struggles,” writes Sinha. With the basin now confronting surging water demand, climate shocks and mounting water stress, the stakes are only intensifying in the future. Can this decades-old treaty evolve to meet a new era of crisis, rekindling its role as a platform for cooperation?

Rivers themselves have always had their own logic: their natural beauties, their floods, droughts, their tendency to silt up, their changes of course, tipping points and disappearances, as Vanessa Taylor puts it in *Seven Rivers* (Weidenfeld & Nicolson, 2025). Rivers have shaped our lives, just as we have shaped theirs. Changing hydro dynamics of the Indus river offers a view of the world where the person and the river are seen in relation to each other. Love, grief, and hope flow through the river.

*Sudhrendar Sharma is an independent writer, researcher and academic.*

## The Indus conundrum: when water is both a lifeline and a faultline सिंधु द्विधा: जब जल जीवनरेखा भी है और विभाजन रेखा भी

- As he prepared to map the **Chenab**, “a river of diplomacy enshrined in the **Indus Waters Treaty**”, **Danesh Rana** was reminded of a **Bashir Badr** couplet: “**Agar fursat mile paani ki tahriron ko padh lena, har ek dariya haazaron saal ka afsana likhta hai.**”  
जब उन्होंने **चेनाब नदी** का मानचित्र तैयार करने की तैयारी की, जो कि **इंडस वाटर्स ट्रीटी (Indus Waters Treaty)** में एक “**कूटनीतिक नदी**” के रूप में निहित है, **दानिश राणा** को **बशीर बद्र** की एक पंक्ति याद आई — “**अगर फूरसत मिले पानी की तहरीरों को पढ़ लेना, हर एक दरिया हज़ारों साल का अफ़साना लिखता है!**”

- In his memoir and travelogue, *The Dark Coloured Waters (Juggernaut)*, Rana, who has served as an **IPS officer** in the erstwhile State of **Jammu & Kashmir**, profiles the river with **myths, legends, anecdotes, and photographs**, including one of the **highest railway bridges** in the world across the Chenab in **Reasi district**.

अपनी **संस्मरण और यात्रा-वृत्तांत** *The Dark Coloured Waters (Juggernaut)* में, राणा, जिन्होंने **जम्मू और कश्मीर** राज्य में **IPS अधिकारी** के रूप में सेवा दी है, इस नदी का चित्रण **मिथकों, किंवदंतियों, किस्सों और तस्वीरों** के माध्यम से करते हैं, जिसमें **रीसी ज़िले** में **चेनाब नदी** पर बने **विश्व के सबसे ऊँचे रेल पुलों** में से एक की तस्वीर भी शामिल है।





- He also describes the state of the river post-the **Pahalgam massacre**, when India **suspended the Indus Water Treaty**, brokered by the **World Bank** in **1960**.  
वे पहलगाम नरसंहार के बाद नदी की स्थिति का भी वर्णन करते हैं, जब भारत ने 1960 में विश्व बैंक द्वारा मध्यस्थता की गई इंडस वाटर्स ट्रीटी को निलंबित कर दिया था।
- “A day after the suspension of the treaty, the **sluices at Baghlihar and Salal Hydroelectric Projects were closed**,” he writes. Soon, the water receded rapidly, “turning the **roar of the river to a whimper**,” and people began to **walk across the river**.  
“संधि के निलंबन के एक दिन बाद, **बघलिहार और सलाल जलविद्युत परियोजनाओं** के द्वार बंद कर दिए गए,” वे लिखते हैं। जल्द ही पानी तेजी से घट गया, “**नदी की गर्जना सिसकी में बदल गई**,” और लोग नदी पार करने लगे।
- Is it possible to **halt or divert rivers**? Rivers are the proverbial **natural arteries of ecological systems**. They are also **worshipped, navigated, and dammed**.  
क्या नदियों को रोका या मोड़ा जा सकता है? नदियाँ पारिस्थितिक तंत्र की प्राकृतिक धमनियाँ हैं। उन्हें पूजा जाता है, नौवहन के लिए उपयोग किया जाता है, और बाँधा भी जाता है।
- From the **ancient ecosystems of Egypt** to the **sinking cities of Shanghai**, rivers are valued differently.  
मिस्र के प्राचीन पारिस्थितिक तंत्रों से लेकर शंघाई के डूबते शहरों तक, नदियों का महत्व अलग-अलग रूपों में देखा जाता है।
- No wonder, some of our **major river systems are drying and dying**. Despite such ambiguity, rivers have remained **intertwined with humanity**.  
आश्चर्य नहीं कि हमारी कुछ **मुख्य नदियाँ सूख रही हैं और मर रही हैं**। इस तरह की अस्पष्टता के बावजूद, नदियाँ हमेशा **मानवता से जुड़ी** रही हैं।

## Water history

### जल का इतिहास

- A river determines **water history** in any region, **seasonal variation in its flow** being the prime determinant.  
किसी भी क्षेत्र में एक नदी **जल के इतिहास** को निर्धारित करती है, और उसके **प्रवाह में मौसमी परिवर्तन** इसका मुख्य निर्धारक होता है।
- With the bulk of water coming from **rainfall and snowmelt in mountains**, a river finally **flows to the sea**, completing its **hydrological cycle**.  
जब पानी का अधिकांश हिस्सा **पर्वतों में वर्षा और हिमपात के पिघलने** से आता है, तो नदी अंततः **समुद्र तक बहती है**, जिससे उसका **जल चक्र (Hydrological Cycle)** पूरा होता है।
- Of all rivers that have tried to complete the cycle, the **Indus basin** stands as one of **modern history's great stories of environmental transformation**.  
उन सभी नदियों में जो अपने चक्र को पूरा करने की कोशिश करती हैं, **सिंधु बेसिन (Indus Basin)** को **आधुनिक इतिहास के महान पर्यावरणीय परिवर्तन** की कहानियों में गिना जाता है।
- It is also a story of **changing relationships between society and the state**.  
यह **समाज और राज्य के बीच बदलते संबंधों** की कहानी भी है।
- In **2015**, Prof. **David Gilmartin** of **North Carolina State University** argued that a **large-scale environmental history** of the Indus basin was yet to be written (*Blood and Water*, University of California Press).  
**2015** में, **नॉर्थ कैरोलाइना स्टेट यूनिवर्सिटी** के प्रोफेसर **डेविड गिल्मार्टिन** ने तर्क दिया कि **सिंधु बेसिन का बड़े पैमाने पर पर्यावरणीय इतिहास** अभी लिखा जाना बाकी है (*Blood and Water*, यूनिवर्सिटी ऑफ कैलिफोर्निया प्रेस)।
- Although a largely **arid region**, the Indus basin became one of the **world's most heavily irrigated river basins**.  
यद्यपि यह क्षेत्र **मुख्यतः शुष्क** है, फिर भी **सिंधु बेसिन** दुनिया के सबसे अधिक सिंचित नदी बेसिनों में से एक बन गया।
- The **flow in the river from October to March is just 16% of the total annual flow**, but **summer floods have been historically significant**.  
नदी में **अक्टूबर से मार्च** के बीच का प्रवाह केवल **कुल वार्षिक प्रवाह का 16%** है, लेकिन **गर्मी के मौसम की बाढ़ें ऐतिहासिक रूप से महत्वपूर्ण** रही हैं।



- It is claimed that the **Indus basin supplies 80%** of the water for **Pakistan's irrigated agriculture**, employing **two-thirds of the labour force** and generating **one-fourth of the national GDP**.  
कहा जाता है कि सिंधु बेसिन पाकिस्तान की सिंचित कृषि के लिए 80% पानी प्रदान करता है, जो श्रम शक्ति के दो-तिहाई हिस्से को रोजगार देता है और राष्ट्रीय GDP का एक-चौथाई उत्पन्न करता है।
- Such a linear relationship has been **climatically challenged**. In **July–August 2010**, **Indus floods** affected **20 million people**, destroyed **2 million homes**, killed **1.6 million livestock**, and caused **\$43 billion** in losses.  
ऐसा सीधा संबंध जलवायु के कारण चुनौतीपूर्ण बन गया है। जुलाई–अगस्त 2010 में सिंधु बाढ़ ने 2 करोड़ लोगों को प्रभावित किया, 20 लाख घर नष्ट किए, 16 लाख पशु मारे गए, और 43 अरब डॉलर का नुकसान हुआ।
- Though it was said to be a **once-in-a-century event**, **global warming** now brings **greater climatic uncertainty**.  
यद्यपि इसे सदी में एक बार होने वाली घटना कहा गया था, लेकिन वैश्विक तापन (Global Warming) ने अब अधिक जलवायु अनिश्चितता पैदा कर दी है।

## Floods and Irrigation बाढ़ और सिंचाई

- No message is more powerfully conveyed by the **floods' damage** than that **massive human development** has vastly increased the system's **vulnerability**.  
बाढ़ से हुई तबाही से अधिक शक्तिशाली संदेश कोई नहीं देता कि मानव विकास की व्यापकता ने प्रणाली की कमज़ोरी (vulnerability) को अत्यधिक बढ़ा दिया है।
- Together with this, **large-scale irrigation projects** have become a tool to **dominate nature**.  
इसके साथ ही, बड़े पैमाने की सिंचाई परियोजनाएँ अब प्रकृति पर नियंत्रण के उपकरण बन गई हैं।
- **Erik P. Eckholm** had noted in the **1970s** that “the greater irrigation works in modern times had come to dramatise the dangers inherent in efforts to expand large-scale control over nature without sufficient attention to the ‘ecological requisites’ of nature itself.”  
एरिक पी. एकहोल्म ने 1970 के दशक में कहा था कि “आधुनिक काल की बड़ी सिंचाई परियोजनाएँ इस खतरे को उजागर करती हैं जो प्रकृति की ‘पारिस्थितिक आवश्यकताओं’ पर पर्याप्त ध्यान दिए बिना उस पर नियंत्रण बढ़ाने के प्रयासों में निहित है।”
- The **Indus basin** is not bereft of such transformation or vulnerability, and it is in this light that the river ought to be studied.  
सिंधु बेसिन भी ऐसे परिवर्तन और असुरक्षा से मुक्त नहीं है, और इसी दृष्टिकोण से नदी का अध्ययन किया जाना चाहिए।
- The **Indus Water Treaty** was a **shared heritage** between **India and Pakistan**, till its **suspension in April 2025**.  
इंडस वाटर ट्रीटी भारत और पाकिस्तान के बीच साझा विरासत थी, जब तक कि इसे अप्रैल 2025 में निलंबित नहीं किया गया।
- Consequently, the future of the **water-sharing treaty** between **upper riparian India and lower riparian Pakistan** remains **shrouded in mystery**, writes **Uttam Kumar Sinha** in *Trial by Water* (Penguin, 2025).  
परिणामस्वरूप, ऊपरी तटीय भारत और निचले तटीय पाकिस्तान के बीच जल-साझाकरण संधि का भविष्य अब भी अनिश्चितता के घेरे में है, जैसा कि उत्तम कुमार सिन्हा ने *Trial by Water* (Penguin, 2025) में लिखा है।
- As per the treaty, the **water of the five rivers of Punjab** used to flow into the **Indus**. It may not in future.  
संधि के अनुसार, पंजाब की पाँच नदियों का जल सिंधु नदी में प्रवाहित होता था, लेकिन भविष्य में ऐसा संभवतः नहीं होगा।
- All these rivers show similar patterns of flow, and their **vicissitudes** have dictated much of the basin's **hydrogeography**.  
इन सभी नदियों का प्रवाह पैटर्न समान है, और उनकी परिवर्तनशीलता (vicissitudes) ने बेसिन की जल-भौगोलिक संरचना (hydrogeography) को काफी हद तक निर्धारित किया है।



- However, all this is going to change if **river water is diverted over time** by the **upper riparian state**.  
हालांकि, यदि ऊपरी तटीय राज्य समय के साथ नदी के जल को मोड़ देता है, तो यह सब बदल जाएगा।
- At this moment, it is important to delineate the **fundamental hydrogeography of the Indus basin** and its **complex flow patterns**.  
इस समय सिंधु बेसिन की मूलभूत जल-भौगोलिक संरचना और उसके जटिल प्रवाह पैटर्न को समझना आवश्यक है।
- How **water becomes both a lifeline and a faultline** in the **contested South-Asian landscape** is the lingering question.  
यह प्रश्न अब भी बना हुआ है कि **दक्षिण एशिया के विवादित भू-दृश्य में जल कैसे जीवनरेखा और विभाजन रेखा (faultline) दोनों बन जाता है।**
- Under the changing situation, can the river be allowed to flow its course to fulfil its **ecological obligations** of flowing to the sea and completing the **hydrological cycle**?  
बदलती परिस्थितियों में क्या नदी को उसकी प्राकृतिक धारा में बहने की अनुमति दी जा सकती है ताकि वह समुद्र तक बहकर अपने पारिस्थितिक दायित्व और जल चक्र की पूर्णता को निभा सके?

## Mounting Stress

### बढ़ता हुआ दबाव

- To focus solely on **bilateral tensions** is to miss the larger picture. “The **Indus Basin** must be seen as a **single, interconnected whole** — its challenges not confined to **legal frameworks or diplomatic flashpoints** but rooted in **deeper ecological struggles**,” writes **Sinha**.  
केवल द्विपक्षीय तनावों पर ध्यान केंद्रित करना व्यापक तस्वीर को नज़रअंदाज़ करना है। **सिन्हा** लिखते हैं कि “**सिंधु बेसिन को एक एकीकृत और परस्पर जुड़ा हुआ तंत्र माना जाना चाहिए — जिसकी चुनौतियाँ केवल कानूनी ढाँचों या कूटनीतिक विवादों तक सीमित नहीं हैं, बल्कि गहरे पारिस्थितिक संघर्षों में निहित हैं।**”
- With the basin now confronting **surging water demand, climate shocks, and mounting water stress**, the **stakes are intensifying** for the future.  
अब जब यह बेसिन बढ़ती जल मांग, जलवायु झटकों, और बढ़ते जल तनाव का सामना कर रहा है, तो भविष्य के लिए **जोखिम और दांव और गंभीर** हो गए हैं।
- Can this **decades-old treaty** evolve to meet a **new era of crisis**, rekindling its role as a **platform for cooperation**?  
क्या यह **दशकों पुरानी संधि** एक **नए संकट युग** की आवश्यकताओं को पूरा करने के लिए विकसित हो सकती है और एक **सहयोग मंच (platform for cooperation)** के रूप में अपनी भूमिका को फिर से जीवित कर सकती है?
- Rivers themselves have always had their own **logic** — their **natural beauties, floods, droughts, silting, changes of course, tipping points, and disappearances**, as **Vanessa Taylor** notes in *Seven Rivers* (Weidenfeld & Nicolson, 2025).  
**वनेसा टेलर** ने *Seven Rivers* (Weidenfeld & Nicolson, 2025) में लिखा है कि नदियों की अपनी एक **तर्कशक्ति (logic)** होती है — उनकी **प्राकृतिक सुंदरता, बाढ़, सूखा, गाद जमना, धारा परिवर्तन, संकट बिंदु और लुप्त होना।**
- Rivers have **shaped human lives**, just as **humans have shaped theirs**.  
नदियों ने **मानव जीवन को आकार दिया है**, ठीक वैसे ही जैसे **मानवों ने नदियों को आकार दिया है।**
- The **changing hydro dynamics of the Indus river** offers a view of the world where **the person and the river are seen in relation to each other**.  
**सिंधु नदी की बदलती जल-गतिकी (hydro dynamics)** हमें एक ऐसा दृष्टिकोण प्रदान करती है जहाँ **मनुष्य और नदी को परस्पर संबंध में देखा जाता है।**
- **Love, grief, and hope flow through the river**.  
**प्रेम, दुःख और आशा नदी के साथ बहते हैं।**



## Hurricane Melissa a 'beast' among a string of monster Atlantic storms

**GS I: Geography**

**Agence France Presse**

**H**urricane Melissa, which struck Jamaica with record-tying 296 kmph winds on October 28, was a beast that stood out as extreme even in a record number of monster storms spawned over the last decade in a superheated Atlantic Ocean.

While more storms these days are undergoing rapid intensification – gaining 356 kmph in wind speed over 24 hours – Melissa did a lot more than that. It achieved what's called extreme rapid intensification – gaining at least 92 kmph over 24 hours. In fact, Melissa turbocharged by about 112 kmph during a 24-hour period last week and had an unusual second round of rapid intensification that spun it up to 280 kmph, scientists said.

"It's been ... just a beast of a storm," Colorado State University hurricane researcher Phil Klotzbach said.

When Melissa came ashore it tied strength records for Atlantic hurricanes making landfall, both in wind speed and barometric pressure, which is a key measurement that meteorologists use, said Mr. Klotzbach and University of Miami hurricane researcher Brian McNoldy. The pressure measurement tied the deadly 1935 Labour Day storm in Florida, while the 296 kmph wind speed equalled marks set that year and during 2019's Hurricane Dorian. Hurricane Allen reached 304 kmph winds in 1980, but not at landfall.

**Melissa turbocharged by 112 kmph in 24-hours last week and had an unusual second round of rapid intensification that spun it up to 280 kmph**

Usually when major hurricanes brew, they get so strong that the wind twirling in the centre of the storm gets so intense and warm in places that the eyewall needs to grow, so a small one collapses and a bigger one forms. That's called an eyewall replacement cycle, Mr. McNoldy said, and it usually weakens the storm at least temporarily.

Melissa showed some signs of being ready to do this, but it never did, Mr. McNoldy and Klotzbach said.

Another weird thing is that Melissa sat offshore of mountainous Jamaica for a while before coming inland. Usually mountains, even on islands, tear up storms, but not Melissa.

"It was next to a big mountainous island, and it doesn't even notice it's there," Mr. McNoldy said in amazement.

Warm water is the fuel for hurricanes. The hotter and deeper the water, the more a storm can power up. But when storms sit over one area for a while – which Melissa did for days on end – it usually brings cold water up from the depths, choking off the fuel a bit. But that didn't happen to Melissa, said Bernadette Woods Placky, chief meteorologist for Climate Central, a combination of scientists and journalists who study climate change.

"It's wild how almost easily this was allowed to just keep venting," Ms. Placky said. "This had enough warm water at such high levels and it just kept going."

Melissa rapidly intensified during five six-hour periods as it hit the extreme rapid intensification level, Mr. McNoldy said. And then it jumped another 56 kmph, and "that's extraordinary," he said.

For meteorologists following it, "just your stomach would sink as you'd see these updates coming in," Ms. Placky said.

"We were sitting at work on Monday morning with our team, and you just saw the numbers just start jumping again, 175. And then again this morning (Tuesday), 185," Ms. Placky said.

up to 280 kmph, scientists said.

वैज्ञानिकों के अनुसार, मेलिसा ने तेज़ी से तीव्रता प्राप्त करने का दूसरा दौर भी पार किया, जिससे इसकी गति 280 किमी/घं. तक पहुँच गई।

- "It's been ... just a beast of a storm," said Phil Klotzbach, hurricane researcher at Colorado State University. कोलोराडो स्टेट यूनिवर्सिटी के हरिकेन शोधकर्ता फिल क्लोटज़बाख ने कहा, "यह एक बेहद भयानक तूफान रहा है।"
- When Melissa made landfall, it tied strength records for Atlantic hurricanes in both wind speed and barometric pressure, according to Klotzbach and Brian McNoldy of the University of Miami. जब मेलिसा भूमि से टकराया, तब उसने अटलांटिक तूफानों के ताकत रिकॉर्ड को हवा की गति और वायुदाब (barometric pressure) दोनों में बराबरी पर पहुँचा दिया, जैसा कि क्लोटज़बाख और ब्रायन मैकनॉल्डी (मियामी विश्वविद्यालय) ने कहा।
- The pressure measurement tied the deadly 1935 Labour Day storm in Florida, while the 296 kmph wind speed equalled Hurricane Dorian (2019). वायुदाब माप 1935 के घातक लेबर डे तूफान (फ्लोरिडा) के बराबर था, जबकि 296 किमी/घं. की हवा की गति 2019 के हरिकेन डोरियन के समान थी।

**Hurricane Melissa — a 'beast' among a string of monster Atlantic storms**

**हरिकेन मेलिसा — अटलांटिक के राक्षसी तूफानों की श्रृंखला में एक 'दैत्या'**

• **Hurricane Melissa, which struck Jamaica with record-tying 296 kmph winds on October 28, was an extreme storm even among a record number of monster storms spawned over the last decade in a superheated Atlantic Ocean.**

हरिकेन मेलिसा, जिसने 28 अक्टूबर को जमैका में 296 किमी/घं. की हवाओं के साथ प्रहार किया, पिछले दशक में अत्यधिक गर्म अटलांटिक महासागर में पैदा हुए रिकॉर्ड संख्या वाले तूफानों में भी एक अत्यधिक शक्तिशाली तूफान था।

• More storms these days are undergoing rapid intensification — gaining 56 kmph in wind speed over 24 hours — but Melissa went beyond that.

आजकल अधिकतर तूफान तेज़ी से तीव्रता प्राप्त (rapid intensification) कर रहे हैं — जो 24 घंटे में 56 किमी/घं. की गति बढ़ाते हैं — लेकिन मेलिसा ने इसे भी पार कर लिया।

• It achieved extreme rapid intensification, gaining at least 92 kmph over 24 hours, and actually increased about 112 kmph in one day.

इसने अत्यधिक तीव्र वृद्धि (extreme rapid intensification) प्राप्त की, जहाँ 24 घंटे में कम से कम 92 किमी/घं. और वास्तव में लगभग 112 किमी/घं. की वृद्धि हुई।

• Melissa also went through a second round of rapid intensification that pushed its speed





- **Hurricane Allen (1980) reached 304 kmph winds, but not at landfall.**  
हरिकेन एलेन (1980) ने 304 किमी/घं. की गति प्राप्त की थी, लेकिन भूमि पर पहुंचने से पहले।
- Usually, major hurricanes undergo an **eyewall replacement cycle**, where the small inner wall collapses and a larger one forms, temporarily weakening the storm.  
आमतौर पर, बड़े हरिकेन में **आंख की दीवार प्रतिस्थापन चक्र (eyewall replacement cycle)** होता है, जिसमें छोटा आंतरिक चक्र ध्वस्त होकर बड़ा चक्र बनता है, जिससे तूफान अस्थायी रूप से कमजोर होता है।
- Melissa showed signs of this but **never completed the cycle**, according to McNoldy and Klotzbach.  
**मैकनॉल्डी** और **क्लोत्ज़बाख** के अनुसार, मेलिसा ने इसके संकेत दिखाए, लेकिन **चक्र पूरा नहीं किया**।
- Another unusual aspect: Melissa stayed **offshore of mountainous Jamaica** for a while before coming inland, yet was **unaffected by the mountains**.  
एक और असामान्य बात यह थी कि मेलिसा कुछ समय तक **जमैका के पहाड़ी तट के पास** रुका रहा, फिर भी **पहाड़ों से अप्रभावित** रहा।
- “It was next to a big mountainous island, and it doesn’t even notice it’s there,” said McNoldy in amazement.  
**मैकनॉल्डी** ने आश्चर्य से कहा, “यह एक बड़े पहाड़ी द्वीप के पास था, लेकिन जैसे उसे इसका अहसास ही नहीं हुआ।”
- **Warm water** is the fuel for hurricanes — the hotter and deeper the water, the stronger the storm.  
**गर्म पानी** हरिकेन के लिए ईंधन होता है — जितना गर्म और गहरा पानी होगा, तूफान उतना शक्तिशाली बनेगा।
- Usually, when storms stay in one area for long, they pull up **cold water from depths**, reducing fuel — but that didn’t happen with Melissa.  
सामान्यतः जब तूफान किसी क्षेत्र में लंबे समय तक रहते हैं, तो वे **गहराई से ठंडा पानी ऊपर खींच लेते हैं**, जिससे ईंधन कम हो जाता है — लेकिन मेलिसा के साथ ऐसा नहीं हुआ।
- **Bernadette Woods Placky**, chief meteorologist for **Climate Central**, said: “It’s wild how easily this kept venting. This had enough warm water and it just kept going.”  
**क्लाइमेट सेंटरल** की मुख्य मौसम वैज्ञानिक **बर्नाडेट वुड्स प्लैकी** ने कहा: “यह अद्भुत है कि यह तूफान इतनी आसानी से लगातार सक्रिय रहा। इसमें पर्याप्त **गर्म पानी** था और यह बस चलता ही गया।”
- Melissa **rapidly intensified** during **five six-hour periods**, hitting the **extreme rapid intensification level**, McNoldy said.  
**मैकनॉल्डी** ने बताया कि मेलिसा ने **पाँच छह-घंटे की अवधियों में तेज़ी से तीव्रता प्राप्त की**, और **अत्यधिक तीव्रता स्तर (extreme rapid intensification)** तक पहुँच गया।
- Then it **jumped another 56 kmph**, which was “extraordinary.”  
फिर इसकी गति में **और 56 किमी/घं. की वृद्धि हुई**, जो “असाधारण” थी।
- Meteorologists watching it said it was terrifying to see the updates as wind speeds surged to **175 kmph**, then **185 kmph** the next morning.  
इसे देखते हुए मौसम वैज्ञानिकों ने कहा कि जैसे-जैसे हवा की गति **175 किमी/घं.** और फिर अगले दिन सुबह **185 किमी/घं.** पहुँची, अपडेट्स देखना **भयावह** था।
- “Just your stomach would sink as you’d see these updates coming in,” Ms. Placky said.  
**सुश्री प्लैकी** ने कहा, “जैसे ही ये अपडेट्स आ रहे थे, हमारे दिल बैठ जा रहे थे।”



TELEGRAM CHANNEL: <https://t.me/patrioticIAS>

YOUTUBE CHANNEL: <https://www.youtube.com/@PatrioticIAS>

CONTACT: 9971932488



Questions and Answers to the previous day's

daily quiz: 1. Five days after nearly 13 million shares of U.S. stock were sold in one day in 1929, an additional 16 million shares were sold on this day, fuelling the Great Depression. Ans: **Black Tuesday**

2. This country announced that it was ending its one-child policy in 2015. Ans: **China**

3. This Academy Award-nominated screenwriter wrote *Dr. Strangelove* and *Easy Rider*. Ans: **Terry Southern**

4. The group of painters who treated urban scenes realistically. Ans: **Ashcan school**

5. This country was established largely through the efforts of Kemal Atatürk. Ans: **Türkiye**

6. Anarchist Leon Czolgosz was executed for the assassination of this U.S. President. Ans: **William McKinley**

7. This person was the Minister of Propaganda for the German Third Reich under Adolf Hitler. Ans: **Joseph Goebbels**

Visual: Identify this former President of Liberia.

Ans: **Ellen Johnson Sirleaf**

Early Birds: Erfanally Oosmany| Haridas Pal|

Ritviz| Abhay Krishan| Sachin. D

## QUIZ

### Black Tuesday (29 October 1929)

- The Wall Street Crash of 1929 was one of the most devastating financial events in modern history. It began on **Black Thursday (24 October 1929)** and culminated on **Black Tuesday (29 October 1929)**, when panic selling reached its peak.
- On **Black Tuesday**, investors traded around **16.4 million shares** on the New York Stock Exchange (NYSE) in a single day — a record volume at the time.
- Just five days earlier, on 24 October, about **13 million shares** had been sold.
- The crash marked the end of the “**Roaring Twenties**”, a period of rapid economic growth, and triggered a chain of events that led to the **Great Depression**.
- Between 1929 and 1932, the **Dow Jones Industrial Average (DJIA)** lost almost **89 %** of its value.

### Important Concepts and Data

#### Speculative Bubble

- During the 1920s, U.S. stock prices rose dramatically.
- The DJIA increased nearly six-fold — from around **63 in August 1921** to **381 in September 1929**.
- Many people believed the market would continue to rise indefinitely, which encouraged reckless investment.

#### Margin Buying

- A key reason for the crash was **margin buying** — borrowing money to purchase stocks.
- Investors often paid only a small percentage of the stock's price in cash and borrowed the rest.
- When prices fell, investors could not repay loans, forcing them to sell stocks rapidly, further deepening the collapse.

#### Trading Volume and Panic

- On **Black Tuesday**, the volume of trading was so immense that **ticker machines** fell hours behind, and prices were unclear.
- Fear spread among ordinary citizens, who rushed to withdraw money from banks — leading to a wave of **bank failures**.

#### Government and Institutional Response

- The crash exposed the absence of effective financial regulation in the U.S.
- In response, the **U.S. government** introduced major reforms during the **New Deal era**, including:
  - The **Securities Act of 1933** and **Securities Exchange Act of 1934**, establishing strict disclosure and anti-fraud laws.
  - Creation of the **Securities and Exchange Commission (SEC)** in 1934 to regulate stock markets.
    - These reforms aimed to restore trust in financial institutions and prevent speculative bubbles in the future.

#### China's One-Child Policy: End of an Era

Address : 3rd Floor, KV Tower, Padleyganj Road, Gorakhpur  
 Email Id : [info@patrioticias.in](mailto:info@patrioticias.in)  
 Contact Number : 9971932488  
 Website : [patrioticias.in](http://patrioticias.in)



**TELEGRAM CHANNEL:** <https://t.me/patrioticIAS>

**YOUTUBE CHANNEL:** <https://www.youtube.com/@PatrioticIAS>

**CONTACT: 9971932488**



- The **one-child policy** in China was officially introduced around **1980** to curb the country's rapidly growing population.
- The policy aimed to **reduce population growth** so as to facilitate **economic development**, manage **resource needs**, and improve **living standards**.
- Over the decades, the policy was strictly enforced — in many cases with **penalties, birth quotas, and regulation of family size**.

#### Key Change: Ending the One-Child Policy

- On **29 October 2015**, China announced that it would **end the one-child policy** and allow couples to have **two children**.
- The new law was formally enacted by the **Standing Committee of the National People's Congress** on **27 December 2015**, coming into effect from **1 January 2016**.

#### Reasons for the Policy Shift

- China faced a rapidly **ageing population**, declining **birth-rates**, and a shrinking **working-age population**, which threatened future **economic growth**.
- The **gender imbalance** (more men than women) and the **"4-2-1 problem"** (four grandparents, two parents, one child) made supporting the elderly increasingly difficult.

PATRIOTIC IAS



# U.S. will cut troops in Europe: Romania

**GS I: Mapping**

**Agence France-Presse**  
BUCHAREST

Washington has told Romania, which neighbours war-torn Ukraine, and allies it will reduce the number of U.S. troops deployed on NATO's eastern flank, Romania's Defence Ministry said on Wednesday, a move some officials downplayed while analysts warned it could embolden Russia.

U.S. President Donald Trump has repeatedly criticised NATO, and insisted that European allies boost military spending as Ukraine battles Russia's invasion.

Some 85,000 American troops are stationed in Europe, including 20,000 troops deployed to reinforce NATO's eastern flank after Russia invaded Ukraine in 2022, according to the U.S. Defence Department.

The latest announcement came after reports this year that Washington could withdraw 10,000 troops from eastern Europe as the U.S. focus shifts more towards the Indo-Pacific region, which the

Pentagon called its "priority theatre".

"The resizing of U.S. forces is a result of the new priorities of the presidential administration, announced back in February," Romania's Defence Ministry said. The decision "also took into account the fact that NATO has strengthened its presence and activity on the eastern flank."

A NATO official told AFP that the body had been informed by the Trump administration in advance, and played down its significance.

"Even with this adjustment, the U.S. force posture in Europe remains larger than it has been for many years, with many more U.S. forces on the continent than before 2022," the official said.

Washington's commitment to the alliance remained "clear", the official added.

But experts such as George Scutaru, co-founder of the New Strategy Center, a Romanian think tank, warned the move was the "wrong signal" to send to Russia regarding the Black Sea region.

## U.S. will cut troops in Europe: Romania अमेरिका यूरोप में सैनिकों की संख्या घटाएगा: रोमानिया

• Washington has told Romania, which neighbours war-torn Ukraine, and allies it will reduce the number of U.S. troops deployed on NATO's eastern flank, Romania's Defence Ministry said on Wednesday.

रोमानिया के रक्षा मंत्रालय ने बुधवार को कहा कि वाशिंगटन ने युद्धग्रस्त यूक्रेन से सटे रोमानिया और सहयोगी देशों को सूचित किया है कि वह नाटो के पूर्वी मोर्चे पर तैनात अमेरिकी सैनिकों की संख्या कम करेगा।

• The move some officials downplayed while analysts warned it could embolden Russia. कुछ अधिकारियों ने इस कदम को मामूली बताया, जबकि विश्लेषकों ने चेतावनी दी कि यह रूस को साहस दे सकता है।

### Trump's stance on NATO नाटो पर ट्रंप का रुख

• U.S. President Donald Trump has repeatedly criticised NATO, and insisted that European allies boost military spending as Ukraine battles Russia's invasion.

अमेरिकी राष्ट्रपति डोनाल्ड ट्रंप ने बार-बार नाटो की आलोचना की है और यह जोर दिया है कि यूरोपीय सहयोगी देशों को सैन्य खर्च बढ़ाना चाहिए, जबकि यूक्रेन रूस के आक्रमण का सामना कर रहा है।

• Some 85,000 American troops are stationed in Europe, including 20,000 troops deployed to reinforce NATO's eastern flank after Russia invaded Ukraine in 2022, according to the U.S. Defence Department.

अमेरिकी रक्षा विभाग के अनुसार, यूरोप में लगभग 85,000 अमेरिकी सैनिक तैनात हैं, जिनमें से 20,000 सैनिक 2022 में रूस द्वारा यूक्रेन पर हमले के बाद नाटो के पूर्वी मोर्चे को मजबूत करने के लिए तैनात किए गए थे।

- The latest announcement came after reports this year that Washington could withdraw 10,000 troops from eastern Europe as the U.S. focus shifts more towards the Indo-Pacific region, which the Pentagon called its "priority theatre." इस वर्ष की रिपोर्टों के बाद यह नवीनतम घोषणा आई कि वाशिंगटन पूर्वी यूरोप से 10,000 सैनिक वापस बुला सकता है, क्योंकि अमेरिका का ध्यान अब अधिक इंडो-पैसिफिक क्षेत्र पर केंद्रित है, जिसे पेंटागन ने अपना "प्राथमिक क्षेत्र" कहा है।

### Romania's Defence Ministry Statement रोमानिया के रक्षा मंत्रालय का बयान

- "The resizing of U.S. forces is a result of the new priorities of the presidential administration, announced back in February," Romania's Defence Ministry said. रोमानिया के रक्षा मंत्रालय ने कहा, "अमेरिकी बलों का पुनर्गठन राष्ट्रपति प्रशासन की नई प्राथमिकताओं का परिणाम है, जिसकी घोषणा फरवरी में की गई थी।"



Mihail Kogalniceanu Air Base after Romania said the U.S. plans to cut the number of troops in Europe, on Wednesday. REUTERS



- The decision “also took into account the fact that NATO has strengthened its presence and activity on the eastern flank.”  
इस निर्णय में यह तथ्य भी शामिल किया गया कि नाटो ने अपने पूर्वी मोर्चे पर अपनी उपस्थिति और गतिविधि को मजबूत किया है।

### NATO's reaction नाटो की प्रतिक्रिया

- A NATO official told AFP that the body had been informed by the Trump administration in advance, and played down its significance.  
एक नाटो अधिकारी ने एएफपी को बताया कि संगठन को ट्रंप प्रशासन द्वारा पहले ही सूचित कर दिया गया था, और उसने इस कदम के महत्व को कम करके आंका।
- “Even with this adjustment, the U.S. force posture in Europe remains larger than it has been for many years, with many more U.S. forces on the continent than before 2022,” the official said.  
अधिकारी ने कहा, “इस समायोजन के बावजूद, यूरोप में अमेरिकी सैन्य उपस्थिति कई वर्षों की तुलना में अधिक बनी हुई है, और 2022 से पहले की तुलना में अधिक अमेरिकी सैनिक महाद्वीप पर मौजूद हैं।”
- Washington’s commitment to the alliance remained “clear,” the official added.  
अधिकारी ने जोड़ा कि गठबंधन के प्रति वाशिंगटन की प्रतिबद्धता “स्पष्ट” बनी हुई है।

### Experts' Warning विशेषज्ञों की चेतावनी

- But experts such as George Scutaru, co-founder of the New Strategy Center, a Romanian think tank, warned the move was the “wrong signal” to send to Russia regarding the Black Sea region.  
लेकिन न्यू स्ट्रैटेजी सेंटर (एक रोमानियाई थिंक टैंक) के सह-संस्थापक जॉर्ज स्कुटारू जैसे विशेषज्ञों ने चेतावनी दी कि यह कदम ब्लैक सी क्षेत्र को लेकर रूस को “गलत संदेश” भेजेगा।

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# U.S. doing a trade deal with India: Trump

At the APEC CEO summit in South Korea, President Trump says he has a great relationship with Modi

Trump reiterates claim that he used trade ties to resolve the India-Pakistan conflict in May

Trump says the leaders of India and Pakistan called him after two days and stopped fighting

GS II: India US

**Press Trust of India**  
TOKYO/SEOUL

U.S. President Donald Trump on Wednesday said Washington is "doing a trade deal with India", and emphasised that he has "a great relationship" with Prime Minister Narendra Modi, as both sides continue negotiations on a proposed pact.

"If you look at India and Pakistan... so, I'm doing a trade deal with India and I have great respect and love, as you know, for Prime Minister Modi. We have a great relationship," Mr. Trump said at the APEC (Asia-Pacific Economic Cooperation) CEO Summit in Gyeongju, South Korea.

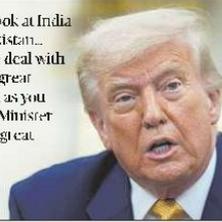
"Prime Minister Modi is the nicest looking guy... he's tough as hell," Mr. Trump added. He landed in South Korea on Wednesday morning from Japan as part of a three-nation tour of Asia.

Mr. Trump, who did not elaborate on trade talks, reiterated his claim that he used trade to resolve the war between India and Pakistan in May. "I called Prime Minister Modi. I said, we can't make a trade deal with you... (He said) No, no, we must make a trade... I said, No, we can't. You are starting a war with Pakistan. We're not going to do it," Mr. Trump said.

He also praised Pakistan's Army chief Field Marshal Asim Munir, calling him "a great fighter" and

If you look at India and Pakistan... I'm doing a trade deal with India and I have great respect and love, as you know, for Prime Minister Modi. We have a great relationship

**DONALD TRUMP**  
U.S. President



"a great guy." "Then I called Pakistan. I said, we're not going to do trade with you because you're fighting with India and you know, two nuclear nations. And they said, no, no, no, you should let us fight. They both said that," he added.

Mr. Trump claimed that

the leaders of both India and Pakistan called him after two days and stopped fighting. "After literally two days, they called up, they said, we understand, and they stopped fighting. How is that? Isn't that amazing? Now, you think [Joe] Biden would have done that?" Mr. Trump said.

## Talks with EU have gone past halfway mark: Goyal

**T.C.A. Sharad Raghavan**  
NEW DELHI

Negotiations between India and the EU on a free trade agreement have crossed the halfway mark, with 10 out of 20 chapters

finalised, and several other chapters nearing completion, Union Minister Piyush Goyal said on Wednesday.

**FULL REPORT**  
» PAGE 4

that nuclear dust all over the place. All of you are affected, right? And we said, No, we're not doing any deals if you're going to fight. And within about 24 hours, that was the end of that. It was amazing, actually," the U.S. President said.

**'Under strain'**

The U.S. President's comment came at a time when the relations between New Delhi and Washington have been reeling under severe strain after Mr. Trump imposed 50% tariffs on India, including an additional 25% levies for its procurement of Russian crude oil.

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The previous day, in Tokyo, Mr. Trump said he brought the war to an end in 24 hours. "Seven planes were shot down, seven brand new, beautiful planes were shot down, and they were going at it... two big nuclear powers," he said at a reception and dinner with business lead-

ers in the Japanese capital. He added that he told Mr. Modi and Gen. Munir, "Look, we're not going to do any trade if you're going to be fighting." "They said one thing has nothing to do with the other. I said this, it has a lot to do with the other...two nuclear powers...we get

## U.S. doing a trade deal with India: Trump भारत के साथ व्यापार समझौता कर रहा है अमेरिका: ट्रंप

- U.S. President **Donald Trump** on Wednesday said Washington is "doing a trade deal with India", and emphasised that he has "a great relationship" with **Prime Minister Narendra Modi**, as both sides continue negotiations on a proposed pact. बुधवार को अमेरिकी राष्ट्रपति डोनाल्ड ट्रंप ने कहा कि वाशिंगटन "भारत के साथ व्यापार समझौता कर रहा है" और उन्होंने यह भी कहा कि उनकी प्रधानमंत्री नरेंद्र मोदी के साथ "बहुत अच्छी दोस्ती" है, क्योंकि दोनों पक्ष एक प्रस्तावित समझौते पर बातचीत जारी रखे हुए हैं।

- "If you look at **India and Pakistan**... so, I'm doing a trade deal with India and I have great respect and love, as you know, for **Prime Minister Modi**. We have a great relationship," Mr. Trump said at the **APEC (Asia-Pacific Economic Cooperation) CEO Summit** in **Gyeongju, South Korea**.

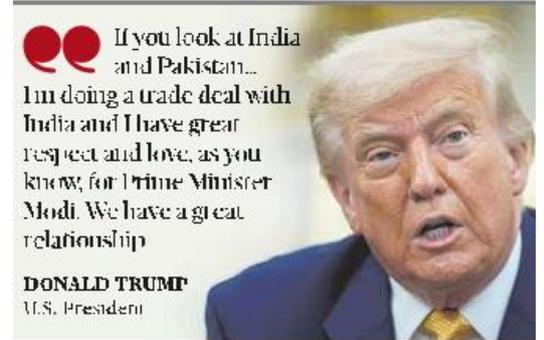
"अगर आप भारत और पाकिस्तान को देखें... तो मैं भारत के साथ व्यापार समझौता कर रहा हूँ और जैसा कि आप जानते हैं, मुझे प्रधानमंत्री मोदी के लिए बहुत सम्मान और प्रेम है। हमारा एक शानदार संबंध है," श्री ट्रंप ने एपेक (एशिया-प्रशांत आर्थिक सहयोग) सीईओ शिखर सम्मेलन, ग्योंगजू, दक्षिण कोरिया में कहा।

- "**Prime Minister Modi** is the nicest looking guy... he's **tough as hell**," Mr. Trump added. He landed in **South Korea** on Wednesday morning from **Japan** as part of a **three-nation tour of Asia**.

"प्रधानमंत्री मोदी सबसे अच्छे दिखने वाले व्यक्ति हैं... वह बहुत सख्त हैं," श्री ट्रंप ने कहा। वह बुधवार सुबह जापान से दक्षिण कोरिया पहुंचे, जो एशिया के तीन देशों की यात्रा का हिस्सा था।

- Mr. Trump, who did not elaborate on trade talks, reiterated his claim that he used **trade** to resolve the **war between India and Pakistan** in May. "I called **Prime Minister Modi**. I said, we can't make a trade deal with you... (He said) No, no, we must make a trade... I said, No, we can't. You are starting a war with Pakistan. We're not going to do it," Mr. Trump said.

श्री ट्रंप, जिन्होंने व्यापार वार्ता पर विस्तार से बात नहीं की, ने दोहराया कि उन्होंने भारत और पाकिस्तान के बीच युद्ध को सुलझाने के लिए व्यापार का इस्तेमाल किया। "मैंने प्रधानमंत्री मोदी को





फोन किया। मैंने कहा, हम आपके साथ व्यापार समझौता नहीं कर सकते... (उन्होंने कहा) नहीं, नहीं, हमें व्यापार करना ही है... मैंने कहा, नहीं, हम नहीं कर सकते। आप **पाकिस्तान के साथ युद्ध शुरू कर रहे हैं।** हम ऐसा नहीं करेंगे,” श्री ट्रंप ने कहा।

- He also praised **Pakistan's Army chief Field Marshal Asim Munir**, calling him “a **great fighter**” and “a **great guy**.” “Then I called Pakistan. I said, we’re not going to do trade with you because you’re fighting with India and you know, two nuclear nations. And they said, no, no, no, you should let us fight. They both said that,” he added.  
उन्होंने **पाकिस्तान के सेना प्रमुख फील्ड मार्शल असीम मुनीर** की भी प्रशंसा की, उन्हें “**एक महान योद्धा**” और “**एक बेहतरीन व्यक्ति**” कहा। “फिर मैंने **पाकिस्तान** को फोन किया। मैंने कहा, हम आपके साथ व्यापार नहीं करेंगे क्योंकि आप **भारत से लड़ रहे हैं** और आप जानते हैं, दोनों **परमाणु राष्ट्र** हैं। और उन्होंने कहा, नहीं, नहीं, नहीं, आपको हमें लड़ने देना चाहिए। दोनों ने यही कहा,” उन्होंने जोड़ा।
- Mr. Trump claimed that the previous day, in **Tokyo**, he said he brought the **war to an end in 24 hours**. “Seven planes were shot down, seven brand new, beautiful planes were shot down, and they were going at it... two big nuclear powers,” he said at a **reception and dinner** with business leaders in the Japanese capital.  
श्री ट्रंप ने दावा किया कि एक दिन पहले, **टोक्यो** में उन्होंने कहा कि उन्होंने **24 घंटे में युद्ध समाप्त कर दिया**। “सात विमान गिराए गए, सात नए, सुंदर विमान गिराए गए, और वे लड़ रहे थे... दो बड़े परमाणु शक्तियां,” उन्होंने जापान की राजधानी में **व्यापारिक नेताओं के साथ एक स्वागत समारोह और रात्रिभोज** में कहा।
- He added that he told **Mr. Modi and Gen. Munir**, ‘Look, we’re not going to do any trade if you’re going to be fighting,’ “(They said) one thing has nothing to do with the other. I said this, it has a lot to do with the other ...two nuclear powers...we get that **nuclear dust** all over the place. All of you are affected, right? And we said, No, we’re not doing any deals if you’re going to fight. And within about **24 hours**, that was the end of that. It was amazing, actually,” the U.S. President said.  
उन्होंने आगे कहा कि उन्होंने **मोदी और जनरल मुनीर** से कहा, ‘देखो, अगर तुम लड़ाई करने जा रहे हो तो हम कोई व्यापार नहीं करेंगे,’ “(उन्होंने कहा) एक चीज का दूसरी से कोई लेना-देना नहीं है। मैंने कहा, इसका बहुत लेना-देना है ...दो **परमाणु शक्तियां**...हमें वह **परमाणु धूल** हर जगह मिल जाएगी। आप सब प्रभावित होंगे, सही है? और हमने कहा, नहीं, हम कोई समझौता नहीं करेंगे अगर आप लड़ाई करेंगे। और लगभग **24 घंटे** के भीतर, वह समाप्त हो गया। यह वास्तव में अद्भुत था,” अमेरिकी राष्ट्रपति ने कहा।
- ‘**Under strain**’ — The U.S. President’s comment came at a time when the **relations between New Delhi and Washington** have been **reeling under severe strain** after Mr. Trump imposed **50% tariffs on India**, including an additional **25% levies** for its procurement of **Russian crude oil**.  
‘**तनाव में**’ — अमेरिकी राष्ट्रपति की यह टिप्पणी ऐसे समय में आई जब **नई दिल्ली और वाशिंगटन के संबंध गंभीर तनाव** में थे क्योंकि श्री ट्रंप ने **भारत पर 50% शुल्क** लगाए थे, जिसमें **रूसी कच्चे तेल की खरीद पर अतिरिक्त 25% कर** शामिल था।
- The leaders of both **India and Pakistan** called him after two days and **stopped fighting**. “After literally two days, they called up, they said, we understand, and they stopped fighting. How is that? Isn’t that amazing? Now, you think **[Joe] Biden** would have done that?” Mr. Trump said.  
दोनों **भारत और पाकिस्तान** के नेताओं ने दो दिन बाद उन्हें फोन किया और **लड़ाई बंद कर दी**। “सचमुच दो दिन बाद उन्होंने फोन किया, कहा कि हमने समझ लिया, और उन्होंने लड़ाई बंद कर दी। कैसा है यह? क्या यह अद्भुत नहीं है? अब, क्या आप सोचते हैं कि **[जो] बाइडेन** ऐसा कर पाते?” श्री ट्रंप ने कहा।

### The previous day, in Tokyo पिछले दिन, टोक्यो में

- The previous day, in **Tokyo**, Mr. Trump said he brought the **war to an end in 24 hours**.  
पिछले दिन **टोक्यो** में, श्री ट्रंप ने कहा कि उन्होंने **24 घंटे में युद्ध समाप्त कर दिया**।



- “Seven planes were shot down, seven brand new, beautiful planes were shot down, and they were going at it... **two big nuclear powers**,” he said at a **reception and dinner** with business leaders in the **Japanese capital**.  
“सात विमान गिराए गए, सात नए और सुंदर विमान गिराए गए, और वे एक-दूसरे से लड़ रहे थे... **दो बड़ी परमाणु शक्तियां**,” उन्होंने **जापान की राजधानी** में व्यापारिक नेताओं के साथ एक **स्वागत समारोह और रात्रिभोज** में कहा।
- He added that he told **Mr. Modi and Gen. Munir**, ‘Look, we’re not going to do any trade if you’re going to be fighting.’  
उन्होंने यह भी जोड़ा कि उन्होंने **श्री मोदी और जनरल मुनीर** से कहा, ‘देखो, अगर तुम लोग लड़ाई करने जा रहे हो तो हम कोई व्यापार नहीं करेंगे।’
- “(They said) one thing has nothing to do with the other. I said this, it has a lot to do with the other ...**two nuclear powers**...we get that **nuclear dust** all over the place. All of you are affected, right?”  
“(उन्होंने कहा) एक बात का दूसरी से कोई लेना-देना नहीं है। मैंने कहा, इसका बहुत लेना-देना है ...**दो परमाणु शक्तियां**...हमें वह **परमाणु धूल** हर जगह मिल जाएगी। आप सब प्रभावित होंगे, है ना?”
- “And we said, **No, we’re not doing any deals if you’re going to fight**. And within about **24 hours**, that was the end of that. It was amazing, actually,” the **U.S. President** said.  
“और हमने कहा, **नहीं, अगर तुम लड़ाई करने जा रहे हो तो हम कोई समझौता नहीं करेंगे**। और लगभग **24 घंटे** के भीतर, वह मामला खत्म हो गया। यह वास्तव में अद्भुत था,” **अमेरिकी राष्ट्रपति** ने कहा।
- The **U.S. President’s comment** came at a time when the **relations between New Delhi and Washington** have been **reeling under severe strain** after Mr. Trump imposed **50% tariffs on India**, including an additional **25% levies** for its procurement of **Russian crude oil**.  
**अमेरिकी राष्ट्रपति की टिप्पणी** ऐसे समय आई जब **नई दिल्ली और वाशिंगटन** के संबंध गंभीर तनाव में थे, क्योंकि **श्री ट्रंप** ने **भारत पर 50% शुल्क** लगाए थे, जिसमें **रूसी कच्चे तेल की खरीद** पर अतिरिक्त **25% कर** शामिल था।



# An amended Constitution Bill, its contentious issues

GS II: Parliament

The central government recently introduced the Constitution (One Hundred And Thirtieth Amendment) Bill in Parliament to amend Article 75, Article 164 and Article 239AA of the Constitution which pertain to the Union Council of Ministers, State Council of Ministers and the special administrative provisions for Delhi, respectively. The Bill has been referred to a Joint Parliamentary Committee.

The Bill provides that in case a Minister is arrested and detained in custody for 30 consecutive days, for an alleged offence punishable with imprisonment which may extend up to five years or more, he shall be removed from office by the President, on the advice of the Prime Minister, which is to be tendered by the 31st day of such custody. Or, he shall cease to be a Minister in case such advice is not tendered by then. A similar provision is provided for Ministers in State Assemblies, who shall be removed by the Governor on the advice of the Chief Minister. In the case of the Prime Minister and Chief Minister of a State, they are required either to tender their resignation by the 31st day or else shall (automatically) cease to be the Prime Minister or Chief Minister of a State.

**What was contentious for the Opposition**  
The two contentious issues that forced the Opposition to come together against the Bill were 'arrest' by the police and authorising 'detention' by a court. Since, wide discretion lies with both, there needs to be scrutiny of the Bill to ensure that it is not misused.

The first parameter to remove a Minister is arrest, which is discretionary and in the hands of the enforcement agencies. While the Bharatiya Nagarik Suraksha Sanhita (BNS) provides for the enforcement of some conditions before there is an arrest for offences that are punishable for up to seven years of imprisonment, it is not mandatory for a police officer to arrest any person accused of commission of a cognisable offence that is punishable with imprisonment even for more than seven years.

The Madras High Court, in *Deenan vs Jayalalitha* (1989), refused to interfere in the police investigation when the petitioner pleaded before the High Court to use its inherent powers to direct the Commissioner of Police to arrest the respondent, Jayalalitha.

The High Court said that the words 'may arrest' under Section 41 showed that the power of arrest is discretionary and that a police officer is not always bound to make an arrest for cognisable offences. Though he has the power to arrest, he can refrain from arresting persons, depending upon the nature of the offence and the circumstances unfurled not only in the complaint but also during the course of investigation. The authorised power of arrest of an offender by a private person is restricted to cases of commission of non-bailable and cognisable offences in his presence and to the case of the



**R.K. Vij**

is a former IPS officer



**Shivani Vij**

is a lawyer

There needs to be greater scrutiny of the Constitution (One Hundred And Thirtieth Amendment) Bill and its focus on 'arrest'

proclaimed offender, not otherwise.

In *Joginder Kumar vs State of U.P.* (1994), the Supreme Court of India observed that no arrest can be made only because a police officer is authorised to do so. The police officer must be able to justify the arrest. Arrest and detention in a police lock-up of a person can cause incalculable harm to the reputation and self-esteem of a person, the Court said.

In another case, *Amarawati And Anr. (Smt.) vs State Of U.P.* (2004), the Bench of the Allahabad High Court, after carefully examining the definition of 'cognisable offence', provisions of Section 41 and Section 157 of the Code of Criminal Procedure (CrPC), held that the Legislature has consciously used the words 'may arrest' and it was not mandatory for the police to make an arrest in a cognisable offence. Section 157 of the CrPC empowers the police to investigate a cognisable offence and arrest the accused, if required.

In 2009, in an amendment of Section 41 of the CrPC, some distinction was made for arrest in offences punishable with imprisonment extendable up to seven years and offences punishable with over seven years of imprisonment. However, Section 41A of the CrPC, which provides for issuing notice of appearance (when arrest of a person is not required), does not make a differentiation between offences based on their term of imprisonment. The Supreme Court, in *Satender Kumar Antil vs CBI and Anr.* (2022), held that the investigating agencies are bound to comply with the provisions of Section 41 and Section 41A CrPC. Section 35 of the BNS is *pari materia* to Sections 41 and 41A of the CrPC, read together.

**There could be misuse**

While the continuation of Ministers in the cabinet with serious criminal charges does not augur well for constitutional morality, the misuse of this discretionary power of arrest by the police to target leaders of the Opposition parties cannot be ruled out. High Courts have repeatedly taken objection for not following the directions issued in *Armesh Kumar vs State of Bihar and Another* (2014) which mandated that the investigating officer record reasons and material which necessitated the arrest. The National Police Commission (1977) in its third report observed that nearly 60% of the arrests were unnecessary or unjustified. Given such a scenario, where the police are alleged to be amenable to political pressure, 'arrest' may be used as a political tool to initiate the unseating of Ministers in Opposition parties.

The second parameter is continuous detention in custody for "thirty consecutive days", which signifies the importance of bail. If a Minister is able to obtain bail within this period, disqualification under Article 75(5A) would not operate. Though the Supreme Court has repeatedly reaffirmed the principle that 'bail is the rule, jail is the exception', bail is often

rejected for factors other than the triple test – i.e., flight risk, possibility of tampering with evidence, and threatening of witnesses. For instance, the gravity or seriousness of an offence is considered to be an important fourth factor, despite its conflict with the presumption of innocence of the accused. So, while bail may be granted in early stages in economic offences, it is extremely difficult in heinous offences unless the accused has undergone considerable incarceration.

**The main issues**

The new Amendment does not account for default bail under Section 167(2) CrPC (*pari materia* Section 187, BNS). Default bail is the right of an accused person when the investigation is not completed within 60 days to 90 days (depending on the gravity of the offence) of his custody. Since the cumulative period of police and judicial remand itself exceeds 30 days, the embargo under Article 75(5A) does not seem to be rational. It is true that remand is not mandatory jail time and needs to be extended by the court at intervals, but courts readily grant this extension within the outer limits of 60 days to 90 days.

Further, the phrase 'an offence under any law for the time being in force' includes complaints filed under special statutes such as PMLA (money laundering), NDPS (narcotics), and UAPA (unlawful activity). This is even more dangerous since all special statutes have the infamous twin conditions of bail that are not present in the CrPC/BNS. First, the accused must prove that he is not guilty of the offence, and second, that he would not commit an offence while on bail. As opposed to trial, these conditions must be satisfied at the stage of bail itself. They are often termed onerous and reverse the burden of proof from the prosecution to the accused. The Manish Sisodia case, where he was accused in the liquor policy scam, is a case in point – bail was granted 17 months after his incarceration under the PMLA. This being the norm for special statutes, the threshold of "thirty consecutive days" under the new Amendment Bill would be an abysmally low benchmark to cross. Removal from office would be extremely damaging.

Another factor which may hinder bail to a Minister is their ability to influence witnesses due to their position of power, which is considered significant to an investigation and trial. A Minister may be faced with a Hobson's choice – either continue or get bail. Staying on as a Minister would jeopardise bail and therefore mean removal under the amended provisions, while resigning would prevent him from carrying out ministerial duties even if bail was granted.

A last factor that makes bail uncertain and vulnerable is whether the judge concerned has a *pro* or *ante* liberty stance under Article 21. Leaving aside the objective facts of a case, this brings about enormous subjectivity and discretion in granting bail.

## An Amended Constitution Bill, Its Contentious Issues

### संविधान संशोधन विधेयक और इसके विवादास्पद मुद्दे

- The central government recently introduced the **Constitution (One Hundred And Thirtieth Amendment) Bill in Parliament to amend Article 75, Article 164 and Article 239AA** of the Constitution which pertain to the **Union Council of Ministers, State Council of Ministers and the special administrative provisions for Delhi**, respectively.  
हाल ही में केंद्र सरकार ने संसद में संविधान (एक सौ तीसवां संशोधन) विधेयक पेश किया, जिसका उद्देश्य अनुच्छेद 75, अनुच्छेद 164 और अनुच्छेद 239AA में संशोधन करना है, जो क्रमशः केंद्रीय मंत्रिपरिषद, राज्य मंत्रिपरिषद और दिल्ली के विशेष प्रशासनिक प्रावधानों से संबंधित हैं।
- The Bill has been referred to a **Joint Parliamentary Committee**.  
इस विधेयक को संयुक्त संसदीय समिति (Joint Parliamentary Committee) के पास भेजा गया है।



- The Bill provides that in case a **Minister is arrested and detained in custody for 30 consecutive days**, for an alleged offence punishable with imprisonment which may extend up to **five years or more**, he shall be **removed from office by the President**, on the advice of the **Prime Minister**, which is to be tendered by the **31st day of such custody**.  
विधेयक के अनुसार, यदि कोई मंत्री 30 लगातार दिनों तक हिरासत में रहता है और उस पर 5 वर्ष या उससे अधिक की सजा वाले अपराध का आरोप है, तो उसे राष्ट्रपति द्वारा पद से हटा दिया जाएगा, यह कार्रवाई प्रधानमंत्री की सलाह पर की जाएगी, जो 31वें दिन तक दी जानी आवश्यक है।
- Or, he shall **cease to be a Minister** in case such advice is not tendered by then.  
या, यदि उस समय तक ऐसी सलाह नहीं दी जाती, तो वह व्यक्ति स्वतः मंत्री पद से मुक्त हो जाएगा।
- A similar provision is provided for **Ministers in State Assemblies**, who shall be **removed by the Governor** on the advice of the **Chief Minister**.  
इसी प्रकार की व्यवस्था राज्य मंत्रियों के लिए भी की गई है, जिन्हें राज्यपाल द्वारा मुख्यमंत्री की सलाह पर पद से हटाया जाएगा।
- In the case of the **Prime Minister and Chief Minister of a State**, they are required either to **tender their resignation by the 31st day** or else shall **automatically cease to be the Prime Minister or Chief Minister of a State**.  
प्रधानमंत्री और मुख्यमंत्री के मामले में, उन्हें 31वें दिन तक इस्तीफा देना होगा, अन्यथा वे स्वतः अपने पद से मुक्त माने जाएंगे।

## What was contentious for the Opposition

### विपक्ष के लिए विवादास्पद क्या था

- The two contentious issues that forced the Opposition to come together against the Bill were **'arrest' by the police and authorising 'detention' by a court**.  
दो प्रमुख विवादास्पद मुद्दे जिन्होंने विपक्ष को इस विधेयक के खिलाफ एकजुट किया, वे थे — पुलिस द्वारा 'गिरफ्तारी' (arrest) और न्यायालय द्वारा 'हिरासत' (detention) की अनुमति देना।
- Since wide **discretion lies with both**, there needs to be **scrutiny** of the Bill to ensure that it is not misused.  
चूंकि दोनों के पास व्यापक विवेकाधिकार (discretion) है, इसलिए विधेयक की समीक्षा (scrutiny) आवश्यक है ताकि इसका दुरुपयोग न हो।
- The first parameter to remove a Minister is **arrest**, which is **discretionary and in the hands of the enforcement agencies**.  
किसी मंत्री को हटाने का पहला आधार गिरफ्तारी (arrest) है, जो विवेकाधीन (discretionary) है और प्रवर्तन एजेंसियों के हाथों में है।
- While the **Bharatiya Nagarik Suraksha Sanhita (BNSS)** provides for some **conditions before arrest, it is not mandatory** for a police officer to arrest any person accused of a cognisable offence punishable even with **more than seven years of imprisonment**.  
यद्यपि भारतीय नागरिक सुरक्षा संहिता (BNSS) गिरफ्तारी से पहले कुछ शर्तें निर्धारित करती है, लेकिन किसी संज्ञेय अपराध (cognisable offence) में आरोपी व्यक्ति को गिरफ्तार करना अनिवार्य नहीं है, भले ही उस अपराध की सजा सात वर्ष से अधिक क्यों न हो।

## Judicial Precedents on Arrest Discretion

### गिरफ्तारी में विवेकाधिकार पर न्यायिक उदाहरण

- The **Madras High Court, in Deenan vs Jayalalitha (1989)**, refused to interfere in the police investigation when the petitioner pleaded before the court to direct the Commissioner of Police to arrest Jayalalitha.  
मद्रास उच्च न्यायालय ने Deenan बनाम जयललिता (1989) मामले में यह कहते हुए हस्तक्षेप से इनकार कर दिया कि वह पुलिस आयुक्त को जयललिता को गिरफ्तार करने का निर्देश नहीं दे सकता।
- The High Court said that the words **'may arrest' under Section 41** showed that the **power of arrest is discretionary** and that a police officer is **not always bound to make an arrest** for cognisable offences.  
न्यायालय ने कहा कि धारा 41 के अंतर्गत 'may arrest' शब्द यह दर्शाते हैं कि गिरफ्तारी का अधिकार विवेकाधीन है और पुलिस अधिकारी हमेशा गिरफ्तारी करने के लिए बाध्य नहीं है।



- The court further stated that a police officer can refrain from arresting a person depending upon the **nature of the offence** and **circumstances of the investigation**.  
अदालत ने आगे कहा कि पुलिस अधिकारी **अपराध की प्रकृति** और **जांच की परिस्थितियों** के आधार पर गिरफ्तारी से बच सकता है।
- The **authorised power of arrest by a private person** is restricted only to cases of **non-bailable and cognisable offences** committed in his presence or for a **proclaimed offender**.  
किसी निजी व्यक्ति द्वारा गिरफ्तारी का अधिकार केवल उन मामलों तक सीमित है जहाँ उसके सामने असंवरणीय (non-bailable) और संज्ञेय अपराध हुआ हो या वह व्यक्ति घोषित अपराधी (proclaimed offender) हो।

## Supreme Court Judgments सर्वोच्च न्यायालय के निर्णय

- In **Joginder Kumar vs State of U.P. (1994)**, the **Supreme Court** observed that **no arrest can be made only because a police officer is authorised** to do so; he must **justify the arrest**.  
*जोगिंदर कुमार बनाम उत्तर प्रदेश राज्य (1994)* में **सर्वोच्च न्यायालय** ने कहा कि केवल इसलिए गिरफ्तारी नहीं की जा सकती क्योंकि पुलिस अधिकारी को अधिकार प्राप्त है; उसे **गिरफ्तारी का औचित्य सिद्ध करना होगा**।
- The **Court remarked that arrest and detention can cause incalculable harm to the reputation and self-esteem of a person**.  
न्यायालय ने कहा कि **गिरफ्तारी और हिरासत** किसी व्यक्ति की **प्रतिष्ठा और आत्मसम्मान को अपूरणीय क्षति** पहुंचा सकती है।
- In **Amarawati And Anr. (Smt.) vs State Of U.P. (2004)**, the **Allahabad High Court** held that **'may arrest'** does not make arrest mandatory in cognisable offences and that **Section 157 of CrPC empowers police to investigate and arrest if required**.  
*अमरावती बनाम उत्तर प्रदेश राज्य (2004)* में **इलाहाबाद उच्च न्यायालय** ने कहा कि **'may arrest'** का अर्थ यह नहीं है कि गिरफ्तारी अनिवार्य है, और **दंड प्रक्रिया संहिता (CrPC) की धारा 157** पुलिस को केवल आवश्यकता होने पर गिरफ्तारी और जांच का अधिकार देती है।

## Amendments and BNSS Linkage संशोधन और BNSS से संबंध

- In **2009**, an **amendment to Section 41 of the CrPC** distinguished between **offences punishable up to seven years** and those **above seven years**.  
**2009** में **दंड प्रक्रिया संहिता (CrPC) की धारा 41** में संशोधन कर उन अपराधों में अंतर किया गया जो **सात वर्ष तक दंडनीय** हैं और जो **सात वर्ष से अधिक दंडनीय** हैं।
- However, **Section 41A of the CrPC**, which provides for **issuing notice of appearance**, does not differentiate between offences based on imprisonment term.  
हालांकि, **CrPC की धारा 41A**, जो **उपस्थिति के लिए नोटिस जारी करने** का प्रावधान करती है, अपराधों में सजा की अवधि के आधार पर कोई भेदभाव नहीं करती।
- The **Supreme Court**, in **Satender Kumar Antil vs CBI and Anr. (2022)**, held that **investigating agencies are bound to comply with Section 41 and 41A**.  
**सर्वोच्च न्यायालय** ने *सतेंद्र कुमार अंतिल बनाम CBI (2022)* में कहा कि **जांच एजेंसियों को धारा 41 और 41A का पालन करना अनिवार्य है**।
- **Section 35 of the BNSS** is **pari materia** (similar in content) to **Sections 41 and 41A of the CrPC**, when read together.  
**BNSS की धारा 35** की विषयवस्तु **CrPC की धाराओं 41 और 41A** के समान (pari materia) है जब इन्हें साथ पढ़ा जाए।

## There could be misuse दुरुपयोग की संभावना हो सकती है

- While the continuation of **Ministers in the cabinet with serious criminal charges** does not augur well for **constitutional morality**, the **misuse of discretionary power of arrest** by the



police to target Opposition leaders cannot be ruled out.

गंभीर आपराधिक आरोपों वाले मंत्रियों का पद पर बने रहना संवैधानिक नैतिकता (constitutional morality) के लिए शुभ संकेत नहीं है, लेकिन पुलिस द्वारा गिरफ्तारी के विवेकाधीन अधिकार (discretionary power) का विपक्षी नेताओं को निशाना बनाने के लिए दुरुपयोग भी नकारा नहीं जा सकता।

- **High Courts** have repeatedly taken objection for not following directions issued in **Arnesh Kumar vs State of Bihar (2014)** which mandated that the **investigating officer record reasons and materials** necessitating the arrest.  
उच्च न्यायालयों ने बार-बार इस बात पर आपत्ति जताई है कि **Arnesh Kumar बनाम बिहार राज्य (2014)** में दिए गए निर्देशों का पालन नहीं किया गया, जिसमें यह अनिवार्य किया गया था कि **जांच अधिकारी गिरफ्तारी के लिए कारण और साक्ष्य दर्ज करे।**
- The **National Police Commission (1977)** in its **third report** observed that nearly **60% of the arrests were unnecessary or unjustified.**  
राष्ट्रीय पुलिस आयोग (1977) ने अपनी तीसरी रिपोर्ट में पाया कि लगभग **60% गिरफ्तारियाँ अनावश्यक या अनुचित थीं।**
- Given such a scenario, where the **police are alleged to be under political pressure**, 'arrest' may be used as a **political tool** to unseat Opposition Ministers.  
ऐसी स्थिति में जहाँ **पुलिस पर राजनीतिक दबाव होने के आरोप हैं**, 'गिरफ्तारी (arrest)' का उपयोग **राजनीतिक हथियार (political tool)** के रूप में विपक्षी मंत्रियों को पद से हटाने के लिए किया जा सकता है।
- The second parameter is **continuous detention in custody for "thirty consecutive days"**, which highlights the **importance of bail.**  
दूसरा मापदंड है **"तीस लगातार दिनों"** की हिरासत, जो **जमानत (bail)** के महत्व को दर्शाता है।
- If a Minister is able to **obtain bail within this period**, disqualification under **Article 75(5A)** would **not apply.**  
यदि कोई मंत्री इस अवधि में **जमानत प्राप्त कर लेता है**, तो **अनुच्छेद 75(5A)** के तहत **अयोग्यता लागू नहीं होगी।**
- Although the **Supreme Court** has reaffirmed that **"bail is the rule, jail is the exception,"** bail is often rejected for reasons beyond the **triple test — flight risk, tampering with evidence, and witness intimidation.**  
यद्यपि **सर्वोच्च न्यायालय** ने यह सिद्धांत दोहराया है कि **"जमानत नियम है, जेल अपवाद"**, फिर भी कई बार जमानत को **त्रिस्तरीय परीक्षण (flight risk, साक्ष्य से छेड़छाड़, गवाहों को धमकाना)** से परे कारणों से अस्वीकार कर दिया जाता है।
- The **gravity or seriousness of an offence** is often considered a **fourth factor**, despite conflicting with the **presumption of innocence.**  
**अपराध की गंभीरता (gravity)** को अक्सर **चौथा कारक** माना जाता है, जो **निर्दोषता की धारणा (presumption of innocence)** के सिद्धांत से टकराता है।
- While bail may be easier in **economic offences**, it is extremely difficult in **heinous offences** unless the accused has undergone **prolonged incarceration.**  
**आर्थिक अपराधों** में जमानत अपेक्षाकृत आसान होती है, लेकिन **जघन्य अपराधों (heinous offences)** में यह अत्यंत कठिन होती है जब तक कि आरोपी **लंबी कैद (incarceration)** न झेल चुका हो।
- The new Amendment does not account for **default bail under Section 167(2) CrPC (pari materia Section 187, BNSS).**  
नए संशोधन में **दंड प्रक्रिया संहिता (CrPC) की धारा 167(2)** (जो **BNSS** की धारा 187 के समान है) के अंतर्गत **डिफॉल्ट जमानत (default bail)** का प्रावधान शामिल नहीं है।
- **Default bail** is the **right of an accused** if investigation is **not completed within 60–90 days** depending on the gravity of the offence.  
**डिफॉल्ट जमानत** आरोपी का **अधिकार** है, यदि जांच **अपराध की गंभीरता के अनुसार 60 से 90 दिनों** के भीतर पूरी नहीं होती।
- Since the cumulative **period of police and judicial remand** itself exceeds **30 days**, the **embargo under Article 75(5A)** seems **irrational.**  
चूंकि **पुलिस और न्यायिक रिमांड की कुल अवधि ही 30 दिनों से अधिक** होती है, इसलिए **अनुच्छेद 75(5A)** के तहत यह प्रावधान **अतार्किक प्रतीत होता है।**



- Although remand is not mandatory jail time, courts readily grant extensions within the outer limit of 60–90 days.  
यद्यपि रिमांड अनिवार्य जेल नहीं होता, फिर भी न्यायालय आसानी से विस्तार (extension) प्रदान करते हैं जो 60–90 दिनों तक होता है।

## Impact of Special Laws

### विशेष कानूनों का प्रभाव

- The phrase “an offence under any law for the time being in force” includes special statutes such as PMLA (money laundering), NDPS (narcotics), and UAPA (unlawful activities).  
“किसी भी वर्तमान कानून के तहत अपराध (offence under any law for the time being in force)” वाक्यांश में PMLA (मनी लॉन्ड्रिंग), NDPS (नारकोटिक्स) और UAPA (गैरकानूनी गतिविधियाँ) जैसे विशेष कानून शामिल हैं।
- These special laws have twin conditions of bail not found in CrPC/BNSS — first, the accused must prove innocence, and second, must show he won’t commit an offence while on bail.  
इन विशेष कानूनों में जमानत की दोहरी शर्तें (twin conditions) होती हैं — पहली, आरोपी को अपनी निर्दोषता साबित करनी होती है, और दूसरी, यह दिखाना होता है कि वह जमानत पर रहते हुए अपराध नहीं करेगा।
- These conditions reverse the burden of proof from the prosecution to the accused, making bail extremely onerous and difficult.  
ये शर्तें सबूत का बोझ अभियोजन से आरोपी पर स्थानांतरित (reverse burden) कर देती हैं, जिससे जमानत अत्यंत कठिन और कठोर (onerous) हो जाती है।
- The Manish Sisodia case (liquor policy scam) is an example — bail was granted 17 months after incarceration under the PMLA.  
मनीष सिसोदिया मामला (शराब नीति घोटेला) इसका उदाहरण है — PMLA के तहत 17 महीने की हिरासत के बाद जमानत दी गई थी।
- Thus, the threshold of “thirty consecutive days” in the new Amendment Bill is an abysmally low benchmark, making removal from office extremely damaging.  
इसलिए नए संशोधन विधेयक में “तीस लगातार दिन” की सीमा बहुत निम्न स्तर का मानक है, जिससे पद से हटाया जाना अत्यंत हानिकारक सिद्ध हो सकता है।

## Challenges in Granting Bail

### जमानत देने में चुनौतियाँ

- Another factor that may hinder bail is the Minister’s ability to influence witnesses due to their position of power, which is crucial during investigation and trial.  
जमानत में बाधा डालने वाला एक और कारक मंत्री की सत्ता की स्थिति के कारण गवाहों को प्रभावित करने की क्षमता है, जो जांच और मुकदमे के दौरान महत्वपूर्ण होती है।
- A Minister may face a Hobson’s choice — either continue in office or secure bail.  
एक मंत्री को Hobson’s choice जैसी स्थिति का सामना करना पड़ सकता है — या तो पद पर बने रहें या जमानत प्राप्त करें।
- Staying in office could jeopardise bail leading to removal under the amended provisions, while resigning would prevent ministerial duties even if bail is later granted.  
पद पर बने रहना जमानत को जोखिम में डाल सकता है, जिससे संशोधित प्रावधानों के तहत हटाए जाने की संभावना बढ़ेगी, जबकि इस्तीफा देना मंत्रीय कार्यों को रोक देगा, भले ही बाद में जमानत मिल जाए।



- A final factor is whether the **judge concerned** holds a **pro-liberty or anti-liberty stance** under **Article 21**, which introduces **subjectivity and discretion** in bail decisions.  
अंतिम कारक यह है कि संबंधित **न्यायाधीश का दृष्टिकोण (stance) अनुच्छेद 21** के तहत **स्वतंत्रता समर्थक (pro-liberty)** है या **विरोधी (anti-liberty)**, जिससे जमानत के निर्णयों में **व्यक्तिपरकता (subjectivity)** और **विवेकाधिकार (discretion)** बढ़ जाता है।

## Federalism and funds

State autonomy cannot be bargaining point for availing central financing

GS II: Polity

**K**erala sprang a surprise last week by signing up for the scheme, Prime Minister Schools for Rising India (PM SHRI), that dovetails the National Education Policy (NEP)-2020, to upgrade and brand 14,500 schools nationwide as model institutions. Kerala, one of the three States to oppose the NEP-2020 (the others being Tamil Nadu and West Bengal), on the contention that it sought to encroach on the subject of school education, which is in the Concurrent List, and infuse it with communal bias and anti-scientific content, was evidently looking to gain central funds. Earlier this year, Tamil Nadu had approached the Supreme Court of India after the Centre withheld funds under the Samagra Shiksha (SS) scheme over the State's refusal to adopt the NEP-PM SHRI framework. Kerala's agreement on adopting the scheme is now in freeze after strife within the ruling Left Democratic Front (LDF) soon after the government signed the PM SHRI Memorandum of Understanding (MoU) with the Centre, without Cabinet approval – an issue deferred twice in Cabinet meetings. The CPI, a key LDF partner, demanded an immediate withdrawal. The CPI(M), which holds the general education portfolio, initially defended the decision, arguing that enrolment in PM SHRI was necessary to avail of federal funds withheld under the SS, which had led to salary arrears for teachers and non-teaching staff. The CPI(M) clarified that Kerala remained opposed to the NEP-2020 and would retain control over its school curriculum. The allies reached a détente on Wednesday – a cabinet subcommittee will scrutinise the MoU. Implementation of PM SHRI will remain suspended until the subcommittee's recommendation. The Centre will be formally informed of this decision.

Kerala has long excelled in school education, achieving near-universal gross enrolment ratio, high retention rates, superior learning outcomes, and modern infrastructure – milestones that render many NEP-2020 targets redundant in the State. For Kerala, PM SHRI amounts to little more than cosmetic rebranding of already high-performing institutions, but the State would be forced to comply with provisions of the NEP-2020 for integration of 'Indian Knowledge Systems', which many reckon is a euphemism for pseudoscience. It is regrettable that the Centre withholds federal funds under the SS to arm-twist States into accepting NEP-2020 or PM SHRI. While Tamil Nadu has pursued legal redress, its case has not received the judicial urgency it warrants. In India's federal polity, the judiciary must robustly defend cooperative federalism whenever it is undermined. As Kerala pauses PM SHRI, it must consider litigation to secure its rightful share of central funds. Federalism and State autonomy cannot be bargaining points in the quest for funds.

## Federalism and Funds संघवाद और वित्त

### Kerala and PM SHRI Scheme केरल और पीएम श्री योजना

- Kerala sprang a surprise last week by signing up for the scheme, **Prime Minister Schools for Rising India (PM SHRI)**, that dovetails the **National Education Policy (NEP)-2020**, to upgrade and brand **14,500 schools nationwide** as model institutions.

केरल ने पिछले सप्ताह **प्रधानमंत्री स्कूल्स फॉर राइजिंग इंडिया (PM SHRI)** योजना पर हस्ताक्षर करके सबको चौंका दिया, जो **राष्ट्रीय शिक्षा नीति (NEP)-2020** से जुड़ी है, और पूरे देश में **14,500 स्कूलों** को मॉडल संस्थानों के रूप में उन्नत और ब्रांड करने का उद्देश्य रखती है।

- Kerala was one of the **three States** to oppose **NEP-2020** (others being **Tamil Nadu** and **West Bengal**) on the contention that it sought to **encroach on the subject of school education**, which is in the **Concurrent List**, and **infuse communal bias and anti-scientific content**.

केरल उन **तीन राज्यों** में से एक था (अन्य हैं **तमिलनाडु** और **पश्चिम बंगाल**) जिसने **NEP-2020** का विरोध किया था, यह कहते हुए कि यह **विद्यालय शिक्षा के विषय में हस्तक्षेप** करता है, जो **समवर्ती सूची (Concurrent List)** में आता है, और इसमें **सांप्रदायिक पक्षपात व वैज्ञानिकता-विरोधी तत्व** डाले गए हैं।

- Kerala was evidently looking to **gain central funds** through this move.

केरल का उद्देश्य स्पष्ट रूप से **केंद्रीय निधि प्राप्त करना** था।

- Earlier this year, **Tamil Nadu** had approached the **Supreme Court of India** after the **Centre withheld funds** under the **Samagra Shiksha (SS) scheme over the State's refusal to adopt the NEP-PM SHRI framework**.

इस वर्ष की शुरुआत में, **तमिलनाडु** ने **भारत के सर्वोच्च न्यायालय** का रुख किया था जब केंद्र ने **समग्र शिक्षा (SS)** योजना के तहत फंड रोक दिए थे क्योंकि राज्य ने **NEP-PM SHRI ढाँचे** को अपनाने से इनकार कर दिया था।

- Kerala's agreement on adopting the scheme is now **in freeze** after **strife within the ruling Left Democratic Front (LDF)** soon after the government signed the **PM SHRI MoU** with the Centre **without Cabinet approval**.

केंद्र के साथ **PM SHRI समझौता ज्ञापन (MoU)** पर **मंत्रिमंडल की स्वीकृति के बिना** हस्ताक्षर करने के बाद, **सत्तारूढ़ वाम लोकतांत्रिक मोर्चा (LDF)** में विवाद उत्पन्न हुआ, जिसके चलते अब केरल का इस योजना को अपनाने का समझौता **स्थगित (freeze)** हो गया है।

- The **CPI**, a key **LDF partner**, demanded an **immediate withdrawal** from the MoU.

**CPI**, जो **LDF** की एक प्रमुख सहयोगी पार्टी है, ने इस समझौते से **तत्काल वापसी** की मांग की।



- The **CPI(M)**, which holds the **general education portfolio**, initially defended the decision, arguing that enrolment in PM SHRI was necessary to **avail of federal funds** withheld under **SS**, which had led to **salary arrears** for teachers and non-teaching staff.  
**CPI(M)**, जिसके पास **सामान्य शिक्षा विभाग** है, ने प्रारंभ में इस निर्णय का बचाव किया, यह तर्क देते हुए कि **PM SHRI** में नामांकन आवश्यक था ताकि **SS योजना के तहत रोके गए केंद्रीय फंड** प्राप्त किए जा सकें, जिनके अभाव में **शिक्षकों और गैर-शिक्षण कर्मचारियों के वेतन बकाया** हो गए थे।
- The **CPI(M)** clarified that Kerala remained **opposed to NEP-2020** and would **retain control** over its school curriculum.  
**CPI(M)** ने स्पष्ट किया कि केरल अब भी **NEP-2020 का विरोध** करता है और अपने **स्कूल पाठ्यक्रम पर नियंत्रण** बनाए रखेगा।
- The allies reached a détente — a **cabinet subcommittee** will now **scrutinise the MoU**, and implementation of **PM SHRI** will remain **suspended** until the subcommittee's recommendation.  
सहयोगियों के बीच समझौता हुआ — एक **मंत्रिमंडलीय उपसमिति** अब **MoU की जांच** करेगी, और **PM SHRI** का कार्यान्वयन **उपसमिति की सिफारिश तक स्थगित** रहेगा।
- The **Centre** will be formally **informed** of this decision.  
इस निर्णय की औपचारिक **सूचना केंद्र को दी जाएगी**।
- Kerala has long excelled in **school education**, achieving **near-universal gross enrolment ratio, high retention rates, superior learning outcomes, and modern infrastructure** — milestones that render many **NEP-2020 targets redundant** in the State.  
केरल ने लंबे समय से **स्कूल शिक्षा** में उत्कृष्टता प्राप्त की है — **लगभग सार्वभौमिक नामांकन अनुपात, उच्च प्रतिधारण दर, बेहतर अधिगम परिणाम, और आधुनिक बुनियादी ढाँचा** हासिल किया है — जो राज्य में **NEP-2020 के कई लक्ष्यों को अप्रासंगिक** बना देता है।
- For Kerala, **PM SHRI** amounts to little more than **cosmetic rebranding** of already high-performing institutions.  
केरल के लिए **PM SHRI** योजना पहले से उत्कृष्ट प्रदर्शन करने वाले संस्थानों का मात्र **सतही पुनर्ब्रांडिंग (cosmetic rebranding)** है।
- However, the State would be forced to comply with **provisions of NEP-2020 for integration of 'Indian Knowledge Systems'**, which many reckon is a euphemism for **pseudoscience**.  
हालांकि, राज्य को **'भारतीय ज्ञान प्रणाली (Indian Knowledge Systems)'** के एकीकरण हेतु **NEP-2020** के प्रावधानों का पालन करना पड़ेगा, जिसे कई लोग **छद्मविज्ञान (pseudoscience)** के लिए एक सौम्य शब्द मानते हैं।
- It is regrettable that the **Centre withholds federal funds under SS** to arm-twist States into accepting **NEP-2020 or PM SHRI**.  
यह खेदजनक है कि **केंद्र सरकार समग्र शिक्षा (SS)** के तहत **केंद्रीय निधि रोककर राज्यों पर दबाव** बना रही है कि वे **NEP-2020 या PM SHRI** को स्वीकार करें।
- While **Tamil Nadu** has pursued **legal redress**, its case has not received the **judicial urgency** it warrants.  
जबकि **तमिलनाडु** ने **न्यायिक उपाय** अपनाया है, उसके मामले को अपेक्षित **न्यायिक प्राथमिकता** नहीं मिली है।
- In India's **federal polity**, the **judiciary** must robustly defend **cooperative federalism** whenever it is undermined.  
भारत की **संघीय व्यवस्था (federal polity)** में, **न्यायपालिका** को जब भी **सहकारी संघवाद (cooperative federalism)** को कमजोर किया जाए, उसका दृढ़ता से बचाव करना चाहिए।
- As Kerala pauses **PM SHRI**, it must consider **litigation** to secure its **rightful share of central funds**.  
जब तक केरल ने **PM SHRI** को स्थगित रखा है, तब तक उसे अपने **केंद्रीय निधि के उचित हिस्से** को सुरक्षित करने हेतु **कानूनी कार्रवाई (litigation)** पर विचार करना चाहिए।



- **Federalism and State autonomy cannot be bargaining points** in the quest for funds. संघवाद और राज्य की स्वायत्तता को फंड प्राप्ति की सौदेबाज़ी का विषय नहीं बनाया जा सकता।

# What is China's complaint against India at WTO

What is the Production-Linked Incentive (PLI) scheme in India? Which three specific PLIs does China oppose? What are the World Trade Organization's rules when it comes to subsidies? What does the Subsidies and Countervailing Measures agreement state?

ISS II: International Institutions  
**EXPLAINER**

**Prabhash Ranjan**

**The story so far:**

China has filed a complaint with the World Trade Organization (WTO) against India. It alleges that India is providing subsidies, as part of the Production-Linked Incentive (PLI) scheme, for the development of advanced chemistry cell (ACC) batteries; for boosting the auto sector; and for facilitating the production of Electric Vehicles, in contravention of WTO law.

**What is the PLI scheme?**

India launched the PLI scheme in 2020 to give a fillip to Indian manufacturing. This scheme provides financial incentives based on incremental sales to strategic industries; aims to bolster India's position in global value chains; and integrates medium and small-scale industries into the industrial production process through backward linkages. The three specific PLI schemes that China has challenged are – the PLI scheme which aims to incentivise the establishment of mega-scale manufacturing capabilities of ACC batteries in India; the scheme for the auto industry, which seeks to buttress the manufacturing of Advanced Automotive Technology (AAT) products in India, encompassing both vehicles and their components; and third, a scheme to promote EV manufacturing by attracting global EV manufacturers to the country.

**What is China's complaint?**

China alleges that the three PLI schemes provide financial benefits or subsidies to companies operating in India contingent on Domestic Value Addition (DVA). For instance, under the PLI scheme for the auto sector, one of the conditions for eligibility to get financial benefits is that there must be a 50% DVA. Likewise, one of the salient features of the PLI scheme for ACC batteries is that the beneficiary must ensure a DVA of 25%. The Chinese



**Subsidy wars:** The World Trade Organization (WTO) in Geneva. AFP

argue that the DVA requirements under these PLI schemes incentivise companies to use domestic goods rather than imported goods, discriminating against Chinese goods in the Indian market.

**What is the law on subsidies in WTO?**

While providing industrial subsidies to boost domestic industry is a sovereign right of states, WTO law ensures that these subsidies are not provided in a manner that jeopardises the international trade of other countries by ushering in unfair competition. Unfair competition may arise from subsidies that confer an artificial advantage on industries for exporting or competing with imported products. Consequently, the grant of industrial subsidies is regulated by the Subsidies and Countervailing Measures (SCM) agreement of the WTO. Article 1 of the SCM agreement defines a subsidy as a financial contribution by a government or a public body that confers a benefit. The

subsidy should also be specific.

The SCM agreement divides subsidies into three categories – prohibited subsidies, actionable subsidies, and non-actionable subsidies. Prohibited subsidies are forbidden by definition and are generally of two types: export subsidies and Import Substitution (IS) subsidies. Export subsidies are contingent on export performance, and IS subsidies, as defined in Article 3.1(b) of the SCM agreement, refer to subsidies contingent upon the use of domestic goods over imported goods. Thus, if a country promises a financial contribution to a specific industry on the condition that it use domestic goods or goods produced locally, rather than imported goods, it would constitute a prohibited subsidy.

**Do IS subsidies violate other laws?**

An IS subsidy will also breach two other WTO legal provisions. First is the national treatment obligation, codified in Article

III.4 of the General Agreement on Tariffs and Trade (GATT), which obligates countries to ensure that their domestic laws do not treat imported products less favourably than their domestic products; and second, is Article 2.1 of the Trade Related Investment Measures (TRIMs) Agreement which states that no country shall impose any TRIM that is inconsistent with its national treatment obligations enshrined in GATT's Article III. The TRIMs agreement contains a specific illustration of a prohibited trade-related investment measure. This illustration pertains to local content requirements which incentivise the use of domestically produced goods. Since an IS subsidy gives preference to domestic over foreign goods, it constitutes as a proscribed TRIM under the WTO law.

China alleges that India's three PLI schemes are IS subsidies. However, it is critical to note that the DVA milestones in India's PLI scheme do not automatically translate to local content requirements. Value addition at the domestic level can occur in multiple ways, and not just through the use of domestic goods. The analysis of the DVA component in these three PLI schemes must thus consider a complex set of facts.

**What happens next?**

The first step in resolving a dispute at the WTO is through consultations. Thus, India and China will try to resolve this matter amicably. If this does not occur, the dispute will proceed to adjudication by a three-member ad hoc WTO panel. The WTO's appellate mechanism, the Appellate Body, has remained incapacitated since December 2019. Thus, if the WTO panel's decision is appealed, it would mean postponing the adjudication of the dispute till the time the Appellate Body is resurrected. The practical implication is that the status quo remains, and a country can continue with its impugned measures.

*Prabhash Ranjan is Professor and Vice Dean (Research), Jindal Global Law School. Views are personal.*

**THE GIST**

India's PLI scheme provides financial incentives based on incremental sales to strategic industries; aims to bolster India's position in global value chains; and integrates medium and small-scale industries into the industrial production process through backward linkages.

While providing industrial subsidies to boost domestic industry is a sovereign right of states, WTO law ensures that these subsidies are not provided in a manner that jeopardises the international trade of other countries by ushering in unfair competition.

The SCM agreement divides subsidies into three categories – prohibited subsidies, actionable subsidies, and non-actionable subsidies.

## China's complaint against India at WTO WTO में भारत के खिलाफ चीन की शिकायत

### China's WTO Complaint against India over PLI Scheme PLI योजना पर भारत के खिलाफ चीन की WTO में शिकायत

- **China has filed a complaint with the World Trade Organization (WTO) against India.** चीन ने भारत के खिलाफ विश्व व्यापार संगठन (WTO) में शिकायत दर्ज की है।
- **It alleges that India is providing subsidies as part of the Production-Linked Incentive (PLI) scheme for the development of advanced chemistry cell (ACC) batteries, for boosting the auto sector, and for facilitating the production of Electric Vehicles (EVs), in contravention of WTO law.** इसमें आरोप लगाया गया है कि भारत PLI योजना के तहत एडवांस्ड केमिस्ट्री सेल (ACC) बैटरियों के विकास, ऑटो सेक्टर को बढ़ावा देने, और इलेक्ट्रिक वाहनों (EVs) के उत्पादन को प्रोत्साहित करने के लिए सब्सिडी दे रहा है, जो WTO कानून का उल्लंघन है।





## What is the PLI scheme?

### PLI योजना क्या है?

- **India launched the PLI scheme in 2020 to give a fillip to Indian manufacturing.**  
भारत ने 2020 में PLI योजना शुरू की ताकि भारतीय विनिर्माण क्षेत्र को प्रोत्साहन दिया जा सके।
- The **scheme provides financial incentives based on incremental sales to strategic industries**, aims to **bolster India's position in global value chains**, and integrates **medium and small-scale industries** through **backward linkages**.  
यह योजना रणनीतिक उद्योगों को बढ़ी हुई बिक्री के आधार पर वित्तीय प्रोत्साहन देती है, भारत की स्थिति को वैश्विक मूल्य श्रृंखलाओं (Global Value Chains) में मजबूत करती है, और लघु व मध्यम उद्योगों (MSMEs) को बैकवर्ड लिंक के माध्यम से औद्योगिक उत्पादन प्रक्रिया में शामिल करती है।
- The three specific **PLI schemes that China has challenged** are —  
चीन ने जिन तीन विशिष्ट PLI योजनाओं को चुनौती दी है, वे हैं —
  - The PLI scheme to **incentivise mega-scale manufacturing of ACC batteries** in India.  
भारत में गिगा-स्तर पर ACC बैटरी निर्माण को प्रोत्साहित करने वाली योजना।
  - The PLI scheme for the **auto industry**, promoting **Advanced Automotive Technology (AAT)** products, including **vehicles and components**.  
ऑटो उद्योग के लिए योजना, जो एडवांस्ड ऑटोमोटिव टेक्नोलॉजी (AAT) उत्पादों — वाहनों और उनके घटकों — के निर्माण को प्रोत्साहित करती है।
  - A scheme to **promote EV manufacturing** by attracting **global EV manufacturers** to India.  
एक योजना जो वैश्विक EV निर्माताओं को भारत आकर्षित कर, EV निर्माण को बढ़ावा देने का लक्ष्य रखती है।

## What is China's complaint?

### चीन की शिकायत क्या है?

- **China alleges** that the three **PLI schemes provide financial benefits or subsidies** to companies in India **contingent on Domestic Value Addition (DVA)**.  
चीन का आरोप है कि ये तीनों PLI योजनाएँ भारत में कंपनियों को घरेलू मूल्य संवर्धन (Domestic Value Addition - DVA) पर आधारित वित्तीय लाभ या सब्सिडी प्रदान करती हैं।
- Under the **PLI for the auto sector**, eligibility requires **50% DVA**, and for **ACC batteries**, the beneficiary must ensure **25% DVA**.  
ऑटो सेक्टर की PLI योजना में पात्रता हेतु 50% DVA और ACC बैटरी योजना में 25% DVA सुनिश्चित करना अनिवार्य है।
- The **Chinese argument** is that **DVA requirements** encourage companies to use **domestic goods over imported goods**, thus **discriminating against Chinese products** in the Indian market.  
चीन का तर्क है कि ये DVA शर्तें कंपनियों को घरेलू वस्तुओं के उपयोग के लिए प्रेरित करती हैं और आयातित वस्तुओं, विशेष रूप से चीनी उत्पादों, के साथ भेदभाव करती हैं।

## What is the law on subsidies in WTO?

### WTO में सब्सिडी से संबंधित कानून क्या है?

- Providing **industrial subsidies** to boost **domestic industry** is a **sovereign right** of states, but **WTO law** ensures that such subsidies do not create **unfair competition** in **international trade**.  
घरेलू उद्योग को बढ़ावा देने के लिए औद्योगिक सब्सिडी प्रदान करना देशों का संप्रभु अधिकार है, लेकिन WTO कानून यह सुनिश्चित करता है कि ऐसी सब्सिडी अंतरराष्ट्रीय व्यापार में अनुचित प्रतिस्पर्धा (Unfair Competition) न पैदा करे।
- **Unfair competition** may result when subsidies give an **artificial advantage** to exporters or firms competing with **imported products**.



अनुचित प्रतिस्पर्धा तब उत्पन्न होती है जब सब्सिडी निर्यातकों या आयातित उत्पादों से प्रतिस्पर्धा करने वाले उद्योगों को कृत्रिम लाभ (Artificial Advantage) देती है।

- These subsidies are regulated by the **Subsidies and Countervailing Measures (SCM) Agreement of the WTO**.  
ऐसी सब्सिडियों को WTO के Subsidies and Countervailing Measures (SCM) Agreement द्वारा नियंत्रित किया जाता है।
- **Article 1** of the SCM defines a **subsidy** as a **financial contribution by a government or public body that confers a benefit**, and the subsidy must also be **specific**.  
**SCM समझौते के अनुच्छेद 1** में सब्सिडी को एक सरकार या सार्वजनिक निकाय द्वारा दी गई वित्तीय सहायता के रूप में परिभाषित किया गया है, जो लाभ प्रदान करती है और यह सब्सिडी विशिष्ट (Specific) होनी चाहिए।
- The **SCM Agreement divides subsidies into three categories — prohibited, actionable, and non-actionable subsidies**.  
**SCM समझौता** सब्सिडियों को तीन श्रेणियों में विभाजित करता है — प्रतिबंधित (Prohibited), कार्रवाई योग्य (Actionable), और गैर-कार्रवाई योग्य (Non-actionable) सब्सिडियाँ।
- **Prohibited subsidies include two main types: export subsidies and Import Substitution (IS) subsidies**.  
प्रतिबंधित सब्सिडियों में दो प्रमुख प्रकार शामिल हैं — निर्यात सब्सिडी (Export Subsidy) और आयात प्रतिस्थापन सब्सिडी (Import Substitution - IS Subsidy)।
- **Export subsidies** depend on **export performance**, while **IS subsidies**, defined in **Article 3.1(b)** of the SCM Agreement, are based on the **use of domestic goods over imported goods**.  
निर्यात सब्सिडियाँ निर्यात प्रदर्शन पर निर्भर होती हैं, जबकि **SCM समझौते के अनुच्छेद 3.1(b)** में परिभाषित आयात प्रतिस्थापन सब्सिडियाँ (IS Subsidies) घरेलू वस्तुओं के उपयोग को आयातित वस्तुओं पर प्राथमिकता देने पर आधारित होती हैं।
- Hence, if a country gives **financial aid** to an industry **on the condition** that it uses **domestic goods** rather than **imported ones**, it is classified as a **prohibited subsidy**.  
अतः यदि कोई देश किसी उद्योग को इस शर्त पर वित्तीय सहायता देता है कि वह घरेलू वस्तुओं का उपयोग करे न कि आयातित वस्तुओं का, तो यह एक प्रतिबंधित सब्सिडी (Prohibited Subsidy) मानी जाती है।

**Do IS subsidies violate other laws?**

**क्या IS सब्सिडी अन्य कानूनों का उल्लंघन करती है?**

- An **IS subsidy** will also breach two other **WTO legal provisions**.  
एक **IS सब्सिडी** दो अन्य **WTO कानूनी प्रावधानों** का भी उल्लंघन करेगी।
- First is the **national treatment obligation**, codified in **Article III.4** of the **General Agreement on Tariffs and Trade (GATT)**, which obligates countries to ensure that their domestic laws do not treat imported products less favourably than their domestic products.  
पहला है **राष्ट्रीय उपचार दायित्व (National Treatment Obligation)**, जिसे **GATT के अनुच्छेद III.4** में संहिताबद्ध किया गया है, जो देशों को यह सुनिश्चित करने के लिए बाध्य करता है कि उनके घरेलू कानून आयातित उत्पादों के साथ घरेलू उत्पादों की तुलना में कम अनुकूल व्यवहार न करें।
- **Second is Article 2.1 of the Trade Related Investment Measures (TRIMs) Agreement**, which states that no country shall impose any TRIM that is inconsistent with its **national treatment obligations** enshrined in **GATT's Article III**.  
दूसरा है **ट्रेड रिलेटेड इन्वेस्टमेंट मेजर्स (TRIMs) समझौते का अनुच्छेद 2.1**, जो कहता है कि कोई भी देश ऐसा कोई **TRIM** नहीं लागू करेगा जो **GATT के अनुच्छेद III** में निहित उसके **राष्ट्रीय उपचार दायित्वों** के साथ असंगत हो।
- The **TRIMs agreement** contains a specific illustration of a **prohibited trade-related investment measure**, which pertains to **local content requirements** that incentivise the use of **domestically produced goods**.  
**TRIMs समझौते** में प्रतिबंधित व्यापार-संबंधी निवेश उपायों का एक विशिष्ट उदाहरण शामिल है, जो **स्थानीय सामग्री आवश्यकताओं (Local Content Requirements)** से संबंधित है जो घरेलू रूप से उत्पादित वस्तुओं के उपयोग को प्रोत्साहित करती हैं।
- Since an **IS subsidy** gives preference to **domestic over foreign goods**, it constitutes a **proscribed TRIM** under **WTO law**.



क्योंकि IS सब्सिडी विदेशी वस्तुओं की तुलना में घरेलू वस्तुओं को प्राथमिकता देती है, इसलिए यह WTO कानून के तहत एक प्रतिबंधित TRIM मानी जाती है।

## China's allegation and India's defence चीन का आरोप और भारत की दलील

- **China alleges that India's three PLI schemes are IS subsidies.**  
चीन का आरोप है कि भारत की तीन PLI योजनाएँ IS सब्सिडी हैं।
- However, it is critical to note that the **DVA milestones** in India's **PLI scheme** do not automatically translate to **local content requirements**.  
हालाँकि, यह ध्यान देने योग्य है कि भारत की **PLI योजना** में **DVA माइलस्टोन** स्वचालित रूप से **स्थानीय सामग्री आवश्यकताओं** में परिवर्तित नहीं होते।
- **Value addition** at the domestic level can occur in multiple ways, and not just through the use of domestic goods.  
**घरेलू स्तर पर मूल्य संवर्धन (Value Addition)** कई तरीकों से हो सकता है, न कि केवल घरेलू वस्तुओं के उपयोग से।
- The analysis of the **DVA component** in these three **PLI schemes** must thus consider a **complex set of facts**.  
इसलिए इन तीनों **PLI योजनाओं** में **DVA घटक** का विश्लेषण करते समय **तथ्यों के एक जटिल समूह** पर विचार किया जाना चाहिए।

## What happens next? अब आगे क्या होगा?

- The first step in resolving a dispute at the **WTO** is through **consultations**.  
**WTO** में किसी विवाद को सुलझाने का पहला कदम **परामर्श (Consultations)** होता है।
- Thus, **India and China** will try to resolve this matter **amicably**.  
इसलिए, **भारत और चीन** इस मामले को **सौहार्दपूर्ण तरीके से** सुलझाने का प्रयास करेंगे।
- If this does not occur, the dispute will proceed to **adjudication** by a **three-member ad hoc WTO panel**.  
यदि ऐसा नहीं होता है, तो विवाद को **तीन-सदस्यीय अस्थायी WTO पैनल** द्वारा **निर्णय (Adjudication)** के लिए भेजा जाएगा।
- The **WTO's appellate mechanism**, the **Appellate Body**, has remained **incapacitated since December 2019**.  
**WTO की अपीलिय प्रणाली**, यानी **Appellate Body**, **दिसंबर 2019 से निष्क्रिय** बनी हुई है।
- Thus, if the **WTO panel's decision** is appealed, it would mean **postponing the adjudication** of the dispute till the **Appellate Body** is **resurrected**.  
इसलिए, यदि **WTO पैनल के निर्णय** के खिलाफ अपील की जाती है, तो इसका अर्थ होगा कि विवाद के **निर्णय को तब तक टाल दिया जाएगा** जब तक कि **Appellate Body** को **पुनः सक्रिय** नहीं किया जाता।
- The **practical implication** is that the **status quo** remains, and a country can continue with its **impugned measures**.  
इसका **व्यावहारिक प्रभाव** यह है कि **यथास्थिति (Status Quo)** बनी रहती है, और देश अपने **विवादित उपायों** को जारी रख सकता है।



**GS Paper III: Economy, S&T, Environment, DM, &IS**

<b>TOPICS COVERED</b>	<b>30_10_2025</b>
1.	<b>Tourism surge forces safari limits in tiger reserves</b> पर्यटन में बढ़ोतरी के कारण बाघ अभयारण्यों में सफारी सीमित की गई
2.	<b>IT industry a major contributor to carbon footprint, report finds</b> आईटी उद्योग कार्बन फुटप्रिंट में एक प्रमुख योगदानकर्ता है, रिपोर्ट में खुलासा
3.	<b>Study reveals rare defence traits in Indian frogs</b> अध्ययन में भारतीय मेंढकों में दुर्लभ रक्षा लक्षणों का खुलासा
4.	<b>Indian maritime sector has seen historic progress: Modi</b> भारतीय समुद्री क्षेत्र में ऐतिहासिक प्रगति हुई है: मोदी
5.	<b>NSCN (I-M) leader reiterates Naga sovereignty demand</b> NSCN (I-M) नेता ने नागा संप्रभुता की मांग दोहराई
6.	<b>Developing nations need 12 times more funds to fight climate crisis</b> विकासशील देशों को जलवायु संकट से निपटने के लिए 12 गुना अधिक धन की आवश्यकता है
7.	<b>Nanometre 'tank' of helium reveals weird waves never seen before</b> हीलियम के नैनोमीटर 'टैंक' में पहली बार देखी गई अजीब तरंगें
8.	<b>Hurricane Melissa — a 'beast' among a string of monster Atlantic storms</b> हरिकेन मेलिसा — अटलांटिक के राक्षसी तूफानों की श्रृंखला में एक 'दैत्या'
9.	<b>Uneven Growth</b> असमान वृद्धि
10.	<b>A decade after Paris accord, an unstoppable transition</b> पेरिस समझौते के एक दशक बाद, एक अटूट परिवर्तन
11.	<b>Norway and India: Green maritime partners</b> नॉर्वे और भारत: ग्रीन समुद्री सहयोगी
12.	<b>According to a survey of 25 countries, Indians are least aware of AI</b> 25 देशों के सर्वेक्षण के अनुसार, भारतीय एआई के प्रति सबसे कम जागरूक हैं
13.	<b>Sugar sector concerned over reduction in ethanol sourcing</b> एथेनॉल की खरीद में कमी को लेकर चीनी क्षेत्र चिंतित



## Tourism surge forces safari limits in tiger reserves

**GS III: Environment**

**The Hindu Bureau**  
MYSURU

Following frequent human-tiger conflicts around the Bandipur-Nagarahole belt and complaints from stakeholders of unregulated tourism, the number of safari trips has been reduced by one in both the tiger reserves.

This has come into effect from October 28 following a directive by the Minister for Forests, Ecology, and Environment Eshwar B. Khandre.

The Minister said that there was an increase in the tourist footfall in both Bandipur and Nagarahole with instances of safari vehicles continuing to ply in the tourism zone even after 6 p.m. He said farmers have expressed concern that this was causing disturbance to wildlife, resulting in conflict situations in villages outside the forests.

In a bid to strike a balance between conservation education and safeguarding local interests, the Minister said that safari and tourism was not only a source of livelihood for many, but was vital for education related to forests, wildlife, and conservation, and directed that the number of safari trips be reduced.

### Tigress captured

In a separate development, Forest Department personnel captured a tigress at Anjanapura in Nanjangud taluk late on Tuesday. The tigress is different from the one for which combing operations are going on close to Nugu Wildlife Sanctuary where a farmer was killed in a tiger attack a few days ago.

## Tourism surge forces safari limits in tiger reserves पर्यटन में बढ़ोतरी के कारण बाघ अभयारण्यों में सफारी सीमित की गई

- Following frequent **human-tiger conflicts** around the **Bandipur-Nagarahole belt** and complaints from stakeholders of **unregulated tourism**, the number of **safari trips** has been reduced by one in both the tiger reserves.  
बंदीपुर-नगरहोल क्षेत्र में बार-बार होने वाले मानव-बाघ संघर्षों और अनियंत्रित पर्यटन की शिकायतों के बाद दोनों बाघ अभयारण्यों में सफारी यात्राओं की संख्या एक घटा दी गई है।
- This has come into effect from **October 28** following a directive by the **Minister for Forests, Ecology, and Environment Eshwar B. Khandre**.  
यह निर्णय 28 अक्टूबर से लागू हुआ है, जो वन, पारिस्थितिकी और पर्यावरण मंत्री ईश्वर बी. खांद्रे के निर्देश के बाद लिया गया।
- The Minister said that there was an increase in the **tourist footfall** in both **Bandipur and Nagarahole** with instances of **safari vehicles continuing to ply in the tourism zone even after 6 p.m.**  
मंत्री ने कहा कि बंदीपुर और नगरहोल दोनों में पर्यटकों की संख्या में वृद्धि हुई है और कई बार शाम 6 बजे के बाद भी सफारी वाहन पर्यटन क्षेत्र में चलते रहते हैं।
- He said **farmers have expressed concern** that this was causing **disturbance to wildlife**, resulting in **conflict situations in villages** outside the forests.  
उन्होंने कहा कि किसानों ने चिंता जताई है कि इससे वन्यजीवों को परेशानी हो रही है और जंगलों के बाहर के गांवों में संघर्ष की स्थिति उत्पन्न हो रही है।
- In a bid to **strike a balance between conservation education and safeguarding local interests**, the Minister said that **safari and tourism** was not only a **source of livelihood for many**, but was **vital for education** related to **forests, wildlife, and conservation**, and directed that the **number of safari trips be reduced**.  
संरक्षण शिक्षा और स्थानीय हितों की रक्षा के बीच संतुलन बनाने के प्रयास में मंत्री ने कहा कि सफारी और पर्यटन न केवल कई लोगों की आजीविका का स्रोत है, बल्कि वन, वन्यजीव और संरक्षण से संबंधित शिक्षा के लिए भी महत्वपूर्ण है, इसलिए उन्होंने सफारी यात्राओं की संख्या घटाने के निर्देश दिए।

### Tigress captured बाघिन को पकड़ा गया

- In a separate development, **Forest Department personnel** captured a **tigress at Anjanapura in Nanjangud taluk** late on Tuesday.  
एक अलग घटना में, वन विभाग के कर्मियों ने मंगलवार देर रात नंजनगुड तालुक के अंजनापुरा में एक बाघिन को पकड़ा।
- The **tigress is different** from the one for which **combing operations** are going on **close to Nugu Wildlife Sanctuary**, where a **farmer was killed** in a **tiger attack** a few days ago.  
यह बाघिन उस बाघिन से अलग है जिसके लिए नुगु वन्यजीव अभयारण्य के पास कंघी अभियान चलाया जा रहा है, जहां कुछ दिन पहले एक किसान की बाघ के हमले में मौत हो गई थी।



# IT industry a major contributor to carbon footprint, report finds

**GS III: Pollution**

**The Hindu Bureau**  
BENGALURU

Enforcing sustainable travel policies such as flying economy, choosing non-stop flights, trains or buses, and capping frequent flyer trips are among the recommendations made to IT companies in a report on the "Urgency and Potential of Aviation Impact Mitigation In India."

cBalance.in, a knowledge-centric solutions hub specialising in tool building and strategy development to support the management and mitigation of the

impact of climate crisis which prepared the report, said that the Indian IT industry is a major contributor to business-driven air travel.

"Over a 1,000 km journey, an air traveller emits 285 kg of CO<sub>2</sub> per kilometre, while a railway passenger in even an air conditioned executive-class compartment emits 30 kg and in a comfortable AC bus the same passenger emits 70 kg. Clearly, air travel, irrespective of its efficiency benefits, is the most climate-polluting way to travel," it said.

that the Indian IT industry is a major contributor to business-driven air travel.

इस रिपोर्ट को cBalance.in ने तैयार किया, जो एक ज्ञान-केंद्रित समाधान केंद्र है और जलवायु संकट के प्रभाव के प्रबंधन और शमन के लिए उपकरण निर्माण और रणनीति विकास में विशेषज्ञता रखता है। रिपोर्ट में कहा गया कि भारतीय आईटी उद्योग व्यापार-आधारित हवाई यात्रा में एक मुख्य योगदानकर्ता है।

- "Over a 1,000 km journey, an air traveller emits 285 kg of CO<sub>2</sub> per kilometre, while a railway passenger in even an air-conditioned executive-class compartment emits 30 kg, and in a comfortable AC bus, the same passenger emits 70 kg.

"1,000 किलोमीटर की यात्रा में, एक हवाई यात्री प्रति किलोमीटर 285 किलोग्राम CO<sub>2</sub> उत्सर्जित करता है, जबकि एक रेल यात्री, यहां तक कि एयर-कंडीशंड एग्जीक्यूटिव क्लास डिब्बे में भी, 30 किलोग्राम CO<sub>2</sub> उत्सर्जित करता है, और आरामदायक एसी बस में वही यात्री 70 किलोग्राम CO<sub>2</sub> उत्सर्जित करता है।

- Clearly, air travel, irrespective of its efficiency benefits, is the most climate-polluting way to travel, it said.

रिपोर्ट ने कहा कि स्पष्ट रूप से, हवाई यात्रा, चाहे उसमें दक्षता के लाभ क्यों न हों, पर्यावरण को सबसे अधिक प्रदूषित करने वाला यात्रा का तरीका है।

**IT industry a major contributor to carbon footprint, report finds**

**आईटी उद्योग कार्बन फुटप्रिंट में एक प्रमुख योगदानकर्ता है, रिपोर्ट में खुलासा**

- Enforcing sustainable travel policies such as flying economy, choosing nonstop flights, trains or buses, and capping frequent flyer trips are among the recommendations made to IT companies in a report on the "Urgency and Potential of Aviation Impact Mitigation in India."

"भारत में विमानन प्रभाव शमन की तात्कालिकता और संभावनाएं" शीर्षक वाली रिपोर्ट में आईटी कंपनियों को यह सुझाव दिया गया है कि वे सतत यात्रा नीतियों को अपनाएं जैसे कि इकोनॉमी क्लास में यात्रा करना, सीधी उड़ानों, ट्रेनों या बसों को चुनना, और बार-बार उड़ान भरने की सीमा तय करना।

- cBalance.in, a knowledge-centric solutions hub specialising in tool building and strategy development to support the management and mitigation of the impact of climate crisis, which prepared the report, said



## Study reveals rare defence traits in Indian frogs

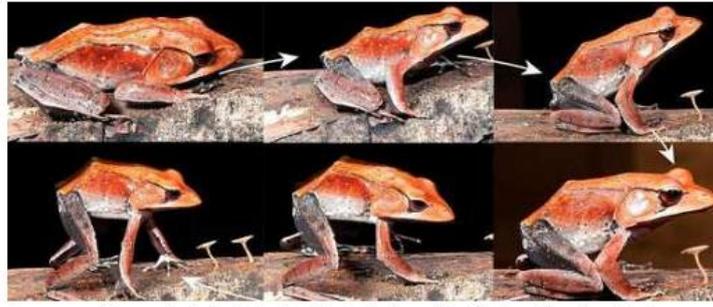
**GS III: Ecology**

**Sarath Babu George**  
THIRUVANANTHAPURAM

Scientists from the University of Delhi have, for the first time, documented rare and contrasting anti-predator behaviours in two frog species from India: one that shrieks and bites attackers, and another that suddenly elevates its body to intimidate threats.

The findings, published in *Herpetological Notes*, were made by a team from Delhi University's Systematics Lab, led by herpetologist S.D. Biju. The study reveals remarkable and previously unrecorded defence strategies among Indian amphibians.

The nocturnal *apatani* horned toad (*Xenophrys*



A sequence of images displaying the body-raising behaviour of the bicoloured frog from Kerala. S.D. BIJU

*apatani*), endemic to Arunachal Pradesh, relies on its cryptic, leaf-litter-like colouration to remain undetected during the day. When threatened or approached, it inflates its body, emits a piercing distress call and may even bite

the intruder. Such behaviour was first noticed during field photography and later confirmed experimentally.

In contrast, the bicoloured frog (*Clinotarsus curtipes*), a diurnal species from the Western Ghats in

Kerala, typically found on the forest floor among leaf litter, was observed to arch its body upwards by vertically extending its limbs when disturbed. This posture, believed to make it appear larger and more intimidating, was document-

ed in the wild and later tested using a threat stimulus.

The observations mark the first records of biting and body-raising as defensive strategies among India's 419 known frog species. Of the 7,876 known frog species globally, around 650 are reported to display such behaviours. However, such natural history observations are rarely documented among Indian species.

"These new observations in Indian frogs are just an example of how much remains either undocumented or completely unknown about the natural history and behaviours of our native species," Prof. Biju points out.

### Study reveals rare defence traits in Indian frogs

#### अध्ययन में भारतीय मेंढकों में दुर्लभ रक्षा लक्षणों का खुलासा

- Scientists from the **University of Delhi** have, for the first time, documented rare and contrasting **anti-predator behaviours** in two frog species from India: one that **shrieks and bites** attackers, and another that **suddenly elevates its body** to intimidate threats.

दिल्ली विश्वविद्यालय के वैज्ञानिकों ने पहली बार भारत की दो मेंढक प्रजातियों में दुर्लभ और विपरीत प्रतिशत्रु व्यवहारों को दर्ज किया है — एक जो चीखती और काटती है, और दूसरी जो अचानक अपना शरीर ऊँचा उठाकर खतरे को डराती है।

- The findings, published in *Herpetological Notes*, were made by a team from Delhi University's **Systematics Lab**, led by herpetologist **S.D. Biju**.

यह निष्कर्ष *Herpetological Notes* में प्रकाशित हुए, जो दिल्ली विश्वविद्यालय की सिस्टेमैटिक्स लैब की टीम द्वारा, **हरपेटोलॉजिस्ट एस. डी. बिजू** के नेतृत्व में किए गए।

- The study reveals remarkable and previously **unrecorded defence strategies** among Indian amphibians.

अध्ययन भारतीय उभयचरों में असाधारण और पहले कभी दर्ज न किए गए रक्षा व्यवहारों का खुलासा करता है।

- The **nocturnal apatani horned toad (*Xenophrys apatani*)**, endemic to **Arunachal Pradesh**, relies on its **cryptic, leaf-litter-like colouration** to remain undetected during the day.

रात्रिचर अपातानी हॉर्न टोड (*Xenophrys apatani*), जो अरुणाचल प्रदेश का स्थानिक है, अपने पत्तों जैसे छलावरण रंग पर निर्भर करता है ताकि दिन के समय अदृश्य बना रहे।

- When threatened or approached, it **inflates its body**, emits a **piercing distress call**, and may even **bite the intruder**.

जब इसे खतरा महसूस होता है या कोई पास आता है, तो यह अपने शरीर को फुलाता है, एक तेज चेतावनी ध्वनि निकालता है, और यहां तक कि हमलावर को काट भी लेता है।

- Such behaviour was first noticed during **field photography** and later confirmed **experimentally**.





ऐसा व्यवहार पहली बार मैदानी फोटोग्राफी के दौरान देखा गया था और बाद में प्रयोगात्मक रूप से पुष्टि की गई।

- In contrast, the bicoloured frog (*Clinotarsus curtipes*), a diurnal species from the Western Ghats in Kerala, typically found on the forest floor among leaf litter, was observed to arch its body upwards by vertically extending its limbs when disturbed. इसके विपरीत, द्विवर्णीय मेंढक (*Clinotarsus curtipes*), जो केरल के पश्चिमी घाटों की एक दिवाचर प्रजाति है और सामान्यतः जंगल की जमीन पर सूखे पत्तों के बीच पाया जाता है, को परेशान करने पर अपने अंगों को सीधा कर शरीर को ऊपर उठाते हुए देखा गया।
- This posture, believed to make it appear larger and more intimidating, was documented in the wild and later tested using a threat stimulus. इस मुद्रा को, जो इसे अधिक बड़ा और डरावना दिखाने के लिए मानी जाती है, प्राकृतिक रूप से दर्ज किया गया और बाद में खतरे की उत्तेजना का उपयोग कर परीक्षण किया गया।
- The observations mark the first records of biting and body-raising as defensive strategies among India's 419 known frog species. यह अवलोकन भारत की 419 ज्ञात मेंढक प्रजातियों में काटने और शरीर उठाने जैसे रक्षा व्यवहारों के पहले रिकॉर्ड हैं।
- Of the 7,876 known frog species globally, around 650 are reported to display such behaviours. विश्व की 7,876 ज्ञात मेंढक प्रजातियों में से लगभग 650 प्रजातियों में ऐसे व्यवहार पाए गए हैं।
- However, such natural history observations are rarely documented among Indian species. हालांकि, ऐसी प्राकृतिक व्यवहार संबंधी टिप्पणियाँ भारतीय प्रजातियों में बहुत कम दर्ज की गई हैं।
- "These new observations in Indian frogs are just an example of how much remains either undocumented or completely unknown about the natural history and behaviours of our native species," Prof. Biju points out. प्रोफेसर बिजू बताते हैं कि "भारतीय मेंढकों में ये नए अवलोकन इस बात का उदाहरण हैं कि हमारी देशी प्रजातियों के प्राकृतिक इतिहास और व्यवहारों के बारे में कितना कुछ अभी भी अदर्ज या पूरी तरह अज्ञात है।"



# Indian maritime sector has seen historic progress: Modi

PM launches initiatives worth ₹2.2 lakh crore for shipping and shipbuilding sectors at Maritime Leaders' Conclave; amid global tensions, India represents autonomy and inclusive growth, he says

**GS III: Ports**

**Vinaya Deshpande Pandit**  
MUMBAI

The PM said India's maritime sector has seen historic and major progress. Prime Minister Narendra Modi said on Wednesday, "Cargo movement has increased 700% in inland areas. Today, India's ports are considered among the best in the developing world," he added.

Mr. Modi was speaking at the Maritime Leaders' Conclave held at the NESCO Ground to mark 'India Maritime Week'.

"When the global seas are rough, the world looks for a steady lighthouse. India can play that role very strongly. Amid global tensions, India represents autonomy and inclusive growth," Mr. Modi said, hinting at the prevailing global trade headwinds.

During the event, Mr. Modi launched initiatives worth ₹2.2 lakh crore for the shipping and shipbuilding sectors, including acquisition of 437 vessels.



Narendra Modi at an exhibition during the Maritime Leaders' Conclave at the India Maritime Week event in Mumbai. PTI

Several memoranda of understanding (MoUs) for port-led industrialisation, sustainability, and shipbuilding, among others, were signed.

### Sign of confidence

"In 2016, the maiden India Maritime Week was held in Mumbai. Today, it has become a global summit. Eighty-five countries participate in it today. This itself sends a very big message," Mr. Modi said.

"The MoUs signed here show the confidence of the

world in India's maritime capabilities."

"This [2025] is a crucial year for the country's maritime capabilities. The Vizhinjam deep water transit hub has been operational. It is a matter of pride for every Indian. Kandla port and the Jawaharlal Nehru Port Trust (JNPT) have shown great capabilities. The JNPT's handling capability has doubled, making it India's biggest container port," he added.

Speaking about reforms undertaken by the govern-

ment to improve shipping and port efficiency and safety, Mr. Modi said, "We are taking big steps. Modern and futuristic laws have been implemented and old laws scrapped. They strengthen sustainability and enhance digitisation in ports. The safety of our ports has increased and ease of business has improved."

### Logistics performance

Praising logistics performance of Indian ports, Mr. Modi said, "In the Logistics Performance Index of the World Bank, India had performed better."

"Shipbuilding is our top priority too. India is making great strides in shipbuilding," he said, adding, "New alternatives for finance and easy credit will be offered."

"We welcome your ideas, innovation and investment. Public-Private Partnerships [PPP] have been increasing. We are giving incentives to States to attract investment," he told the attendees at the conclave.

**Indian maritime sector has seen historic progress: Modi**  
**भारतीय समुद्री क्षेत्र में ऐतिहासिक प्रगति हुई है: मोदी**

• The progress in India's maritime domain has been historic and the capability of major ports has doubled, Prime Minister Narendra Modi said on Wednesday.

भारत के समुद्री क्षेत्र में प्रगति ऐतिहासिक रही है और प्रमुख बंदरगाहों की क्षमता दोगुनी हो गई है, प्रधानमंत्री नरेंद्र मोदी ने बुधवार को कहा।

• "Cargo movement has increased 700% in inland areas. Today, India's ports are considered among the best in the developing world," he added.

"अंतर्देशीय क्षेत्रों में कार्गो मूवमेंट 700% बढ़ा है। आज, भारत के बंदरगाह विकासशील विश्व के

सर्वश्रेष्ठ में गिने जाते हैं," उन्होंने कहा।

- Mr. Modi was speaking at the **Maritime Leaders' Conclave** held at the NESCO Ground to mark '**India Maritime Week**'.  
श्री मोदी नेसको ग्राउंड पर आयोजित 'इंडिया मेरीटाइम वीक' के अवसर पर हुए मैरिटाइम लीडर्स कॉन्क्लेव में बोल रहे थे।
- "When the **global seas are rough**, the world looks for a steady lighthouse. **India can play that role very strongly**. Amid global tensions, India represents autonomy and inclusive growth," Mr. Modi said, hinting at the prevailing **global trade headwinds**.  
"जब वैश्विक समुद्र उथल-पुथल में होते हैं, तो दुनिया एक स्थिर लाइटहाउस की तलाश करती है। भारत यह भूमिका मजबूती से निभा सकता है। वैश्विक तनावों के बीच, भारत स्वायत्तता और समावेशी विकास का प्रतीक है," श्री मोदी ने कहा, जो वर्तमान वैश्विक व्यापार चुनौतियों की ओर संकेत कर रहे थे।
- During the event, Mr. Modi launched initiatives worth **₹2.2 lakh crore** for the **shipping and shipbuilding sectors**, including acquisition of **437 vessels**.  
इस कार्यक्रम के दौरान, श्री मोदी ने शिपिंग और शिपबिल्डिंग क्षेत्रों के लिए **₹2.2 लाख करोड़ रुपये** की पहल शुरू की, जिसमें **437 जहाजों की खरीद** भी शामिल है।
- Several **MoUs** for port-led industrialisation, sustainability, and shipbuilding, among others, were signed.  
बंदरगाह आधारित औद्योगिकीकरण, सस्टेनेबिलिटी और शिपबिल्डिंग सहित कई एमओयू पर हस्ताक्षर किए गए।



## Sign of Confidence

### विश्वास का संकेत

- “In 2016, the maiden **India Maritime Week** was held in Mumbai. Today, it has become a **global summit**.  
2016 में पहली बार **इंडिया मेरीटाइम वीक** मुंबई में आयोजित हुआ था। आज यह एक **वैश्विक शिखर सम्मेलन** बन चुका है।
- **Eighty-five countries** participate in it today. This itself sends a very big message,” Mr. Modi said.  
“आज **पचासी देश** इसमें भाग लेते हैं। यह अपने आप में एक बहुत बड़ा संदेश देता है,” श्री मोदी ने कहा।
- “The **MoUs** signed here show the confidence of the world in **India’s maritime capabilities**.  
“यहाँ हस्ताक्षरित **एमओयू** विश्व के **भारत की समुद्री क्षमताओं** पर विश्वास को दर्शाते हैं।”

## Major Developments in 2025

### 2025 में प्रमुख विकास

- “This [2025] is a crucial year for the country’s **maritime capabilities**. The **Vizhinjam deep water transit hub** has been operational. It is a matter of pride for every Indian.  
“यह [2025] देश की **समुद्री क्षमताओं** के लिए एक महत्वपूर्ण वर्ष है। **विझिंजम डीप वॉटर ट्रांजिट हब** चालू हो गया है। यह हर भारतीय के लिए गर्व की बात है।
- **Kandla port** and the **Jawaharlal Nehru Port Trust (JNPT)** have shown great capabilities.  
**कांडला पोर्ट** और **जवाहरलाल नेहरू पोर्ट ट्रस्ट (JNPT)** ने बेहतरीन क्षमताएँ प्रदर्शित की हैं।
- The **JNPT’s handling capability has doubled**, making it India’s biggest container port,” he added.  
“**JNPT की हैंडलिंग क्षमता दोगुनी** हो गई है, जिससे यह भारत का सबसे बड़ा **कंटेनर पोर्ट** बन गया है,” उन्होंने कहा।

## Reforms and Modernisation

### सुधार और आधुनिकीकरण

- Speaking about **reforms undertaken by the government** to improve shipping and port efficiency and safety, Mr. Modi said, “We are taking big steps.  
**शिपिंग और पोर्ट की दक्षता व सुरक्षा सुधारने** के लिए सरकार द्वारा किए गए **सुधारों** पर बोलते हुए, श्री मोदी ने कहा, “हम बड़े कदम उठा रहे हैं।
- **Modern and futuristic laws** have been implemented and old laws scrapped.  
**आधुनिक और भविष्यवादी कानून** लागू किए गए हैं और पुराने कानूनों को समाप्त किया गया है।
- They strengthen **sustainability** and enhance **digitisation** in ports.  
ये **सस्टेनेबिलिटी** को मजबूत करते हैं और बंदरगाहों में **डिजिटलीकरण** को बढ़ावा देते हैं।
- The **safety of our ports** has increased and **ease of business** has improved.”  
हमारे बंदरगाहों की **सुरक्षा** बढ़ी है और **व्यवसाय में आसानी** में सुधार हुआ है।”

## Logistics Performance and Shipbuilding

### लॉजिस्टिक्स प्रदर्शन और जहाज निर्माण

- Praising logistics performance of Indian ports, Mr. Modi said, “In the **Logistics Performance Index** of the World Bank, **India had performed better**.  
भारतीय बंदरगाहों के **लॉजिस्टिक्स प्रदर्शन** की सराहना करते हुए, श्री मोदी ने कहा, “**विश्व बैंक के लॉजिस्टिक्स परफॉर्मेंस इंडेक्स** में **भारत का प्रदर्शन बेहतर रहा है।**”
- “**Shipbuilding** is our top priority too. India is making great strides in **shipbuilding**,” he said.  
“**शिपबिल्डिंग** भी हमारी सर्वोच्च प्राथमिकता है। भारत **जहाज निर्माण** में बड़ी प्रगति कर रहा है,” उन्होंने कहा।



- “New alternatives for finance and easy credit will be offered.”  
“वित्त के नए विकल्प और आसान ऋण सुविधाएँ प्रदान की जाएँगी।”
- “We welcome your ideas, innovation and investment. Public-Private Partnerships (PPP) have been increasing.  
“हम आपके विचारों, नवाचार और निवेश का स्वागत करते हैं। सार्वजनिक-निजी भागीदारी (PPP) बढ़ रही है।”
- We are giving incentives to States to attract investment,” he told the attendees at the conclave.  
“हम निवेश आकर्षित करने के लिए राज्यों को प्रोत्साहन दे रहे हैं,” उन्होंने सम्मेलन में उपस्थित लोगों से कहा।

# NSCN(I-M) leader reiterates Naga sovereignty demand

**GS III: Naga Insurgency**

**The Hindu Bureau**  
GUWAHATI

National Socialist Council of Nagalim (I-M) leader Thuingaleng Muivah on Wednesday reiterated his group’s unwavering stand on Naga sovereignty.

Addressing a rally in Manipur’s Senapati on his way back from his birthplace, Somdal village, to the NSCN (I-M)’s central headquarters near Dimapur in adjoining Nagaland, Mr. Muivah assured the Nagas

that the group would never compromise on what it set out to do decades ago.

“The only honourable negotiated political agreement shall be according to the letter and spirit of the Amsterdam Joint Communiqué and the Framework Agreement (August 2015), and the officially recognised Nagalim unique history, Nagalim sovereignty, Nagalim territory, and the Naga national flag, and the Naga national constitution,” Mr. Muivah said.

आश्वासन दिया कि संगठन उन उद्देश्यों से कभी समझौता नहीं करेगा जिन्हें उसने दशकों पहले निर्धारित किया था।

- “The only honourable negotiated political agreement shall be according to the letter and spirit of the **Amsterdam Joint Communiqué and the Framework Agreement (August 2015)**, and the **officially recognised Nagalim unique history, Nagalim sovereignty, Nagalim territory, and the Naga national flag, and the Naga national constitution**,” Mr. Muivah said.  
“केवल वही सम्मानजनक राजनीतिक समझौता स्वीकार्य होगा जो एम्सटर्डम संयुक्त घोषणा पत्र और फ्रेमवर्क एग्रीमेंट (अगस्त 2015) की भावना और शब्दों के अनुरूप हो, तथा आधिकारिक रूप से मान्यता प्राप्त नागालिम के विशिष्ट इतिहास, नागालिम की संप्रभुता, नागालिम की क्षेत्रीय अखंडता, नागा राष्ट्रीय ध्वज, और नागा राष्ट्रीय संविधान पर आधारित हो,” श्री मुइवा ने कहा।

**NSCN (I-M) leader reiterates Naga sovereignty demand**

**NSCN (I-M) नेता ने नागा संप्रभुता की मांग दोहराई**

- **National Socialist Council of Nagalim (I-M) leader Thuingaleng Muivah** on Wednesday reiterated his group’s unwavering stand on **Naga sovereignty**.



नेशनल सोशलिस्ट काउंसिल ऑफ नागालिम (I-M) के नेता **थुइंगलेंग मुइवा** ने बुधवार को अपने संगठन के नागा संप्रभुता पर अडिग रुख को दोहराया।

- Addressing a rally in **Manipur’s Senapati** on his way back from his birthplace, **Somdal village**, to the **NSCN (I-M)’s central headquarters near Dimapur in adjoining Nagaland**, Mr. Muivah assured the Nagas that the group would never compromise on what it set out to do decades ago.

**मणिपुर के सेनापति** में एक रैली को संबोधित करते हुए, अपने जन्मस्थान **सोमदल गांव** से सटे **नागालैंड** में **दीमापुर के पास स्थित NSCN (I-M) के केंद्रीय मुख्यालय** की ओर लौटते समय, श्री मुइवा ने नागाओं को



# Developing nations need 12 times more funds to fight climate crisis

**GS III: Adaptation and Mitigation**

**NEW DELHI**

To adapt to climate change, developing countries will require anywhere from \$310-365 billion (at least ₹27 lakh crore) annually by 2035, according to a United Nations analysis. This is nearly 12 times more than the money that currently flows from the developed to the developing world for this purpose.

The analysis, underlining the huge gap between the demand and supply of funds needed to protect developing nations from climate change impacts, appears in *Running on Empty*, an annual report on the shortfall released on Wednesday, ahead of the 30<sup>th</sup> edition of the UN Framework Convention on Climate Change Conference of Parties (COP-30) to be held in Belém, Brazil next month.

International public adaptation finance flows to developing countries stood



Developing countries need more climate finance to move away from power plants dependent on fossil fuels. FILE PHOTO

at \$26 billion (about ₹2.2 lakh crore) in 2023, down from \$28 billion the previous year. If these trends continue, a target agreed upon by countries at the COP-26 in Glasgow, to double adaptation finance to \$40 billion by 2025 will be “missed”, the report added.

### Disappointing target

Finance is a significant issue in climate negotiations, as developing countries insist that developed countries pay the costs of adap-

tation (to deal with climate change impacts) and mitigation (to move away from fossil fuels), as well as compensation for losses and damages already occurring. This total bill is collectively called “climate finance”.

At COP-29 in Baku, Azerbaijan last year, developing countries, which were demanding nearly \$1.3 trillion annually by 2035, were disappointed when the developed world agreed to only \$300 billion, called the New Collec-

tioned Goal (NCQG) on climate finance.

Tuesday’s UN report underlines this criticism. “...it is far too evident that the financial resources needed to enable adaptation action in developing countries at the scale necessary to meet the growing challenges of current and future climate risks is woefully inadequate. It will take nothing less than a global collective effort to increase climate finance to the levels articulated in the Baku to Belém Roadmap to 1.3 trillion,” it notes.

The report also raises concerns that whatever money has been made available at present is primarily classified as ‘debt.’ Although 70% of international public adaptation finance was concessional in 2022-23, it is “worrying” that debt instruments continue to dominate these overall flows, comprising 58% on average in that financial year, the report said.

## Developing nations need 12 times more funds to fight climate crisis

विकासशील देशों को जलवायु संकट से निपटने के लिए 12 गुना अधिक धन की आवश्यकता है

- To adapt to **climate change**, developing countries will require anywhere from **\$310-365 billion (at least ₹27 lakh crore)** annually by **2035**, according to a **United Nations analysis**.  
संयुक्त राष्ट्र के विश्लेषण के अनुसार, जलवायु परिवर्तन के अनुकूल न के लिए विकासशील देशों को 2035 तक हर वर्ष \$310-365 बिलियन (कम से कम ₹27 लाख करोड़) की आवश्यकता होगी।
- This is nearly **12 times more** than the money that currently flows from the **developed to the developing world** for this purpose.  
यह वर्तमान में विकसित देशों से विकासशील देशों को इस उद्देश्य के लिए प्रवाहित होने वाले धन से लगभग 12 गुना अधिक है।



- The analysis, underlining the **huge gap between the demand and supply** of funds needed to protect developing nations from **climate change impacts**, appears in **Running on Empty**, an annual report on the shortfall released on Wednesday, ahead of the **30th edition of the UN Framework Convention on Climate Change Conference of Parties (COP-30) to be held in Belem, Brazil** next month.  
इस विश्लेषण ने विकासशील देशों को जलवायु परिवर्तन के प्रभावों से बचाने के लिए आवश्यक धन की मांग और आपूर्ति के बीच के बड़े अंतर को रेखांकित किया है। यह "रनिंग ऑन एम्प्टी" नामक वार्षिक रिपोर्ट में प्रकाशित हुआ है, जिसे बुधवार को UN फ्रेमवर्क कन्वेंशन ऑन क्लाइमेट चेंज (COP-30) के 30वें संस्करण से पहले जारी किया गया, जो अगले महीने ब्राज़ील के बेलेम में आयोजित होगा।
- International public adaptation finance flows to developing countries stood at \$26 billion (about ₹2.2 lakh crore) in 2023, down from \$28 billion the previous year.**  
अंतरराष्ट्रीय सार्वजनिक अनुकूलन वित्त का प्रवाह 2023 में विकासशील देशों के लिए \$26 बिलियन (लगभग ₹2.2 लाख करोड़) रहा, जो पिछले वर्ष के \$28 बिलियन से कम है।
- If these trends continue, a target agreed upon by countries at the **COP-26 in Glasgow, to double adaptation finance to \$40 billion by 2025**, will be "missed", the report added.  
रिपोर्ट में कहा गया कि यदि यह रुझान जारी रहता है, तो ग्लासगो में COP-26 पर देशों द्वारा तय किया गया 2025 तक अनुकूलन वित्त को \$40 बिलियन तक दोगुना करने का लक्ष्य "पूरा नहीं हो पाएगा।"

### Disappointing target निराशाजनक लक्ष्य

- Finance** is a significant issue in **climate negotiations**, as developing countries insist that developed countries pay the costs of **adaptation** (to deal with climate change impacts) and **mitigation** (to move away from fossil fuels), as well as compensation for **losses and damages** already occurring.  
वित्त जलवायु वार्ताओं में एक महत्वपूर्ण मुद्दा है, क्योंकि विकासशील देश इस पर जोर देते हैं कि विकसित देश अनुकूलन (जलवायु परिवर्तन के प्रभावों से निपटने) और शमन (जीवाश्म ईंधनों से दूर जाने) की लागतों के साथ-साथ पहले से हो रहे नुकसान और क्षति का मुआवजा भी दें।
- This total bill is collectively called "**climate finance**."  
इस कुल व्यय को सामूहिक रूप से "जलवायु वित्त" कहा जाता है।
- At **COP-29 in Baku, Azerbaijan** last year, developing countries, which were demanding nearly **\$1.3 trillion annually by 2035**, were **disappointed when the developed world agreed to only \$300 billion, called the New Collective Quantified Goal (NCQG) on climate finance**.  
पिछले वर्ष अज़रबैजान के बाकू में COP-29 में, विकासशील देश जो 2035 तक प्रतिवर्ष \$1.3 ट्रिलियन की मांग कर रहे थे, निराश हुए जब विकसित देशों ने केवल \$300 बिलियन पर सहमति व्यक्त की, जिसे "न्यू कलेक्टिव क्वांटिफाइड गोल (NCQG)" कहा गया।

### UN Report Criticism संयुक्त राष्ट्र की रिपोर्ट की आलोचना

- Tuesday's **UN report** underlines this criticism. "...it is far too evident that the financial resources needed to enable **adaptation action in developing countries** at the scale necessary to meet the growing challenges of current and future climate risks is **woefully inadequate**."  
मंगलवार की संयुक्त राष्ट्र रिपोर्ट ने इस आलोचना को रेखांकित किया। "...यह स्पष्ट है कि विकासशील देशों में अनुकूलन कार्रवाई के लिए आवश्यक वित्तीय संसाधन वर्तमान और भविष्य के जलवायु जोखिमों से निपटने के पैमाने पर बहुत अपर्याप्त हैं।"
- "It will take nothing less than a **global collective effort** to increase **climate finance** to the levels articulated in the **Baku to Belém Roadmap to \$1.3 trillion**," it notes.  
रिपोर्ट में कहा गया, "जलवायु वित्त को 'बाकू से बेलेम रोडमैप' में उल्लिखित \$1.3 ट्रिलियन के स्तर तक बढ़ाने के लिए एक वैश्विक सामूहिक प्रयास की आवश्यकता होगी।"



TELEGRAM CHANNEL: <https://t.me/patrioticIAS>

YOUTUBE CHANNEL: <https://www.youtube.com/@PatrioticIAS>

CONTACT: 9971932488



## Debt Concerns ऋण संबंधी चिंताएँ

- The report also raises concerns that whatever money has been made available at present is primarily classified as 'debt'.  
रिपोर्ट ने यह भी चिंता व्यक्त की कि वर्तमान में उपलब्ध कराई गई अधिकांश राशि 'ऋण' के रूप में वर्गीकृत की गई है।
- Although **70% of international public adaptation finance was concessional** in **2022-23**, it is "worrisome" that **debt instruments** continue to dominate these overall flows, comprising **58% on average** in that financial year, the report said.  
रिपोर्ट में कहा गया कि यद्यपि **2022-23** में **70%** अंतरराष्ट्रीय सार्वजनिक अनुकूलन वित्त रियायती था, लेकिन यह "चिंताजनक" है कि **ऋण साधन (debt instruments)** अभी भी इन प्रवाहों पर हावी हैं, जो उस वित्तीय वर्ष में औसतन **58%** थे।

PATRIOTIC IAS



# Nanometre 'tank' of helium reveals weird waves never seen before

When cooled to just a few degrees above absolute zero, helium becomes a superfluid – it can flow without any friction or viscosity; this means an ultra-shallow film of superfluid helium, a few nanometres thick, can move freely without getting stuck – something impossible for any normal fluid

By Sankar Ghosh

Vasudevan Mukunth

Imagine a tsunami, a colossal wave capable of travelling across entire oceans and causing immense destruction. Now, picture another special kind of wave, known as a soliton. Unlike a regular wave that spreads out and loses energy, a soliton is a solitary wave that holds its shape and speed over incredibly long distances. These powerful and mysterious waves are examples of what scientists call nonlinear wave dynamics. Understanding them is crucial for everything from predicting natural disasters to designing better communications systems.

For decades, scientists have studied these waves in enormous, hundred-metre-long water tanks called wave flumes. By generating waves in these controlled environments, they can observe how they behave.

However, even the biggest and most advanced wave flumes have a major limitation: they can't replicate the extreme conditions that create the most powerful nonlinear waves found in nature, like the sheer force of a tsunami or the intensity of the world's most extreme tides. "Nonlinear" here means the wave's behaviour doesn't scale in a simple, proportionate way; instead, small changes in conditions can produce disproportionately large or unpredictable effects. The physics behind these waves is very complex, and reaching the level of nonlinearity seen in nature has been impossible to achieve in a lab.

## Incredible properties

This is the challenge a team of researchers from the University of Queensland in Australia set out to surmount. But instead of going even bigger, they went much smaller.

They created a wave flume on a microscopic chip and used a unique kind of fluid to generate waves more powerful (relative to their size) than anything ever seen on the earth. Their goal was to create a platform to study the full range of nonlinear wave behaviour in a controlled, miniature environment.

"The study of how fluids move has fascinated scientists for centuries because hydrodynamics governs everything from ocean waves and the swirl of hurricanes to the flow of blood and air through our bodies," study coauthor and ARC Future Fellow Christopher Baker said in a statement. "But a lot of the physics behind waves and turbulence has been a mystery."

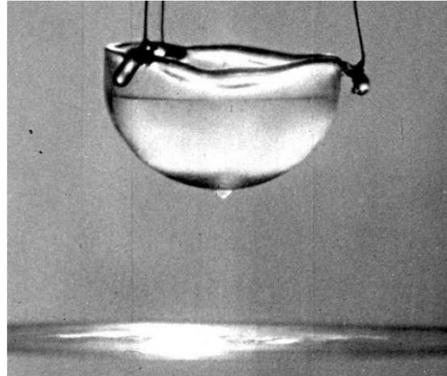
The findings were published in *Science* on October 23.

When cooled to just a few degrees above absolute zero, helium becomes a superfluid – a unique quantum state of matter with incredible properties. Most importantly in this context, it can flow without any friction or viscosity. This means an ultra-shallow film of superfluid helium just a few nanometres thick can move freely without getting stuck. This is impossible for any normal fluid.

The team fabricated a silicon beam about the width of a human hair on a chip. When cooled, a 6.7-nm deep film of superfluid helium could naturally coat this beam, creating a perfect wave channel.

## Lilliputian paddles

The next challenge was to make waves in such a small system and see them. At one end of the silicon beam, the team built a photonic crystal cavity – a structure with



Superfluid helium can creep up the surface of the cup, climb out, and drip down from the bottom. Classical fluids can't do this. PUBLIC DOMAIN

nanometre-wide holes that trapped light. When the researchers shone a laser into this cavity, it heated the superfluid helium slightly.

Superfluid helium has another strange property: it flows towards rather than away from heat, a phenomenon called the fountain effect. By rapidly changing the laser's intensity, they could create pulses of heat that pushed the superfluid, like a Lilliputian light-powered paddle.

Second, the height of the helium film affected the light trapped in the cavity. As a wave passed by, raising or lowering the fluid's surface, it slightly changed the light's frequency. By monitoring the light coming out of the cavity, the researchers could precisely measure the shape and height of the waves in real-time in a very sensitive way. Thus, this all-optical system allowed the team to both generate powerful waves and observe their behaviour on a microscopic scale.

With their chip-scale wave flume up and running, the researchers were able to observe a whole host of nonlinear phenomena that had previously been stuck on paper. One of the first things they observed was backward steepening. In a normal water wave, the crest moves faster than the trough, causing the wave to lean forward and eventually break.

In the superfluid, they saw the exact opposite. The troughs moved faster than the crests, causing the wave to lean backwards before breaking. This strange behaviour had been predicted for superfluid helium decades ago but had never been directly observed.

## Solitary waves

Second, by cranking up the power of their laser paddle, they generated even more extreme waves and witnessed the formation of near-instantaneous shock fronts: where the wave's leading edge becomes almost vertical. And then, they saw something even more spectacular: soliton fission. The powerful initial wave, instead of just breaking, split apart into a train of smaller, perfectly formed solitary waves, or solitons. The team was able to generate a train of up to 12 of these solitons from a single wave pulse.

Intriguingly, these solitons weren't like those we normally see in water, which are



The study of how fluids move has fascinated scientists for centuries because hydrodynamics governs everything from ocean waves and the swirl of hurricanes to the flow of blood and air through our bodies

CHRISTOPHER BAKER  
ARC FUTURE FELLOW

peaks that rise above the surface. These were hot solitons – propagating as depressions or troughs below the average fluid depth. Read that again: below the average fluid depth. They're called hot solitons because their troughs are slightly warmer than the surrounding superfluid. This remarkable observation confirmed another long-standing prediction about superfluid dynamics.

"Using laser light to both drive and measure the waves in our system, we have observed a range of striking phenomena," said Dr. Baker. "We saw waves that leaned backward instead of forward, shock fronts, and solitary waves known as solitons which travelled as depressions rather than peaks. This exotic behaviour has been predicted in theory but never seen before."

## Macroscopic to microscopic

Using a microscopic platform to study waves evidently had several advantages. First, the experiments played out much faster. Phenomena that would take hours to observe in a giant water tank unfolded in just milliseconds, allowing scientists to collect vast amounts of data quickly.

Of course, one question is pertinent here: can we be sure that what happens at the microscopic scale is/will be exactly replicated at the macroscopic scale, with the same forces and phenomena at play?

The short answer is 'no', we can't assume that what happens at the macroscopic scale is exactly replicated at the microscopic scale – but this doesn't mean the study's findings aren't applicable to the waves we see in water bodies.

At the macroscopic scale, say, in a 100-m flume, gravity and inertia

dominate whereas at nanometric scales, like the 6.7-nm helium films in the study, gravity becomes negligible; instead, van der Waals forces and surface tension dominate. So although both systems can be modelled by shallow-water hydrodynamics, the effective gravitational acceleration is replaced by a van der Waals term in the corresponding equation – in this case, the Korteweg-De Vries (KdV) equation. However, the equation's form itself doesn't change.

Put another way, both microscopic and macroscopic waves are governed by the same mechanics; it's just that the physical constants are different and the equation has different terms that dominate.

One of these constants is the Ursell number, which dictates how hydrodynamic behaviour scales nonlinearly with depth and amplitude. This is why shrinking a system by a factor of a million doesn't linearly scale its dynamics. Instead, the system is "pushed" into an entirely different regime.

Second, at the microscale, the helium film is a quantum fluid, not a classical substance. Its viscosity vanishes, heat flow drives its motion (via the fountain effect), and strange phases of matter like quantised vortices become possible. None of these exist in classical macroscopic fluids. Similarly, the crystal cavities also modify how waves disperse, producing wave behaviour that's impossible in natural flumes.

However, researchers aren't claiming their experiment reproduces the exact same physical forces as in a macroscopic water flume but that their waves-on-a-chip setup obeys the same (KdV) hydrodynamic equation in form.

Specifically, what allows them to compare the superfluid flumes and a real oceanic flume isn't identical forces—which don't exist—but the mathematical equivalence of the governing equation.

In the study, the team worked under limiting conditions where the fluid's depth is low, also known as the shallow-water limit. In this regime, the dynamics governing the waves depend on three dimensionless parameters: the Ursell number, the aspect ratio (ratio of depth to length), and the dispersion coefficients in the KdV equation. If two systems share the same three forms of these parameters, then, even if one involves gravity and the other involves van der Waals forces, their wave evolution should be dynamically similar.

Put another way, the chip experiment wasn't meant to reproduce a tsunami in miniature but to reproduce the same mathematics of nonlinear wave evolution.

And in the paper, the researchers described three things they did to prove they did so in a correct way.

First, they used a custom Euler solver, which is a full hydrodynamic model with nonlinear behaviour due to van der Waals forces, and the KdV equation to model the experiment and found that it could do so correctly.

Second, they plotted the Ursell number in their microscopic experiment and found that it curved up to cross a value of 100 million. Thus they could conclude that their experiment was hydrodynamically equivalent to, or exceeded, what they might have seen in a large flume.

Third, they observed wave steepening, shock-front formation, and soliton fission – which is the very sequence of formations that the theory predicts for waves of large amplitude in shallow water.

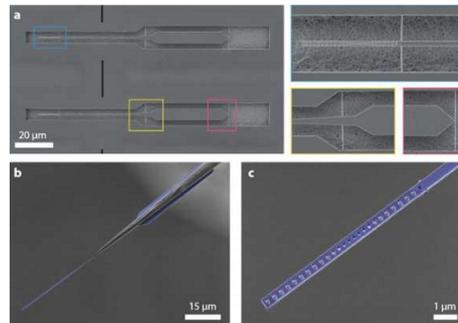
Finally, overall, the authors of the new study have been careful not to say "we've shrunk the ocean onto a chip." Instead their paper repeatedly emphasises the differences between the two scales: that gravity is replaced by van der Waals acceleration, that dispersion is engineered using light (rather than naturally), and that the fluid is a superfluid with zero viscosity.

## Toolkit to explore

The second advantage was that the system was very easy to control. The researchers could finely tune the waves' properties by adjusting the laser power and the thickness of the superfluid film. They could also modify the chip's design to create different channel shapes or place obstacles in the waves' way, providing a toolkit to explore complex fluidic phenomena.

Finally, according to the study paper, the work also pushes the boundaries of optomechanics – the study of how light and mechanical motion interact. The extreme nonlinearities observed go beyond the gentle perturbations typically studied in this field, opening a new regime of nonlinear dynamics.

mukunth.v@thehindu.co.in



Top-left: Scanning electron micrograph top-view of two fabricated devices on a silicon on insulator chip. Right: Zoom-ins of the boxed regions; b) False colour scanning electron microscope image showing the silicon superfluid wave flume (blue) glued to a silica optical fibre taper (grey); c) Zoomed-in view showing the silicon photonic crystal cavity at the end of the device. The silicon waveguide is around 500 nm wide and 220 nm thick. ARXIV:2504.13301v1



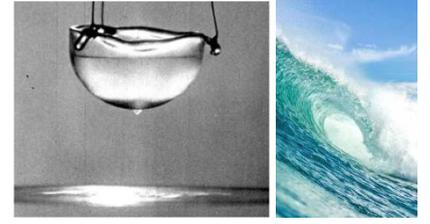
In a normal water wave, the crest moves faster than the trough, causing the wave to lean forward and eventually break. MARK HARBUR/UNSPLOSH



## Nanometre 'tank' of helium reveals weird waves never seen before हीलियम के नैनोमीटर 'टैंक' में पहली बार देखी गई अजीब तरंगें

### The Mysterious Power of Soliton Waves

#### सोलिटॉन तरंगों की रहस्यमयी शक्ति



- Imagine a **tsunami**, a colossal wave capable of traveling across entire oceans and causing immense destruction. Now, picture another special kind of wave, known as a **soliton**.  
एक **सुनामी** की कल्पना करें, जो पूरे महासागरों में यात्रा कर सकती है और अत्यधिक विनाश कर सकती है। अब एक और विशेष प्रकार की लहर की कल्पना करें जिसे **सोलिटॉन** कहा जाता है।
- Unlike regular waves that spread out and lose energy, a **soliton is a solitary wave that maintains its shape and speed over very long distances**.  
सामान्य तरंगों के विपरीत जो फैलती हैं और ऊर्जा खो देती हैं, **सोलिटॉन एक एकल तरंग (solitary wave)** है जो लंबी दूरी तक अपना आकार और गति बनाए रखती है।
- These mysterious waves are examples of nonlinear wave dynamics**.  
ये रहस्यमयी तरंगें **गैर-रेखीय तरंग गतिकी (nonlinear wave dynamics)** का उदाहरण हैं।
- Understanding them is important for predicting **natural disasters** and designing **better communication systems**.  
इन्हें समझना **प्राकृतिक आपदाओं की भविष्यवाणी और बेहतर संचार प्रणालियाँ** बनाने के लिए महत्वपूर्ण है।

### Studying Nonlinear Waves

#### गैर-रेखीय तरंगों का अध्ययन

- For decades, scientists have studied these waves in **large wave flumes** — huge, hundred-metre-long water tanks.  
दशकों से वैज्ञानिक इन तरंगों का अध्ययन बड़े **वेव फ्लूम्स (wave flumes)** — सौ मीटर लंबे जल टैंकों — में करते आए हैं।
- These controlled environments allow observation of wave behaviour.  
ये नियंत्रित वातावरण वैज्ञानिकों को तरंगों के व्यवहार का अवलोकन करने की अनुमति देते हैं।
- Even the biggest **wave flumes** cannot replicate the **extreme natural conditions** of tsunamis or strong tides.  
सबसे बड़े **वेव फ्लूम्स** भी **सुनामी** या शक्तिशाली ज्वार जैसी **चरम प्राकृतिक परिस्थितियों** की नकल नहीं कर सकते।
- "Nonlinear"** means wave behaviour doesn't scale proportionately — small changes can cause **huge or unpredictable effects**.  
"गैर-रेखीय (Nonlinear)" का अर्थ है कि तरंग का व्यवहार आनुपातिक नहीं होता — छोटे परिवर्तन **अत्यधिक या अप्रत्याशित प्रभाव** पैदा कर सकते हैं।
- The **physics** behind these waves is very complex, and such **nonlinearity** has been impossible to achieve in laboratories.  
इन तरंगों के पीछे की **भौतिकी** बहुत जटिल है, और प्रयोगशालाओं में ऐसी **गैर-रेखीयता (nonlinearity)** प्राप्त करना अब तक असंभव रहा है।

### Breakthrough by University of Queensland Scientists

#### क्वींसलैंड विश्वविद्यालय के वैज्ञानिकों की सफलता

- A team from the **University of Queensland, Australia**, aimed to overcome this challenge.  
**ऑस्ट्रेलिया के यूनिवर्सिटी ऑफ क्वींसलैंड** की एक टीम ने इस चुनौती को हल करने का लक्ष्य रखा।
- Instead of building bigger setups, they went **microscopic**.  
बड़े सेटअप बनाने के बजाय, उन्होंने **सूक्ष्म (microscopic)** स्तर पर काम किया।
- They created a **wave flume on a microchip** using a special kind of fluid.  
उन्होंने एक विशेष प्रकार के द्रव का उपयोग करके एक **माइक्रोचिप पर वेव फ्लूम् (wave flume)** बनाया।



- These waves were **more powerful (relative to their size)** than anything ever seen on Earth. ये तरंगों अपने आकार के अनुपात में पृथ्वी पर देखी गई किसी भी तरंग से **अधिक शक्तिशाली** थीं।
- The aim was to create a **platform for studying nonlinear wave behaviour** in a controlled, miniature setup. उद्देश्य था कि एक **नियंत्रित, सूक्ष्म सेटअप में गैर-रेखीय तरंग व्यवहार (nonlinear wave behaviour)** का अध्ययन किया जा सके।

### Significance of the Study अध्ययन का महत्व

- According to **Christopher Baker**, “the study of how fluids move has fascinated scientists for centuries.” **क्रिस्टोफर बेकर** के अनुसार, “कैसे द्रव प्रवाहित होते हैं, इसका अध्ययन सदियों से वैज्ञानिकों को आकर्षित करता रहा है।”
- **Hydrodynamics governs everything from ocean waves and hurricanes to blood and air flow in our bodies.** **तरल गतिकी (hydrodynamics)** महासागर की तरंगों, **हरिकेन**, और हमारे शरीर में **रक्त और वायु के प्रवाह** को नियंत्रित करती है।
- Much of the physics behind **waves and turbulence** remains a **mystery**. **तरंगों और अशांति (turbulence)** के पीछे की भौतिकी अभी भी **रहस्य** बनी हुई है।
- The findings were **published in Science on October 23**. ये निष्कर्ष **23 अक्टूबर** को **Science** पत्रिका में प्रकाशित हुए।

### Superfluid Helium and Its Role सुपरफ्लुइड हीलियम और इसकी भूमिका

- When cooled near **absolute zero**, helium turns into a **superfluid**, a quantum state with amazing properties. जब हीलियम को **पूर्ण शून्य (absolute zero)** के पास ठंडा किया जाता है, तो यह एक **सुपरफ्लुइड (superfluid)** बन जाता है जिसमें अद्भुत गुण होते हैं।
- **It can flow without friction or viscosity**, meaning it moves freely without resistance. यह **घर्षण या सान्द्रता (viscosity)** के बिना प्रवाहित हो सकता है, यानी यह बिना किसी अवरोध के स्वतंत्र रूप से बहता है।
- **A 6.7-nm deep film of superfluid helium was used to coat a silicon beam about the width of a human hair.** **6.7 नैनोमीटर गहरी परत** वाले सुपरफ्लुइड हीलियम का उपयोग **मानव बाल जितनी चौड़ाई** वाली **सिलिकॉन बीम (silicon beam)** को ढकने के लिए किया गया।
- This created a **perfect wave channel** for observing nonlinear wave motion. इसने **गैर-रेखीय तरंग गति (nonlinear wave motion)** को देखने के लिए एक **संपूर्ण तरंग चैनल (perfect wave channel)** बनाया।

### Lilliputian paddles लिलिपुटियन पैडल्स

- The next challenge was to make waves in such a small system and see them. अगली चुनौती इतनी छोटी प्रणाली में तरंगों बनाना और उन्हें देखना थी।
- At one end of the silicon beam, the team built a **photonic crystal cavity** — a structure with **nanometre-wide holes** that trapped light. सिलिकॉन बीम के एक सिरे पर टीम ने एक **फोटोनिक क्रिस्टल कैविटी** बनाई — जिसमें **नैनोमीटर चौड़े छेद** थे जो प्रकाश को फँसा लेते थे।
- When the researchers shone a laser into this cavity, it **heated the superfluid helium slightly**. जब शोधकर्ताओं ने इस कैविटी में लेज़र डाली, तो इससे **सुपरफ्लुइड हीलियम थोड़ा गर्म** हुआ।



- **Superfluid helium flows towards heat** instead of away from it — this is called the **fountain effect**.  
सुपरफ्लुइड हीलियम गर्मी से दूर नहीं बल्कि उसकी ओर बहता है — इसे फाउंटैन प्रभाव कहा जाता है।
- By rapidly changing the laser's intensity, they created **pulses of heat** that pushed the superfluid, like a **Lilliputian light-powered paddle**.  
लेज़र की तीव्रता को तेज़ी से बदलकर उन्होंने गर्मी की तरंगों (pulses) बनाई जो सुपरफ्लुइड को लिलिपुटियन प्रकाश-संचालित पैडल की तरह धकेलती थीं।
- The **height of the helium film** affected the **light trapped in the cavity**.  
हीलियम फिल्म की ऊँचाई ने कैविटी में फँसी रोशनी को प्रभावित किया।
- As a wave passed, it slightly changed the **light's frequency** by **raising or lowering the fluid surface**.  
जैसे ही तरंग गुजरी, उसने द्रव की सतह को ऊपर या नीचे करके प्रकाश की आवृत्ति में हल्का परिवर्तन किया।
- Monitoring the outgoing light helped them **measure the shape and height of waves in real-time**.  
बाहर निकलती रोशनी की निगरानी से वे वास्तविक समय में तरंगों के आकार और ऊँचाई को माप सकते थे।
- This **all-optical system** enabled them to **generate powerful waves** and **observe their microscopic behaviour**.  
यह पूर्णतः प्रकाश आधारित प्रणाली उन्हें शक्तिशाली तरंगों उत्पन्न करने और उनके सूक्ष्म व्यवहार को देखने में सक्षम बनाती थी।
- With their **chip-scale wave flume** working, they observed **nonlinear phenomena** that had only existed on paper before.  
जब उनका चिप-स्तरीय वेव फ्लूम काम करने लगा, तो उन्होंने कई गैर-रेखीय घटनाएँ देखीं जो पहले केवल सिद्धांत में थीं।

### Backward Steepening पिछड़े झुकाव की घटना

- The first phenomenon they observed was **backward steepening**.  
उन्होंने सबसे पहले पिछड़े झुकाव (Backward Steepening) की घटना देखी।
- In normal water waves, **crests move faster than troughs**, making the wave **lean forward and break**.  
सामान्य जल तरंगों में शिखर गर्त से तेज़ चलते हैं, जिससे तरंग आगे झुकती है और टूट जाती है।
- In superfluid helium, the **troughs moved faster than the crests**, so the wave **leaned backward before breaking**.  
सुपरफ्लुइड हीलियम में गर्त शिखरों से तेज़ चलते थे, जिससे तरंग टूटने से पहले पीछे की ओर झुक जाती थीं।
- This behaviour was **predicted decades ago** but had **never been observed directly**.  
इस व्यवहार की दशकों पहले भविष्यवाणी की गई थी, लेकिन इसे पहले कभी प्रत्यक्ष रूप से नहीं देखा गया था।

### Solitary waves (Solitons) एकाकी तरंगें (सोलिटॉन)

- Increasing the **laser paddle power** generated **extreme waves** and **shock fronts**, where the **leading edge became vertical**.  
लेज़र पैडल की शक्ति बढ़ाने से अत्यधिक तरंगें और झटकेदार सीमाएँ (shock fronts) बनीं, जहाँ तरंग का आगे वाला किनारा सीधा हो गया।
- They then observed **soliton fission** — the initial strong wave **split into smaller solitary waves (solitons)**.  
इसके बाद उन्होंने सोलिटॉन विभाजन (Soliton Fission) देखा — प्रारंभिक तरंग छोटी एकाकी तरंगों (सोलिटॉन) में विभाजित हो गई।
- They generated **up to 12 solitons** from a single pulse.  
उन्होंने एक ही तरंग दाल (pulse) से 12 तक सोलिटॉन उत्पन्न किए।



- These were **hot solitons**, existing as **troughs below the fluid surface**, slightly warmer than the surrounding superfluid.  
ये हॉट सोलिटॉन थे, जो द्रव सतह से नीचे गर्त के रूप में मौजूद थे और आसपास के सुपरफ्लुइड से थोड़ा गर्म थे।
- This confirmed a **long-standing prediction** about **superfluid dynamics**.  
इसने सुपरफ्लुइड गतिशीलता से जुड़ी एक पुरानी भविष्यवाणी की पुष्टि की।
- “Using **laser light** to both **drive and measure waves**, we observed **backward-leaning waves, shock fronts, and solitons as depressions**,” said **Dr. Baker**.  
डॉ. बेकर ने कहा, “लेज़र प्रकाश का उपयोग करके तरंगों को उत्पन्न और मापते हुए, हमने पीछे झुकती तरंगें, झटकेदार सीमाएँ और गर्त के रूप में चलने वाले सोलिटॉन देखे।”
- “This **exotic behaviour** had been **predicted theoretically** but **never seen before**.”  
“यह अद्भुत व्यवहार सैद्धांतिक रूप से भविष्यवाणी किया गया था, लेकिन पहले कभी नहीं देखा गया था।”

## Macroscopic to Microscopic

### सूक्ष्म स्तर से स्थूल स्तर तक

- Using a **microscopic platform** to study waves evidently had several advantages.  
तरंगों का अध्ययन करने के लिए **सूक्ष्म प्लेटफॉर्म** का उपयोग करने के कई स्पष्ट लाभ थे।
- First, the experiments played out much faster.  
पहला, प्रयोग बहुत तेज़ी से संपन्न हुए।
- Phenomena that would take **hours** to observe in a giant water tank unfolded in just **milliseconds**, allowing scientists to collect vast amounts of data quickly.  
जो घटनाएँ एक बड़े पानी के टैंक में देखने में घंटों लगतीं, वे मात्र **मिलीसेकंड्स** में घटित हो गईं, जिससे वैज्ञानिकों को बड़ी मात्रा में डेटा शीघ्रता से एकत्र करने में मदद मिली।
- One question is pertinent here: can we be sure that what happens at the **macroscopic scale** is replicated at the **microscopic scale** with the same forces and phenomena?  
यहाँ एक प्रश्न प्रासंगिक है: क्या हम सुनिश्चित हो सकते हैं कि जो कुछ **स्थूल स्तर (macroscopic scale)** पर होता है, वही **सूक्ष्म स्तर (microscopic scale)** पर भी समान बलों और घटनाओं के साथ घटित होगा?
- The short answer is ‘**no**’, we can’t assume exact replication, but the findings are still **applicable** to the waves we see in water bodies.  
संक्षिप्त उत्तर है ‘**नहीं**’, हम पूर्ण समानता नहीं मान सकते, लेकिन निष्कर्ष फिर भी जल निकायों में देखी जाने वाली तरंगों पर लागू होते हैं।
- At the macroscopic scale, **gravity and inertia** dominate; at nanometric scales, **van der Waals forces** and **surface tension** dominate.  
स्थूल स्तर पर **गुरुत्वाकर्षण और जड़त्व** प्रमुख होते हैं; जबकि नैनोमीटर स्तर पर **वैन डर वॉल्स बल** और **सतही तनाव** प्रभावी होते हैं।
- Though both systems can be modeled by **shallow-water hydrodynamics**, the effective gravitational acceleration is replaced by a **van der Waals term** in the **Korteweg-De Vries (KdV) equation**.  
यद्यपि दोनों प्रणालियों को **अल्पगहरे जल गतिकी (shallow-water hydrodynamics)** से मॉडल किया जा सकता है, परंतु प्रभावी गुरुत्वीय त्वरण को **वैन डर वॉल्स घटक** से प्रतिस्थापित किया जाता है जो **Korteweg-De Vries (KdV) समीकरण** में आता है।
- Both microscopic and macroscopic waves are governed by the same mechanics, only **physical constants differ**.  
सूक्ष्म और स्थूल दोनों प्रकार की तरंगें समान यांत्रिकी से नियंत्रित होती हैं, केवल **भौतिक नियतांक (physical constants)** भिन्न होते हैं।
- One such constant is the **Ursell number**, which dictates how hydrodynamic behaviour scales nonlinearly with depth and amplitude.  
ऐसा एक नियतांक **Ursell संख्या** है, जो यह निर्धारित करता है कि जलगतिकी का व्यवहार गहराई और आयाम के साथ **गैर-रेखीय (nonlinear)** रूप से कैसे बदलता है।
- At the **microscale**, the helium film is a **quantum fluid** — viscosity vanishes, heat flow drives motion, and **quantized vortices** appear.  
**सूक्ष्म स्तर** पर हीलियम फिल्म एक **क्वांटम द्रव (quantum fluid)** होती है — इसमें श्यानता नहीं होती, ऊष्मा प्रवाह गति उत्पन्न करता है, और **क्वांटिज्ड भंवर (quantized vortices)** उत्पन्न होते हैं।



- The researchers don't claim identical physical forces but highlight the **mathematical equivalence** of the governing **KdV equation**.  
शोधकर्ताओं ने समान भौतिक बलों का दावा नहीं किया, बल्कि नियंत्रक **KdV समीकरण** की **गणितीय समानता (mathematical equivalence)** पर बल दिया।
- The study worked under **shallow-water limit**, where wave dynamics depend on three **dimensionless parameters** — Ursell number, aspect ratio, and dispersion coefficients.  
अध्ययन **अल्पगहरे जल सीमा (shallow-water limit)** में किया गया, जहाँ तरंग गतिकी तीन **आयामरहित पैरामीटरों** — Ursell संख्या, आयाम अनुपात, और प्रसरण गुणांक — पर निर्भर करती है।
- If two systems share these parameters, their **wave evolution** should be dynamically similar even if forces differ.  
यदि दो प्रणालियाँ इन पैरामीटरों को साझा करती हैं, तो उनकी **तरंग विकास प्रक्रिया** गतिशील रूप से समान होगी, भले ही बल भिन्न हों।
- The experiment aimed to reproduce the **mathematics** of nonlinear wave evolution, not a miniature **tsunami**.  
इस प्रयोग का उद्देश्य एक **सूक्ष्म सुनामी** बनाना नहीं था, बल्कि **गैर-रेखीय तरंग विकास की गणितीय प्रक्रिया** को पुनरुत्पादित करना था।

### Proof of Correctness (सत्यापन के प्रमाण)

- Researchers used a **custom Euler solver** (a full hydrodynamic model) incorporating **nonlinear van der Waals behaviour** to correctly model the experiment.  
शोधकर्ताओं ने एक **कस्टम यूलर सॉल्वर (custom Euler solver)** का उपयोग किया जो **वैन डर वॉल्स के गैर-रेखीय व्यवहार** को सम्मिलित करता है ताकि प्रयोग को सही ढंग से मॉडल किया जा सके।
- They plotted the **Ursell number**, which reached up to **100 million**, proving **hydrodynamic equivalence** with large-scale flumes.  
उन्होंने **Ursell संख्या** का ग्राफ बनाया जो **10 करोड़ (100 million)** तक पहुँचा, जिससे बड़े पैमाने के फ्लूम के साथ **जलगतिकीय समानता** सिद्ध हुई।
- They observed **wave steepening**, **shock-front formation**, and **soliton fission**, exactly as **theory predicts** for large-amplitude shallow water waves.  
उन्होंने **तरंग तीव्रता (wave steepening)**, **आघात-मोर्चा निर्माण (shock-front formation)** और **सॉलिटन विभाजन (soliton fission)** देखा — जैसा कि सिद्धांत बड़े आयाम की उथली तरंगों के लिए भविष्यवाणी करता है।
- The authors emphasize differences: gravity replaced by **van der Waals acceleration**, dispersion engineered with **light**, and the fluid being a **superfluid**.  
लेखकों ने अंतर पर जोर दिया: गुरुत्वाकर्षण को **वैन डर वॉल्स त्वरण** से बदला गया, प्रसरण को **प्रकाश** द्वारा **इंजीनियर** किया गया, और द्रव एक **सुपरफ्लुइड** था।

### Toolkit to Explore

#### अन्वेषण हेतु उपकरण

- The system was very **easy to control**; researchers could finely tune wave properties using **laser power** and **film thickness**.  
प्रणाली को नियंत्रित करना बहुत **आसान** था; शोधकर्ता **लेज़र शक्ति** और **फिल्म की मोटाई** को समायोजित करके तरंग गुणों को सटीक रूप से नियंत्रित कर सकते थे।
- They could also **modify the chip design** to create different **channel shapes** or add **obstacles**, forming a toolkit to study **complex fluid phenomena**.  
वे **चिप डिज़ाइन** को **संशोधित** कर विभिन्न **चैनल आकार** बना सकते थे या **बाधाएँ** जोड़ सकते थे, जिससे **जटिल द्रव घटनाओं** का अध्ययन करने के लिए एक उपकरण सेट तैयार हुआ।

### Advancement in Optomechanics

#### ऑप्टोमैकेनिक्स में प्रगति

- The study pushes boundaries of **optomechanics** — the study of how **light interacts with mechanical motion**.



यह अध्ययन ऑटोमैकेनिक्स की सीमाओं को आगे बढ़ाता है — अर्थात् प्रकाश और यांत्रिक गति की पारस्परिक क्रिया का अध्ययन।

- The extreme **nonlinearities** observed go beyond the gentle perturbations typical of the field, opening a **new regime** of nonlinear dynamics.

देखी गई चरम गैर-रेखीयताएँ (**extreme nonlinearities**) इस क्षेत्र में प्रचलित सामान्य व्यवधानों से परे हैं, जिससे गैर-रेखीय गतिकी के नए क्षेत्र की शुरुआत हुई है।

## Linear Wave vs Nonlinear Wave

### Linear Wave

- A **linear wave** is one where the **disturbance (wave motion)** is *directly proportional* to the force that caused it.
- In other words — if you double the force, the disturbance also doubles.
- The wave **obeys the principle of superposition**.
- It behaves in a **simple and predictable way**.

### Nonlinear Wave

- A **nonlinear wave** is one where the **disturbance is not proportional** to the force that created it.
- Here, if you double the force, the wave might become *three times, four times*, or behave *unpredictably*.
- It **does not obey** the superposition principle.
- It behaves in a **complex and sometimes chaotic way**.

### Principle of Superposition (Simplified)

- Linear Waves:** If two small waves meet, the total displacement = (Wave 1 + Wave 2).
- They simply “add up.”
- Nonlinear Waves:** If two waves meet, they can **distort each other, change speed, or form new shapes**.
- They don't just add up — they interact!

### 3. Examples to Understand Easily

Example Type	Linear Wave	Nonlinear Wave
Sound Waves	Low-volume sound in air behaves linearly (e.g., normal talking).	Very loud sound (like an explosion or sonic boom) behaves nonlinearly — the air compresses unevenly.



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**CONTACT: 9971932488**



<b>Water Waves</b>	Small ripples on a pond after you drop a pebble — linear.	Big ocean waves during a storm or tsunami — nonlinear, because large amplitude changes the speed and shape.
<b>Light Waves</b>	Light travelling through normal air or glass behaves linearly.	Laser beams in certain crystals (optical fibers) can behave nonlinearly — leading to effects like <i>self-focusing</i> or <i>frequency doubling</i> .
<b>Guitar String</b>	Small vibrations on a string are linear.	Very strong pluck causes nonlinear vibrations, changing tone or pitch.

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## Uneven growth

Increasing incomes and creating jobs are a must to boost demand

GS III: Economy

The industrial production data for September is especially useful as it provides insights into longer periods such as the second quarter and the first half of the financial year. The news is not all bad, but there are areas that warrant attention. When looked at on a half-yearly basis, the IIP data for April-September 2025 show that industrial growth was the slowest in at least five years. At just 3%, the half-yearly growth is well below what it should be. However, quarterly growth shows that things are improving – Q2 growth was a more robust 4.1%, compared to 2% in Q1. The bright spot in all of this, at least on the surface, has been the manufacturing sector. In September, it grew by 4.8%, the second highest in this financial year. On a quarterly basis, the July-September 2025 quarter saw the manufacturing sector grow by a relatively strong 4.9%, the fastest quarterly growth it has seen since the quarter-ended December 2023. On a half-yearly basis, too, the sector's growth bounced back to 4.1% in the April-September 2025 half, after having slowed to 3.8% in the first half of the previous year. Activity in the mining sector contracted in September 2025, the second quarter, as well as in the first half of the financial year. While some of this can be attributed to the monsoon this year, this performance is still unusually poor. Strengthening the sector should be a priority to shore up India's energy and strategic mineral security.

The manufacturing sector's apparent strong performance, too, is not something that should be taken at face value. The data show that the growth is not broad-based, and is instead concentrated in some sectors. Of the 23 main manufacturing sub-sectors measured in the IIP, more than half contracted in the July-September 2025 quarter. Of concern is that labour-intensive sectors such as apparels, leather products, rubber products and plastics, all contracted in the September 2025 quarter. The sectors that grew included wood products, mineral products, basic metals and fabricated metal products, many of which are more capital intensive. If this trend persists, it could have negative implications for job creation, and warrants attention. The other troubling aspect of the data is that the consumer non-durables sector has contracted for the last six consecutive quarters. While some of these are essential items such as salt and edible oils, others are items of discretionary spending. Much of this is because of the base effect, but slack demand has been a problem that policymakers have been grappling with for some time. The only real solution lies in increasing incomes and creating jobs.

## Uneven Growth असमान वृद्धि

• The industrial production data for September is especially useful as it provides insights into longer periods such as the second quarter and the first half of the financial year.

सितंबर के औद्योगिक उत्पादन डेटा विशेष रूप से उपयोगी हैं क्योंकि यह दूसरी तिमाही और वित्तीय वर्ष के पहले आधे हिस्से जैसे लंबी अवधियों की जानकारी प्रदान करता है।

• The news is not all bad, but there are areas that warrant attention.

खबर पूरी तरह बुरी नहीं है, लेकिन कुछ क्षेत्र ऐसे हैं जिन्हें ध्यान देने की आवश्यकता है।

• When looked at on a half-yearly basis, the IIP data for April-September 2025 show that industrial growth was the slowest in at least five years.

जब इसे अर्धवार्षिक आधार पर देखा जाता है, तो अप्रैल-सितंबर 2025 के लिए IIP डेटा दर्शाता है कि औद्योगिक वृद्धि कम से कम पांच वर्षों में सबसे धीमी थी।

• At just 3%, the half-yearly growth is well below what it should be.

केवल 3% की अर्धवार्षिक वृद्धि दर अपेक्षित स्तर से काफी कम है।

• However, quarterly growth shows that things are improving — Q2 growth (4.1%) compared to 2% in Q1.

हालांकि, त्रैमासिक वृद्धि दिखाती है कि स्थिति सुधर रही है — दूसरी तिमाही (4.1%) की तुलना में पहली तिमाही (2%) बेहतर रही।

• The bright spot has been the manufacturing sector, which grew by 4.8% in September, the second highest in this financial year.

एक उज्वल पक्ष विनिर्माण क्षेत्र रहा, जिसने सितंबर में 4.8% की वृद्धि दर्ज की, जो इस वित्तीय वर्ष की दूसरी सबसे ऊंची वृद्धि है।

• On a quarterly basis, the July-September 2025 quarter saw manufacturing sector growth of 4.9%, the fastest since December 2023.

त्रैमासिक आधार पर, जुलाई-सितंबर 2025 तिमाही में विनिर्माण क्षेत्र की वृद्धि 4.9% रही, जो दिसंबर 2023 के बाद से सबसे तेज़ है।

• On a half-yearly basis, the sector's growth bounced back to 4.1% in April-September 2025, after having slowed to 3.8% in the first half of the previous year.

अर्धवार्षिक आधार पर, क्षेत्र की वृद्धि अप्रैल-सितंबर 2025 में 4.1% तक सुधरी, जबकि पिछले वर्ष के पहले आधे हिस्से में यह 3.8% थी।

• Activity in the mining sector contracted in September 2025, in the second quarter, as well as in the first half of the financial year.

खनन क्षेत्र की गतिविधि सितंबर 2025, दूसरी तिमाही, और वित्तीय वर्ष के पहले आधे में संकुचित हुई।

• While some of this can be attributed to the monsoon, the performance remains unusually poor.

इसका कुछ हिस्सा मानसून से जुड़ा हो सकता है, लेकिन प्रदर्शन असामान्य रूप से कमजोर बना रहा।

• Strengthening the mining sector should be a priority to ensure energy and strategic mineral security.

खनन क्षेत्र को मजबूत करना ऊर्जा और रणनीतिक खनिज सुरक्षा

सुनिश्चित करने के लिए एक प्राथमिकता होनी चाहिए।



- The manufacturing sector's strong performance should not be taken at face value, as growth is not broad-based but concentrated in few sectors.  
विनिर्माण क्षेत्र का मजबूत प्रदर्शन को सतही रूप से नहीं देखा जाना चाहिए, क्योंकि वृद्धि व्यापक नहीं बल्कि कुछ क्षेत्रों तक सीमित है।
- Of the 23 main manufacturing sub-sectors, more than half contracted in the July-September 2025 quarter.  
23 प्रमुख विनिर्माण उप-क्षेत्रों में से आधे से अधिक जुलाई-सितंबर 2025 तिमाही में संकुचित हुए।
- **Labour-intensive sectors such as apparels, leather products, rubber products, and plastics all contracted** in the September 2025 quarter.  
श्रम-प्रधान क्षेत्रों जैसे वस्त्र, चमड़े के उत्पाद, रबर उत्पाद और प्लास्टिक सभी सितंबर 2025 तिमाही में संकुचित हुए।
- The **growing sectors included wood products, mineral products, basic metals, and fabricated metal products, which are more capital-intensive.**  
वृद्धि दर्ज करने वाले क्षेत्र लकड़ी, खनिज उत्पाद, बेसिक मेटल और निर्मित धातु उत्पाद थे, जो पूंजी-प्रधान हैं।
- **If this trend persists, it could have negative implications for job creation** and thus warrants attention.  
यदि यह रुझान जारी रहा, तो इसका रोजगार सृजन पर नकारात्मक प्रभाव पड़ सकता है और यह चिंता का विषय है।
- Another troubling aspect is that the **consumer non-durables sector has contracted for six consecutive quarters.**  
एक और चिंताजनक पहलू यह है कि उपभोक्ता गैर-टिकाऊ वस्तु क्षेत्र लगातार छह तिमाहियों से संकुचित हो रहा है।
- Some of these items are **essential goods** like salt and edible oils, while others belong to **discretionary spending.**  
इनमें से कुछ वस्तुएँ आवश्यक वस्तुएँ हैं जैसे नमक और खाद्य तेल, जबकि अन्य वैकल्पिक खर्च से जुड़ी हैं।
- Much of this is due to the **base effect**, but **slack demand** remains a **persistent problem.**  
इसका अधिकांश हिस्सा आधार प्रभाव (base effect) के कारण है, लेकिन कमजोर मांग अभी भी एक लगातार समस्या बनी हुई है।
- **The only real solution** lies in **increasing incomes and creating jobs.**  
इसका एकमात्र वास्तविक समाधान आय बढ़ाने और रोजगार सृजन में निहित है।



# A decade after Paris accord, an unstoppable transition

GS III: Environment

Ten years after the adoption of the Paris Agreement at COP21, the planet faces unprecedented challenges. Despite a shared global pledge to limit global warming well below 2°C and keep the 1.5°C target within reach, emissions and temperatures continue to rise at alarming rates. The devastating consequences of climate change are already visible across the globe, including in India, as seen this year in Uttarakhand, Punjab and Jammu and Kashmir.

Yet, the Paris Agreement is delivering. Ten years ago, before the adoption of the Paris Agreement, the world was heading towards global warming of around 4°C-5°C by the end of the century. Through sustained commitment and concrete and collective action, this curve was altered to approximately 2°C-3°C. This remains far above what science deems sustainable, as underscored by the Intergovernmental Panel on Climate Change (IPCC). But it demonstrates that collective action can have an impact on our collective trajectories and that multilateralism can work.

The Paris Agreement delivers because it is fair, just and promotes international solidarity with the countries most affected by the adverse impacts of climate change. It respects national circumstances and provides for differentiated levels of commitment.

### A turning point

Throughout the decade, the Paris Agreement has been a powerful instrument that engaged the world's economy on the path to a low carbon transition. Ten years ago, the most competitive way to produce energy was fossil fuel use. It is no longer the case. Today, everywhere in the world, renewable energies such as wind, solar, hydroelectricity are driving growth and jobs. This marks tremendous progress for energy security and sovereignty.

Ten years ago, electric mobility seemed an elusive dream. Today, thanks to remarkable advances in battery technology and energy storage, electric vehicles represent nearly 20% of



**Benoît Faraco**

is France's Special Envoy for Climate Negotiations and a former Senior Energy and Environment Adviser to the French President

The Paris Agreement is an example of climate progress and how multilateralism can work

global new car sales, heralding the drastic reduction of fossil fuels in transport, bringing also multiple co-benefits such as clean air to our cities. The scale of this transformation is monumental.

**The impressive example of the solar alliance**  
The International Solar Alliance (ISA) is a striking example of the commitment by India and France to strong international multilateralism for climate progress.

Conceived at COP21 in Paris and jointly launched by Prime Minister Narendra Modi and then French President François Hollande, the ISA stands as a compelling embodiment of India and France's shared commitment to climate multilateralism. At the COP30 in Belém, France and India shared a joint vision: we needed this kind of alliance to transform the hope of the Paris Agreement into action.

Since its inception, the ISA has grown into a global coalition of more than 120 member and signatory countries, delivering concrete results through capacity building, training programmes and financial mechanisms supporting underfunded energy transitions. It was inspiring to witness first-hand the remarkable achievements of the ISA at its Eighth Assembly that this writer co-chaired on October 28, 2025, with India's Minister of New and Renewable Energy, Pralhad Joshi. The ISA's mission remains vital: to make solar energy accessible to all.

India has a strong commitment to renewable energies, more than half of which will come from solar. India aims to become the largest major economy to develop using a low-carbon pathway, fulfilling the vision of "Viksit Bharat" by 2047 and achieving net-zero carbon emission by 2070. This year, India has demonstrated leadership by achieving 50% of installed electricity capacity from non-fossil sources, five years ahead of the 2030 target.

These efforts must be sustained and expanded across all regions. At COP30 in Belém, five priorities must guide the international community.

First, there must be agreement on a way to collectively raise global ambition to accelerate the reduction of carbon emissions. The world's collective efforts are still not sufficient and there is a need to accelerate efforts, for the world's people and its future.

Second, there must be a championing of a just and inclusive transition, placing vulnerable communities at its core. France devotes one-third of its climate finance to adaptation, contributing to the Green Climate Fund, the Loss and Damage Fund, and early warning systems such as CREWS. As co-chair of the Coalition for Disaster Resilient Infrastructure alongside India, France also advocates innovative, predictable climate finance such as global solidarity levies ahead of COP30.

Third, there must be a protection of natural carbon sinks – the world's forests, mangroves and oceans. From the Amazon to the Sundarbans, these ecosystems are the world's best allies in the fight against climate change.

Fourth, there must be an empowerment of non-state actors – local governments, businesses, scientists, philanthropies and citizens – to translate ambition into implementation. The broad engagement that defined COP21 must now deliver tangible results and have a real-world impact that benefits everyone.

Fifth, science must be defended by supporting the IPCC and fighting climate disinformation. Together with Brazil and other countries, France is working to ensure that facts and science, not fear, guide the global transition.

### In perspective

The transformation initiated in Paris cannot be reversed. It may face obstacles, but it is unstoppable. Unstoppable because adaptation has become a necessity, not a choice. Unstoppable because industries are investing irreversibly. Unstoppable because local authorities are embedding sustainability into standards and investments. Unstoppable because multilateralism, despite challenges, will continue to deliver if the world continues to believe in it.

## A decade after Paris accord, an unstoppable transition पेरिस समझौते के एक दशक बाद, एक अटूट परिवर्तन

### Ten years after the adoption of the Paris Agreement at COP21 COP21 में पेरिस समझौते को अपनाए जाने के दस वर्ष बाद

- Ten years after the adoption of the **Paris Agreement** at **COP21**, the planet faces **unprecedented challenges**.  
COP21 में पेरिस समझौते को अपनाए जाने के दस वर्ष बाद, पृथ्वी **अभूतपूर्व चुनौतियों** का सामना कर रही है।
- Despite a shared global pledge to limit **global warming** well below **2°C** and keep the **1.5°C target** within reach, **emissions** and **temperatures** continue to rise at alarming rates.  
**वैश्विक तापमान वृद्धि** को **2°C से कम** रखने और **1.5°C लक्ष्य** को प्राप्त करने की साझा वैश्विक प्रतिबद्धता के बावजूद, **उत्सर्जन** और **तापमान** चिंताजनक दरों पर बढ़ते जा रहे हैं।
- The **devastating consequences** of climate change are already visible across the globe, including in **India**, as seen this year in **Uttarakhand, Punjab and Jammu and Kashmir**.  
**जलवायु परिवर्तन के विनाशकारी परिणाम** पूरी दुनिया में पहले से ही दिखाई दे रहे हैं, जिनमें **भारत** भी शामिल है, जैसा कि इस वर्ष **उत्तराखंड, पंजाब और जम्मू-कश्मीर** में देखा गया।
- Yet, the **Paris Agreement** is delivering.  
फिर भी, **पेरिस समझौता** परिणाम दे रहा है।
- Ten years ago, before the adoption of the Paris Agreement, the world was heading towards **global warming of around 4°C-5°C** by the end of the century.  
दस वर्ष पहले, पेरिस समझौते को अपनाने से पहले, दुनिया इस सदी के अंत तक लगभग **4°C-5°C** की **वैश्विक तापमान वृद्धि** की ओर बढ़ रही थी।



- Through **sustained commitment** and **concrete and collective action**, this curve was altered to approximately **2°C-3°C**.  
लगातार प्रतिबद्धता और ठोस सामूहिक कार्रवाई के माध्यम से, इस प्रवृत्ति को लगभग **2°C-3°C** तक बदल दिया गया।
- This remains far above what science deems sustainable, as underscored by the **Intergovernmental Panel on Climate Change (IPCC)**.  
यह अभी भी उस स्तर से ऊपर है जिसे विज्ञान सतत मानता है, जैसा कि **जलवायु परिवर्तन पर अंतर-सरकारी पैनल (IPCC)** ने रेखांकित किया है।
- But it demonstrates that **collective action** can impact our **collective trajectories** and that **multilateralism** can work.  
लेकिन यह दर्शाता है कि **सामूहिक कार्रवाई** हमारी **साझा दिशा** को प्रभावित कर सकती है और कि **बहुपक्षवाद (Multilateralism)** कारगर हो सकता है।
- The **Paris Agreement** delivers because it is **fair, just** and promotes **international solidarity** with the countries most affected by climate change.  
**पेरिस समझौता** प्रभावी है क्योंकि यह **न्यायसंगत, समान** है और **जलवायु परिवर्तन से सबसे अधिक प्रभावित देशों** के साथ **अंतरराष्ट्रीय एकजुटता** को बढ़ावा देता है।
- It respects **national circumstances** and provides for **differentiated levels of commitment**.  
यह **राष्ट्रीय परिस्थितियों** का सम्मान करता है और **विभेदित प्रतिबद्धता स्तरों** का प्रावधान करता है।

## A turning point

### एक मोड़

- Throughout the decade, the **Paris Agreement** has been a **powerful instrument** that engaged the world's economy on the path to a **low carbon transition**.  
इस पूरे दशक में, **पेरिस समझौता** एक **शक्तिशाली साधन** रहा है जिसने विश्व अर्थव्यवस्था को **कम-कार्बन संक्रमण** के मार्ग पर आगे बढ़ाया।
- Ten years ago, the most **competitive way to produce energy** was **fossil fuel use**.  
दस वर्ष पहले, **ऊर्जा उत्पादन का सबसे प्रतिस्पर्धी तरीका जीवाश्म ईंधन (Fossil Fuel)** का उपयोग था।
- It is no longer the case. Today, **renewable energies** such as **wind, solar, hydroelectricity** are driving **growth and jobs** globally.  
अब ऐसा नहीं है। आज पूरी दुनिया में **पवन, सौर, जलविद्युत** जैसी **नवीकरणीय ऊर्जा विकास और रोजगार** को गति दे रही हैं।
- This marks **tremendous progress** for **energy security and sovereignty**.  
यह **ऊर्जा सुरक्षा और संप्रभुता** के लिए **अत्यंत प्रगति** को दर्शाता है।
- Ten years ago, **electric mobility** seemed an **elusive dream**.  
दस वर्ष पहले, **इलेक्ट्रिक मोबिलिटी** एक **दूर का सपना** लगती थी।
- Today, thanks to **remarkable advances** in **battery technology** and **energy storage**, **electric vehicles (EVs)** represent nearly **20% of global new car sales**.  
आज, **बैटरी तकनीक** और **ऊर्जा भंडारण** में **उल्लेखनीय प्रगति** के कारण, **इलेक्ट्रिक वाहन (EVs)** अब **वैश्विक नई कार बिक्री का लगभग 20%** हैं।
- This heralds the **drastic reduction of fossil fuels** in transport, bringing **multiple co-benefits** such as **clean air** to our cities.  
यह परिवहन में **जीवाश्म ईंधन के तीव्र कमी** की दिशा में संकेत देता है और **स्वच्छ वायु** जैसे **कई सह-लाभ** भी लाता है।
- The scale of this **transformation** is **monumental**.  
इस **परिवर्तन का पैमाना विशाल** है।

## The impressive example of the Solar Alliance

### सौर गठबंधन का प्रभावशाली उदाहरण

- The **International Solar Alliance (ISA)** is a striking example of the commitment by **India and France** to strong **international multilateralism** for **climate progress**.  
**अंतरराष्ट्रीय सौर गठबंधन (ISA)**, **भारत और फ्रांस** की **जलवायु प्रगति** के लिए मजबूत **अंतरराष्ट्रीय बहुपक्षवाद (multilateralism)** के प्रति प्रतिबद्धता का एक उल्लेखनीय उदाहरण है।



- Conceived at **COP21 in Paris** and jointly launched by **Prime Minister Narendra Modi** and then **French President François Hollande**, the ISA stands as a compelling embodiment of **India and France's shared commitment to climate multilateralism**.  
पेरिस में COP21 पर प्रस्तावित और प्रधानमंत्री नरेंद्र मोदी तथा उस समय के फ्रांस के राष्ट्रपति फ्रांस्वा ओलांद द्वारा संयुक्त रूप से शुरू किया गया ISA, भारत और फ्रांस की साझा जलवायु बहुपक्षीय प्रतिबद्धता का एक प्रभावशाली प्रतीक है।
- At **COP30 in Belém**, France and India shared a joint vision: that this kind of alliance was needed to transform the **hope of the Paris Agreement into action**.  
**COP30 (बेलें)** में, फ्रांस और भारत ने एक साझा दृष्टिकोण प्रस्तुत किया — कि इस प्रकार का गठबंधन पेरिस समझौते की आशा को कार्रवाई में बदलने के लिए आवश्यक था।
- Since its inception, the **ISA has grown into a global coalition of more than 120 member and signatory countries, delivering results through capacity building, training programmes, and financial mechanisms supporting underfunded energy transitions**.  
स्थापना के बाद से, **ISA 120 से अधिक सदस्य और हस्ताक्षरकर्ता देशों** के एक वैश्विक गठबंधन में विकसित हो गया है, जो क्षमता निर्माण, प्रशिक्षण कार्यक्रमों और वित्तीय तंत्रों के माध्यम से ऊर्जा संक्रमण को समर्थन प्रदान कर ठोस परिणाम दे रहा है।
- The **8th Assembly of ISA** was co-chaired on **October 28, 2025**, by this writer and **India's Minister of New and Renewable Energy, Pralhad Joshi**, where the **remarkable achievements of ISA** were highlighted.  
**ISA की 8वीं महासभा, 28 अक्टूबर 2025** को इस लेखक और **भारत के नवीन एवं नवीकरणीय ऊर्जा मंत्री प्रह्लाद जोशी** द्वारा सह-अध्यक्षता की गई, जहां **ISA की उल्लेखनीय उपलब्धियों** को प्रदर्शित किया गया।
- The **ISA's mission** remains vital: to make **solar energy accessible to all**.  
**ISA का मिशन** अभी भी महत्वपूर्ण है — **सौर ऊर्जा को सभी के लिए सुलभ बनाना**।
- **India** has a strong commitment to **renewable energies**, more than half of which will come from **solar**.  
**भारत** की **नवीकरणीय ऊर्जा** के प्रति मजबूत प्रतिबद्धता है, जिसमें से **आधा हिस्सा सौर ऊर्जा** से आएगा।
- **India** aims to become the **largest major economy** to develop using a **low-carbon pathway**, fulfilling the vision of "**Viksit Bharat**" by **2047** and achieving **net-zero carbon emissions by 2070**.  
**भारत** का लक्ष्य है कि वह **2047 तक "विकसित भारत"** के दृष्टिकोण को साकार करते हुए **कम-कार्बन मार्ग** से विकास करने वाली **सबसे बड़ी अर्थव्यवस्था** बने और **2070 तक शून्य कार्बन उत्सर्जन (Net-zero)** प्राप्त करे।
- In **2025**, **India** achieved **50% of installed electricity capacity from non-fossil sources, five years ahead of the 2030 target**.  
**2025** में, **भारत** ने **गैर-जीवाश्म स्रोतों** से स्थापित बिजली क्षमता का **50%** हासिल कर लिया, जो **2030 लक्ष्य से पाँच वर्ष पहले** है।
- These efforts must be **sustained and expanded** across all regions.  
इन प्रयासों को **सभी क्षेत्रों में बनाए रखना और विस्तार देना** आवश्यक है।

## Priorities for COP30 in Belém

### बेलें में COP30 के लिए प्राथमिकताएँ

- **First**, there must be an agreement to **collectively raise global ambition** to accelerate the **reduction of carbon emissions**.  
**पहला**, **कार्बन उत्सर्जन में कमी** को तेज़ करने के लिए **वैश्विक महत्वाकांक्षा** को सामूहिक रूप से बढ़ाने पर सहमति आवश्यक है।
- The world's collective efforts are still **insufficient**, and there is a need to **accelerate actions** for the planet's **people and future**.  
दुनिया के **सामूहिक प्रयास अभी भी अपर्याप्त** हैं, और पृथ्वी के **लोगों और भविष्य** के लिए **कार्रवाई तेज़** करने की आवश्यकता है।
- **Second**, there must be a **just and inclusive transition**, placing **vulnerable communities** at its core.  
**दूसरा**, परिवर्तन **न्यायसंगत और समावेशी** होना चाहिए, जिसमें **कमजोर समुदायों** को केंद्र में रखा जाए।
- **France** devotes **one-third of its climate finance** to **adaptation**, contributing to the **Green Climate Fund**, the **Loss and Damage Fund**, and **early warning systems** such as **CREWS**.



फ्रांस अपनी जलवायु वित्त का एक-तिहाई हिस्सा अनुकूलन (Adaptation) के लिए देता है, जिसमें ग्रीन क्लाइमेट फंड, लॉस एंड डैमेज फंड, और CREWS जैसे प्रारंभिक चेतावनी तंत्र शामिल हैं।

- As co-chair of the Coalition for Disaster Resilient Infrastructure (CDRI) alongside India, France advocates innovative and predictable climate finance such as global solidarity levies ahead of COP30.  
भारत के साथ आपदा लचीला अवसंरचना गठबंधन (CDRI) के सह-अध्यक्ष के रूप में, फ्रांस वैश्विक एकजुटता लेवी (solidarity levies) जैसे नवीन और पूर्वानुमेय जलवायु वित्त का समर्थन करता है, विशेषकर COP 30 से पहले।
- Third, there must be protection of natural carbon sinks — the world's forests, mangroves, and oceans.  
तीसरा, प्राकृतिक कार्बन सिंक — जैसे दुनिया के वन, मैंग्रोव और महासागर — की सुरक्षा आवश्यक है।
- From the Amazon to the Sundarbans, these ecosystems are the world's best allies in the fight against climate change.  
अमेज़न से सुंदरबन तक, ये पारिस्थितिक तंत्र जलवायु परिवर्तन के खिलाफ लड़ाई में दुनिया के सबसे अच्छे सहयोगी हैं।
- Fourth, there must be empowerment of non-state actors — local governments, businesses, scientists, philanthropies, and citizens — to turn ambition into implementation.  
चौथा, गैर-राज्य कारकों (non-state actors) — जैसे स्थानीय सरकारें, व्यवसाय, वैज्ञानिक, परोपकारी संस्थाएँ और नागरिक — को सशक्त करना आवश्यक है, ताकि महत्वाकांक्षा को क्रियान्वयन में बदला जा सके।
- The broad engagement that defined COP21 must now produce tangible results and real-world impact that benefits everyone.  
COP21 की तरह व्यापक भागीदारी अब ठोस परिणामों और वास्तविक प्रभावों में परिवर्तित होनी चाहिए, जिससे सभी को लाभ मिले।
- Fifth, science must be defended by supporting the IPCC and fighting climate disinformation.  
पाँचवाँ, विज्ञान की रक्षा IPCC का समर्थन कर और जलवायु संबंधी भ्रामक सूचनाओं से लड़कर करनी होगी।
- Together with Brazil and other countries, France is ensuring that facts and science, not fear, guide the global transition.  
ब्राज़ील और अन्य देशों के साथ मिलकर, फ्रांस यह सुनिश्चित कर रहा है कि तथ्य और विज्ञान, न कि भय, वैश्विक परिवर्तन का मार्गदर्शन करें।

## In Perspective परिप्रेक्ष्य में

- The transformation initiated in Paris cannot be reversed.  
पेरिस में शुरू हुआ परिवर्तन अब वापस नहीं पलटा जा सकता।
- It may face obstacles, but it is unstoppable.  
इसमें बाधाएँ आ सकती हैं, पर यह अविराम (unstoppable) है।
- Unstoppable because adaptation has become a necessity, not a choice.  
यह अविराम है क्योंकि अनुकूलन (adaptation) अब एक आवश्यकता बन गया है, विकल्प नहीं।
- Unstoppable because industries are investing irreversibly.  
यह अविराम है क्योंकि उद्योग अब अपरिवर्तनीय निवेश कर रहे हैं।
- Unstoppable because local authorities are embedding sustainability into standards and investments.  
यह अविराम है क्योंकि स्थानीय प्राधिकरण अपने मानकों और निवेशों में सततता (sustainability) को शामिल कर रहे हैं।
- Unstoppable because multilateralism, despite challenges, will continue to deliver if the world continues to believe in it.  
यह अविराम है क्योंकि बहुपक्षवाद (multilateralism) चुनौतियों के बावजूद तब तक परिणाम देता रहेगा जब तक दुनिया उस पर विश्वास बनाए रखेगी।



# Norway and India: Green maritime partners

GS III: Industry

In Mumbai for India Maritime Week 2025, I witnessed the buzz of a global industry that has confidently set sail towards a secure, sustainable, and equitable future. Norway has built up a comprehensive maritime cluster of ship designers, equipment manufacturers, shipyards, shipping companies, financial and insurance institutions, and shipbrokers. Representing the country at an event of this scale that covers every link of the maritime value chain is a privilege rife with possibilities.

## Charting a common course

For both Norway and India, oceans and coastlines are natural assets. Oceans connect our economies and our people and are at the heart of our bilateral partnership. India plays a vital role in global shipping. It is not only a hub for trade, shipbuilding and ship recycling, but also offers technological and digital capacity.

The entry into force of the India-EFTA Trade and Economic Partnership Agreement (TEPA) on October 1 provides a major boost to the India-Norway partnership. Stronger maritime collaboration is a natural and strategic complement to these shared ambitions. Norwegian Prime Minister Jonas Gahr Støre looks forward to welcoming Prime Minister Narendra Modi to Oslo for the 3rd India-Nordic Summit where we will continue the dialogue on ocean cooperation, among other priorities.

In 2019, both countries came together to establish a formal ocean dialogue and an India-Norway Task Force on Blue Economy to focus on sustainable ocean management, mitigation of marine pollution, and green shipping. At Norway's flagship maritime event Nor-Shipping held in Oslo this summer, India made a splash with its first-ever India Pavilion, led by the Minister of Ports, Shipping and Waterways Sarbananda Sonowal. India's participation left a lasting



**Marianne Sivertsen Naess**

Norway's Minister of Fisheries and Ocean Policy

As major ocean nations, Norway and India face common challenges, and with them, a shared responsibility to think globally and act for the benefit of all

impression with conversations around sustainable growth, green shipping corridors, shipbuilding, digital maritime solutions and leveraging India's workforce and investment opportunities.

Maritime partners Norway and India have much to contribute to each other, a fact well illustrated by the number of Norwegian companies present in Mumbai for the India Maritime Week. During the event, officials from Norway's Ministry of Trade, Industry and Fisheries and the Indian Ministry of Ports, Shipping and Waterways met for the 10th Joint Working Group Maritime, discussing green shipping, maritime training and security as well as ship recycling.

As the global shipbuilding market reaches capacity, India's rapidly growing position as a builder of the global fleet presents exciting opportunities for partnership. Already, about 10% of ships ordered by members of the Norwegian Shipowners' Association are built in India. Norwegian shipowners have longstanding relationships with Indian yards such as Cochin Shipyard, which recently secured 14 vessel orders from Norway's Wilson ASA. This is a testament to the trust and quality that Indian yards deliver. India has also been an excellent partner in the development of environmentally sound and safe ship recycling.

## Aiming for a sea change

Norway sees India as a key partner on the journey to a sustainable blue economy. Guided by the principle that environmental responsibility and economic growth must go hand in hand, Norway ambitiously aims to reduce emissions from domestic shipping and fisheries by 50% by 2030 compared to 2005 levels.

Our approach to green shipping combines targeted domestic action with strong international engagement. We support stricter international regulations to cut climate gas emissions from shipping, helping build a global market for low- and zero-emission

solutions. We strongly supported the adoption of the International Maritime Organization's Net-Zero Framework, even though consensus has not yet been reached. Over the next year, it is extremely important for member states to unite to ensure this framework becomes a reality.

The green transition in Norway is the result of collaboration between the government, industry, and research institutions. Our maritime sector is exploring new fuels such as ammonia and hydrogen, and Norway has been among the first countries to launch autonomous and fully electric vessels, including the Yara Birkeland, the world's first zero-emission, autonomous container ship, and ASKO ferries.

Norway is committed to advancing women's participation in the maritime industry. I was pleased to be part of the constructive dialogue on gender equality and inclusion at the Maritime SheEO Conference, an initiative that Norway has supported since its inception in 2019. It was deeply inspiring to meet Indian women seafarers, cadets, and captains who are shaping the industry's future.

Indian seafarers are the second largest nationality working aboard Norwegian-controlled vessels. With TEPA, Norway and India have agreed to facilitate on-board training opportunities for our respective seafarers. Even though women are a minority in maritime professions globally, our two countries can make this industry more inclusive and future-ready by sharing best practices.

The Maritime India Vision 2030 and Amrit Kaal 2047 show India's forward-looking maritime strategy and align with Norway's vision for sustainable ocean management. Unarguably, this has been one of the biggest years for the maritime partnership between Norway and India. As major ocean nations, we face common challenges, and with them, a shared responsibility to think globally and act for the benefit of all.

## Norway and India: Green maritime partners

### नॉर्वे और भारत: ग्रीन समुद्री सहयोगी

- In **Mumbai for India Maritime Week 2025**, I witnessed the buzz of a global industry that has confidently set sail towards a **secure, sustainable, and equitable future**.  
**इंडिया मेरीटाइम वीक 2025** के लिए **मुंबई** में, मैंने एक वैश्विक उद्योग की हलचल देखी जो **सुरक्षित, टिकाऊ और समान भविष्य** की ओर आत्मविश्वास से आगे बढ़ रहा है।
- **Norway** has built a comprehensive **maritime cluster** of ship designers, equipment manufacturers, shipyards, shipping companies, financial and insurance institutions, and



shipbrokers.

नॉर्वे ने जहाज़ डिज़ाइनर, उपकरण निर्माता, शिपयार्ड, शिपिंग कंपनियाँ, वित्तीय और बीमा संस्थान, और शिपब्रोकर शामिल करते हुए एक व्यापक **समुद्री क्लस्टर** विकसित किया है।

- Representing the country at such a large-scale event that covers every link of the **maritime value chain** is a privilege full of possibilities.

**समुद्री मूल्य श्रृंखला (maritime value chain)** के प्रत्येक हिस्से को कवर करने वाले इस पैमाने के कार्यक्रम में देश का प्रतिनिधित्व करना संभावनाओं से भरा एक सम्मान है।

## Charting a Common Course

### साझा मार्ग तय करना

- For both **Norway and India**, oceans and coastlines are **natural assets**.  
नॉर्वे और भारत दोनों के लिए, महासागर और तटरेखाएँ **प्राकृतिक संपत्तियाँ** हैं।
- Oceans connect our economies and people and are central to our **bilateral partnership**.  
महासागर हमारी अर्थव्यवस्थाओं और लोगों को जोड़ते हैं और हमारी **द्विपक्षीय साझेदारी** के केंद्र में हैं।
- India plays a **vital role in global shipping** — as a hub for trade, shipbuilding, ship recycling, and offering **technological and digital capacity**.  
भारत **वैश्विक शिपिंग में एक महत्वपूर्ण भूमिका** निभाता है — व्यापार, जहाज़ निर्माण, जहाज़ पुनर्चक्रण और **प्रौद्योगिकी व डिजिटल क्षमता** प्रदान करने के केंद्र के रूप में।
- The entry into force of the **India–EFTA Trade and Economic Partnership Agreement (TEPA)** on **October 1, 2025**, provides a major boost to the India–Norway partnership.  
**1 अक्टूबर 2025** को **भारत–EFTA व्यापार और आर्थिक साझेदारी समझौते (TEPA)** के लागू होने से भारत–नॉर्वे साझेदारी को एक बड़ा प्रोत्साहन मिला है।
- **Stronger maritime collaboration** is a natural and strategic complement to these shared ambitions.  
इन साझा महत्वाकांक्षाओं का एक स्वाभाविक और रणनीतिक पूरक **मजबूत समुद्री सहयोग** है।
- **Norwegian PM Jonas Gahr Støre** looks forward to welcoming **PM Narendra Modi** to Oslo for the **3rd India–Nordic Summit**, to continue the dialogue on **ocean cooperation**.  
नॉर्वे के प्रधानमंत्री जोनास गहर स्टोरे प्रधानमंत्री नरेंद्र मोदी का तीसरे इंडिया–नॉर्डिक शिखर सम्मेलन के लिए ओस्लो में स्वागत करने की प्रतीक्षा कर रहे हैं ताकि **महासागर सहयोग** पर वार्ता जारी रखी जा सके।

## India–Norway Ocean Dialogue and Blue Economy

### भारत–नॉर्वे महासागर संवाद और नीली अर्थव्यवस्था

- In **2019**, both countries established a formal **Ocean Dialogue** and an **India–Norway Task Force on Blue Economy**.  
**2019** में, दोनों देशों ने औपचारिक **महासागर संवाद** और **भारत–नॉर्वे ब्लू इकॉनमी टास्क फोर्स** स्थापित की।
- Focus areas: **Sustainable ocean management, mitigation of marine pollution, and green shipping**.  
ध्यान के क्षेत्र: **सतत महासागर प्रबंधन, समुद्री प्रदूषण में कमी, और ग्रीन शिपिंग**।
- At **Nor-Shipping 2025** in Oslo, India participated with its **first-ever India Pavilion**, led by **Minister Sarbananda Sonowal**.  
**ओस्लो में Nor-Shipping 2025** में भारत ने अपने पहले इंडिया पैविलियन के साथ भाग लिया, जिसका नेतृत्व **मंत्री सर्बानंद सोनोवाल** ने किया।
- India's participation highlighted **sustainable growth, green shipping corridors, digital maritime solutions, and investment opportunities**.  
भारत की भागीदारी ने **सतत विकास, ग्रीन शिपिंग कॉरिडोर, डिजिटल समुद्री समाधान, और निवेश अवसरों** पर ध्यान केंद्रित किया।

## Expanding Cooperation in Shipbuilding and Green Shipping

### जहाज़ निर्माण और ग्रीन शिपिंग में सहयोग का विस्तार



- **Many Norwegian companies participated in India Maritime Week 2025** in Mumbai, strengthening business ties.  
कई नॉर्वेजियन कंपनियों ने मुंबई में इंडिया मेरीटाइम वीक 2025 में भाग लेकर व्यावसायिक संबंधों को मजबूत किया।
- The **10th Joint Working Group on Maritime Cooperation** discussed **green shipping, maritime training, security, and ship recycling**.  
10वें संयुक्त कार्य समूह ने ग्रीन शिपिंग, समुद्री प्रशिक्षण, सुरक्षा, और जहाज़ पुनर्चक्रण पर चर्चा की।
- As the **global shipbuilding market** reaches capacity, **India's growing position as a builder of global fleets** presents new opportunities.  
जैसे-जैसे वैश्विक जहाज़ निर्माण बाजार अपनी सीमा तक पहुँच रहा है, भारत की बढ़ती स्थिति एक वैश्विक फ्लीट निर्माता के रूप में नए अवसर प्रस्तुत करती है।
- About **10% of ships** ordered by members of the **Norwegian Shipowners' Association** are now built in **India**.  
नॉर्वेजियन शिपओनर्स एसोसिएशन के सदस्यों द्वारा आदेशित लगभग 10% जहाज़ अब भारत में बनाए जाते हैं।
- **Cochin Shipyard** recently secured **14 vessel orders** from **Norway's Wilson ASA**, showing the trust and quality of Indian yards.  
कोचीन शिपयार्ड ने हाल ही में नॉर्वे की विल्सन ASA से 14 जहाज़ों के आदेश प्राप्त किए, जो भारतीय शिपयार्ड की विश्वसनीयता और गुणवत्ता को दर्शाता है।
- India has also been a strong partner in **environmentally sound and safe ship recycling**.  
भारत पर्यावरण के अनुकूल और सुरक्षित जहाज़ पुनर्चक्रण में भी एक मजबूत भागीदार रहा है।

## Aiming for a Sea Change

### समुद्र में परिवर्तन का लक्ष्य

- **Norway sees India as a key partner** on the journey to a **sustainable blue economy**.  
नॉर्वे भारत को एक प्रमुख साझेदार के रूप में देखता है जो सतत नीली अर्थव्यवस्था (sustainable blue economy) की यात्रा में साथ है।
- Guided by the principle that **environmental responsibility and economic growth** must go hand in hand.  
यह सिद्धांत नॉर्वे का मार्गदर्शन करता है कि पर्यावरणीय जिम्मेदारी और आर्थिक विकास साथ-साथ चलने चाहिए।
- **Norway aims to reduce emissions from domestic shipping and fisheries by 50% by 2030, compared to 2005 levels**.  
नॉर्वे का लक्ष्य है कि 2005 के स्तर की तुलना में 2030 तक घरेलू शिपिंग और मत्स्य उद्योग से उत्सर्जन में 50% की कमी लाई जाए।
- The approach to **green shipping** combines **domestic action** with **international engagement**.  
ग्रीन शिपिंग के प्रति नॉर्वे का दृष्टिकोण घरेलू कार्रवाई और अंतरराष्ट्रीय भागीदारी का संयोजन है।
- Norway supports **stricter international regulations** to cut **climate gas emissions** from shipping.  
नॉर्वे शिपिंग से ग्रीनहाउस गैस उत्सर्जन में कमी के लिए कड़े अंतरराष्ट्रीय नियमों का समर्थन करता है।
- Norway strongly supported the **International Maritime Organization's (IMO) Net-Zero Framework**, even though **consensus** has not yet been reached.  
नॉर्वे ने अंतरराष्ट्रीय समुद्री संगठन (IMO) के नेट-ज़ीरो फ्रेमवर्क का दृढ़ समर्थन किया, भले ही अभी सहमति नहीं बनी है।
- In the coming year, it is crucial for **member states** to unite to make this framework a **reality**.  
आने वाले वर्ष में सदस्य देशों का एकजुट होना इस ढाँचे को वास्तविकता में बदलने के लिए अत्यंत आवश्यक है।

## Norway's Green Transition and Innovation

### नॉर्वे का हरित परिवर्तन और नवाचार



- The **green transition** in Norway is driven by collaboration between the **government, industry, and research institutions**.  
नॉर्वे में हरित परिवर्तन सरकार, उद्योग और अनुसंधान संस्थानों के सहयोग से संचालित है।
- The **maritime sector is exploring new fuels such as ammonia and hydrogen**.  
समुद्री क्षेत्र अमोनिया और हाइड्रोजन जैसे नए ईंधनों की खोज कर रहा है।
- Norway has been among the first to launch **autonomous and fully electric vessels** like the **Yara Birkeland**, the **world's first zero-emission autonomous container ship**, and **ASKO ferries**.  
नॉर्वे उन पहले देशों में से है जिसने स्वायत्त और पूर्णतः विद्युत संचालित जहाज़ जैसे यारा बिरकलैंड (दुनिया का पहला शून्य-उत्सर्जन स्वायत्त कंटेनर जहाज़) और ASKO फेरीज़ लॉन्च किए।

## Women's Participation and Maritime Inclusion

### महिलाओं की भागीदारी और समुद्री समावेशन

- Norway is committed to **advancing women's participation** in the maritime industry.  
नॉर्वे समुद्री उद्योग में महिलाओं की भागीदारी बढ़ाने के लिए प्रतिबद्ध है।
- Norway has supported the **Maritime SheEO Conference** since **2019**, promoting **gender equality and inclusion**.  
नॉर्वे ने 2019 से Maritime SheEO सम्मेलन का समर्थन किया है, जो लैंगिक समानता और समावेशन को बढ़ावा देता है।
- It was inspiring to meet **Indian women seafarers, cadets, and captains** shaping the future of the industry.  
भारतीय महिला नाविकों, कैडेट्स और कप्तानों से मिलना प्रेरणादायक था, जो इस उद्योग का भविष्य आकार दे रही हैं।
- **Indian seafarers are the second-largest nationality working aboard Norwegian-controlled vessels**.  
भारतीय नाविक नॉर्वे नियंत्रित जहाज़ों पर कार्यरत दूसरे सबसे बड़े राष्ट्रीय समूह हैं।
- Under **TEPA**, both countries have agreed to facilitate **on-board training opportunities** for seafarers.  
TEPA के तहत, दोनों देशों ने नाविकों के लिए जहाज़ पर प्रशिक्षण के अवसरों को सुगम बनाने पर सहमति जताई है।
- Though women remain a minority in global maritime professions, **India and Norway can make the sector more inclusive and future-ready** by sharing **best practices**.  
भले ही महिलाएँ वैश्विक समुद्री पेशों में अल्पसंख्यक हैं, लेकिन भारत और नॉर्वे श्रेष्ठ प्रथाएँ साझा करके इस क्षेत्र को अधिक समावेशी और भविष्य-उन्मुख बना सकते हैं।

## Shared Vision and Common Responsibility

### साझा दृष्टिकोण और सामूहिक जिम्मेदारी

- **Maritime India Vision 2030** and **Amrit Kaal 2047** highlight India's **forward-looking maritime strategy**, aligning with **Norway's vision of sustainable ocean management**.  
**Maritime India Vision 2030** और **अमृत काल 2047** भारत की दूरदर्शी समुद्री रणनीति को रेखांकित करते हैं, जो सतत महासागर प्रबंधन की नॉर्वे की दृष्टि के अनुरूप है।
- 2025 has been one of the **biggest years for maritime partnership** between **Norway and India**.  
2025, नॉर्वे और भारत के बीच समुद्री साझेदारी के लिए सबसे बड़े वर्षों में से एक रहा है।
- As **major ocean nations**, both face **common challenges** and share a **responsibility to act globally** for the **benefit of all**.  
महासागर राष्ट्रों के रूप में, दोनों देश साझी चुनौतियों का सामना करते हैं और सभी के लाभ के लिए वैश्विक स्तर पर कार्य करने की साझी जिम्मेदारी निभाते हैं।



## According to a survey of 25 countries, Indians are least aware of AI

GS III: S&T

Despite low awareness, Indians expressed the most confidence in government regulation

### DATA POINT

#### The Hindu Data Team

According to a Pew survey covering 25 countries, Indians have the lowest awareness about Artificial Intelligence (AI). The survey found that about 14% of Indians have heard of or read a lot about AI; and another 32% have read a little about it. Together, this share (46%) is the lowest among the countries surveyed.

Chart 1 shows the share of people who have heard of or read a lot or little about AI. At 46%, India's share is well below the 25-country median of 81%.

Although AI is a new technology that young adults are generally expected to know more about, only 19% of Indians aged 18-34 said they have heard of or read a lot about AI. This is the second lowest share in that age group among the 25 countries surveyed (Chart 2).

Consequently, Indians are also among the least concerned about the increasing use of AI in daily life. Close to 19% of them said the increasing use of AI in daily life makes them more concerned than excited. This share is one of the lowest among the countries surveyed (Chart 3).

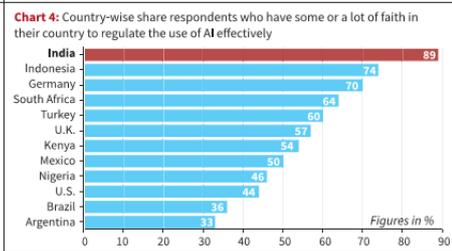
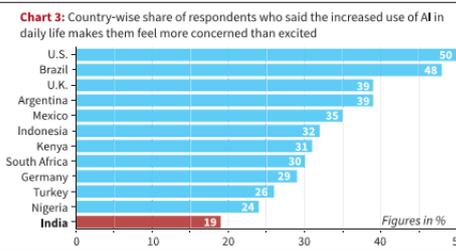
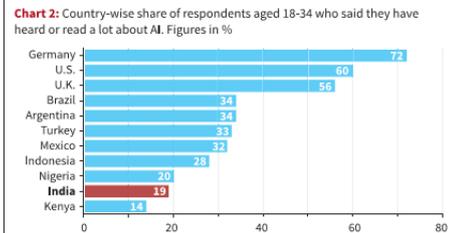
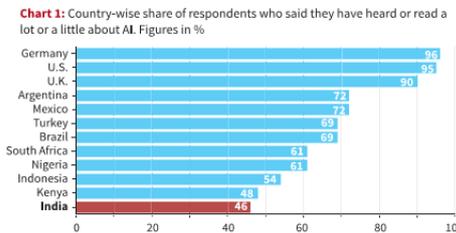
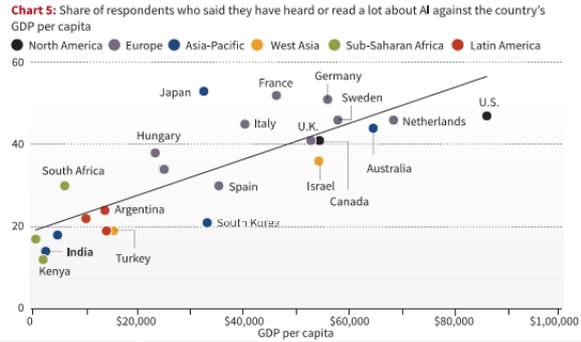
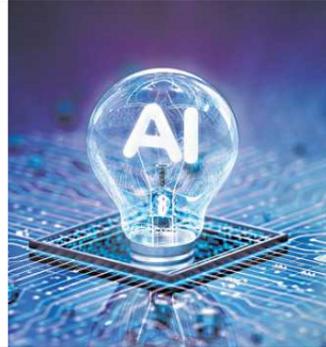
Nearly 90% of Indians also said they trust that their country will regulate the use of AI effectively. This share is the highest among all the countries surveyed, and by a significant margin (Chart 4).

Wealthier countries tend to have a higher share of people who have heard a lot about AI. Around half the adults in Japan, Germany, France, and the U.S. said they have heard a lot about AI, compared to the 14% in India and 12% in Kenya. Chart 5 plots the share of people who said they have heard of or read a lot about AI against the GDP per capita of the countries.

Charts 1, 2, 3, and 4 display data for only selected countries out of the 25 surveyed, while Chart 5 includes figures for all countries.

## AI awareness: survey results

The data for the charts are sourced from the Pew Research Center's 'How People Around the World View AI' (October 2025). For non-U.S. data, this analysis draws on nationally representative surveys of 28,333 adults conducted from January 8 to April 26, 2025. Countries are classified as either high- or middle-income based on categories from the World Bank that rely on per capita gross national income.



## According to a survey of 25 countries, Indians are least aware of AI

### 25 देशों के सर्वेक्षण के अनुसार, भारतीय एआई के प्रति सबसे कम जागरूक हैं

- Despite low awareness, **Indians expressed the most confidence in government regulation.**  
कम जागरूकता के बावजूद, भारतीयों ने सरकारी विनियमन में सबसे अधिक विश्वास व्यक्त किया।
- According to a **Pew survey covering 25 countries**, **Indians have the lowest awareness about Artificial Intelligence (AI).**  
25 देशों को कवर करने वाले प्यू सर्वेक्षण के अनुसार, भारतीयों में कृत्रिम बुद्धिमत्ता (AI) के बारे में सबसे कम जागरूकता है।
- The survey found that about **14% of Indians have heard of or read a lot about AI**; and another **32% have read a little about it.**  
सर्वेक्षण में पाया गया कि लगभग **14% भारतीयों ने एआई के बारे में बहुत सुना या पढ़ा है**, और अन्य **32% ने इसके बारे में थोड़ा पढ़ा है**।
- Together, this share (**46%**) is the **lowest among the countries surveyed.**  
कुल मिलाकर, यह हिस्सा (**46%**) सर्वेक्षण किए गए देशों में सबसे कम है।





- **Chart 1** shows the share of people who have heard of or read a lot or little about AI. At **46%**, India's share is well below the **25-country median of 81%**.  
चार्ट 1 उन लोगों का अनुपात दिखाता है जिन्होंने एआई के बारे में बहुत या थोड़ा सुना या पढ़ा है।  
**46%** पर, भारत का हिस्सा **25 देशों के औसत 81% से काफी कम** है।

### Awareness among young adults युवा वयस्कों में जागरूकता

- Although **AI is a new technology** that young adults are generally expected to know more about, only **19% of Indians aged 18-34** said they have heard of or read a lot about AI.  
यद्यपि **एआई एक नई तकनीक** है जिसके बारे में आमतौर पर युवाओं से अधिक जानकारी रखने की अपेक्षा की जाती है, केवल **18 से 34 वर्ष के 19% भारतीयों** ने कहा कि उन्होंने एआई के बारे में बहुत सुना या पढ़ा है।
- This is the **second lowest share** in that age group among the **25 countries surveyed (Chart 2)**.  
यह **25 देशों के सर्वेक्षण में उस आयु वर्ग में दूसरा सबसे कम प्रतिशत** है (चार्ट 2)।

### Public concern about AI use एआई के उपयोग को लेकर जन चिंता

- Consequently, **Indians are also among the least concerned** about the increasing use of AI in daily life.  
परिणामस्वरूप, **भारतीय भी उन देशों में शामिल हैं जो दैनिक जीवन में एआई के बढ़ते उपयोग को लेकर सबसे कम चिंतित हैं।**
- Close to **19%** of them said the increasing use of AI in daily life makes them **more concerned than excited**.  
उनमें से लगभग **19%** ने कहा कि दैनिक जीवन में एआई के बढ़ते उपयोग से वे **उत्साहित होने से अधिक चिंतित हैं।**
- This share is one of the **lowest among the countries surveyed (Chart 3)**.  
यह अनुपात **सर्वेक्षण किए गए देशों में सबसे कम में से एक** है (चार्ट 3)।

### Trust in government regulation सरकारी नियमन में विश्वास

- Nearly **90% of Indians** also said they **trust that their country will regulate the use of AI effectively**.  
लगभग **90%** भारतीयों ने कहा कि वे **विश्वास करते हैं कि उनका देश एआई के उपयोग को प्रभावी रूप से विनियमित करेगा।**
- This share is the **highest among all the countries surveyed**, and by a **significant margin (Chart 4)**.  
यह अनुपात **सभी सर्वेक्षण किए गए देशों में सबसे अधिक** है और यह **काफी बड़े अंतर से आगे** है (चार्ट 4)।

### Correlation with wealthier nations धनाढ्य देशों के साथ संबंध

- **Wealthier countries** tend to have a higher share of people who have heard a lot about AI.  
**धनाढ्य देशों में उन लोगों का अनुपात अधिक होता है जिन्होंने एआई के बारे में अधिक सुना या पढ़ा है।**
- Around **half the adults in Japan, Germany, France, and the U.S.** said they have heard a lot about AI, compared to **14% in India** and **12% in Kenya**.  
**जापान, जर्मनी, फ्रांस और अमेरिका** के लगभग आधे वयस्कों ने कहा कि उन्होंने एआई के बारे में बहुत सुना है, जबकि **भारत में यह 14%** और **केन्या में 12%** है।



- **Chart 5** plots the share of people who said they have heard of or read a lot about AI against the **GDP per capita** of the countries.  
चार्ट 5 उन लोगों के अनुपात को दर्शाता है जिन्होंने एआई के बारे में बहुत सुना या पढ़ा है, इसे देशों के प्रति व्यक्ति जीडीपी के साथ तुलना करते हुए।
- **Charts 1, 2, 3, and 4** display data for only **selected countries** out of the 25 surveyed, while **Chart 5 includes figures for all countries**.  
चार्ट 1, 2, 3, और 4 में 25 में से केवल चयनित देशों के आंकड़े दिखाए गए हैं, जबकि चार्ट 5 में सभी देशों के आंकड़े शामिल हैं।

## Sugar sector concerned over reduction in ethanol sourcing

**GS III: Environment**

**M. Soundariya Preetha**

COIMBATORE

The sugar sector is concerned over the cut in ethanol sourcing in the 2025-2026 ethanol supply year.

The Indian Sugar & Bio-Energy Manufacturers Association (ISMA) said only 289 crore litre ethanol had been allocated from sugar-based feedstock or 28% of the total need. The industry invested almost ₹40,000 crore with a capacity to supply 650 crore litre of ethanol a year. It supplied 330 crore litre last ethanol supply year.

The sector expects almost 345 lakh tonne sugar



Centre must raise ethanol procurement price.

output between October 1 and September 30, 2026. Of this, local consumption will be just 284 lakh tonne and sugar diversion for ethanol 34 lakh tonne leading to excess sugar stocks.

While the Fair and Remunerative Price of sugar-

cane rose 16.5% to ₹355 a quintal since 2022-23, ethanol procurement prices from sugarcane juice and B-heavy molasses was static at ₹60.73 and ₹65.61 a litre respectively. Ethanol's cost of production was ₹66.09 a litre from B-heavy molasses and ₹70.70 a litre from cane juice.

The minimum selling price (MSP) of sugar has been ₹31 a kg since February 2019 with output cost at ₹40.24/kg. The Centre must ensure 50% ethanol is sourced from sugar sector, raise MSP, announce sugar export policy and increase ethanol procurement prices, ISMA said.



## Sugar sector concerned over reduction in ethanol sourcing एथेनॉल की खरीद में कमी को लेकर चीनी क्षेत्र चिंतित

- The sugar sector is concerned over the cut in ethanol sourcing in the 2025–2026 ethanol supply year. चीनी क्षेत्र 2025–2026 एथेनॉल आपूर्ति वर्ष में एथेनॉल खरीद में कटौती को लेकर चिंतित है।
- The Indian Sugar & Bio-Energy Manufacturers Association (ISMA) said only 289 crore litre ethanol had been allocated from sugar-based feedstock or 28% of the total need.



- इंडियन शुगर एंड बायो-एनर्जी मैनुफैक्चरर्स एसोसिएशन (ISMA) ने कहा कि चीनी-आधारित फीडस्टॉक से केवल 289 करोड़ लीटर एथेनॉल, यानी कुल आवश्यकता का सिर्फ 28%, आवंटित किया गया है।
- The industry invested almost ₹40,000 crore with a capacity to supply 650 crore litre of ethanol a year. उद्योग ने लगभग ₹40,000 करोड़ का निवेश किया है, जिसकी क्षमता प्रति वर्ष 650 करोड़ लीटर एथेनॉल की आपूर्ति करने की है।
- It supplied 330 crore liters last ethanol supply year. पिछले एथेनॉल आपूर्ति वर्ष में 330 करोड़ लीटर की आपूर्ति की गई थी।

## Expected Sugar Output and Surplus अपेक्षित चीनी उत्पादन और अधिशेष

- The sector expects almost 345 lakh tonne sugar output between October 1 and September 30, 2026. यह क्षेत्र 1 अक्टूबर से 30 सितंबर 2026 के बीच लगभग 345 लाख टन चीनी उत्पादन की उम्मीद कर रहा है।
- Of this, local consumption will be just 284 lakh tonne, and sugar diversion for ethanol will be 34 lakh tonne, leading to excess sugar stocks. इसमें से घरेलू खपत केवल 284 लाख टन होगी, और एथेनॉल के लिए चीनी का विचलन 34 लाख टन रहेगा, जिससे अधिशेष चीनी भंडार बन जाएगा।

## Price and Production Cost Concerns कीमत और उत्पादन लागत संबंधी चिंताएँ

- While the Fair and Remunerative Price (FRP) of sugarcane rose 16.5% to ₹355 a quintal since 2022–23, ethanol procurement prices from sugarcane juice and B-heavy molasses were static at ₹60.73 and ₹65.61 a litre respectively. 2022–23 से गन्ने का निष्पक्ष और पारिश्रमिक मूल्य (FRP) 16.5% बढ़कर ₹355 प्रति क्विंटल हो गया है, लेकिन गन्ने के रस और बी-हैवी शीरे से एथेनॉल खरीद मूल्य क्रमशः ₹60.73 और ₹65.61 प्रति लीटर पर स्थिर हैं।
- Ethanol's cost of production was ₹66.09 a litre from B-heavy molasses and ₹70.70 a litre from cane juice. बी-हैवी शीरे से एथेनॉल उत्पादन लागत ₹66.09 प्रति लीटर और गन्ने के रस से ₹70.70 प्रति लीटर रही।

## Sugar Price and Policy Demands चीनी मूल्य और नीतिगत मांगें

- The minimum selling price (MSP) of sugar has been ₹31 a kg since February 2019, with output cost at ₹40.24/kg.



**TELEGRAM CHANNEL:** <https://t.me/patrioticIAS>

**YOUTUBE CHANNEL:** <https://www.youtube.com/@PatrioticIAS>

**CONTACT: 9971932488**



चीनी का न्यूनतम बिक्री मूल्य (MSP) फरवरी 2019 से ₹31 प्रति किलोग्राम है, जबकि उत्पादन लागत ₹40.24 प्रति किलोग्राम है।

- The Centre must ensure 50% ethanol is sourced from the sugar sector, raise MSP, announce sugar export policy, and increase ethanol procurement prices, ISMA said.

ISMA ने कहा कि केंद्र सरकार को यह सुनिश्चित करना चाहिए कि 50% एथेनॉल चीनी क्षेत्र से खरीदा जाए, एमएसपी बढ़ाया जाए, चीनी निर्यात नीति की घोषणा की जाए, और एथेनॉल खरीद मूल्य में वृद्धि की जाए।

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