

DECEMBER

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MK Yadav Sir

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Clean Ganga mission signs pact with Mississippi river initiative

EXPRESS NEWS SERVICE
NEW DELHI, DECEMBER 8

THE NATIONAL Mission for Clean Ganga (NMCG), which implements Centre's flagship Namami Gange scheme, has signed a Memorandum of Common Purpose (MoCP) with the Mississippi River Cities and Towns Initiative (MRCTI), which represents 124 cities/towns situated along the banks of the Mississippi River, the United States.

In a statement, the Jal Shakti Ministry said the MoCP was signed by G Asok Kumar, DG, NMCG, and Mayor Mitch Reynolds of La Crosse (Wisconsin), Mayor Errick Simmons of Greenville (Mississippi), Mayor LaToya Cantrell of New Orleans (Louisiana), and Colin Wellemkamp (executive director, MRCTI) on behalf of USA's MRCTI, in the presence of senior officials from US State Department, UNEP, National Institute of Urban Affairs (NIUA) and Rotary International.

The NMCG has signed the MoCP on behalf of the River Cities Alliance (RCA). The signing ceremony took place at the Rotary Hall as part of the COP28, currently underway in Dubai, the statement said.

Context: The National Mission for Clean Ganga (NMCG), which implements Centre's flagship Namami Gange scheme, has signed a Memorandum of Common Purpose (MoCP) with the Mississippi River Cities and Towns Initiative (MRCTI).

National Mission for Clean Ganga (NMCG):

- **About:** It is a society under the Societies Registration Act 1860.
- **Formation:** It was formed to act as **implementation arm of National Ganga River Basin Authority (NGRBA)** which was constituted under the provisions of **the Environment (Protection) Act (EPA), 1986**, and was established to address pollution challenges in the Ganga River.
 - NGRBA has since **been dissolved with effect from the 7th October 2016**, consequent to constitution of National Council for Rejuvenation, Protection and Management of River Ganga (referred as **National Ganga Council**).
- **NMCG - Organizational Structure:**
 - **National level:** Two-tier management structure and consists of: The **Governing Council** and **Executive Committee**.
 - At the state level: **State Programme Management Groups (SPMGs):** Act as the implementing arm.
- **Implementation:** It is undertaken across **three phases:** Entry level, medium term and long term activities.

Namami gange programme

- **Aim:** It is an integrated umbrella programme, aimed to ensure effective abatement of pollution and conservation of river Ganga and its tributaries by adopting a river basin approach.
- **Implementation:** It was inaugurated in June 2014.
- **Two objectives:** Conservation and rejuvenation of Ganga.

Private Bill seeks power for Assemblies to remove Governors

The Hindu Bureau
NEW DELHI

The discussion in the Rajya Sabha on Friday on a private member's Bill to amend the Constitution saw members demanding a system to fix the accountability of Governors.

The Bill, moved by CPI (M) MP V. Sivadasan, sought to provide powers to the State Assemblies to remove Governors.

Mr. Sivadasan said in the statement of objects and reasons of the Bill that the stature and dignity of the Governor's office required that the person who held such a position enjoyed the legitimate support of the people and was accountable to the people of the State.

"To appoint the Head of the State governments through executive orders is

antithetical to the spirit of democracy and federal spirit," he argued in the Bill.

The Bill sought amendments to the Constitution so that the Governor is elected by the members of an electoral college consisting of Legislative Assemblies of the States and elected members of the gram panchayats, municipalities and corporations of the States. "The election of the Governor shall be held in accordance with the system of proportional representation by means of the single transferable vote and the voting at such election shall be by secret ballot," the Bill said.

Most of the Opposition members who were present during the debate supported the Bill. They said Parliament must intervene to protect the federal rights of the States.

Context: Recently, a discussion was started in the Parliament on a **private member's Bill** to amend the Constitution demanding a system to fix the accountability of Governors.

Private Member's Bill

- **About:** The Bills introduced by **private members** are referred to as **private member's Bills** and those introduced by ministers are called **government Bills**.
- **Introduction:** A Private Member's Bill can be introduced in either the **Lok Sabha or Rajya Sabha**.
- **Admission of a Private Bill** - is decided by the **Chairperson** in the case of the Rajya Sabha and the **Speaker** in the case of the Lok Sabha.
- **Parliamentary Committee**
 - **Lok Sabha:** It has a special Parliamentary Committee on Private Member's Bills and Resolutions, with **15 members**, and the **Deputy speaker as its Chairperson**.
 - **Rajya Sabha does not have such a committee**, however, the same function is performed by its Business Advisory committee.
- **Private member:** Any Member of Parliament, who is **not a minister**, is referred to as a private member. Both private members and ministers take part in the law-making process.
- **Private member Bill (Status):** Only 14 private member bills (5 introduced in Rajya Sabha) have become laws since the first Lok Sabha in 1952. No private member's Bill has been passed by Parliament since 1970.
 - First private member bill to become a law was the **Muslim Wakfs Bill, 1952**, passed in **1954**.
 - **Last Private Member bill passed** was Supreme Court (Enlargement of Criminal Appellate Jurisdiction) Bill, 1968.

Ecological Impact of Biofortified Seeds

Posted On: 08 DEC 2023 5:17PM by PIB Delhi

Context: Ministry of Agriculture & Farmers Welfare recently informed the Parliament that since 2014, 142 **biofortified varieties** have been developed under aegis of the ICAR and they **don't have any impact** on ecological conditions especially on soil and water.

Biofortification:

- **About:** It is the process of improving the nutritional quality of food crops. This can be achieved through agronomic practices, conventional breeding or biotechnology-based approaches like genetic engineering and genome editing. Ex: Golden Rice.
- **Types:**
 - **Agronomic biofortification:** It describes the biofortification method in which deliberate application of mineral fertilization is carried out to increase the concentration of the desired micronutrients in the edible part of the crop to increase dietary intake.
 - **Conventional breeding:** It is a process of development of new varieties of crops by using older techniques and natural processes without using the latest molecular plant biological tools.
 - **Transgenic breeding:** It refers to the genetic improvement of crop plants in relation to various economic traits useful for human beings by means of genetic engineering tools.
 - **Genetic engineering:** It is a process of using the **recombinant DNA technology** to alter the genetic make-up of an organism.

Genetic modification (GM) technology

- **About:** It allows the transfer of genes for **specific traits** between species. It embeds a new trait which does not occur naturally in the species using laboratory techniques.
- **In India:** GEAC cleared the cultivation of **BT cotton in 2002**. This is the **only GM crop** approved for cultivation in India till date.
- **Approval:** In India, the Genetic Engineering Appraisal Committee (GEAC) is the apex body that allows for the commercial release of GM crops.

Advantages of biofortification

Targets mainly on low-income households.

Low recurrent costs.

Biofortified crop system is highly sustainable.

Increment of nutritional quality in daily diets.

Improvement of plant or crop quality and increment of variability in germplasm.

Approaches	Advantages	Limitations
Agronomic	Simplest method	Highly variable Less cost-effective Labour intensive Unfavourable environmental effects
Conventional	Sustainable Long-term cost-effective solution Higher practical utilization	Genetic variability Impossible to breed for a specific trait Timescale Effort
Transgenic	Inadequacy of restricted genetic variation	Low acceptance among population Various regulatory procedures

Carbon tax: India will retaliate, if needed

FE BUREAU
New Delhi, December 8

THE GOVERNMENT WILL address the issue of the European Union's (EU's) plan to impose carbon tax on some imports of goods, and will "retaliate" in case the need arises, commerce and industry minister Piyush Goyal said on Friday.

"Bharat will address the problem of CBAM (Carbon Border Adjustment Mechanism) or carbon tax with confidence...we will find solutions...we will see how we can convert CBAM to our advantage...Of course we will retaliate," Goyal said, while addressing Ficci's annual convention here.

"India today does not do these things easily. Even with the US, we had



Commerce and industry minister Piyush Goyal

retaliated when they had put unfair taxes on us...we were able to resolve all the seven WTO (World Trade Organisation) disputes," Goyal said.

The EU's CBAM aims to impose tariffs on the carbon emitted during the production of carbon-intensive

goods that are entering the EU. The tariffs will come into effect from January 1, 2026. A transitional period for CBAM began from October 1, 2023 till December 31, 2025 during which Indian companies from seven carbon-intensive sectors are required to share quarterly data on carbon emissions with the EU.

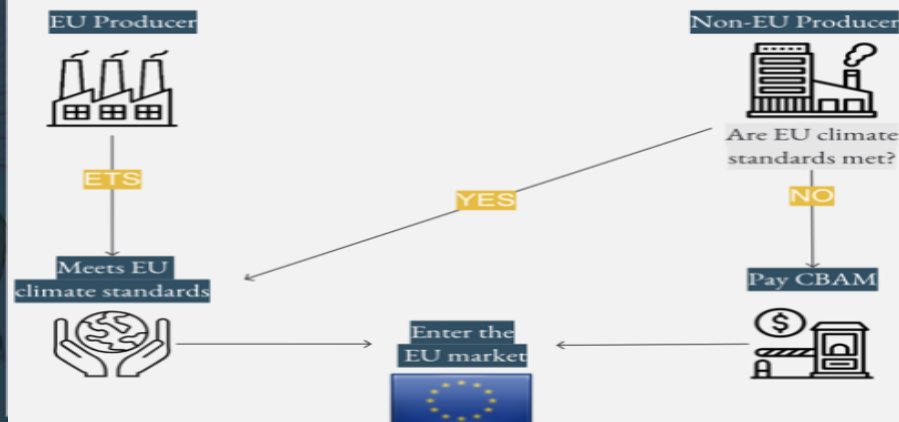
Experts have estimated the tax will hit Indian metal exports, including iron, steel, and aluminium, worth \$8 billion annually starting 2026. As per a report by Global Trade Research Initiative, CBAM tax rate of 20-35% will apply on certain imports into the EU. "The CBAM tax, between 20-35%, is far higher than the EU's average import tariff of 2.2% on manufactured products," said the report.

Peru, Chile keen on FTAs

On free trade agreements (FTAs), Goyal said Peru and Chile are willing to sign trade pacts with India, while asking Indian corporates to 'seize the opportunity'.

Goyal also said that India's current levels of foreign exchange reserves can cover for imports for the next five-six years. As on December 1, India's forex reserves stood at \$604 billion. On India's demography, Goyal said that the under 30 population for the next 30 years will add \$30 trillion to our GDP. "The pillar of strong fundamentals of the economy, the pillar of aspirational India with their basic needs met, and the pillar of massive investments directed towards infrastructure is what will define the next three decades."

CARBON BORDER ADJUSTMENT MECHANISM



CARBON TAX

(Syllabus: GS Paper 3 – Environment)

Context: Commerce and Industry Minister of India recently said that the government will address the issue of the European Union's plan to impose **carbon tax** on some imports. It is mainly known as **carbon border adjustment mechanism (CBAM)**.

Carbon tax:

- **Meaning:** It is a tax levied on the carbon emissions required to produce goods and services.
 - Carbon taxes are intended to make visible the "hidden" social costs of carbon emissions, which are otherwise felt only in indirect ways like more severe weather events.
 - It is a form of '**pollution tax**'.
- **Purpose:** To reduce greenhouse gas emissions by increasing prices of the fossil fuels that emit them when burned.
- **History and Rationale:** David Gordon Wilson first proposed this type of tax in 1973.
- **Design:** A carbon tax involves two primary factors: the level of the tax, and the use of the revenue.

Carbon leakage:

- **About:** It happens when the regulation of emissions in one country/sector pushes those emissions to other places that with less regulation.
 - Leakage effects can be both **negative** (i.e., increasing the effectiveness of reducing overall emissions) and **positive** (reducing the effectiveness of reducing overall emissions).
 - Negative leakages, which are desirable, can be referred to as "spill-over".

CLIMATE CHANGE

COP28: India had fourth best ranking in climate performance among countries during 2022, says report

Preachers are not performing, underlined the report; US, UK sliding down in performance

Context: The report Climate Change Performance Index (CCPI) 2024, was recently release during the COP28 session.

Climate Change Performance Index, 2024

- **Released by:** German watch, New Climate Institute and Climate Action Network Europe.
- **About:** It is an annual report that has been prepared since 2005 with the involvement of nearly 450 climate and energy experts, assesses each country's performance in **four categories**:
 - **(1)** GHG Emission (40%)
 - **(2)** Renewable Energy (20%)
 - **(3)** Energy Use(20%)
 - **(4)** Climate Policy (20%).
- **Ranking:** **No country** has occupied the first three ranks.
 - **Denmark** retained the top spot followed by **Estonia and the Philippines**.
 - **India:** India has been ranked **7th** , **an improvement of one spot** over last year's performance when it was ranked eighth.
 - ✓ Of the four indices considered, India was ranked **9th in GHG Emissions and 10th in Energy Use** among assessed countries; **10th in Climate Policy and 37th in Renewable Energy**.

RBI retains policy rate, ups growth projection

Roshan Kishore

letters@hindustantimes.com

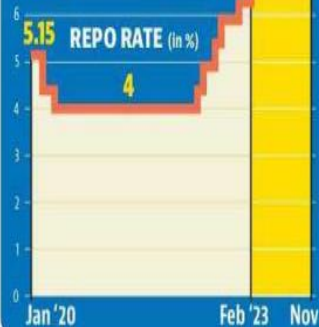
NEW DELHI: The Reserve Bank of India's (RBI) last monetary policy of the calendar struck a happy note by increasing its growth forecast to 7% even as it signalled that it is completely in control of the inflation side of the growth-inflation balance it is expected to manage.

"The summer of 2022 is behind us," Reserve Bank of India governor Shaktikanta Das said after the last Monetary Policy Committee (MPC) meeting for 2023, signalling a guarded victory, and more importantly, a steadfast commitment to inflation management in the Indian economy. MPC increased the policy rate by 2.5 percentage points starting May 2022 to rein in inflation — and the latest headline numbers show that even core inflation is now in check, although the overall print is some distance away from RBI's target of 4%.

continued on →15

No repo rate change

The repo rate has now not changed for 10 months



"Financial stability is a public good... We do not wait for the house to catch fire and then act. Prudence at all times should be the guiding philosophy, both for the regulators and the regulated entities."

— Shaktikanta Das, RBI Governor



UPI payment limit raised for hospitals, universities

MUMBAI: The Reserve Bank of India (RBI) on Friday raised limit for certain transactions done through the Unified Payments Interface (UPI).

RBI said an individual can make payments through the UPI to hospitals and educational

institutions up to ₹5 lakh per transaction, compared to ₹1 lakh earlier. "This will help the consumers to make UPI payments of higher amounts for education and healthcare purposes," said Shaktikanta Das, RBI governor, in the policy statement. →P20

Context: The Reserve Bank of India (RBI)'s last monetary policy of the calendar struck a happy rate by increasing its growth forecast to 7% even as it signalled that it is completely in control of the inflation tolerance.

Monetary Policy Committee

- **About:** It is body created in 2016, responsible for fixing the benchmark interest rate in India.
 - Its meeting are held at least four times a year (specifically, at least once a quarter) and it publishes its decisions after each such meeting.
 - The committee is answerable to the government of India if the inflation exceeds the range prescribed for three consecutive quarters.
- **First proposed by:** The Urjit Patel Committee.
- **Members:** The committee comprises six members — **three officials** of the Reserve Bank of India and **three external members** nominated by the government of India.
 - They need to observe a "silent period" seven days before and after the rate decision for "utmost confidentiality".
 - The governor of the Reserve Bank of India is the chairperson ex officio of the committee.
- **Decisions:** It is taken by majority with the governor having the casting vote in case of a tie.
- **The current mandate:** To maintain 4% annual inflation until 31 March 2026 with an upper tolerance of 6% and a lower tolerance of 2%.

India has been selected as pioneer lead country for International Maritime Organization (IMO) Green Voyage2050 Project: Shri Sarbananda Sonowal

Context: India has been selected as pioneer lead country for **International Maritime Organization (IMO) Green Voyage2050 Project**, with the objective to assist developing countries in their efforts to reduce Green House Gases (GHG) emissions from ships.

Green Voyage2050 Project

- **About:** It is a partnership project between the **Government of Norway and IMO**.
- **Launched in:** May 2019.
- **Aim:** To transform the shipping industry towards a lower carbon future, to spur global efforts to demonstrate and test technology solutions.
- **Initiative:** The global partnership is supporting developing countries, including Small Islands Developing States (SIDS) and Least Developed Countries (LDCs), in meeting their commitment towards relevant climate change and energy efficiency goals, for international shipping, through supporting the Initial IMO GHG Strategy.
 - Private sector participation is achieved through enhancing the existing Global Industry Alliance to Support Low Carbon Shipping with new partners from the maritime sector.

International Maritime Organization (IMO)

- **About:** It is a **specialized agency** of the United Nations responsible for regulating shipping.
- **Established in** 1948 (came into force: 1959)
- **Members:** 174 member and 3 associate members;
- **HQ** - London, UK
- **IMO's primary purpose** - to develop and maintain a comprehensive regulatory framework for shipping. Its remit today includes safety, environmental concerns, legal matters, technical cooperation, maritime security and the efficiency of shipping.

First gene-editing therapy for sickle cell approved by US FDA

REUTERS
8 December

The US Food and Drug Administration (FDA) on Friday approved a pair of gene therapies for sickle cell disease, including the first treatment based on the breakthrough Crispr gene editing technology.

The agency approved Lyfgenia from bluebird bio, and a separate treatment called Casgevy by partners Vertex Pharmaceuticals and Crispr Therapeutics.

Both the therapies were approved for people aged 12 years and older.

The Vertex/Crispr gene therapy uses the breakthrough gene editing technology that won its inventors the Nobel Prize in 2020.

Sickle cell disease is a painful, inherited blood disorder that can be debilitating and lead to premature death. It affects an estimated 100,000 people in the United States, most of whom are Black.

In sickle cell disease, the body makes flawed, sickle-shaped hemoglobin, impairing the ability of red blood cells to properly carry oxygen to the body's tissues.

The sickle cells tend to stick together and can block small blood vessels, causing intense pain. It also can lead to strokes and organ failure.

US-listed shares of Crispr therapeutics were up 1.6 per cent, while Vertex Pharmaceuticals stock was



Sickle cell disease affects an estimated 100,000 people in the US, most of whom are Black

down 1.4 per cent. Shares of bluebird bio were halted for trading ahead of the news.

Makers of both the therapies have pitched them as one-time treatments, but data on how long their effect lasts is limited.

The only longer-term treatment for sickle cell disease is a bone marrow transplant.

"I actually am very reticent to call them a cure. I prefer to call them a transformative therapy because patients will still have sickle cell disease on the other side of gene therapy," said Dr Shari Azar, medical director of the Comprehensive Sickle Cell Disease Treatment Center at Massachusetts General Hospital.

Bluebird bio's sickle cell therapy is designed to work by inserting modified genes into the body through disabled viruses to help the patient's red blood cells produce normal hemoglobin.

For Vertex's therapy, patients must have stem cells harvested

from their bone marrow. The cells are then sent to manufacturing facilities where they are edited using Crispr/Cas9 technology. Once the cells are incubated, they are infused back into the patient during a month-long hospital stay.

Both gene therapies can take several months and involve high-dose chemotherapy, but this has potential risks of infertility.

"Not everybody who undergoes chemotherapy will end up having infertility, but the majority of them will," said Dr Azar.

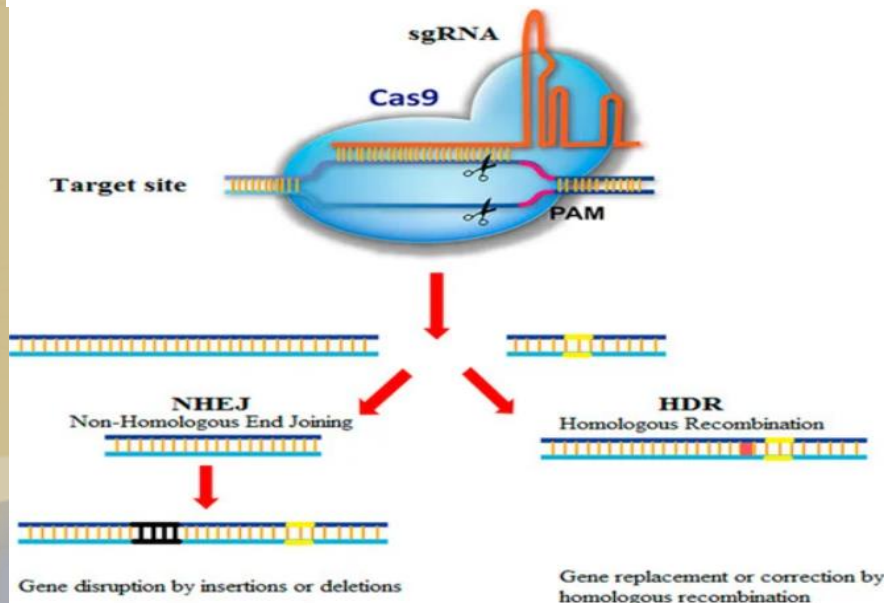
While the risk can be managed by fertility preservation methods like freezing eggs and sperm banking, this is only covered by insurance for cancer patients who undergo chemotherapy and not those receiving gene therapy, said Dr Azar.

He said the out-of-pocket expense on it can be as high as \$40,000.

FDA staff in documents released ahead of an October meeting of a panel of independent experts on Vertex's therapy had also flagged concerns of unintended genomic alterations from the treatment.

The company plans to assess potential long-term safety risks through a 15-year follow-up study after approval.

Vertex's Crispr therapy is also under an FDA review for another blood disease, transfusion-dependent beta thalassemia, with a decision expected by March 30.



GENE EDITING

(Syllabus: GS Paper 3 – Science and Technology)

Context: The US Food and Drug Administration (FDA) approved a pair of gene therapies for sickle cell disease, including the first treatment based on the breakthrough Crispr gene editing technology.

- The Crispr gene therapy uses the breakthrough gene editing technology that won its inventors the Nobel Prize in 2020.

Genome editing (also called gene editing)

- About:** A group of technologies that give scientists the ability to change an organism's DNA. These technologies allow genetic material to be added, removed, or altered at particular locations in the genome.
- Approach:** A well-known approach to genome editing is called CRISPR-Cas9, which is short for clustered regularly interspaced short palindromic repeats and CRISPR-associated protein 9.
 - The CRISPR-Cas9 system is faster, cheaper, more accurate, and more efficient than other genome editing methods.

Sickle cell disease

- About:** It is one of a group of inherited disorders known as sickle cell disease.
- Cause:** It is caused by a change in the gene that tells the body to make the iron-rich compound in red blood cells called haemoglobin.
- Symptoms:** Extreme tiredness or irritability due to anaemia, painful swelling of hands and feet, and jaundice in the early stages.
- Treatment:** Blood transfusions alleviate anaemia and lower pain crisis risk.

It's 40 years since India became permanent resident of Antarctica

Newton.Sengupta
@timesgroup.com

December 1983 was a landmark month because it gave India its first people's car, the Maruti 800. But something else of great significance was about to happen. On December 3, the Flamingo, a chartered ice class vessel, had sailed out of Mormugao, Goa, with an 81-member team on board. Their mission was to set up Dakshin Gangotri, India's first permanent base in Antarctica.

It wasn't India's first mission to the White Continent. A 21-member team had sailed on December 6, 1981 and stayed a fortnight after arriving on January 9, 1982. Another team had arrived on December 28, 1982 and spent two months "focused on geological experiments to assess the continent's mineral and oil potential," TOI had reported then.

Why December every time? Because that's when Antarctica, like Sydney, Rio, Johannesburg and other places in the southern hemisphere, has its summer. There's a brief window of two months to get work done before the continent freezes up again.

The 1980s was a time when every major country was racing to explore and claim the mineral and marine wealth of Antarctica, so India could not have remained a seasonal visitor. "India realised that a permanent base was an absolute necessity for round-the-year observations in the icy continent," says Harsh Gupta, who led the 1983-84 expedition that went on to establish Dakshin Gangotri.

The Tricolour was unfurled in Antarctica in January 1982 but India did not have a permanent base there till its third expedition arrived in December 1983 and set up buildings where scientists could live year-round



CAMPION ON ICE: The Dakshin Gangotri station as photographed in 1984 by Pawan Nair, who was then a Major in the Indian Army and led the construction team



of the helicopter hit the ship's crane."

The chopper with five crew members on board started drifting and sinking in the icy waters. "A Chetak helicopter was launched to rescue them," says Gupta, but the first two men it scooped up could not hold on to the harness as their arms had become numb. They tumbled into the water again and a boat had to be rushed to rescue all five.

Professor Sullipta Sengupta, a core geologist, and oceanographer

briefed the Prime Minister's office from the bridge of the ship. Soon, they received a call from PM Indira Gandhi, whose first question was about the wellbeing of the survivors. Then she asked, "Can you still do it?"

"If I don't do it, I don't come back," Gupta says he replied without a thought. There was a pause, and then the PM said, "Go ahead and do it."

"From that moment, 'We don't go back if we don't complete Dakshin Gangotri' became our war cry," says Gupta.

Mission Accomplished

Although scientific exploration was the chief aim of the mission, the team had more defence personnel than scientists. As against 16 scientists, there were 20 Army personnel, and 12 each from the Air Force and the Navy. All had been trained on the Machoi Glacier in Jammu & Kashmir.

As TOI reported on December 28, 1983, the defence establishment had a big role in setting up the permanent base at Dakshin Gangotri. The prefabricated huts for the base were made by the Defence Research and Development Organisation. They were insulated and heated and could withstand wind speeds of up to 200kmph. "To give the scientists a touch of their familiar home atmosphere, there will be taped music, an enormous collection of books and video cassettes," the TOI report said.

When the Flamingo left Goa, it was loaded with 900 tonnes of construction materials.

Indians again on Antarctica

TOI Dec 28, 1983

Aditi Pant were the only women on the mission. "For a few minutes we were horrified by the prospect of the team members dying. To our great relief, they were alright," says Sengupta.

With one of their four helicopters lost and five men fighting hypothermia, the mission was in jeopardy. Gupta remembers the tension in the air when they

Context: It's 40 years since India became permanent resident of Antarctica.

- The Tricolour was unfurled in Antarctica in January 1982 but India did not have a permanent base there till its third expedition arrived in December 1983 and set up buildings where scientists could live year-round.

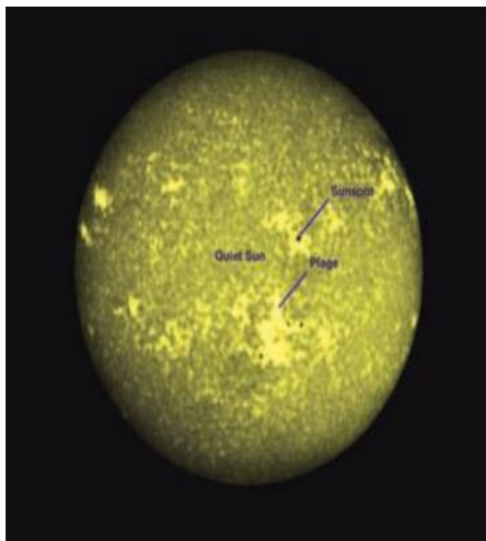
Antarctica

- About:** It is Earth's southernmost and least-populated continent. Situated almost entirely south of the Antarctic Circle and surrounded by the Southern Ocean (also known as the Antarctic Ocean).
 - It contains the geographic South Pole. Antarctica is the fifth-largest continent, being about 40% larger than Europe.
- Regulation:** It is governed by about 30 countries, all of which are parties of the **1959 Antarctic Treaty System**.
 - Prohibited activities:** Military activity, mining, nuclear explosions, and nuclear waste.
 - Allowed activities:** Tourism, fishing and research.

India's research stations

- In Arctic:** Himadri - located at Ny Alesund, Spitsbergen Island, Norway, IndARC - India's first underwater observatory at Svalbard, Norway.
- In Antarctic:** Two operational research stations - Maitri (Commissioned in 1989) and Bharati (Commissioned in 2012)

Aditya-L1 captures 1st ever full-disk images of Sun



Objectives of Aditya-L1 mission

The Indian Space Research Organisation (Isro) said in a post on X, formerly Twitter, on Friday that the first ever full-disk images of the Sun had been captured by India's Aditya-L1 Mission. "The photos provide pioneering insights into the intricate details of the Sun's photosphere and chromosphere," Isro said in the statement. Launched on September 2 by the Isro, Aditya L1 is India's first space-based mission to study the Sun. Positioned in a halo orbit, approximately 15 lakh km from Earth, the spacecraft can continuously observe the Sun without interruptions. This unobstructed view allows for real-time monitoring of solar activities and their impact on space weather, making it important for future space researches.

PHOTO: ISRO

Study of Solar upper atmospheric (chromosphere and corona) dynamics

Observe the in-situ particle and plasma environment

Understanding physics of the partially ionized plasma

Physics of solar corona and its heating mechanism

Development, dynamics and origin of Coronal Mass Ejections

Identify the sequence of processes that occur at multiple layers (chromosphere, base and extended corona)

Magnetic field topology and magnetic field measurements in the solar corona

Study drivers for space weather

Context: The Indian Space Research Organisation (Isro) recently said that the first ever full-disk images of the Sun had been captured by **India's Aditya-L1 Mission**.

Aditya-L1 Mission

- **About:** It is the country's **first dedicated solar mission**. It is a **fully indigenous effort** with the participation of national institutions.
 - **China, Japan, the US and European countries** have similar missions that investigate solar flares, coronal mass ejections and the sun's magnetic fields.
- **Aim:** The mission aims to **study the Sun from a halo orbit around first Sun-earth Lagrangian point (L1)**, which is located roughly 1.5 million km from Earth.
 - **Lagrange points** are positions in space where **objects sent there tend to stay put**. At Lagrange points, the **gravitational pull of two large masses** precisely equals the **centripetal force required** for a small object to move with them.
 - There are **five points in any two-body system** like this, where the net of all these forces is zero. Among the five Lagrange points, **L1 is the most favoured** to get an unhindered view of the Sun.
- **Payloads:** The spacecraft **carries seven payloads** to observe the **photosphere, chromosphere and the outermost layers** of the Sun (the corona) using electromagnetic and particle and magnetic field detectors.

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