DIA, DEOGHAR IAS ACADEMY

Daily News Feed

D.N.F

04.11.2025 Sabaijor Complex, Near Jamunajor Pul,

Castair Town Deoghar, Mob: -9162500508



External Affairs Minister S. Jaishankar with Bahrain Foreign Affairs Minister Abdullatif bin Rashid Alzayani in New Delhi. PTI

India, Bahrain hold talks on boosting defence, trade ties

Kallol Bhattacheriee

NEW DELHI

India on Monday reiterated that the Gaza peace plan of U.S. President Donald Trump will lead to a "lasting" solution to the West Asian conflict.

Welcoming Bahrain's Foreign Minister Abdullatif bin Rashid Alzayani, External Affairs Minister S. Jaishankar said there are "unprecedented" changes in the West Asian region as well as in the world.

"So I take the opportunity to reiterate our support for the Gaza Peace Plan which we hope will lead to a lasting and durable solution," said Mr. Jaishankar in his opening remarks.

A joint statement issued after the meeting of the High Joint Commission headed by Mr. Jaishankar and Mr. Alzayani said that India and Bahrain expressed optimism for "enhancing future collaboration in the areas of defence and security". The joint statement also mentioned unequivocal condemnation of "terrorism, in all its forms and manifestations and reaffirmed strong commitment to combat terrorism, including cross border terrorism."

The two sides highlighted that India is among the top five trading partners of the Kingdom of Bahrain.

Both sides agreed to develop a common understanding to commence Double Taxation Avoidance Agreement (DTAA) negotiations, which will help eliminate double taxation, provide tax certainty and promote trade and investment.

English Summary:

External Affairs Minister **Dr. S. Jaishankar** held bilateral discussions with **Bahrain's Foreign Affairs Minister Abdullatif bin Rashid Alzayani** in New Delhi, focusing on strengthening **defence, trade, and security cooperation** between the two nations.

Both sides reaffirmed their commitment to **counter-terrorism**, **economic collaboration**, and **regional peace**, particularly in the context of the **West Asian conflict** and the **Gaza peace process**.

Context and Background

- India and Bahrain share **historical**, **cultural**, **and trade ties** spanning centuries.
- The visit comes amid ongoing **geopolitical instability in West Asia**, particularly due to the **Israel-Gaza conflict**.
- India reiterated its support for the **Gaza Peace Plan**, proposed by the U.S., as a potential "lasting and durable solution" to the conflict.

Key Areas of Discussion

(A) Defence and Security Cooperation

- Both ministers emphasized **enhancing defence collaboration** through:
 - o Joint military exercises.
 - o Training exchanges between armed forces.
 - o Maritime security and intelligence-sharing in the **Indian Ocean Region (IOR)**.
- Both nations reaffirmed unequivocal condemnation of terrorism in all forms, including crossborder terrorism.

(B) Trade and Economic Partnership

- India ranks among the **top five trading partners** of Bahrain.
- The two sides agreed to:
 - o **Strengthen trade connectivity** and investment cooperation.
 - Begin negotiations for a **Double Taxation Avoidance Agreement (DTAA)** aimed at eliminating double taxation and ensuring **tax certainty**.
 - o Explore **energy collaboration**, particularly in the oil and gas sector.

Strategic Significance

- For India:
 - Strengthens its **footprint in the Gulf Cooperation Council (GCC)** region.
 - o Supports **energy security** through deeper economic links with Bahrain.
 - o Reinforces India's role as a **stabilizing actor in West Asia** amid regional turbulence.
- For Bahrain:
 - o Enhances **defence cooperation** with a major regional power.
 - o Expands trade opportunities with India's rapidly growing economy.
 - o Positions Bahrain as a **bridge for India's West Asia policy**.

Broader Diplomatic Context

Details

- The talks are part of India's "Extended Neighbourhood Policy" focusing on stronger ties with the Gulf region.
- Follows similar strategic engagements with **Saudi Arabia**, **UAE**, **and Oman**.
- Bahrain's proactive engagement underscores its support for India's global diplomacy, including on issues like counter-terrorism and economic reform.

Key Outcomes

Area

Defence Expanded cooperation in training, joint exercises, and maritime security.

Terrorism Joint statement condemning terrorism and reaffirming commitment to global peace.

Trade Agreement to negotiate DTAA for investment facilitation. **Diplomacy** Reaffirmed support for Gaza peace plan and regional stability.

Hindi Summary (हिंदी सारांश):

भारत और बहरीन ने द्विपक्षीय वार्ता में रक्षा, व्यापार और सुरक्षा सहयोग को मजबूत करने पर सहमति व्यक्त की।

- विदेश मंत्री **डॉ. एस. जयशंकर** और बहरीन के विदेश मंत्री **अब्दुल्लतीफ़ बिन राशिद अलजायनी** की बैठक नई दिल्ली में हई।
- दोनों देशों ने **आतंकवाद के सभी रूपों की निंदा** की और **सीमा-पार आतंकवाद** के खिलाफ सख्त रुख अपनाने की
- भारत ने **गाज़ा शांति योजना** के प्रति अपना समर्थन दोहराया।
- दोनों पक्षों ने **डबल टैक्सेशन अवॉइडेंस एग्रीमेंट (DTAA)** शुरू करने पर सहमति जताई, जिससे व्यापारिक निवेश को प्रोत्साहन मिलेगा।
- भारत बहरीन के शीर्ष 5 व्यापारिक साझेदारों में शामिल है।

UPSC Mains Practice Question:

"India's engagement with the Gulf countries reflects a pragmatic blend of energy security and strategic partnership." Examine this statement with special reference to India-Bahrain relations. (250 words - GS Paper 2)

The case for energy efficiency

ndia has doubled down on clean energy, yet the power you plug into today is dirtier than it was five years ago. This is a paradox that is at the heart of our energy transition

As of June 2025, non-fossil fuel sources account for about 50% of India's total installed capacity. However, India's grid emission factor (GEF) - a measure of the carbon intensity of electricity - has increased from 0.703 tCO₂/MWh in 2020-21 to 0.727 tCO₂/MWh in 2023-24, according to the Central Electricity Authority. This is a striking reversal: more renewables should mean a cleaner grid. Why is india's grid getting dirtier instead?

The capacity-generation mismatch The answer lies in the distinction between capacity and generation. While renewables now account for a large share of installed capacity, they deliver far less electricity over the year compared to coal or nuclear. Solar and wind plants typically run at 15-25% capacity utilisation, versus 65-90% for coal and nuclear.

In 2023-24, renewables (including hydro) supplied just 22% of total electricity; the rest was fossil fuel-powered. The gap between headline capacity and actual delivered energy is widening, and India's fast-growing demand is being met by the most carbon-intensive source in the system:

India's electricity demand also peaks when renewables are least available. Solar floods the grid in the afternoon but fades by evening, just as peak loads from households surge. Fossil fuel plants, therefore, act as the system's shock absorbers - dispatched to meet night-time and peak demand - but they also lock in emissions.

This temporal mismatch highlights the limits of capacity expansion alone. To truly decarbonise, India needs flexibility along with more gigawatts.



Satish Kumar

Executive Director, Alliance for an Energy



Ajay Mathur

Professor of Practice, IIT Delhi; Former Director General, International Solar Alliance and Bureau of Energy Efficiency

If India wants to actually decarbonise its grid, efficiency must become the first fuel and flexibility. not fossil fuels. must power the

While Round-the-Clock (RTC) renewable electricity, at less than ₹5 per kWh, costs less than new coal-based power stations, upscaling is slow. We need policies that enable more land, transmission lines, and investment.

The role of energy efficiency

Energy efficiency provides the opportunity. Often called the "first fuel", it reduces demand before supply even needs to be generated. By lowering the evening and night-time peaks, efficiency reduces reliance on coal when emissions are highest. Scaling up efficient appliances - fans, air conditioners, and motors - and embedding efficiency in buildings and industrial processes can reshape this curve.

The benefits extend beyond reduced coal consumption and enhanced opportunity for integrating renewables. Energy efficiency enhances flexibility by flattening demand peaks and allowing demand to align with renewable availability. It also prevents lock-in by replacing old, inefficient technologies early.

Energy efficiency is invisible by design diffuse, distributed, and cumulative. Yet, without it, the energy transition cannot be achieved. Concrete evidence from the Bureau of Energy Efficiency shows that India saved about 200 Million Tonnes of Oil Equivalent of final energy, equivalent to around 1.29 GT of CO2eq, and close to ₹760,000 crore in savings, from FY2017-18 to FY2022-23.

India is not alone, but its pathway is unique. Countries such as France, Norway, and Sweden boast grid emission factors of just 0.1-0.2 tCO2/MWh, largely thanks to large shares of hydro and nuclear electricity. India, at 0.727, starts from a coal-heavy base and faces relentless demand growth. This makes efficiency part of the core strategy, not just an option. Without it,

renewables risk being stranded in the wrong

What needs to be done

To unlock the full value of clean energy, India must urgently do the following. First, it must enable homes and offices to connect their batteries into virtual power plants, helping the grid glide over the peak demand. Second, it must accelerate appliance efficiency standards. It must move markets towards 4- and 5-star products and steadily raise benchmarks. Third, it must support small and medium enterprises to adopt efficient motors, pumps, and processes. Fourth, it must enable flexible pricing by adopting tariff structures that reward consumers for shifting demand to periods of high renewable availability. Fifth, it must introduce scrappage incentives for old, energy-guzzling equipment. Sixth, it must enable electricity distribution companies to procure "electricity services", such as green cooling, which allows for high-efficiency air conditioning powered by RTC clean power.

The Central Electricity Authority's National Electricity Plan projects a fall in India's GEF to 0.548 by 2026-27, and 0.430 by 2031-32. Achieving this requires more than just building solar and wind farms. It demands a flexible system approach - with efficiency at the centre.

India has grown its economy while cutting emissions intensity by 33% between 2005 and 2019, as noted in its Fourth Biennial Update Report to the UNECCC, But the rising GEF calls for a balanced approach: accelerate supply-side investments in renewables, storage, and transmission, while embedding efficiency across households, industries, and cities. If India wants to actually decarbonise its grid, efficiency must become the first fuel - and flexibility, not fossil fuels, must power the future.

English Summary:

Despite India's major progress in renewable energy capacity, the country's grid is paradoxically becoming dirtier, with a rise in the grid emission factor (GEF) — from 0.703 tCO₂/MWh (2020-21) to $0.727 \text{ tCO}_2/\text{MWh}$ (2023-24).

The article argues that the key to resolving this contradiction lies not only in expanding renewable capacity but in scaling up energy efficiency — the "first fuel" — to reduce demand, flatten peaks, and enable a cleaner energy mix.

Paradox of India's Energy Transition

- As of June 2025, non-fossil fuels account for 50% of installed capacity, yet electricity is more carbon-intensive than before.
- The core issue: a **capacity-generation mismatch** renewables contribute more capacity but less electricity generation.

Capacity-Generation Mismatch Explained			
Aspect	Renewable Energy	Fossil Fuel (Coal/Nuclear)	
Plant Load Factor (PLF)	15–25% (solar, wind)	65-90%	
Electricity Supplied (2023-24)	22%	78% (mostly coal)	
Problem	Solar peaks during daytime; demand peaks at night → Fossil fuels fill the gap	Coal-based generation rises when renewables drop	

Hence, even though renewables grow, **coal still dominates actual power generation**, driving up emissions.

Structural Energy Challenges

- Temporal mismatch between renewable availability and demand.
- **Coal plants** act as backup but are highly polluting.
- Round-the-clock (RTC) renewable electricity costs less than new coal power ($\sim ₹5/kWh$), yet policy, land, and investment bottlenecks slow the transition.

Role of Energy Efficiency ("The First Fuel")

Energy efficiency reduces demand before new supply is needed.

It is the **cheapest**, **fastest**, **and cleanest way** to decarbonise the grid.

Key Contributions:

- 1. **Demand reduction:** Lowers electricity use during high-emission hours.
- 2. **Peak management:** Smoothens evening peaks \rightarrow reduces coal dependence.
- 3. **Flexibility:** Makes demand align with renewable availability.
- 4. **Avoided emissions:** Prevents "lock-in" to inefficient technologies.
- 5. **Industrial benefits:** Reduces costs, boosts competitiveness.

Example: From **FY2017–18 to FY2022–23**, India saved **200 million tonnes of oil equivalent** (MTOE) of final energy and **1.29 GT of CO₂**, worth ₹760,000 crore in avoided costs.

What Needs to Be Done

To unlock the full value of clean energy, **India must adopt a six-point action plan**:

Step	Policy Action
1. Demand-side storage	Enable homes/offices to connect batteries into "virtual power plants" to flatten peak demand.
2. Appliance efficiency	Strengthen appliance standards (move toward 4- & 5-star labels).
3. Market incentives	Flexible pricing and tariffs rewarding off-peak consumption.
4. SME efficiency	Financial and technical support for efficient motors and processes.
5. Scrappage policy	Incentivize replacement of inefficient, energy-guzzling equipment.
6. Green electricity services	Mandate utilities to procure "efficiency services" like green cooling powered by renewable RTC electricity.

Comparative Perspective

- Countries like France, Norway, and Sweden have GEFs around 0.1-0.2 tCO₂/MWh, due to:
 - o High shares of **hydro and nuclear**.

- Early adoption of efficiency and storage measures.
- India's current GEF of **0.727** highlights its coal dependency and slow efficiency integration.

CEA's Target & Outlook

- Central Electricity Authority (CEA) projects grid emission factor (GEF) reduction to:
 - o 0.548 by 2026-27
 - o 0.430 by 2031-32
- Achieving this requires:
 - Renewable expansion + Energy Efficiency (EE)
 - o Investment in storage, smart grids, transmission
 - o Demand-side management (DSM) reforms

Core Argument

India cannot meet its **net-zero targets (2070)** by renewables alone.

Efficiency is **invisible but indispensable** — the **"first fuel"** that bridges demand–supply gaps, cuts costs, and allows renewables to thrive.

Hindi Summary (हिंदी सारांश):

भारत ने स्वच्छ ऊर्जा क्षमता को दोगुना कर लिया है, लेकिन बिजली उत्पादन का **कार्बन उत्सर्जन (GEF)** बढ़ गया है। मुख्य कारण है — **सौर और पवन ऊर्जा की सीमित उत्पादन क्षमता** और **कोयले पर निर्भरता**। समाधान:

- ऊर्जा दक्षता (Energy Efficiency) को "पहला ईंधन" माना जाए।
- इससे मांग घटेगी, पीक लोड कम होगा और नवीकरणीय ऊर्जा का उपयोग बढ़ेगा।
- भारत ने 2017-23 के बीच **200 MTOE ऊर्जा की बचत** कर लगभग **₹7.6 लाख करोड़** की आर्थिक बचत की।
- सरकार को ऊर्जा दक्ष उपकरण, लचीली टैरिफ नीति, और पुराने प्रदूषक उपकरणों को बदलने की योजना को बढ़ावा देना चाहिए।

UPSC Mains Practice Question:

"Energy efficiency is the invisible foundation of India's clean energy transition." Discuss with reference to India's emission trends and policy measures. (250 words – GS Paper 3)

Has cloud seeding been effective?

How does the process work? How does it aim to settle the build of smog and particulate matter in the air? When did India first experiment with cloud seeding? What was the Cloud Aerosol Interaction and Precipitation Enhancement Experiment? Have the recent trials in Delhi been successful?

EXPLAINER

Jacob Koshy

The story so far:

or the first time in nearly 50 years, Delhi conducted two cloud seeding trials with the Indian Institute of Technology Kanpur (ITTK) last week. The aim was to induce rain over Delhi to settle the build of senog and particulate matter that had describerated the air quality.

What is cloud seeding?

Cloud seeding involves agraying a salt mixture into clouds. The science is that such seeding, which is done by aircraft fitted with flares that fire the salt mixture into clouds, can induo it co or water varyour within the clouds to form water droplets. When lots of such droplets coalesoe, they can pour down as rain.

What has been its history?

Cloud seeding has been around for at least three quarters of a century with mixed success. Beginning in the 1940s, General Electric scientists William Schuefer and Bernard Vormegut chanced upon the principle of using dry lee to form see crystals in their lab freezer. They then decided to experiment on real clouds. It was reported that they successfully made it snow over Pittsfield in Massachusetts, U.S. This got the U.S. government excited and a formal programme called Project Cirrus was born. While creating rain was certainly on the back of their minds, the big excitement was the prospect of tuning hurricanes, which did not pan out well in the 1950s and 60s, the use of cloud seeding as a weather modification tool became popular. The Soviets seeded clouds over Leningrad to protect May Day parades — years before China used cloud seeding for clear skies alwaed of the inaugural ceremony of the Olympics in 2008. The U.S. launched Project



For a better sky: A view of the avcraft after the second trial of cloud seeding in Delhi, on October 28. All

planes over the Rockies.

What has India's experience been?
Nearly coincident with Project Grrus, S.K.
Banerji, the first Indian Directur General
of the India Meteorological Department
(IMD), oversaw the first cloud seeding
experiments in Kolkata by releasing salt
and silver lodide in bydrogen halloons in
1952. Most of these were administered as
rockes that were fired from the ground,
And while these experiments seemed to
suggest that on the days when seeding
was done, there was more rain compared
to days when there was no seeding, it
wasn't verifiable if the rain was due to
natural sources or from the seeding.
There was even an attempt to conduct

There was even an attempt to conduct such seeding in Delhi in 1962 but it failed. It's only from the 1970s that researchers properly started to use planes and fly to the top of the clouds to spray salt solutions. They also studied cloud physics, condensation, what kind of clouds gave rain, which ones diabrt, and so on. Several States, when grappling with drought, have experimented with cloud seeding. The results have been sporadic and there was never any systematic way to tell how much rain could reasonably be expected if a certain amount of salt minture was scattered. There was also less-clarity on where exactly one could expect rain. The cost-benefit also was not clear, given that hiring alreraft, pilots, technical personnel and making salt mixtures was expensive.

What was the CAIPEEX? Initiated by the Pune-based Indian Institute of Tropical Meteorology in 2009, Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX) was a systematic scientific investigation to quantify if there were any benefits from cloud seeding. For that it actually studied the interior world of clouds, its physics, and water droplet formation for nearly a decade after which from 2017-2019 they physically identified,

using radar and other instruments, clouds that were suitable for seeding.

This experiment was conducted over a drought prone region called Solapur, Maharashtra, and bence a natural test ground to measure enhancement (if there was any). Once the clouds were identified they flew aircraft and fired flares of calcium chloride (no silver iodide used) into some clouds and left others 'unseeded. Their overall finding was that Solapur got an extra 867 million litres of water – which is considerable. In terms of airifall measured on the ground: seeded clouds gave an average 46% more rain at the seeded locations relative to the unseeded ones.

Over a 100 square km area downwind, there was 18% more rain in the seed versus unseeded.

What happened in Delhi?

There were two flights on October 28 when IT Kanpur flew its own plane and flared clouds. The results were disappointing with no rainfall triggered, though researchers at ITI's said that some parts of Delhi reported a 'light drizzle' and a 'small improvement' in air quality. The drawback was the quality of clouds. The CAIPEEN demonstrated that only mossoon clouds which had a certain quantity of moisture could hope to yield sufficient water. Such clouds are absent in the post-monsoon over Delbi.

For seven years, there have been various proposals for seeding over Delhi that have been discouraged by scientists due to the winter amospheric characteristics. IT Kanpur has however said that it will continue 'trials' during this

THE GIST



Cloud seeding has been around for at least three quarters of a century with mixed success.



Cloud seeding involves spraying a self-misture into clouds. The science is that such seeding, which is done by aircraft fitted with flares that fire the self-misture into clouds, can induce ice or water vapour within the clouds to from water-droplets.



There were two flights on October 26 when 8T Karque flew its own plants and flaned clouds. The results were disappointing with no rainfall triggered.

English Summary:

For the **first time in nearly 50 years**, Delhi conducted **two cloud seeding trials** in collaboration with the **Indian Institute of Technology Kanpur (IIT-K)** in October 2024.

The aim was to **induce artificial rainfall** to **settle smog and particulate pollution** that had severely deteriorated Delhi's air quality.

However, the trials were **unsuccessful**, adding to India's long history of **mixed outcomes** with cloud seeding experiments.

What is Cloud Seeding?

- Cloud seeding is a weather modification technique used to induce rainfall artificially.
- How it works:
 - o Aircraft or rockets spray **salt mixtures** (like silver iodide or calcium chloride) into clouds.
 - o These salts act as **nuclei** for moisture condensation.
 - Water droplets form, coalesce, and may fall as **rain** if conditions are favourable.

Objective:

- Enhance rainfall.
- Disperse fog.
- Reduce air pollution and smog by washing particulates out of the atmosphere.

Historical Background

- Originated in the 1940s in the U.S., led by scientists Vincent Schaefer and Irving Langmuir.
- By the **1950s-60s**, cloud seeding was attempted globally in the **U.S.**, **China**, **Australia**, and the

- **Soviet Union** with limited and inconsistent success.
- India's first trials date back to the 1950s, when experiments were conducted under the Indian Meteorological Department (IMD) and Defence Research Programme.

India's Early Experiments

- 1950s-1970s: Trials using aircraft and rockets in West Bengal, Tamil Nadu, and Maharashtra.
- **1970s–80s:** Mixed results, with lack of reliable meteorological data.
- **2000s:** States like **Karnataka**, **Maharashtra**, **and Tamil Nadu** hired international agencies (e.g., Weather Modification Inc., USA) for drought mitigation projects.
- 2009: CAIPEEX (Cloud Aerosol Interaction and Precipitation Enhancement Experiment) launched by the Indian Institute of Tropical Meteorology (IITM), Pune, to study cloud formation and assess scientific validity of cloud seeding.

What Was the CAIPEEX Experiment?

- Conducted between **2009–2019** across India, especially over **Solapur (Maharashtra)**.
- Aimed to determine if cloud seeding **genuinely enhances rainfall**.
- Used aircraft to seed clouds with calcium chloride and silver iodide.
- Found:
 - o **Seeded clouds** produced **46% more rain** on average than unseeded ones.
 - o Over a **100 sq. km area**, rainfall increased **18%** compared to unseeded regions.
 - o Yet, the variability of results meant it wasn't **universally replicable**.

What Happened in Delhi (2024)?

- Two flights by IIT Kanpur on **October 28** aimed at inducing rain over Delhi's polluted skies.
- Conditions:
 - Low cloud moisture.
 - Post-monsoon dryness.
 - Sparse humidity over NCR region.

Outcome:

- o No rainfall recorded only a "light drizzle" at some IIT-K stations.
- o Experts noted that the **atmospheric moisture** was too low to trigger meaningful rain.
- Thus, the attempt failed to wash away smog as intended.

Why is Cloud Seeding's Success Limited?

Limiting Factor Explanation

Cloud ConditionsRequires sufficient moisture, vertical cloud growth, and temperature

below freezing.

Timing Works only when clouds are already developing — cannot create clouds.

Cost-effectiveness High operational costs, low reliability.

Scientific Uncertainty Difficult to isolate natural vs. induced rainfall.

Environmental ConcernsUse of chemicals (like silver iodide) raises ecological and health concerns.

Benefits & Uses (if effective)

Inducing rain during droughts.

Clearing smog and dust in polluted cities.

Boosting reservoir and agricultural water supplies.

Reducing hail or fog in aviation zones.

However, the **scientific community remains divided** — the **success rate** rarely exceeds **15–20%**, making it **an uncertain policy tool**.

The GIST (Exam-Oriented Points)

• Cloud seeding has existed for **75+ years**; success has been **mixed**.

- India's most systematic study: **CAIPEEX (2009–2019)**.
- 2024 IIT-K Delhi trials **failed** due to inadequate cloud moisture.
- Future success depends on accurate cloud modelling, timing, and sufficient humidity.
- Cloud seeding is a supplement, not a substitute for broader pollution control or water conservation strategies.

Hindi Summary (हिंदी सारांश):

भारत में लगभग **50 वर्षों बाद** पहली बार दिल्ली में क्लाउड सीडिंग (Cloud Seeding) का प्रयास किया गया, ताकि स्मॉग और प्रदुषण को नियंत्रित किया जा सके।

- प्रक्रिया: वायुयान द्वारा नमक मिश्रण (सिल्वर आयोडाइड, कैल्शियम क्लोराइड) को बादलों में छोड़ा जाता है, जिससे वर्षा उत्पन्न की जा सके।
- हाल की दिल्ली परियोजना (2024): IIT कानपुर द्वारा दो उड़ानें भरी गईं, परंतु पर्याप्त नमी के अभाव में वर्षा नहीं
- पिछला प्रयोग (CAIPEEX, 2009-2019): महाराष्ट्र के सोलापुर क्षेत्र में हुआ बीजे गए बादलों से 46% अधिक वर्षा देखी गई।
- निष्कर्ष: सफलता की दर कम है; क्लाउड सीडिंग तभी संभव है जब बादल पर्याप्त नमी से युक्त हों।

UPSC Mains Practice Question:

"Cloud seeding represents the scientific pursuit to modify weather, yet its success remains elusive." Critically analyse with reference to India's experiments and environmental implications. (250 words – GS Paper 3)

What are the challenges with the High Seas Treaty?

What does the principle of 'common heritage of humankind' mean? Is the treaty ambiguous?

Padmashree Anandhan

overfishing and pollution.

The story so far: he High Seas Treaty was ratified by over 60 countries in September; it will now be enforced in January 2026. The treaty sets rules to preserve and use marine biodiversity sustainably and addresses threats from climate change,

What is the treaty about? The Biodiversity Beyond National Jurisdiction (BBNJ) agreement, as the High Seas treaty is formally referred to, creates an all-inclusive framework to govern and manage common marine biodiversity. It identifies Marine Genetic Resources (MGRs) as the common beritage of humankind, insisting on a fair and equitable sharing of benefits. Besides, the Area-Based Management Tools

(MPAs) that can be recognised to protect biodiversity. This will help in improving climate resilience and provide food security, combining science and indigenous knowledge. The treaty also entails Environmental Impact Assessments (EIAs) for events potentially affecting these areas, especially when cumulative and transboundary impacts are taken into account. The first steps for the treaty began two decades ago. In 2004, the UN General Assembly formed an ad-hoc working group to fix the gap in the UN Convention on the Law of the Sea-(UNCLOS), 1982, which did not have clear guidelines on protecting HBNL By 20tt, states had agreed to negotiate on four ke issues, mainly MGRs, ABMTs, EIAs, and capacity building and technology transfer. Following this, four intergovernmental Conference sessions were held between 2018 and 2023. The parties to these discussions finally reached an agreement in March 2023, which led to the adoption

What are the major issues?

First is the uncertainty over the principles of "common heritage of humankind" and freedom of the high seas." The "common heritage principle" supports equitable access and benefit-sharing of marine resources for all, while the "freedom on the high seas" stresses on unrestricted rights of states to carry out navigation, resource usage and research activities. However, the common heritage principle is only applicable partially, especially when it comes to MGRs. This shows a compromise instead of a resolution. It also creates ambiguity in exploration, research and benefit sharing. Second, is the use of MGRs. The governance of MGRs was earlier not defined, raising concerns over "biopiracy" and unfair exploitation by developed countries. Developing nations were concerned that they would be excluded from the pr

discoveries from the high seas. The treaty monetary and non-monetary benefits, but with no clear details on how such benefits will be calculated or shared. Third is the reluctance of big powers to get engaged. The treaty is under threat due to non-participation from the U.S., China, and Russia, who are yet to ratify the treaty. Fourth, is interaction with multilateral institutions. The treaty must coexist and not ignore existing international institutions, such as the International Seabed Authority (ISA) and Regional Fisheries Management Organisations (RFMOs). The BBNJ agreement must also blend with existing international treaties to prevent legal conflicts and lead to more fragmentation

What next?

The treaty provides more clarity to the UNCLOS provisions, focusing on science-based requirements for EIAs, ABMTs and benefit sharing. However, the ambiguous language in the MGRs and the common heritage of humankind principle challenge the execution of the treaty. There is a need for dynamic managem of MPAs, and regular monitoring. To deliver the BBNJ, linking climate-biodiversity with the ocean will be crucial for resilient man Padmashree Anandhan is a project

nciate at NIAS, Bangalore

THE GIST

National Jurisdiction (BBNJ) agreement, as the High Sear treaty is formally referred to, creates an all-inclusive framework to govern and manage common marine biodiversity.

The "common heritage marine resources for all.

Developing nations were concerned that they would be excluded from the profits of scientific discoveries from the

English Summary:

(ABMTs) include Marine Protected Areas

The High Seas Treaty, officially known as the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement, was ratified by over 60 countries in September 2025 and will come into force in January 2026.

It aims to protect marine biodiversity in areas beyond national jurisdictions, addressing threats such as **climate change**, **pollution**, **and overfishing**.

However, the treaty faces **ambiguities** and **implementation** challenges concerning equity, governance, and participation by major powers.

What is the High Seas Treaty?

The BBNJ agreement seeks to **govern marine resources** in international waters — areas that **lie** beyond the 200 nautical mile Exclusive Economic Zones (EEZs) of any country.

- It provides a framework to:
 - Conserve and use marine biodiversity sustainably.
 - o Ensure equitable sharing of benefits from Marine Genetic Resources (MGRs).
 - Establish Marine Protected Areas (MPAs) for conservation.
 - Mandate Environmental Impact Assessments (EIAs) for activities affecting the marine environment.
 - Facilitate capacity building and technology transfer to developing countries.

Background and Evolution

- The UN Convention on the Law of the Sea (UNCLOS, 1982) lacked provisions for conserving biodiversity in areas beyond national control.
- To address this gap, the **UN General Assembly** set up an **ad-hoc working group in 2004**.
- By **2011**, global consensus emerged on the need for a legally binding instrument for:
 - o MGRs
 - Area-Based Management Tools (ABMTs)

 - Capacity building and technology transfer.
- After years of negotiation and four intergovernmental sessions (2018–2023), the **treaty was** adopted in June 2023.

The Principle of "Common Heritage of Humankind"

- Declares that marine genetic resources (MGRs) in international waters are shared global **property** — not owned by any one nation.
- Implies fair and equitable benefit-sharing, especially with developing nations.
- This principle contrasts with the older concept of "Freedom of the High Seas", which allows unrestricted use of ocean resources by all states.

Major Challenges & Issues

(A) Ambiguity between Two Principles

Principle	Concept	Conflict
Common Heritage of Humankind	Shared ownership; equitable access and benefit-sharing.	Favours developing countries.
Freedom of the High Seas	Unrestricted use for navigation, fishing, and research.	Favours developed maritime powers.
The treaty fails to clearly reconcile these two principles, leading to interpretation conflicts .		

The treaty fails to **clearly reconcile** these two principles, leading to **interpr**

(B) Governance of Marine Genetic Resources (MGRs)

- Ambiguity over **how benefits (monetary & non-monetary)** from marine discoveries will be shared.
- **Developing nations fear exclusion** from the profits of biotechnological innovations (e.g., pharmaceuticals derived from marine organisms).
- The **mechanism for calculating and distributing benefits** remains undefined.

(C) Reluctance of Major Powers

- The **U.S., China, and Russia** have **not ratified** the treaty.
- Their absence weakens the treaty's **universality and enforcement capacity**.

(D) Overlap with Existing Institutions

- Potential conflicts with:
 - o **International Seabed Authority (ISA)** (controls mineral extraction).
 - o Regional Fisheries Management Organisations (RFMOs).
- The treaty must align with these bodies to avoid **jurisdictional overlaps** and **legal fragmentation**.

(E) Implementation & Monitoring

- Setting up and managing Marine Protected Areas (MPAs) requires high funding, coordination, and compliance.
- Environmental Impact Assessments (EIAs) for transboundary projects remain complex.
- Regular monitoring of MPAs is still technically and financially challenging.

Opportunities and Significance

Strengthens global ocean governance.

Promotes **science-based conservation** of marine biodiversity.

Encourages North-South cooperation on marine research and technology.

Supports the SDG-14 (Life Below Water) objectives.

What Next?

- The treaty will enter into force in January 2026.
- It provides more **clarity to UNCLOS** and aims to operationalize **EIAs**, **ABMTs**, **and benefit-sharing frameworks**.
- However, **ambiguous language** around MGRs and the **heritage principle** could lead to disputes.
- There's an urgent need for:
 - Dynamic management of MPAs.
 - o Integration of climate and biodiversity governance.
 - o Broader participation, especially from major powers.

The GIST (Exam-Ready Points)

- The High Seas Treaty (BBNJ Agreement) governs marine biodiversity beyond national boundaries.
- Based on "Common Heritage of Humankind" and "Freedom of the High Seas" both partially contradictory.
- Developing nations fear exclusion from MGR benefits.
- Lack of participation by **major powers (U.S., China, Russia)** threatens its global acceptance.
- Implementation depends on scientific assessments, equity mechanisms, and global coordination.

Hindi Summary (हिंदी सारांश):

हाई सीज़ संधि (High Seas Treaty) को सितंबर 2025 में 60 से अधिक देशों ने अनुमोदित किया है और यह जनवरी 2026 से लागू होगी।

यह संधि **समुद्री जैव विविधता की रक्षा** और **जलवायु परिवर्तन, अत्यधिक मत्स्यन एवं प्रदूषण** जैसी चुनौतियों से निपटने का ढांचा प्रदान करती है।

मुख्य बिंदु:

- यह **समुद्री आनुवंशिक संसाधनों (MGRs)** को **मानव जाति की सामान्य धरोहर** मानती है।
- इसका उद्देश्य **लाभों का समान बंटवारा** और **समुद्री क्षेत्रों की रक्षा (MPAs)** है।
- मुख्य चुनौतियाँ:
 - 1. "Common Heritage" और "Freedom of High Seas" सिद्धांतों में टकराव।
 - 2. MGRs से मिलने वाले लाभों के बंटवारे की अस्पष्टता।
 - 3. प्रमुख शक्तियों (अमेरिका, चीन, रूस) की भागीदारी का अभाव।
 - 4. अन्य संस्थाओं (ISA, RFMOs) से अधिकारों का टकराव।

UPSC Mains Practice Question:

"The High Seas Treaty marks a milestone in global ocean governance, but its success depends on reconciling equity with freedom." Discuss. (250 words – GS Paper 3)

Big manufacturing economies struggle as U.S. tariffs hit orders

The world's big mamafacturing economies strug-gled to fire up in October, husiness surveys showed on Monday, as weak U.S. demand and President Do-nald Trump's turiffs hit factory orders.

Euro some factory activi-Saro some factory activi-y stagnated as-new orders flutlined and headcount fell, its prachasing manag-ers' indies (PMD) showed, and its exporting power-house. Germany showed little size of recovery with little sign of recovery with production growth slowing

German engineering or-ders plummeted in Sep-tember, the VDMA engineering association said earlier on Monday.

France's manufacturing

marginally. Spain stood out among the bloc's big for reconomies as its factories expanded at a faster pace

Stagnant sector "The final release of the

euro zone manufacturing PMIs confirmed the sector remains stagnant." Paolo Grignani at Oxford

Economics.
"Details indicate growth is mainly due to solid dom-estic demand, while new foreign orders continue to reports of weak demand m France and the U.S. In ficitain, outside the Eu-ropean Union, factories had their strongest month in a year, but the recovery



production at carmaker Ja-guar Land Rover after it was hit by a cyberattack

some progress in trade ne-gotiotions with the region's large manufacturing economies such as China and

ous about U.S. Manufacturing activity in China grew at a

while it foll in South Korea, with export orders in both ate-sector PMIs for October showed on Monday.

Friday's official PMI survey showed China's factory ac-tivity fell for the seventh straight month, confirming suspicious that the earlier export rush to get ahead of U.S. tariffs had well and

truly ended.
"The PMb suggest that China's economy lost some momentum in October, with slower growth across manufacturing and con-struction," said 2ichun Huang, China economist at Capital Economics. "Some of this weakness

may reverse in the near term, but any boost to exports from the latest U.S.- China trade 'deal's likely to be modest and wider headwinds to growth willpersist."

Cautious optimism

Jinping agreed to de-esca-late tensions, including through a one-year delay in reciprocal tariffs, but the agreement does little to ad-dress a deeper divide bet-ween the world's two eco-nomic uncorressers.

nomic superpowers.

Policymakers in Beijing are looking to see whether Chineski9 triffion econo China's Birthon econo-my is on track to hit its offi-cial 2025 growth target of around 3% without need-ing to reach for further sti-mulus. Trade data for Sep-tember showed China's exports rising faster than

in new markets as U.S.-bound shipments numbled

Sintlarly, Seoul's trade deal with Mr. Trump an-nounced last week secured lower U.S. tariffs on Korean goods, but was seen at best as a compromise that prevents Asia's fourth-langest economy from falling be-

economy from falling be-lind in global trade. In stark contrast to its northeast Asian peers, In-dia's factory activity sped up, driven by brisk domes tic demand that helped off act the hit to exports

Elsewhere in Asia, conti mod manufacturing de-clines were seen in Malay-sia and Taiwan, while Vietnam and Indonesia savg rowth in their manu facturing sectors pick up

English Summary:

The world's major manufacturing economies — including the Eurozone, China, South Korea, and **others** — are witnessing a **slowdown in industrial growth**.

The decline has been largely driven by weak global demand, U.S. tariffs under the Trump administration, and stagnant factory orders.

While domestic demand has offered temporary relief in some countries (notably India and Spain), export orders have contracted, especially from the U.S. and China, signaling weakening global trade momentum.

Kev Highlights

Global Slowdown:

Manufacturing activity across major economies (Eurozone, China, South Korea, UK) stagnated or contracted in October.

U.S. tariffs and declining demand have led to reduced factory orders.

Eurozone:

- Purchasing Managers' Index (PMI) data showed **stagnant growth**.
- **Germany**, Europe's export powerhouse, showed **no recovery signs**.
- France's and Italy's output remained weak.
- **Spain** was the only major Eurozone economy showing modest improvement.

United Kingdom:

Manufacturing showed the **strongest month in a year** due to a one-off rebound in auto production (Jaguar Land Rover restarting post-cyberattack).

China:

- China's factory activity **fell for the seventh consecutive month**.
- The "export rush" to beat U.S. tariffs has ended, causing slower growth.
- Domestic demand remained sluggish, and manufacturing momentum was weak.

South Korea:

- Export orders continued to decline, reflecting **reduced global demand**.
- Despite lower U.S. tariffs on Korean goods, the impact was minimal.

India:

- India's manufacturing sector **expanded** thanks to **strong domestic consumption** that offset export weakness.
- PMI data indicated India remained an **outlier among Asian economies**.

Economic Implications Region	Impact	Key Drivers
Europe	Industrial stagnation	Weak export orders, energy costs, trade tensions
China	Manufacturing	U.S. tariffs, falling export momentum

Region	Impact	Key Drivers
	contraction	
South Korea & Japan	Decline in export orders	Slowdown in U.S. & Chinese demand
India	Relative strength	Robust domestic demand, consumption growth
ASEAN (Vietnam, Malaysia)	Mixed recovery	Supply chain adjustments post-COVID

The U.S. Tariff Impact

- **Trump-era tariffs** targeted imports from China, Europe, and South Korea to protect U.S. manufacturing.
- This led to supply chain disruptions, costlier exports, and slow recovery in manufacturing economies.
- Export-oriented sectors (automobiles, electronics, machinery) were hit hardest.

Policy Responses & Market Sentiment

- **China:** Adopted cautious optimism; considering **targeted stimulus** to meet the 2025 growth target of 5%.
- **South Korea:** Negotiated **tariff relaxations** with the U.S. but growth remains export-dependent.
- **Europe:** Domestic stimulus and green transition funds being used to boost manufacturing competitiveness.

Broader Economic Analysis

- The global economy is showing "asynchronous recovery" developed economies slowing while developing economies like India and Indonesia show resilience.
- Trade decoupling between U.S. and China has created long-term uncertainty.
- Weak PMI trends indicate **slower global industrial output** in the upcoming quarters.

The GIST (Exam-Ready Points)

- **U.S. tariffs** have disrupted global manufacturing supply chains.
- **China's PMI fell for 7 consecutive months** weakest in years.
- **Eurozone manufacturing stagnated**, led by Germany's export weakness.
- **India stands out** with strong domestic demand despite global slowdown.
- Tariff negotiations between the U.S. and China/South Korea have only partially eased tensions.
- Global manufacturing faces protectionism, declining demand, and tariff-related uncertainty.

Hindi Summary (हिंदी सारांश):

विश्व की प्रमुख **निर्माण अर्थव्यवस्थाएँ (Manufacturing Economies)** वर्तमान में **मंदी और अमेरिकी टैरिफ़** (शुल्क) के प्रभाव से जूझ रही हैं।

- यूरोपियन यूनियन (Eurozone): जर्मनी और फ्रांस में उत्पादन घटा है, केवल स्पेन ने हल्की वृद्धि दर्ज की।
- **चीन**: लगातार सातवें महीने औद्योगिक गतिविधि में गिरावट, कारण अमेरिकी टैरिफ और घटती निर्यात मांग।
- दक्षिण कोरियाः निर्यात ऑर्डर में कमी।
- भारतः घरेलू मांग के बल पर वृद्धि बनाए रखी।
 कुल मिलाकर, वैश्विक विनिर्माण में सुस्ती का मुख्य कारण हैं —
- अमेरिकी टैरिफ़ नीति.
- 2. कमज़ोर वैश्विक मांग, और
- 3. आपूर्ति श्रंखला (Supply Chain) की बाधाएँ।

UPSC Mains Practice Ouestion:

"Recent U.S. tariff measures have triggered a slowdown in global manufacturing. Analyse their impact on emerging economies like India."

After Gaza setbacks, Iran watches Iraq's parliamentary polls closely

Agence France-Presse BAGHDAD

Iraq will hold parliamentary elections on November 11, with analysts saying Iran will be watching closely as it hopes to retain influence over its neighbour after losing regional leverage during the Gaza war.

The past two years have seen Iran-backed groups including Palestinian militants Hamas, Hezbollah in Lebanon and the Huthis in Yemen suffer heavy losses at Israel's hands.

Iran itself was on the receiving end of an unprecedented Israeli bombing campaign in June, which the United States briefly joined, and also lost a major ally with last year's overthrow of Bashar al-Assad in Syria.

Weakened on the regional stage, Iran intends



Iraq's Prime Minister Mohammed Shia al-Sudani (C) at a campaign event ahead of the parliamentary elections, in Najaf, on Sunday. AFP

to consolidate its gains in Iraq, which since the US invasion of 2003 has become one of the anchors of its regional influence.

Tehran exerts power in Baghdad through Shiite parties that play a key role in appointing Prime Ministers, including current Premier Mohammed Shia al-Sudani, and allied armed factions. "Tehran retains its influence as long as its allies hold decision-making power," analyst Ihsan al-Shammari said.

Iraq, for its part, has for years navigated a delicate balancing act between Tehran and Washington and has long been a fertile ground for proxy battles.

Pro-Iranian groups claimed responsibility for firing on US positions in Iraq early in the Gaza war, attacks that triggered retaliatory strikes from the United States. Those groups then stayed out of the 12-day Iran-Israel war, even after Washington joined the bombing.

Analyst Munqith Dagher said, "Iran is no longer in a position to impose its conditions." "But that does not mean it will not try to exert influence," the director of the IIACSS think tank added.

More than 21 million voters are eligible to elect 329 lawmakers in the ballot, which will pave the way for the appointment of a new President – a largely ceremonial role – and a Prime Minister chosen after lengthy negotiations.

In Iraq, the role of Prime Minister traditionally goes to a Shiite and the Presidency to a Kurd, while the Speaker of Parliament is usually Sunni.

English Summary:

Iraq will hold **parliamentary elections on November 11**, and **Iran is monitoring closely** in hopes of **retaining influence** over its neighbour.

After recent **regional setbacks** — including **losses by Iran-backed groups** in Gaza, Lebanon, and Yemen — Tehran's geopolitical leverage in West Asia has weakened.

The **Iraq elections** are now critical for Iran's **proxy network and strategic influence** in the post-Gaza regional order.

Background Context

- Iran has historically exerted significant influence in **Iraq**, especially through **Shiite political groups** and **armed factions**.
- Since the **U.S. invasion of Iraq in 2003**, Tehran has used Iraq as a **key anchor for regional influence** supporting political parties, militias, and even shaping leadership appointments.
- However, Iran's position has been challenged recently due to multiple factors:
 - o **Israel's bombing campaign** in June (joined by the U.S.).
 - o Loss of **key allies** like Syria's Bashar al-Assad.
 - o Heavy military setbacks for Iran-backed groups (Hamas, Hezbollah, Houthis).

- Iran seeks to **retain political and military leverage** by ensuring **Shiite-led coalitions** remain dominant in Baghdad.
- It supports parties aligned with current **Prime Minister Mohammed Shia al-Sudani**, whose rise was facilitated by pro-Iranian factions.
- These parties play a central role in appointing Iraq's **Prime Minister** and **influencing cabinet formation**.

Analyst Ihsan al-Shammari noted:

"Tehran retains its influence as long as its allies hold decision-making power in Baghdad."

Recent Regional Setbacks

Region	Iran-Backed Groups	Outcome
Gaza	Hamas	Heavy losses under Israeli bombardment
Lebanon	Hezbollah	Casualties and reduced operational freedom
Yemen	Houthis	Retaliatory U.S. strikes weakened them
Syria	Assad regime	Losing ground, weaker Iranian support base

Iran's regional influence — once spanning from Beirut to Sana'a — has **shrunk significantly**, prompting Tehran to **reinvest politically in Iraq**.

The Gaza Factor

- Following Israel's 12-day war with Iran, U.S. involvement in retaliatory strikes **pushed Iranian proxies to avoid escalation**.
- Tehran's "Axis of Resistance" a network of militant and political allies across the Middle East has suffered severe operational and credibility losses.
- Thus, **Iraq's election outcome** could determine how effectively Iran can **reassert its regional position**.

Expert Views

• **Munqith Dagher**, Director, IIACSS (Iraqi Center for Strategic Studies):

"Iran is no longer in a position to impose its conditions. But it will still try to exert influence."

• This implies Tehran will rely more on **political manipulation and coalition bargaining** rather than overt military influence.

Iraq's Election Landscape

- 21 million eligible voters to elect 329 members of parliament.
- Parliament will appoint a President (ceremonial) and a Prime Minister (executive authority)
 after coalition talks.
- Power distribution pattern:
 - o **Prime Minister** → **Shiite** (traditionally pro-Iranian).
 - o President → Kurdish.
 - \circ Speaker → Sunni.

Thus, **Iraq's political balance** is deeply sectarian — providing Iran natural entry points through Shiite factions.

Broader Geopolitical Implications

For Iran:

- The election offers a chance to **rebuild strategic depth** post-Gaza.
- Retaining Iraq's allegiance prevents complete **U.S.-Saudi encirclement**.

For the U.S.:

- Washington aims to limit Iran's influence through diplomatic engagement with Baghdad.
- Any pro-Iranian government could complicate **U.S. military and energy cooperation** in the region.

For the Region:

• Irag's election is a **proxy contest** between Tehran and Washington for regional dominance.

The GIST (Exam-Ready Points)

- Iraq holds elections on **November 11, 2025**; **Iran is watching closely** post-Gaza.
- Tehran's regional leverage weakened after **losses in Gaza, Syria, Yemen, Lebanon**.
- Iran supports **Shiite-led parties** like PM **Mohammed Shia al-Sudani's bloc**.
- Iraq's parliament: 329 seats → PM (Shiite), President (Kurd), Speaker (Sunni).
- Outcome will influence the **power balance between Iran and the U.S.** in West Asia.

Hindi Summary (हिंदी सारांश):

इराक में 11 नवम्बर 2025 को संसदीय चुनाव होंगे और **ईरान इस पर नज़दीकी नज़र रख रहा है**, क्योंकि गाज़ा युद्ध के बाद उसकी **क्षेत्रीय प्रभावशीलता कमजोर** हुई है।

- पिछले दो वर्षों में ईरान समर्थित समूहों (हमास, हिज़्बुल्लाह, हूती विद्रोही) को भारी नुकसान हुआ।
- ईरान चाहता है कि इराक में शिया दलों का प्रभुत्व बना रहे, जिससे उसका राजनीतिक प्रभाव कायम रहे।
- इराक का प्रधानमंत्री परंपरागत रूप से शिया समुदाय से और राष्ट्रपति **कुर्द** समुदाय से होता है।
- इस चुनाव का परिणाम यह तय करेगा कि ईरान क्षेत्र में अपना प्रभीव पुनः स्थापित कर पाता है या नहीं।

UPSC Mains Practice Question:

"Iran's regional influence has weakened after the Gaza conflict, making Iraq's parliamentary elections crucial for its geopolitical repositioning." Examine.
(250 words – GS Paper 2: International Relations)