1. What is 'Rail Force One', the train PM Modi took from Poland to Ukraine?

Why in News?

Prime Minister Narendra Modi arrived in Ukraine's capital Kyiv from neighbouring Poland by train, an unusual mode of transport for a head of government, but one that has been used earlier by other global leaders as well.

Foreign dignitaries visiting Kyiv have been taking the train ever since Ukraine's airspace was closed following the Russian invasion in February 2022. After Joe Biden rolled into Kyiv last year instead of flying in on Air Force One, the US President's iconic Boeing 747 aircraft, the train was dubbed "Rail Force One".

Train Design

The train, which is run by the state-owned Ukrainian Railways or Ukrzaliznytsia, is painted blue and yellow, the colours of Ukraine's flag.

The first foreign dignitaries to travel to Kyiv by the train were the prime ministers of Poland, Slovenia, and the Czech Republic, who visited in 2022.

Thereafter, the train was used by the former British Prime Minister Boris Johnson, French President Emmanuel Macron, President of the European Commission Ursula von der Leyen, and Prime Minister Justin Trudeau of Canada, besides Biden and now Modi.

A symbol of 'Iron diplomacy'

Alexander Kamyshin, Ukraine's Strategic Industries Minister who is in charge of Ukrzaliznytsia, has often used the hashtag #IronDiplomacy to refer to the world leaders' train trips.

Relevance: GS Prelims & Mains Paper II; International Relations
Source: Indian Express

2. What is vaccine-derived polio?

Introduction

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.

TYPES OF POLIOVIRUS		
	WILD POLIOVIRUS (WPV)	CIRCULATING VACCINE DERIVED POLIOVIRUS (cVDPV)
Definition	Infectious virus that invades the nervous system. Can cause paralysis or death.	A very rare, circulating infectious virus mutated from the weakened strain of poliovirus in OPV. Under certain conditions, may cause paralysis or death.
Risk Factors	Low immunization rates, poor sanitation, high population densities.	Low immunization rates, poor sanitation, high population densities.
To Stop Transmission	Increase immunization rates with OPV.	Increase immunization rates with OPV.
Strains	Type 1: Caused 100% of 2014 cases **Type 2: Eradicated in 1999** Type 3: Last seen in 2012	Type 1: Causes 8% of cVDPV **Type 2: Causes 90% of cVDPV** Type 3: Causes 2% of cVDPV
Cases in 2014	358	52

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 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 inactivated 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 poliovirus 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.

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

Source: The Hindu

3. India adds 3 new Ramsar sites: What are wetlands, why do they matter for the environment?

Background

Union Environment Minister Bhupender Yadav announced three new Ramsar sites in Tamil Nadu and Madhya Pradesh earlier this month, taking the total of such sites in India to 85. The new additions are the Nanjarayan Bird Sanctuary and the Kazhuveli Bird Sanctuary in Tamil Nadu, and the Tawa Reservoir in Madhya Pradesh.

Ramsar sites are also known as wetlands of international importance. The Ramsar convention, which led to their establishment, has been a landmark in raising awareness around this key ecosystem.

What are wetlands, and why are they important?
According to the convention, wetlands are defined as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres".

This definition includes all lakes, rivers, underground aquifers, swamps, marshes, and other major water bodies. Wetlands help regulate climate conditions through carbon sequestration, that is the storage of carbon from the atmosphere, and purifying water by removing pollutants from the shallow waters.

What are Ramsar sites?
The Ramsar Convention is an intergovernmental treaty signed in 1971 in Ramsar, Iran. It encourages the protection and conservation of wetlands worldwide by designating them as such.

The selection of Ramsar sites is based on various criteria defined under the convention. For example, "A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions." It also looks at the sites' capacity to support fishes and waterbirds.

Organisations like the International Union for Conservation of Nature, the World Wide Fund for Nature, and other environmental agencies are associated with the treaty.

It also has 172 signatory countries. They are obligated to create wetland reserves and promote the wise use of wetland habitats. India joined it in 1982, initially designating the Chilika Lake in Orissa and Keoladeo National Park in Rajasthan. Today, the country has among the highest number of Ramsar sites in Asia.

The Sundarbans is one of the most renowned wetlands in India. Cold desert ecosystems also have wetlands, like the Tso Moriri and Pangong Tso in Ladakh, which include rare and endangered species such as the black-necked crane.

What are the new Ramsar sites?
The Nanjarayan Bird Sanctuary in Tamil Nadu is located on the banks of river Noyyal. Originally a water reservoir for irrigation use, it has since become a significant ecosystem, supporting a varied range of avifauna.

Home to species like the Eurasian coot, spot-billed duck and many types of herons, the wetland also serves various migratory birds flying along the Central Asian Highway, establishing itself as a biodiversity hotspot. It also contributes to the locals' livelihood through fishing.

The Kazhuveli Sanctuary on the Coromandel Coast is one of the largest brackish water wetlands in south India. The ecosystem's mix of salt marshes, mudflats and shallow waters make it a home to many globally endangered species, like the black-headed ibis and greater flamingo. It is also a stopover for migratory birds along the East Asian-Australasian Flyway. In

storing water, Kazhuveli also helps with flood control and groundwater recharge, helping maintain the region's water table.

The Tawa Reservoir in Madhya Pradesh is also integral in regional water management. Created by damming the Tawa River, the reservoir became a massive wintering ground for migratory birds. Tawa provides irrigation water to farmlands, drinking water to local communities, and sustains the nearby fisheries.

What are the threats to wetlands?

Wetlands protect the environment from floods and storms by absorbing the excess rainfall and serving as a buffer against the impact of extreme weather events. This is all the more important, as climate change has begun impacting the severity of such incidents.

With the world in critical need of reducing greenhouse gas emissions, wetlands play a role in carbon storage. The Indian government has launched a series of policies and initiatives to protect wetlands, like the National Wetland Conservation Programme of 1986 and the 2015 National Plan for Conservation of Aquatic Wetlands. The Ministry of Environment, Forest and Climate Change has also identified over 2,200 wetlands for conservation schemes.

However, wetlands continue to face major threats. According to the Ramsar Convention's Global Wetland Outlook (2018), 35% of global wetlands were lost between 1970 and 2015, with human activities contributing to their destruction.

Reports published by the MoEFCC show the degradation and shrinking of wetlands in India because of encroachment, pollution and rapid urbanisation. Agricultural and industrial run-off into water bodies significantly damages wetlands' health, worsening the water quality.

Relevance: GS Prelims & Mains Paper III; Environment
Source: Indian Express