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# NEWS JUICE

Intelligent Compilation from The Hindu, Indian Express, PIB & others along with News Background

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## What is News Juice?

BY PREPMATE



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## 1. What does the detected presence of phosphine on Venus mean?

### Relevant for GS Prelims & Mains Paper III; Science & Technology

An international team of astronomers led by Jane S. Greaves of Cardiff University and University of Cambridge, U.K., has announced the discovery of traces of a molecule known as phosphine on Venus. This has caused great excitement because, given the chemical and geological composition of Venus, this can imply the existence of life forms that release this substance through bio-chemical pathways.

The researchers say in the paper, “[Phosphine] could originate from unknown photochemistry or geochemistry, or, by analogy with biological production of [phosphine] on Earth, from the presence of life.” The paper, published on September 14 in *Nature Astronomy*, is a careful exposition of the work done over many years. Professor Greaves first observed phosphine on Venus using the James Clerk Maxwell Telescope in the Mauna Kea observatory in Hawaii in 2017. Pursuing the search further with the 45-telescope array ALMA (Atacama Large Millimeter/submillimeter Array) in Chile led to a confirmation of their observations by this extremely sensitive instrument in 2019.

### Have astronomers found definite signs of life?

The detected presence of phosphine on Venus does convey the possibility of life there. After detecting the phosphine and estimating the amount in Venus’s atmosphere — 20 parts per billion — researchers have calculated whether this amount of phosphine can be produced by natural chemical processes, such as sunlight, volcanoes erupting and lightning. The other mechanisms could at most produce only ten-thousandth of the amount of phosphine they have detected. However, they do not rule out the possibility that there could be unknown natural processes (photochemistry or geochemistry) that can produce this amount of the biomarker. Therefore, more work is needed to prove that it is indeed because of bacteria, or some sort of life, that there is so much phosphine on Venus.

### Why is phosphine gas considered a biomarker of life?

A molecule of phosphine gas consists of a phosphorus atom surrounded by three hydrogen atoms, just like ammonia consists of a nitrogen atom surrounded by three hydrogen atoms. On Earth, this molecule is produced by industrial processes. It is also produced by some anaerobic bacteria, which live in oxygen-sparse environments such as sewers, landfills, or even animal guts. If you can rule out the production of the gas through chemistry, it is the biochemical processes that form a source of the gas — the anaerobic bacteria — hence it is considered a biomarker in astronomy.

### Has phosphine been found on other planets?

Yes, it has been seen on Jupiter and Saturn. As early as the 1970s, when the first exoplanets were not even discovered experimentally, phosphine was seen on Jupiter. But there it is said to form deep in the interiors of the gas giant and rise to the top, in a purely chemical process. But now, on Venus there is a doubt. 1:58

### **Venus is considered to be a hostile planet. How can life survive there?**

The surface temperature of Venus, at about 470 degrees Celsius, is too hot to harbour life as we know it. It is hot enough to melt lead. It is hotter than Mercury which is closest to the sun. According to a senior astronomer who is a member of the Astronomical Society of India, this is because Venus has experienced a runaway greenhouse effect which traps all heat that falls on it. But high up in its atmosphere, there are clouds which can provide a cooler home for microbial life. Even there, the atmosphere is teeming with sulphuric acid vapour which makes it extremely hostile, thereby reducing the chance of finding life forms. According to the expert, the phosphine signature could be the sign of some extraordinary chemistry, as it could be of life forms. The next logical step is to actually do in situ measurements from Venus's atmosphere by sending space probes there.

### **Have space missions been sent to Venus?**

There have been several space missions to study Venus, and some of the recent dedicated missions are the European Space Agency's Venus Express and JAXA's Akatsuki. Many space missions have flown by Venus: for example, NASA's Parker Solar Probe used the gravity of Venus to achieve gravity-assisted boosts to its velocity on its journey to the Sun. NASA is planning a mission to Venus to be launched next year. The Indian Venus mission is being developed. Though formally unnamed, it is referred to as Shukrayaan-1.

**Source: The Hindu**

## **2. To stimulate the US economy, Federal Reserve has indicated that benchmark interest rates would remain near zero at least until 2023. What is the background of its guidance, and the implications for India?**

### **Relevant for GS Prelims & Mains Paper III; Economics**

The US Federal Reserve has reaffirmed plans to leave its benchmark interest rates pinned near zero through at least 2023 and of being accommodative of periods of higher inflation, in what is seen as guidance from the central bank as it moves from the task of stabilising financial markets to stimulating economic growth.

In the September policy statement and economic projections released on Wednesday, Fed chairman Jerome Powell and his colleagues signalled their intention to be extraordinarily patient as they try to rekindle the US economy in the months ahead.

The Fed's policy rate-setting Federal Open Market Committee (FOMC) said in a statement that the panel "expects it will be appropriate to maintain this target range until labour market conditions have reached levels consistent with the committee's assessments of maximum employment and inflation has risen to 2 per cent and is on track to moderately exceed 2 per cent for some time".



### **What is the crux of the new guidance?**

The new guidance builds on a monetary policy shift that was first signalled by the Fed in June, which is aimed at neutralising years of weak inflation and enabling the American economy to counter the pandemic-induced labour market sluggishness.

The Fed also used the policy statement to signal a shift from stabilising financial markets to stimulating the economy, saying it would keep its current government bond-buying at least at the current pace of \$120 billion per month, in part to ensure “accommodative” financial conditions in the future.

The virus “is causing tremendous human and economic hardship”, and the Fed is “committed to using its full range of tools to support the US economy in this challenging time”, the FOMC said. New economic projections released with the policy statement showed interest rates on hold through at least 2023, with inflation never expected to cross 2 per cent during this period.

“Effectively what we are saying is that rates will remain highly accommodative until the economy is far along in its recovery,” Reuters quoted Fed Chair Jerome Powell as saying. “That should be a very powerful statement in supporting economic activity” and returning inflation to the Fed’s 2 per cent goal faster, Powell said, adding that he thinks the forward guidance would be “durable”. The pace of the recovery is expected to slow, requiring continued support from the Fed and further government spending, he said.

Following the policy announcement, the dollar moved up against a basket of major trading partner currencies.

### **Does this change the policy stance?**

The Fed’s stance and the FOMC action builds on policy guidance and projections made three months ago. At their June meeting, all 17 Fed policy-making representatives projected a near zero federal funds rate — the key rate the Fed targets while implementing its monetary policy — for this year and the next.

“We’re not thinking about raising rates, we’re not even thinking about thinking about raising rates,” Powell was quoted as having told reporters following the June meeting, a maxim he has since used repeatedly.

The Fed “is both confident and committed and determined” to modestly overshoot the 2 per cent inflation — even though it would take time, Powell said. Fresh projections say the US economy could contract 3.7 per cent this year, far less than the 6.5 per cent contraction forecast in June; unemployment, which was at 8.4 per cent in August, is now seen improving to 7.6 per cent by the end of the year. All 17 Fed policymakers saw interest rates staying where they are through 2022, with four projecting the need for a rate hike in 2023.

### **What does all this mean?**

In resolving to keep rates low until, or even after, inflation tips over the 2 per cent target, the Fed has committed itself to higher GDP and job growth, announced late last month after a nearly two-year review. The Fed held rates near zero for seven years during and after the 2008 financial crisis, before raising them in December 2015. In the last 10 years, it took more than three years for inflation-adjusted GDP to rise back to the level that prevailed before the global financial crisis.

### **How does the Federal Reserve affect inflation and employment?**

Like other central banks such as the Reserve Bank of India, as the US Fed conducts monetary policy, it influences employment and inflation primarily by using policy tools to control the availability and cost of credit in the economy. The Fed's primary tool of monetary policy is the federal funds rate, changes in which influence other interest rates — which in turn influence borrowing costs for households and businesses as well as broader financial conditions.

For example, when interest rates fall, it is cheaper to borrow, so households are more willing to buy goods and services, and businesses can expand by purchasing property and equipment. They can also hire more workers, influencing overall employment. The stronger demand for goods and services may push up wages and other costs, impacting inflation.

During downturns, the Fed may prune the federal funds rate to its lower bound near zero. If additional support is warranted, it can use other tools to influence financial conditions. Even though the linkages of monetary policy to inflation and employment are not direct or immediate, monetary policy is a key factor.

### **What will be the impact on emerging market economies, including India?**

Theoretically, a signal to maintain lower rates in the US should be positive for emerging market economies (EMEs), especially from a debt market perspective. Emerging economies such as India tend to have higher inflation and higher interest rates than in developed countries. As a result, FIIs would want to borrow in the US at low interest rates in dollar terms, and invest that money in bonds of countries such as India in rupee terms to earn a higher rate of interest.

When the Fed keeps its interest rates low, the difference between the interest rates of the two countries increases, thus making countries such as India more attractive for the currency carry trade.

A lower rate signal by the Fed would also mean a greater impetus to growth in the US, which could be positive news for global growth. But equally, this could translate into more equity investments in the US, and temper investor enthusiasm for emerging market economies.

### **What has been RBI's stance on growth and inflation?**

While the RBI's Monetary Policy Committee decided to keep the policy rates unchanged in the meeting held earlier this month, Governor Shaktikata Das has said that it is important to keep the powder dry and to use it judiciously. He also said that given the uncertain inflation outlook, it is important to see the momentum in inflation, which is also dependent on effective supply-side measures.

The problem for RBI is the effectiveness of its monetary policy signal. It has cut the repo rate by 250 basis points from 6.5 per cent to 4 per cent in the 17-month period from February 2019 to June 2020, but existing borrowers have gained very little. Data show that the weighted average lending rates on outstanding rupee loans has come down by only 53 bps, almost a fifth of the cut in the policy repo rate.

The result is that even though the policy signal has been in favour of a sharp reduction in interest rates, practically all existing borrowers continue to pay a higher rate on their borrowings, thereby limiting the upside of the RBI's policy guidance.

Meanwhile, retail inflation, while easing slightly in August as food inflation cooled, continues to remain above the upper end of RBI's medium-term target for the fifth straight month. The concern is this will result in inflationary expectations inching up, which could put further upward pressure on the actual inflation trajectory. With elevated inflation in the near term, there is reduced room for policy easing, at least until the RBI's December bi-monthly policy review.

**Source: The Indian Express**

### **3. Dr Reddy's-Sputnik V deal explained: Can India get a coronavirus vaccine this year?**

**Relevant for GS Prelims & Mains Paper III; Science & Technology**

Drugmaker Dr Reddy's Laboratories (DRL) announced on Wednesday (September 16) that it will distribute 100 million (10 crore) doses of Russia's Sputnik V Covid-19 vaccine in India after conducting final-stage human trials and receiving regulatory clearances here. Should India's top drug regulatory body sign off on phase 3 trials in the country, Sputnik V will replace Serum Institute of India's (SII's) 'Covishield' as the frontrunner in the race to produce a Covid-19 vaccine for India.

#### **What is the Sputnik V vaccine?**

This is a vaccine that uses what is known as 'human adenoviral vector' technology. Adenoviruses cause a wide range of illnesses ranging from fevers, coughs, and sore throats

to pink eye, diarrhoea, and bladder infections. The adenovirus is modified and weakened so that it cannot replicate in the human body. Instead, it will act like a Trojan Horse, carrying instructions for the cells in the human body to produce the spiky outer layer (spike protein) of SARS-CoV-2, the virus that causes Covid-19.

This is expected to help the body recognise the spike protein as a foreign substance and build an immune response against it so that it can tackle the real virus when it tries to infect.

Sputnik V uses two different genetically modified adenoviruses to carry the spike protein. The vaccine containing the second adenovirus is given 21 days after the first one, and is expected to “boost” the body’s immune response and build “long-lasting immunity”.

Developed by Moscow-based Gamaleya Research Institute of Epidemiology and Microbiology, the Sputnik V vaccine was approved for public use in Russia on August 11.

### **What does DRL’s agreement mean for India? How soon will it be available to the public in this country?**

While India has been in discussions with Russia to explore the possibility of using Sputnik V here for around a month now, the DRL deal is the first concrete development that shows the vaccine will come to India.

DRL on Wednesday announced its agreement with the Russian Direct Investment Fund (RDIF) – Russia’s sovereign wealth fund that has been closely involved in these discussions – to carry out phase 3 human clinical trials of the vaccine in India, following which it would distribute the vaccine here for public use.

If the timeline given by RDIF is to be believed, about 100 million (10 crore) Indians can expect to start getting a Covid-19 vaccine by the end of this year. Each dose of the vaccine includes two vials containing separate adenoviral vectors, according to an RDIF spokesperson.

Going by the government’s vaccination priorities, healthcare, and frontline workers, as well as those who work in occupations that would make them vulnerable to Covid-19 exposure, might be the first to get this (or indeed, any other) vaccine. Following this, the older population and those with co-morbidities may get the shot.

Of course, this will depend on how long it takes for the phase 3 trials to conclude in India, and whether India’s regulatory authorities are convinced by the safety and efficacy data generated in these trials.

### **The development of any vaccine is a long, complex process. What are the things to look out for in the Russian candidate going forward?**

This vaccine was approved in Russia even before phase 3 trials were conducted. Even the phase 1 and 2 human trials were conducted on a very small group of fewer than 100 people. While findings from the early studies showed that the vaccine was safe, the relatively small number of volunteers in the trials, and the skipping of phase 3 trials before approvals, has drawn global criticism.

The only way to truly ascertain the safety and effectiveness of this vaccine is to look at long-term information from those vaccinated in the earlier trials, as well as to conduct larger phase 3 trials over a longer period of time.

These phase 3 trials often enroll thousands of volunteers representing a more diverse population, and checks for whether the vaccine is able to generate the required immune response effectively and without any serious adverse reactions.

To this end, post-registration trials involving 40,000 volunteers are now underway, according to RDIF. Brazil is also expected to approve the vaccine for local use only after phase 3 trials.

How well this vaccine does in India will now depend on the protocol that DRL follows, the results from phase 3 trials here and data generated from post-registration trials in Russia and late-stage trials in other countries. DRL is expected to approach the Indian regulator with its request to conduct the phase 3 trial here “shortly”, according to RDIF.

**Source: The Indian Express**

#### **4. What are the agreements that govern India and China’s actions?**

**Relevant for GS Prelims & Mains Paper II; IOBR**

On September 15, Defence Minister Rajnath Singh told Parliament that China had mobilised a large number of troops and armaments along the Line of Actual Control (LAC) with several friction areas in eastern Ladakh including the north and south banks of Pangong Tso (lake). He said the amassing of troops went against the bilateral agreements of 1993 and 1996.

#### **Why are there different perceptions?**

Mr. Singh said there had been situations of prolonged stand-offs in the border areas with China in the past which had been resolved peacefully. He said the situation this year “is very different both in terms of scale of troops involved and the number of friction points...”

This underscores the magnitude of the current situation along the disputed boundary in Eastern Ladakh. There is no commonly delineated LAC and Mr. Singh said India and China have different perceptions about the LAC. This has led to periodic tensions and the number



of transgressions and face-offs went up as India's border infrastructure improved and Indian Army patrols to the claim areas increased over the years. A series of boundary agreements have been signed and confidence-building measures (CBMs) carried out to maintain peace and tranquillity while the two sides attempted to delineate the boundary through Special Representatives.

### **What happens when agreements are flouted?**

While the agreements remain in place, the recent massive mobilisation of troops, tanks, armoured carriers and air defences very close to the LAC is in violation of the terms. Since the Galwan Valley clash on June 15, the Army has empowered its local commanders to take appropriate action as situations unfold and recently shots have been fired in the air, the first on the LAC since 1975. Thousands of troops and armaments continue to be deployed in close proximity, in some places within a few hundred metres of each other, so the chances of an accidental or inadvertent escalation which can spiral into a major confrontation remain high. Mr. Singh said that in response to "China's actions, our armed forces have also made appropriate counter-deployments in these areas to ensure that India's borders are fully protected".

### **What do the border agreements say?**

A key element of both the 1993 and 1996 agreements is that the two sides would keep their forces in the areas along the LAC to a minimum level, Mr. Singh stated. However, the agreements do not define what comprises the minimum level. The 1996 agreement limits the deployment of major categories of armaments close to the LAC, including tanks, infantry combat vehicles, guns with 75-mm or bigger calibre, mortars with 120-mm or above and various missiles. It also limits combat aircraft from flying within 10 km of the LAC. It stipulates that neither side "shall open fire, cause bio-degradation, use hazardous chemicals, conduct blast operations or hunt with guns or explosives within two km" from the LAC.

Use of firearms on the LAC is strictly regulated as per the agreements of 1993, 1996 and 2005. The 1993 and 1996 agreements also mandate that pending a final solution to the boundary question, the two sides shall strictly respect the LAC. Further in these agreements, India and China committed themselves to clarification and confirmation of the LAC to reach a common understanding of the alignment. However, this process has made little progress since 2003. Both sides have so far exchanged maps only in the central sector, leading to overlapping claims at several points due to "differences in perception".

### **How should troops deal with face-offs?**

In 2012, India and China agreed to establish a Working Mechanism for Consultation and Coordination to "study ways and means to conduct and strengthen exchanges and cooperation between military personnel and establishments...in the border areas." The 2013 Border Defence Cooperation Agreement lists several mechanisms to reduce misunderstandings and improve communication. Article VI of the agreement prohibits

either side from tailing the patrols of the other “in areas where there is no common understanding of the line of actual control”.

### **What is the way forward?**

Since the Galwan clash there have been calls for a review of the agreements from various quarters.

Following the recent flare-up in tensions on the north and south banks of Pangong Tso, at recent meetings between the Defence and Foreign Ministers of the two countries in Moscow, both sides agreed that they shall abide by all the existing boundary agreements, maintain peace and tranquillity in the border areas and “avoid any action that could escalate matters”.

The five-point plan agreed between External Affairs Minister S. Jaishankar and Chinese Foreign Minister Wang Yi in Moscow on September 10 states that “as the situation eases, the two sides should expedite work to conclude new CBMs to maintain and enhance peace and tranquillity in the border areas”.

**Source: The Hindu**

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