KAVISH IAS

— Converting Possibilities into Reality —

KAVISH INFORMIX

DAILY CURRENT AFFAIRS



PRECISE | RELEVANT | EXAM FOCUSED

STAY AHEAD. STAY INFORMED. STAY READY.

Kolkata Topper

VAISHNA BISWAS

AIR - 367 | CSE 2025

TODAY'S DATE

26 OCTOBER 2026

---MONDAY-----

YOUR DREAMS. OUR MISSION. TOGETHER, WE ACHIEVE THE EXTRA ORDINARY.

★ OUR PROVEN LEGACY ★

OUR UPSC TOPPERS 2023



IPS LAXMAN PRATAP
RANK - 597
FORMER ASST. COMMANDANT IN BSF
CITY COLLEGE KOLKATA

OUR UPSC TOPPERS 2024



IRS SARLA JAKHER
AIR 593
CITY COLLEGE KOLKATA



IRS TANMAY
AIR 346
IIT KHARAGPUR





DAILY CURATED NEWS | EXAM ORIENTED ANALYSIS | SMART NOTES & INFOGRAPHICS | BOOST YOUR PREPARATION

"INFORMED TODAY, EMPOWERED TOMORROW."

8789245158 | 9875489158 36A, Shakespeare Sarani, Kol -17

DAILY CURRENT AFFAIRS

1. Two Lab Experiments Bring Bleached Corals Back to Luminous
2. Indigenous Air Independent Propulsion (AIP) System for Indian Navy Submarines
3. **AATAL: Integrated Atmospheric Chemistry and Aerosol Toxicity Analysis Laboratory**
4. Professor Ashoke Sen and the Oskar Klein Medal
5. RBI's Trade Reporting Norms and Concerns of Individual Service Exporters and MSMEs

1.Two Lab Experiments Bring Bleached Corals Back to Luminous

Source: IE

Why in News?

Two laboratory studies have demonstrated that bleached corals can recover through the transfer of symbiotic algae, offering potential new approaches to coral reef restoration amid rising ocean temperatures and climate change.

The findings are significant following the fourth global mass coral bleaching event (2023–2025), during which extensive coral reef areas experienced heat stress. Coral reefs around India, including Lakshadweep, were also affected.

Coral Bleaching: Meaning and Causes

Coral bleaching occurs when corals expel the symbiotic algae living within their tissues in response to environmental stress, particularly elevated sea temperatures.

- Symbiotic algae (zooxanthellae): Microscopic algae that live inside coral tissues and provide food through photosynthesis.
- Loss of colour: Corals become pale or white when they lose these algae and their pigments.
- Reduced energy supply: Without the algae, corals lose a major source of nutrition, making survival and growth difficult.
- Major causes: Rising ocean temperatures, marine heatwaves, ocean acidification, pollution and changes in salinity.
- El Niño: The 2023 El Niño contributed to elevated global ocean temperatures, intensifying bleaching conditions.

Bleaching does not necessarily mean that a coral is dead. If favourable conditions return and the symbiotic relationship is restored, corals may recover.

Key Findings of the Two Studies

Transfer of algae between corals

- A study published in Science found that direct contact between bleached corals and healthy corals with the same genetic background could facilitate the transfer of symbiotic algae.
- This transfer helped bleached corals regain their colour and recover. However, the process was observed to be dependent on the genetic compatibility of the corals.

Introduction of heat-tolerant algae

- Another study, published in Environmental Microbiology Reports, used corals from the Great Barrier Reef and introduced a laboratory-developed, heat-tolerant algal strain.
- The algae successfully established themselves and subsequently spread to other bleached corals, indicating a possible method of improving coral resilience to thermal stress.
- Together, the experiments suggest that coral–algae relationships may offer greater flexibility for recovery than previously understood.

The Science of Bleaching

Corals are marine animals (**polyps**) that live in a symbiotic relationship with microscopic algae called **zooxanthellae**. These algae live inside the coral's tissue, providing up to 90% of its energy through photosynthesis and giving corals their vibrant colors.

When corals are stressed by factors like high sea surface temperatures (SST), pollution, or extreme low tides, they expel these algae. Without the algae, the coral's white calcium carbonate skeleton becomes visible through its transparent tissue—this is **coral bleaching**.

Current Global Status (2023–2026)

As of late 2026, the global coral reef landscape is in a critical state following a series of record-breaking thermal events.

- **The 4th Global Mass Bleaching Event (GCBE4):** Confirmed by NOAA in April 2024, this event lasted until mid-2025 and was the most extensive on record. Over **84% of the world's reef areas** experienced bleaching-level heat stress.
- **The 2026-27 "Super El Niño" Threat:** Recent forecasts (October 2026) indicate a **90% probability** of a very strong El Niño event beginning in late 2026. Scientists warn this could trigger a back-to-back global bleaching episode before reefs have had any time to recover.
- **IUCN Red List Update (Oct 2026):** A landmark assessment released at COP17 (Yerevan) categorized **96% of shallow-water coral reef ecosystems as "Critically Endangered,"** with a high risk of total ecological collapse by 2075 if emissions are not drastically cut.

Significance and Limitations

Significance

- Provides potential new methods for coral reef restoration.
- May improve coral resilience to marine heatwaves.
- Highlights the importance of coral–algae symbiosis in reef survival.
- Could contribute to conservation efforts in vulnerable reef ecosystems, including those around Lakshadweep and the Andaman and Nicobar Islands.

Limitations

- The findings are based on small-scale laboratory experiments.
- Successful algae transfer may depend on coral species and genetic compatibility.
- The long-term stability of introduced heat-tolerant algae under natural conditions remains uncertain.
- Large-scale application faces ecological, technical and logistical challenges.
- Such interventions cannot replace climate change mitigation and the reduction of local stressors such as pollution and destructive fishing.

Conclusion

The experiments provide a promising avenue for coral restoration by exploring the transfer of symbiotic algae and the use of heat-tolerant strains. However, laboratory recovery does not guarantee reef-wide recovery. Long-term coral conservation will require continued research, protection of marine ecosystems and reductions in greenhouse gas emissions to limit ocean warming.

2.Indigenous Air Independent Propulsion (AIP) System for Indian Navy Submarines

Source: The Hindu

Why in News?

The Defence Research and Development Organisation (DRDO) achieved a key milestone in the development of India's indigenous Air Independent Propulsion (AIP) system for diesel-electric submarines with the inauguration of the Setting to Work (STW) Phase-2 activity of its Energy Module on 24 October 2026.

- The activity was inaugurated at Larsen & Toubro's A.M. Naik Heavy Engineering Complex in Hazira, Gujarat.

- The system is being developed by the Naval Materials Research Laboratory (NMRL) under DRDO.

Air Independent Propulsion (AIP) System

AIP is a technology that enables conventional diesel-electric submarines to remain submerged for longer periods without needing to surface or use a snorkel to draw atmospheric oxygen.

Working principle:

- Conventional diesel-electric submarines generally rely on batteries while submerged.
- They must periodically surface or use a snorkel to operate diesel generators and recharge their batteries.
- An AIP system generates additional electrical power underwater without depending on atmospheric oxygen.
- India's indigenous AIP programme uses fuel-cell technology, which generates electricity through an electrochemical reaction involving hydrogen and oxygen.

Key Developments

- Indigenous development: The AIP system has been developed by DRDO's Naval Materials Research Laboratory.
- STW Phase-2: The latest milestone advances the Energy Module towards energisation, operational testing and validation.
- Submarine integration: The Energy Module is planned for integration into a Kalvari-class submarine by Mazagon Dock Shipbuilders Limited in early 2027.
- Industry collaboration: The programme involves cooperation between DRDO, Larsen & Toubro, Mazagon Dock Shipbuilders Limited and the Indian Navy.
- Safety and validation: The next phase involves rigorous testing under Indian Navy protocols, with particular attention to the safety requirements of hydrogen and fuel-cell systems.

Strategic Significance for India

- Enhanced underwater endurance: Allows submarines to remain submerged for longer periods, reducing the frequency of snorkelling.
- Improved stealth: Reduces exposure to detection during snorkelling and battery-charging operations.
- Defence indigenisation: Strengthens domestic capabilities in advanced propulsion and fuel-cell technologies, supporting Aatmanirbhar Bharat.

- Operational advantage: Improves the effectiveness of conventional submarines in surveillance, intelligence gathering and maritime operations.
- Reduced foreign dependence: Builds indigenous expertise in a strategically sensitive defence technology.

Challenges

- Ensuring the reliability and durability of fuel-cell systems under demanding underwater conditions.
- Maintaining stringent safety standards for hydrogen storage and handling.
- Completing integration and validation without compromising submarine operational safety.
- Achieving consistent performance and maintainability during prolonged deployments.

Conclusion

The indigenous AIP programme represents an important step towards strengthening India's submarine capabilities and defence self-reliance. Its successful testing and integration will be crucial for improving the underwater endurance and operational effectiveness of the Indian Navy's conventional submarine fleet.

3.AATAL: Integrated Atmospheric Chemistry and Aerosol Toxicity Analysis Laboratory

Source: PIB

Why in News?

Union Minister Dr. Jitendra Singh inaugurated the Integrated Atmospheric Chemistry and Aerosol Toxicity Analysis Laboratory (AATAL), a specialised air pollution analysis facility for Delhi-NCR.

Established under Mission Mausam at the Delhi branch of the Indian Institute of Tropical Meteorology (IITM), the facility aims to improve the scientific understanding of air pollution by identifying its sources, chemical composition and potential health impacts.

About AATAL

AATAL moves beyond measuring pollution levels to provide detailed information about the sources, composition and toxicity of atmospheric pollutants.

Its major functions include:

- Source identification: Distinguishes pollution originating from vehicular emissions, industrial activities, biomass burning and construction dust.

- Chemical composition analysis: Studies the chemical constituents of particulate matter and other atmospheric pollutants.
- Health impact assessment: Analyses the potential health implications of different pollutants.
- Real-time monitoring: Provides scientific information to support timely pollution-control measures.
- Forecasting support: Contributes to improved understanding and prediction of air pollution episodes.

Integration with AIRWISE

- AATAL is integrated with AIRWISE (Air Quality Warning and Integrated Decision Support System for Emissions) to support evidence-based air pollution management.
- AIRWISE provides high-resolution air-quality forecasts at approximately 400-metre resolution for up to 72 hours, helping authorities assess spatial variations in pollution across Delhi.
- This integration enables authorities to move from general pollution-control measures towards source-specific and location-specific interventions.

Institutional Framework and Applications

The facility can support several institutions involved in air pollution management:

- Commission for Air Quality Management (CAQM): Helps inform pollution-control strategies across Delhi-NCR.
- Graded Response Action Plan (GRAP): Provides scientific inputs for preventive and emergency measures during periods of deteriorating air quality.
- Environmental and regulatory agencies: Supports the identification of major pollution sources and the assessment of interventions.
- Scientific institutions: Strengthens atmospheric research and the understanding of pollutant behaviour.

The initiative reflects a whole-of-government approach, integrating scientific research, forecasting and regulatory action.

Significance and Challenges

Significance

- Enables targeted interventions based on pollution sources.
- Improves the scientific basis of air-quality management.
- Supports early warnings and preventive action.

- Helps assess the relative contributions of different emission sources.
- Strengthens coordination between scientific institutions and regulatory agencies.

Challenges

- Translating scientific findings into timely enforcement.
- Coordinating action across multiple states and agencies in NCR.
- Ensuring consistent data quality and monitoring coverage.
- Addressing pollution from multiple sources simultaneously.
- Sustaining long-term reductions in emissions rather than relying only on emergency measures.

Conclusion

AATAL strengthens India's scientific capacity to analyse air pollution by combining source identification, chemical analysis and forecasting support. Its effectiveness will depend on how efficiently its findings are translated into coordinated, source-specific and sustained pollution-control measures.

4.Professor Ashoke Sen and the Oskar Klein Medal

Source: IE

Why in News?

Professor Ashoke Sen, a distinguished Indian theoretical physicist, has received the prestigious Oskar Klein Medal for his groundbreaking contributions to string theory and the effort to unify the fundamental laws of the universe.

He is recognised internationally for research that has helped establish connections between different formulations of string theory and deepen our understanding of gravity, quantum physics and black holes.

About the Oskar Klein Medal

- The Oskar Klein Medal is an international honour recognising outstanding contributions to physics.
- It is named after Oskar Klein, a Swedish theoretical physicist known for his contributions to quantum theory and the development of ideas related to extra dimensions.
- The award is associated with Stockholm University and the Nobel Committee for Physics of the Royal Swedish Academy of Sciences.

String Theory and Ashoke Sen's Contributions

String theory proposes that the fundamental constituents of nature are not point-like particles but extremely tiny, one-dimensional vibrating strings. Different modes of vibration correspond to different particles.

Its broader objective is to provide a framework that can reconcile quantum mechanics with gravity, two theories that are difficult to combine within a single consistent description.

Professor Sen has made several influential contributions:

- Dualities in string theory: Demonstrated important mathematical equivalences between apparently different string theories, suggesting that they may represent different descriptions of a deeper underlying framework.
- S-duality: Advanced the understanding of relationships between strongly and weakly interacting theories.
- Sen's conjecture: Developed influential results concerning unstable D-branes, objects that arise in string theory.
- Black-hole physics: Contributed the entropy function formalism, which helps calculate the entropy of certain black holes in string theory.

Career and Major Awards

Professor Sen has held research positions at leading Indian institutions, including the Tata Institute of Fundamental Research (TIFR) and the Harish-Chandra Research Institute. He serves as an ICTS–Infosys Madhava Chair Professor at the International Centre for Theoretical Sciences (ICTS), Bengaluru.

His major honours include:

- Shanti Swarup Bhatnagar Prize (1994)
- Fellow of the Royal Society (FRS) (1998)
- Padma Shri (2001)
- Infosys Prize (2009)
- Breakthrough Prize in Fundamental Physics (2012)
- Padma Bhushan (2013)
- Dirac Medal (2014)

Significance

- Advancing fundamental physics: His work contributes to the search for a unified description of nature's fundamental forces.

- Understanding black holes: His research connects string theory with questions about black-hole entropy and quantum gravity.
- Strengthening Indian scientific research: His achievements highlight India's contribution to cutting-edge theoretical physics and international scientific collaboration.

5.RBI's Trade Reporting Norms and Concerns of Individual Service Exporters and MSMEs

Source: The Hindu

Why in News?

The Reserve Bank of India (RBI) introduced the Foreign Exchange Management (Export and Import of Goods and Services) Regulations, 2026, effective October 1, 2026. The new rules have raised concerns among individual service exporters and Micro, Small and Medium Enterprises (MSMEs) over complex reporting requirements and delays in receiving export payments.

Key Provisions of the New Regulations

- Export Declaration Form (EDF): Service exporters are required to submit an EDF within 30 days from the end of the month in which the invoice is raised.
- Detailed reporting: The form seeks information about the customer, country, currency, transaction value, contract details and classification of services.
- 

- Simplified declaration for small exporters: A self-declaration may be used for transactions up to ₹10 lakh per bill as an alternative to uploading an invoice.
- Realisation and repatriation of export proceeds: The period for receiving and bringing export earnings back to India has been reduced to nine months, or 12 months where the transaction is invoiced or settled in Indian rupees, according to the supplied report.

- Banking responsibility: Banks and authorised dealers are responsible for reporting transactions through the Export Data Processing and Monitoring System (EDPMS).

The regulations aim to consolidate and strengthen the foreign exchange framework for exports and imports of goods and services.

Concerns of Service Exporters and MSMEs

- Compliance burden: Multi-page EDF forms can be difficult for individual freelancers and small businesses to complete.
- Payment delays: Uncertainty over documentation requirements has reportedly delayed the processing of export payments by some banks.
- Impact on digital services: Freelancers and small exporters handling frequent, low-value international transactions may face disproportionate compliance costs.
- Inconsistent implementation: Differences in banks' interpretation of the new requirements have created confusion.
- Ease of doing business: Complex procedures may discourage small businesses from participating in international digital trade.

RBI's Clarifications and Possible Solutions

RBI Governor Sanjay Malhotra and Deputy Governor Rohit Jain clarified that transactions undertaken by individuals for personal purposes are exempt from these reporting requirements. This distinction is important because personal foreign exchange transactions and commercial export receipts are not the same.

Possible measures to address exporters' concerns include:

- Introducing simplified, technology-enabled reporting for small exporters.
- Allowing aggregate declarations for recurring, low-value transactions.
- Establishing clear and uniform guidelines for banks and authorised dealers.
- Using risk-based reporting requirements while retaining safeguards against foreign exchange violations.
- Issuing detailed FAQs and providing a transition period for small businesses to adapt.

Significance and Way Forward

- Effective export reporting helps the RBI monitor foreign exchange flows, improve data quality and ensure compliance with the Foreign Exchange Management Act (FEMA).
- However, regulatory requirements must remain proportionate to the size and nature of transactions.

- A tiered compliance framework could help balance regulatory oversight with ease of doing business.
- Simplified declarations for low-value transactions, standardised bank procedures and digital integration could reduce costs without weakening monitoring.
- The objective should be to make foreign exchange compliance simpler and more predictable, particularly for freelancers, digital service providers and MSMEs that are increasingly contributing to India's services exports.

KAVISH IAS
Converting Possibilities into Reality