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INDIA-POLAND, PM VISITS TWO NATION; UKRAINE AND POLAND

'No problem can be solved on battlefield, loss of innocent lives biggest challenge'

Dinakar Peri
WARSAW

The ongoing conflicts in Ukraine and West Asia are a pressing concern for the global community and the loss of innocent lives in any crisis has become the biggest challenge for humanity, Prime Minister Narendra Modi said on Thursday as India and Poland announced the elevation of ties to a strategic partnership.

The countries agreed to formulate and execute a five-year action plan that will guide bilateral collaboration from 2024 to 2028 across several areas.

"This is India's firm be-



Boosting ties: Prime Minister Narendra Modi with his Polish counterpart Donald Tusk in Warsaw on Thursday. AP

lief that no problem can be solved on the battlefield. In any crisis, the loss of lives of innocent people has become the biggest challenge for the whole of humanity. We support dialogue and diplomacy for the early restoration of peace and

stability," Mr. Modi said in remarks after the bilateral meeting with his Polish counterpart Donald Tusk. "For this, India, along with its friendly countries, is ready to provide all possible support."

Earlier, Mr. Modi was re-

ceived by Mr. Tusk and was given a guard of honour.

In a joint statement issued after the bilateral talks, the two leaders expressed their "deepest concern" over the war raging in Ukraine, including its terrible and tragic humanitarian consequences.

They reiterated the need for a "comprehensive, just, and lasting peace" in line with international law, consistent with the purposes and principles of the UN Charter, including respect for "sovereignty and territorial integrity".

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- ❖ PM Modi has landed in Warsaw, marking the first visit by an Indian Prime Minister to the country since 1979.
- ❖ This visit coincides with the 70th anniversary of diplomatic relations between India and Poland and is aimed at revitalizing and elevating bilateral ties to a new level.

Key Highlights:

- ❖ PM Modi laid a wreath and paid tribute to The Dobry Maharaja Memorial in Warsaw.
- ❖ He also paid his tributes at the memorials for the ValivadeKolhapur camp and the Monument to the Battle of Monte Cassino in Warsaw.
- ❖ PM honoured the brave soldiers who fought in World War II. Indian and Polish troops fought side by side in this historic battle.

- ❖ PM Modi also addressed the Indian Diaspora at an event organised by the Indian community in Warsaw.



India – Poland Relation in brief:

- ❖ **Background:**
 - ☛ Diplomatic relations between India and Poland were established in 1954, leading to the opening of the Indian Embassy in Warsaw in 1957 and Polish Embassy in New Delhi in 1954.
 - ☛ During WWII, between 1942 and 1948, over 6,000 Polish women and children found refuge in two princely states in India, Jamnagar and Kolhapur.
 - ☛ Digvijaysinhji Ranjitsinhji Jadeja, the Jam Saheb of Nawanagar, provided shelter to over a thousand Polish children in his state.
 - ☛ Many others found refuge in a giant camp in Kolhapur.
- ❖ **Economic and Commercial Relations:**
 - ☛ Poland continues to be India's largest trading & investment partner in Central & Eastern Europe.
 - ☛ Over the period 2013-2023, the total bilateral trade with Poland has witnessed an increase of 192% i.e. from US\$1.95 billion in 2013 to US\$5.72 billion in 2023.
 - ☛ The balance of trade continues to be largely in favour of India in 2023.
- ❖ **Investment:**
 - ☛ Indian investment in Poland has been steadily growing over the years and is now estimated over US\$ 3 billion.
 - ☛ Total Polish investment in India is estimated at \$685 million.
- ❖ **Sectoral Collaboration:**
 - ☛ Poland possesses reputed clean coal technologies and Polish public sector companies have played a substantial role in development of mining and power sectors in India.



- ☛ Trainee engineers from M/s Coal India Limited trainee have received training in Polish mines that specialize in intelligent mining.
 - ☛ Chemical Industry is one of the major sectors of the Polish economy and Poland is a net importer of chemicals. Chemical products figures in top 5 exports items from India to Poland with organic chemicals taking the lead.
 - ☛ Textile continues to be the largest segment in the Indian exports to Poland. Polish imports of textiles and textile articles from India have grown to US\$ 645 million in 2023.
- ❖ **Cultural Relations:**
- ☛ A monument, commemorating Jam Saheb Digvijaysinhji Ranjitsinhji Jadeja of Nawanagar, was unveiled in October, 2014 at the Square of the Good Maharaja, Ochota District, Warsaw, Poland.
 - ☛ Another plaque commemorating the Valivade-Kolhapur camp near the Monte Casino War Memorial was inaugurated in November 2017 in Warsaw.



SOLAR MAGNETIC FIELDS

IIA finds a novel way to explore the sun's secrets by studying solar magnetic fields

The Hindu Bureau
BENGALURU

Astronomers at the Indian Institute of Astrophysics (IIA) have found a new way to probe deeper into the sun's secrets by studying the magnetic fields at different layers of the solar atmosphere. The astronomers have done this using data from IIA's Kodaikanal Tower Tunnel Telescope.

According to the Department of Science and Technology, the solar atmosphere is composed of various layers interconnected through magnetic fields. The magnetic field acts as a conduit to transfer energy and mass from the inner layers to the outer layers, commonly known



The solar atmosphere is composed of various layers interconnected through magnetic fields. FILE PHOTO

as the coronal heating problem and is also the prime driver of solar wind. To understand the physical mechanisms behind these processes, measurements of magnetic fields at different heights of the solar at-

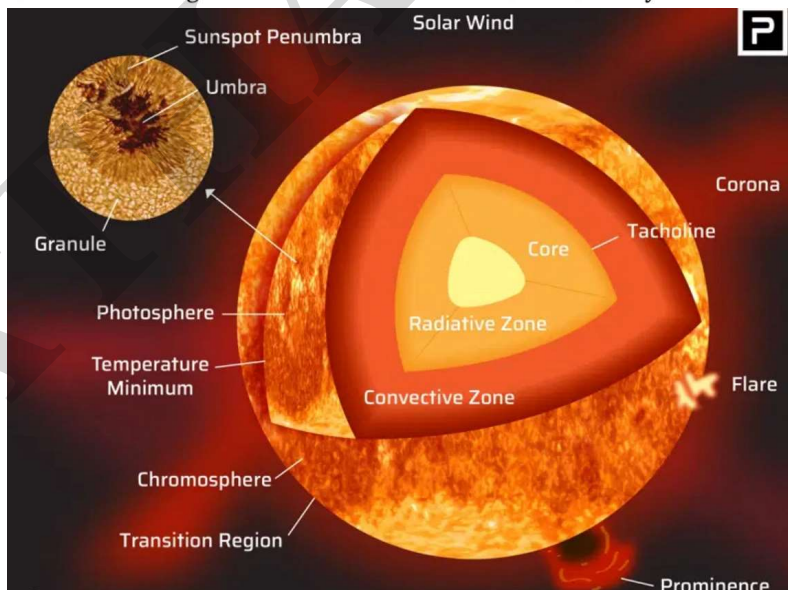
mosphere are important.

IIA astronomers have examined an active region (sunspot) with complex features, including multiple umbrae and a penumbra, through simultaneous observations in the Hydro-

gen-alpha and Calcium II 8662 Å lines from the Kodaikanal Tower Tunnel telescope.

The study used data from multiple spectral lines acquired simultaneously, especially the Hydrogen-alpha line, at 6562.8 Angstroms (Å), to infer the magnetic field's stratification at various heights of the solar atmosphere, taken from the Tunnel Telescope at the Kodaikanal Solar Observatory, which IIA operates.

The primary mirror (M1) of the 3-mirror setup at the Tunnel Telescope tracks the Sun, the secondary mirror (M2) redirects sunlight downwards, and the tertiary mirror (M3) makes the beam horizontal.



The Sun's Internal Structure and Atmosphere:

- ❖ The solar interior, from the inside out, is made up of the core, radiative zone and convective zone. The solar atmosphere above that consists of the photosphere, chromosphere, and the corona (solar wind is an outflow of gas from the corona).



Photosphere:

- ❖ The photosphere is an extremely uneven bright outer layer of the Sun that emits most of the radiation. The effective temperature on the outer side of the photosphere is 6000°C.

Chromosphere:

- ❖ Above the photosphere is the chromosphere. It is a thin layer of burning gases. It is a bit cooler — 4,320°C.

Sunspot:

- ❖ Sunspots are temporary phenomena on the photosphere of the Sun that appear visibly as dark spots compared to surrounding regions. They appear as dark areas because they are about 500-1500 °C cooler than the surrounding chromosphere. They correspond to concentrations of the magnetic field that inhibit convection & result in reduced surface temperature compared to the surrounding photosphere.
- ❖ Sunspot activity cycles about every eleven years. The point of highest sunspot activity during this cycle is known as Solar Maximum, and the point of the lowest activity is Solar Minimum.
- ❖ The individual sunspot has a lifetime ranging from a few days to a few months. Each spot has a black centre or umbra, and a lighter region or penumbra, surrounding it. It has been suggested that the Sun is 1% cooler when it has no sunspot and that this variation in solar radiation might
- ❖ affect the climates of the Earth.

Solar Wind:

- ❖ The solar wind is made of plasma (ionised atoms), a stream of energised, charged particles, primarily electrons and protons, flowing outward from the Sun at speeds as high as 900 km/s and at a temperature of 1 million °C.

Question:

Q. Which of the following are the harmful effects of solar winds?

1. They adversely affect the magnetic field of Earth.
 2. They cause the formation of aurora Borealis in the polar regions
 3. They increase the chances of collisions between aircrafts and collisions between ships
- (a) Only 1
(b) Only 1 and 2
(c) Only 3
(d) All of the above

Answer (d)

Explanation:

- ❖ The solar wind is a stream of energized, charged particles, primarily electrons and protons, flowing outward from the Sun. They collide with the magnetic field of the Earth and cause it to change its shape. The effects of solar winds on the earth that are visible to naked eye are the Aurora Borealis (the Northern lights) at the North Pole and the Aurora Australis (the Southern Lights) at the South Pole. They also affect all navigation and communication systems especially for vessels at sea as the navigation satellites are negatively impacted.



VACCINE DERIVED POLIO

What is vaccine-derived polio?

Priyali Prakash

EXPLAINER

The story so far: A two-year-old child in Tikrikilla, Meghalaya, has been infected with vaccine-derived polio. This is not a case of wild poliovirus, but an infection that presents in some people with low immunity, the Union Health Ministry said on Tuesday, August 20.

"The two-year-old child from Tikrikilla was found to have symptoms of poliomyelitis more than a week ago. The child was diagnosed with acute flaccid paralysis at a hospital in Assam's Goalpara," Meghalaya Chief Minister Conrad K. Sangma said. Officials in the State's West Garo Hills district are on high alert following the confirmation of the case.

Vaccine-derived polio

Vaccine-derived polio is a rare condition that occurs when the weakened (also called attenuated) strain of poliovirus used in the oral polio vaccine (OPV) mutates and regains the ability to cause paralysis.

OPV contains a **live, attenuated virus** that is used for immunisation against the disease. This weakened virus triggers an immune response when administered, thus protecting people from the disease. The attenuated virus replicates in the intestines for a limited period and is excreted in the stool. In rare cases, the virus can mutate enough to



Oral polio drops being administered. FILE PHOTO

cause the disease again and circulate in areas where either immunisation is low, where immunocompromised people reside, or where sanitation and hygiene are poor. This is how vaccine-derived poliovirus (VDPV) spreads. According to the World Health Organization (WHO), the virus is classified as "circulating" (cVDPV2) if it is detected in at least two different sources, at least two months apart, that are genetically linked, showing evidence of transmission in the community.

Types of poliovirus

Polioviruses are enteroviruses that are transmitted primarily by the faecal-oral route. Three types – wild poliovirus type 1 (WPV1), wild poliovirus type 2 (WPV2), and wild poliovirus type 3 (WPV3) – have been known to exist. Symptomatically, all these strains are identical.

More about vaccines

The first successful polio vaccine for poliovirus was made by Jonas Salk in the early 1950s. Salk inactiv-

ated the virus using formaldehyde and injected it into the muscles of test subjects. This inactivated polio vaccine (IPV) induced systemic immunity (relating to the blood, brain, and all other organ systems) in the subjects.

After Salk, Albert Sabin developed another vaccine that contained live polio strains weakened by growing them serially in macaque cells, making them unfit for human infection. Since this vaccine contained the live virus, it had to be administered through its natural mode of infection – in this case, oral. This is what we today know as the OPV.

OPV is usually preferred over IPV because of its ease of administration – it does not require syringes or medical training and is inexpensive. However, the weakened virus in OPV can occasionally revert, causing the disease it is meant to prevent. IPV, on the other hand, is a less potent vaccine, but contains inactivated virus particles and hence has no risk of causing vaccine-associated paralytic poliomyelitis (VAPP) – a rare, adverse reaction to OPV. IPV is comparatively tougher to manufacture, too, as it contains a chemically inactivated virus.

On World Polio Day, October 24, 2019, the WHO declared that WPV3 has been eradicated worldwide. The last case was detected in Nigeria in 2012, the WHO said. WPV2 was officially declared eradicated in 2015. However, more than 90% of vaccine-derived polio-

virus outbreaks are due to the type 2 virus present in oral polio vaccines. VAPP constitutes 40% of cases caused by the type 2 oral polio vaccine. Many cases of VAPP from the type 3 virus also occur in countries using OPV.

The Indian government does not count VAPP as polio since these cases are sporadic and pose little or no threat to others, even though the number of VAPP-compatible cases showed a rising trend.

After the global switch from trivalent (containing all three variants) to bivalent (type 1 and type 3) oral polio vaccine in 2016 to prevent any more type 2 vaccine-derived poliovirus, the number of vaccine-derived type 2 poliovirus outbreaks has only increased sharply.

The WHO authorised a genetically modified type 2 novel oral polio vaccine under Emergency Use Listing in November 2020, it was first used in the field in March 2021, and received WHO prequalification in December 2023. The vaccine is less likely to revert to neurovirulence unlike the Sabin vaccine and therefore cause less type 2 VDPV.

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- ❖ Vaccines work by exposing the body's immune system to weakened or inactive parts of a pathogen, called antigens, which trigger the immune system to produce antibodies. Antibodies are the body's defense system against pathogens, which are disease-causing organisms like bacteria, viruses, parasites, and fungi.
- ❖ Each antibody is trained to recognize one specific antigen, and when someone is vaccinated, they are likely to be protected against the targeted disease. Vaccines help the immune system fight infections faster and more effectively

Vaccines Work by Imitating an Infection:

- ❖ Vaccines work by imitating an infection—the presence of a disease-causing organism in the body—to engage the body's natural defenses. The active ingredient in all vaccines is an antigen, the name for any substance that causes the immune system to begin producing antibodies.



- ❖ In a vaccine, the antigen could be either
 - ☛ Weakened or killed bacteria or viruses
 - ☛ Bits of their exterior surface or genetic material, or
 - ☛ Bacterial toxin treated to make it non-toxic.

Vaccines Strengthen the Body's Natural Defenses:

- ❖ To be immune is to be partially or fully resistant to a specific infectious disease or disease-causing organism. A person who is immune can resist the bacteria or viruses that cause a disease, but the protection is never perfect.
- ❖ Immunization is the process of being made resistant to an infectious disease, usually by means of a vaccine. Immunity is protection against a disease, and it can be passive or active, natural or vaccine induced.
- ❖ Active immunity comes from being exposed to a disease-causing organism.
- ❖ Natural immunity results from being infected by a disease-causing organism, whether the infection is symptomatic or not.
- ❖ Vaccine-induced immunity results from being exposed to killed or weakened bacteria or viruses—or even just important pieces of them— through vaccination. Either way, active immunity takes longer to develop but lasts longer than passive immunity. Passive immunity is provided by antibodies produced by another human being or animal.
- ❖ Full-term babies acquire passive immunity from their mother's antibodies during the final months of pregnancy.
- ❖ Patients can acquire passive immunity through antibody-containing blood products derived from human or animal sources. Passive immunity provides protection that is immediate but fades within weeks or months.

