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### 1. Significance of European solar mission, which ISRO will launch

#### Overview

The Indian Space Research Organisation (ISRO) will launch the European Space Agency's Proba-3 mission on its PSLV rocket to study the solar corona, the outermost and hottest part of the Sun's atmosphere, from Sriharikota on December 4.

The mission will attempt the first-ever "precision formation flying", where two satellites will fly together and maintain a fixed configuration in space.

This is the latest solar mission in ESA's Proba suite of missions. Its predecessors Proba-1 (also launched by ISRO) and Proba-2 were launched in 2001 and 2009, respectively. Teams of scientists from Spain, Belgium, Poland, Italy and Switzerland have worked on Proba-3.



#### What is Proba-3?

Developed at an estimated cost of 200 million euros, Proba-3 has an expected mission life of two years. It will be launched into a highly elliptical orbit measuring around 600 x 60,530 km and have an orbital period of 19.7 hours.

The mission is designed with two satellites that will be launched together, separate from each other and then fly in tandem. They will then form a solar coronagraph, an instrument that helps block out the bright light emitted by the Sun to reveal the objects and atmosphere around it.

### **What will Proba-3 study?**

Due to the corona's temperature, going up to 2 million degrees Fahrenheit, it is difficult for any instrument to observe it closely. However, it is important for scientific study, as all space weather and its associated turbulences — solar storms, solar winds, etc. — originate from the corona.

These phenomena influence space weather and can potentially interfere with the smooth operations of all satellite-based communications, navigation, and power grids on Earth. To study these, Proba-3 will have three instruments onboard:

- \* The Association of Spacecraft for Polarimetric and Imaging Investigation of the Corona of the Sun (ASPIICS) or the coronagraph. Its field of view is between the Sun's outer and inner corona, a circular belt normally observable during solar eclipse events. The instrument has a 1.4-metre diameter occulting disk mounted on it, to block the Sun's light and facilitate a close-up view of this belt.

- \* The Digital Absolute Radiometer (DARA) will maintain a continuous measurement of the Sun's total energy output, known as the total solar irradiance.

- \* The 3D Energetic Electron Spectrometer (3DEES) will measure electron fluxes as it passes through Earth's radiation belts, providing data for space weather studies.

### **Why is Proba-3 unique?**

The two satellites — Occulter Spacecraft (weighing 200 kg) and the Coronagraph Spacecraft (weighing 340 kg) — will mimic a natural solar eclipse. They will manoeuvre precisely in Earth's orbit so that one satellite casts a shadow onto the other.

A naturally occurring solar eclipse allows solar physicists to observe and study the Sun's corona for 10 minutes, across an average of about 1.5 eclipse events per year. Proba-3 will give six hours, equivalent to 50 such events annually, which will help deepen understanding of the Sun's corona like never before.

Both the Occulter and the Coronagraph will face the Sun at all times. They will maintain a formation of a few millimetres and then move to a position where they will be 150 metres for six hours at a time.

One satellite will act as a viewing telescope, kept at the centre of a shadow cast by the other satellite positioned 150 metres away. This positioning will facilitate observing the Sun's corona and will be autonomously achieved through precise flight formation.

If done successfully, the Occulter will create an artificial yet stable eclipse, by masking large parts of the Sun. As a result, the Sun's blinding light will get blocked and only the solar corona

will be visible to the coronagraph, which will photograph and facilitate studies of the lesser-known features.

### **How might India benefit?**

Proba-3 is being called ESA's technology demonstration mission. The fact that ISRO has been designated to launch the mission demonstrates India's reliable space launch facilities and growing space capabilities. A cost-effective launch is also one of the highlights of the mission.

There is a strong possibility that the Indian solar physicist community will get exclusive access to the Proba-3 data. A few Indian solar physicists have also been involved in conceptualising the scientific goals of this mission along with their Belgian counterparts. Soon after the launch, India plans to host a meeting with the ESA's Proba-3 team to explore opportunities for using data from Aditya L1, India's first mission to the Sun (launched in 2023) and Proba-3 for collaborative research. This would allow Indians to work towards and contribute to newer scientific advancements related to the Sun.

Relevance: GS Prelims & Mains Paper III; Science & Technology

Source: Indian Express

## **2. Dismantling of climate talks**

### **Introduction**



The COP29 climate meeting in Baku ended in disappointment last week. On the main issue of finance, developed countries agreed to mobilise only \$300 billion for the developing nations every year, a three-times increase over their current mandate of \$100 billion but way short of at least \$1 trillion that all assessments said was required. Even this nominal scale-up — the needs already run in trillions of dollars — is

not supposed to happen immediately but only from 2035.

This is not the first time that the annual climate conference has produced a disappointing outcome. Each one of them in the last 15 years has delivered much below expectations. As a result, the discussions and outcomes of these summits have been almost completely delinked from the requirements of meeting the temperature targets mentioned in the 2015 Paris Agreement. While science says that the world needs to cut its emissions by at least 43% by 2030 from 2019 levels, all assessments of current actions estimate that global emissions, even in the best-case scenarios, would be barely 2% down by that time.

The underwhelming deal on climate finance reached in Baku might just be the beginning of the unravelling of the climate talks.

### **Inherently unstable**

It is not a surprise that the current international arrangement on climate change has turned out to be this ineffective. It is the only major multilateral system which is completely aligned against the rich and powerful nations. Usually, the rules of any international forum reflect the prevailing power balance, and are mostly in favour of the powerful, as they are the ones who decide on the rules. The climate change architecture, as represented by the 1994 UN Framework Convention on Climate Change (UNFCCC), goes completely against this norm.

In this system, the rich and the powerful — a group of about 40 including the United States and most of Europe — are the main culprits for causing climate change, and the rules are stacked heavily against them. They have been made solely responsible for cutting their greenhouse gas (GHG) emissions, and also for providing money and technologies to the developing countries to help them fight climate change.

These responsibilities were fixed largely in line with the “polluter pays” principle. Since the developed countries were mainly responsible for emitting GHGs over the last 150 years, it was only fitting that they be asked to take responsibility for cleaning it up.

However, equity and fairness are rarely the main drivers of international relations. How this climate structure was allowed to be built up, with the rich and developed countries fully participating in the process, is an interesting and intriguing question that has not yet been settled definitively.

It was not before the 1997 Kyoto Protocol, the precursor to the Paris Agreement, was finalised that the developed world realised that this system could hurt their interests and disrupt the prevailing global power balance. The Kyoto Protocol took forward the principles enshrined in the UNFCCC and assigned specific targets to each of the developed nations in accordance with their “guilt”. The targets were to be fulfilled in a specific time frame, failing which they could be penalised.

It is probably the only instance of such an inherently unstable multilateral system which is so completely at odds with the global power structure being created.

### **Dismantling begins**

The efforts to dismantle the system began immediately after the Kyoto Protocol came into effect in 2005 after the requisite number of ratifications. Although the US played a key role in finalising the Kyoto Protocol, the country never ratified it.

The idea was to tear down the structure brick by brick, not in one go. The crucial differentiation between the developed and developing countries in the assignment of climate responsibilities was repeatedly targeted. This was done to ensure that the failure to meet targets could not be blamed only on the developed nations and instead be shared with everyone.

The first attempt to replace the Kyoto Protocol with a new agreement was made in Copenhagen in 2009 but it failed. Developed countries worked for another six years and succeeded in Paris. But even while it was in force, till 2020, Kyoto Protocol targets were completely ignored by all the developed countries. Many of them walked out of the Kyoto Protocol.

The Paris Agreement made fundamental changes to the way climate responsibilities were structured till then. Emission cuts were not the sole responsibility of the developed countries any longer. Everyone had to “contribute” though in a “nationally-determined” manner. There were no assigned targets for developed countries, their emission cuts also had to be “nationally-determined”, meaning decided by themselves.

### **Emission cuts inadequate**

As a result, emission cuts have been nowhere close to what is required. The European Union is expected to cut its emissions by around 60% from 2019 levels by 2030 but that is about it. Donald Trump is the favourite whipping boy on climate change issue, but even without him the US has been the biggest laggard. Despite the much-touted Inflation Reduction Act, brought in by Joe Biden administration, the US is only aiming for a 50-52% cut by 2030 from 2005 levels, which translates to about 45% from 2019 levels.

If the world as a whole has to reduce its emissions by 43% by 2030 from 2019 levels, equity and fairness demand that the US and EU should have been aiming for about 80-90% reductions.

The sharp distinction between developed and developing countries on emission cuts was broken by the Paris Agreement. But developed countries were still solely responsible for mobilising finance and transfer of clean energy technologies. These are also getting targeted.

### **Dilution of finance responsibility**

The developed countries argue that the scale of finance requirements has increased manifold, and many other countries have grown rich in the last two decades, so they must also be asked to contribute to climate finance. The first attempt to expand the contributor base happened in Paris itself but did not succeed.

In Baku this year, expansion of contributor base was one of the core issues being discussed as part of the finance negotiations, and some criteria for roping in more countries were suggested. But the developing countries managed to thwart it again. Essentially, China, which was a target of the expansion effort, put its foot down.

In the bargain, the developed countries limited the quantum of climate finance to be raised by them — \$300 billion and no more.

The dismantling of the international climate structure has been a continuous process. The dilutions on emissions cuts and finance are just two examples. Erosion has been across the board, leading to a steady decline in trust of the developing countries.

But it is still the only multilateral forum where tiny countries like Tuvalu or Marshall Islands have a voice, and an influential one at that. These countries also benefit from some climate money flowing to them. It is not enough but better than nothing at all.

The climate talks would possibly continue to have some limited utility for some more time, but its effectiveness as a global forum to fight climate change is severely diminished.



Relevance: GS Prelims & Mains Paper III; Environment

Source: PIB

### 3. All about the central government scheme to promote natural farming

#### Introduction

**CABINET DECISION**  
25<sup>TH</sup> NOVEMBER, 2024

## National Mission on Natural Farming

*Cabinet approves National Mission on Natural Farming (NMNF) as a standalone Centrally Sponsored Scheme under the Ministry of Agriculture & Farmers' Welfare*

#### Salient features

- Mission to promote natural farming in mission mode across the country
- Total outlay of **Rs.2481 crore** (Government of India share – **Rs.1584 crore** and States' share – **Rs.897 crore**)
- To be implemented in **15,000 clusters in Gram Panchayats**, which are willing, & reach **1 crore farmers** and **initiate Natural Farming in 7.5 lakh Ha area**
- Preference to be given to areas having prevalence of practising **NF farmers, SRLM / PACS / FPOs, etc**

The Union Cabinet recently approved the launch of the National Mission on Natural Farming (NMNF) as a standalone Centrally Sponsored Scheme under the Ministry of Agriculture & Farmers' Welfare. The NMNF aims to promote natural farming in mission mode across the country.

#### What is natural farming?

The Agriculture Ministry defines natural farming as a "chemical-free" farming system that only uses inputs produced using livestock and plant resources. The ministry plans to implement this first across the districts with high fertiliser consumption.

#### Is the NMNF a new initiative?

No. The proposed NMNF is an improvement of the Bhartiya Prakritik Krishi Paddhti (BPKP) launched by the NDA government in its second term (2019-24). The initiative was launched under an umbrella scheme of Paramparagat Krishi Vikas Yojna (PKVY). The Centre also promoted natural farming in a five-kilometre belt along the Ganga River under the Namami Gange scheme in the financial year 2022-23.

The NDA's return to power in June after the Lok Sabha elections saw a renewed focus on promoting natural farming, with the government launching the NMNF in the first 100 days. The government decided to upscale the experience gained from the BPKP into a mission mode through the NMNF.

In her Budget Speech on July 23, Finance Minister Nirmala Sitharaman announced a plan to initiate one crore farmers countrywide into natural farming in the next two years. "In the next two years, 1 crore farmers across the country will be initiated into natural farming supported by certification and branding. Implementation will be through scientific institutions and willing gram panchayats. 10,000 need-based bio-input resource centres will be established," she announced.

In his Independence Day speech, Prime Minister Narendra Modi expressed his gratitude to the farmers who had embraced natural farming for taking on “the responsibility of environmental conservation.”

### **How much area has been covered under natural farming so far?**

An overall area of 22 lakh hectares has been brought under natural farming to date, with 34 lakh farmers engaged in the practice. This includes 4 lakh hectares under BPKP and 88,000 hectares under Namami Gange. About 17 lakh hectares are covered under various state government initiatives to promote natural farming.

The NMNF mission aims to bring an additional 7.5 lakh hectares of area under natural farming. According to the statement, “In the next two years, NMNF will be implemented in 15,000 clusters in Gram Panchayats, which are willing, & reach 1 crore farmers and initiate Natural Farming (NF) in 7.5 lakh Ha area. Preference will be given to areas having prevalence of practising NF farmers, SRLM / PACS / FPOs, etc. Further, need-based 10,000 Bio-input Resource Centres (BRCs) will be set-up to provide easy availability and accessibility to ready-to-use NF inputs for farmers.

### **How is the mission different from the earlier interventions?**

The natural farming mission is different from the earlier initiatives in several ways. First, it has a higher budgetary outlay. Second, it targets over one crore farmers. Moreover, it aims to create an ecosystem for sustainable natural farming in the country. It also aims to establish “scientifically supported common standards and easy farmer friendly certification procedures for naturally grown chemical free produce.” It also envisages a single national brand for naturally grown chemical-free produce.

According to an official statement, the scheme has a total outlay of Rs. 2,481 crore of which the central government will contribute Rs.1584 crore and the states Rs.897 crore) till the 15th Finance Commission (2025-26).

“Under NMNF, around 2000 NF Model Demonstration Farms shall be established at Krishi Vigyan Kendras (KVKs), Agricultural Universities (AUs) and farmers’ fields, and shall be supported by experienced and trained Farmer Master Trainers. The willing farmers will be trained in Model Demonstration Farms on the NF package of practices, preparation of NF inputs, etc. near their villages in KVKs, AUs and practising NF farmers’ fields. 18.75 lakh trained willing farmers will prepare inputs like Jeevamrit, Beejamrit, etc. by using their livestock or procure from BRCs. 30,000 Krishi Sakhis/ CRPs will be deployed for awareness generation, mobilisation and handholding of willing farmers in the clusters,” it said.

### **Why a mission on natural farming?**

The mission to promote natural farming aims to combat the excessive use of fertilisers. According to sources, the Agriculture Ministry has identified 228 districts across 16 states— Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal— with input (fertiliser) sales above the all-India average (138 kg/hectare) during 2022-23. In contrast, the number of farmers practising natural farming was minimal in

these districts. Thus, the ministry will focus on districts with high chemical fertiliser sales (above 200 kg/ hectares), apart from the Namami Gange region (5 kg area) along the main stem of river Ganga.

According to the official statement, "Natural Farming practices will help farmers to reduce input cost of cultivation and dependency on externally purchased inputs while rejuvenating soil health, fertility & quality and building resilience to climate risks like waterlogging, flood, drought, etc."

"These practices also reduce health risks from exposure to fertilisers, pesticides, etc. and provide healthy & nutritious food for the farmers' family. Further, through Natural Farming, a healthy Mother Earth is bequeathed to the future generations. Through improvement of soil carbon content & water use efficiency, there is an increase in soil microorganisms and biodiversity in NF," it said.

Relevance: GS Prelims & Mains Paper III; Science & Technology

Source: Indian Express