



CURRENT AFFAIRS



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“Triple Dip” La Nina

Why is it in the news?

The occurrence of the La Nina phenomenon for the third consecutive year in the Pacific Ocean, confirmed by The Australian Bureau of Meteorology

For the very first time in this century, spanning three consecutive northern hemisphere winters to become a ‘triple dip’ La Nina, stated by The World Meteorological Organization (WMO) on August 31.

Paper :GS-I: Geography (Climatology, Important Geophysical Phenomena),
GS-III: Environment and Ecology (Environmental Pollution and Degradation, Impact of Climate Change)

What are La- Nina and El-Nino?

- El- Nino which means “the boy” and La – Nina which means “the girl” in Spanish are two mutually opposite phenomena.
- During the occurrence of this phenomenon, an abnormal rise or cooling of sea surface temperatures is observed in the Pacific Ocean along the equator, off the coast of South America.
- Together they constitute, called as El Niño-Southern Oscillation system, or ENSO

- The impact of ENSO conditions can affect both temperatures and rainfall globally, due to their strong interference with global atmospheric circulations.
- Usually, it has been seen that El Nino and La Nina occur every four to five years.
- El Nino is more frequent than La Nina.
- Neutral: These years are not associated with any of the above phenomena.

La Nina.



- La Nina is a complex weather pattern that occurs in an interval of 4 to 5 years, as a consequence of variations in ocean temperatures in the Equatorial Pacific.
- It is a coupled ocean-atmosphere occurrence, which is the colder counterpart of El Niño, as part of the broader EL Nino–Southern Oscillation (ENSO) climate pattern.
- An appearance of La Nina can continue for at least 5 months.
- During a period of La Nina, the sea surface temperature over the equatorial Eastern Central Pacific Ocean will be lower than normal by 3 to 5 °C.
- An appearance of La Nina persists for at least five months.
- It has extensive effects on the global weather, particularly in North America, even affecting the Atlantic and Pacific hurricane seasons, in which more tropical cyclones occur in the Atlantic basin due to low wind shear and warmer sea surface temperatures, while reducing tropical cyclogenesis in the Pacific Ocean.
- It comes out as strong winds blow warm water at the ocean's surface from South America across the Pacific Ocean towards Indonesia.
- As this warm water moves towards the west, cold water from the deep sea rises to the surface near South America.

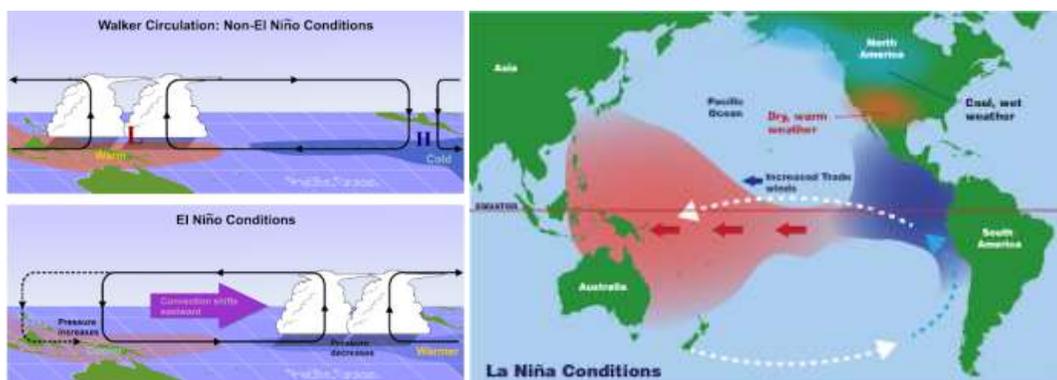
- Consequently, it is considered to be the cold phase of the broader El Niño–Southern Oscillation weather pattern and the opposite of the El Niño weather pattern.
- La Niño impacts the global climate and disrupts normal weather patterns, which as a result can lead to intense storms in some places and droughts in others.

El-Niño

- The warming phase of the sea temperature is known as El Niño and is linked to a band of warm ocean water that evolves in the central and east-central equatorial Pacific, including the area off the Pacific coast of South America.
- El Niño is accompanied by high air pressure in the western Pacific and low air pressure in the eastern Pacific.
- During the evolution of El Niño, rain falls between September–November.

ENSO

- El Niño and the Southern Oscillation, also known as ENSO, is a periodic disturbance in sea surface temperature (El Niño) and the air pressure of the overlying atmosphere (Southern Oscillation) across the equatorial Pacific Ocean.
- The ENSO is the cycle of warm and cold sea surface temperature (SST) of the tropical central and eastern Pacific oceans.
- The cool phase of ENSO is La Niña, with SSTs in the eastern Pacific below average, and air pressure high in the eastern Pacific and low in the western Pacific.
- The ENSO cycle, including El Niño and La Niña, causes global changes in temperature and rainfall.



Impact of ENSO on the Indian Subcontinent

- Weather:
 - El-Nino causes temperature rise and reduces rainfall over the Indian subcontinent, during the monsoon season. On the other hand, La-Nina brings rainfall and decreases the temperature. Hence, this is why La-Nina is heartily welcomed in the Indian subcontinent.
- Environmental Disasters like Drought and Floods:
 - Although El-Nino leads to drought events in the subcontinent, La-Nina is primarily associated with flood events. These disasters affect the socio-economic status of the affected countries.
- Health:
 - El-Nino brings droughts to lead to forest fires, and wildfires, thus aggravating respiratory causes by air pollution. While, La-Nina brings flooding, as well as water-borne diseases like Cholera, Malaria, Jaundice, etc.
- Irrigation:
 - The irrigated area accounts for 48.8% of the total agricultural area of the country. The remaining 51.2% is rainfed. This rainfed area is primarily dependent upon monsoonal rains. Therefore, the El-Nino-induced rainfall-deficit year brings worries for Indian farmers, while La-Nina induced surplus year is widely welcomed by the Indian farmers.
- Economy:
 - As Indian agriculture primarily depends upon the monsoons, also the fact that India is a primarily agricultural country, impacts the Indian economy.
 - ENSO affects the Indian economy in a major way. Better agricultural output means better returns for the Indian farmers and rural population. This induces demand and raises the economic output of the country. Since the ENSO impacts farmers and rural poor more, it also has an important role in the reduction or exacerbation of inequality in the country.
- Ecosystem: ENSO causes warmer and colder temperatures in the sea surface waters. Since the corals are a delicate ecosystem, the temperature change potentially affects their ecosystem.

Why have La Nina conditions continued for 3 years?

- This behavior is termed “abnormal “by the scientist.

- It is surprising that it has continued for the last three years. It may be good for India but not for some other countries.
- Under climate change conditions, one must expect more such instances. Climate change could be a factor driving such anomalous conditions.

Farhin

NASA's mission to protect Earth from the hazardous asteroid that could pose a threat to it in the future

Why it is in the news?

Paper: GS paper III, science and technology.

NASA's DART spacecraft is scheduled to crash into the asteroid **Dimorphos** at approximately 7.14 PM EDT on September 26 (4.44 AM IST on September 27).

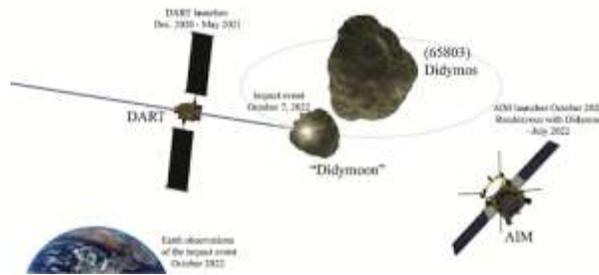
About the DART Mission

- NASA's DART which stands for Double Asteroid Redirection Test is the world's first full-scale mission developed in defence of Earth
- It is a planetary defense-driven test of technologies for defence against an impact on Earth by a hazardous asteroid.
- The spacecraft was launched on a SpaceX Falcon 9 rocket from Vandenberg Space Force Base in California on 24th November 2021.

Objectives of DART:

- DART is the first technology that exhibits the kinetic impact or technique that could be used to mitigate the threat of an asteroid hitting Earth.
- The kinetic impactor mitigation technique is the impulsive deflection of the asteroid through the sudden addition of momentum. In simpler terms, DART is being sent to collide with an asteroid to change its orbital period

Configuration of DART:



Weight :

- It is a low-cost spacecraft DART, weighs about 610 KG at the time of its launch and will discard some of its weight during its flight and will weigh around 550 KG during the impact.

Structure:

- The main structure is a box holding dimensions $1.2 \times 1.3 \times 1.3$ meters.
- It has two solar arrays and uses hydrazine propellant for maneuvering the spacecraft.
- The spacecraft has been attached with a high-resolution imager called **Didymos Reconnaissance and Asteroid Camera for Optical Navigation (DRACO)** which is expected to provide precise images and information to the scientists to study the impact of the collision on the trajectory of the asteroid.
- DART will also carry a small satellite which is a CubeSat named LICIAcube (Light Italian CubeSat for Imaging of Asteroids).

DART's Target

- DART is programmed to target Dimorphos, the much smaller "moonlet" of a binary (two-body) asteroid system.
- Dimorphos orbits a larger asteroid named Didymos which means Greek for "twin" with a diameter of 780 meters.

Importance of DART's crash with Dimorphos

- Didymos is a perfect system to examine the mission because it is an eclipsing binary which means it has a moonlet that regularly orbits the asteroid and it can be seen when it passes in front of the main asteroid.

- With the help of a telescope from Earth, it can study this variation in brightness to understand how long it takes Dimorphos to orbit Didymos.

Does Earth really need a planetary defence system?

NASA has set up the Planetary Defense Coordination Office (PDCO) to look after its ongoing mission of planetary defence.

- The PDCO's aims are to give early detection of potentially hazardous objects, track and characterize the objects, study strategies, and technologies for mitigating possible impacts, and play a leading role in U.S. government response planning for an actual impact.
- DART is the first planetary defence test mission for PDCO.

Farhin

INDIA AND SCO

Context

Prime Minister Narendra Modi will land in Samarkand, Uzbekistan today to attend the 22nd Heads of State Summit of the Shanghai Cooperation Organization (SCO). The PM is also likely to meet Russian President Vladimir Putin as well as Iranian President Ebrahim Raisi.



What is Shanghai Cooperation Organization (SCO)

SCO is a permanent international intergovernmental Organization headquartered at Beijing, China and was formed in 2001 by China, Kazakhstan, Kyrgyzstan, Uzbekistan, Russia and Tajikistan. India and Pakistan became permanent members in 2017 in the SCO Astana Summit. As of now, it includes 9 Permanent members, 3 observer states as members and 6 dialogue partner states.

Aims and Objectives of SCO

SCO was formed with the objective of promoting **political, economic and security cooperation** among its member nations. It aims to **safeguard regional peace, security, and stability** and create a democratic and equitable international, political and economic order. It has a multi dimensional approach to ensure cooperation and synergy in the field of political affairs, trade, education, culture, energy, transport, tourism and environment protection.

Organizational Structure:

The major bodies of SCO are given below:

- **The Heads of State Council (HSC):** It is the supreme decision making body of SCO which meets once a year. It decides the major areas of functioning of SCO and also determines its internal functioning as well as its dealings with other states and international organizations.
- **The Heads of Government Council:** is the second-highest organ of SCO, with a dual mandate to decide on budgetary matters and devise details of economic cooperation.
- **The Council of Ministers of Foreign Affairs:** Considers issues related to day-to-day activities and holding of consultations on international problems within the Organization.
- **Regional Anti-Terrorist Structure (RATS):** Established to fight against terrorism, separatism and extremism.

Importance of the SCO meet

- **Rebuilding economy:** It is the first in-person meeting of Heads of SCO after the onset of the Covid-19 pandemic. Countries will have to find a way to come out of the economic recession hitting the world.
- **Combating terrorism:** With the coming of Taliban into power in Afghanistan coupled with the rise of extreme fundamentalist groups and terrorism sparked by ISIS and other groups, states will have to come together to combat security threats.
- **Resolving Ukraine- Russia conflicts:** The Ukraine-Russia military escalations pose a threat to global stability. The SCO meet needs to address this.
- **De-escalation of Taiwan-China tensions :** The relations have strained all the more ever since US speaker Nancy Pelosi visited Taiwan which was eyed with suspicion by China. There is growing fear of a Chinese invasion as military tensions increased in the Taiwan Strait and USA is considering imposing sanctions against China.
- **Finding solutions to Iran Nuclear Deal:** The negotiations between USA and Iran have continuously reached no conclusion with the USA now imposing new sanctions against Iran.

Significance of SCO for India

- **Support for permanent membership of the UN Security Council:** India can channelize SCO to gain support for permanent seat in UNSC. Uzbekistan already sports India's candidature for it.
- **Connectivity to Central Asia and harnessing relations with Iran:** India showed support to admit Iran as a full member in SCO . Further, during the foreign ministerial meeting of SCO last year, India highlighted the important role of Chabahar Port in increasing the connectivity in the region.
- **Trade and Investment:** India has the opportunity for development of startups, exchange of science and technology and traditional medicine with SCO member states. India is already a major source of medicines and pharmaceuticals in Tajikistan.
- **Natural Resources:** The Central Asian region is rich in natural resources like crude oil, natural gas, gold, iron, aluminum, and copper.
- **Security and stability:** The issues arising from Taliban takeover and conflicts in West Asia can cause spillover effects in India. SCO is a strong platform to resolve such challenges.
- **Combating terrorism, narcotics trade and weapons trafficking:** India has earlier called for "zero tolerance for terrorism in all its manifestations". The RATS of SCO offers a mechanism to deal with terrorism and address issues of state sponsored terrorism also.
- **Tourism diplomacy:** SCO Heads of State have already expressed their admiration for India's joint digital exhibition on Shared Buddhist Heritage earlier. There can be further expansion of tourism in terms of Buddhist connections.

Way Forward

With more than 22% of global GDP and 45% of global population, SCO has immense potential to decide the future world order and balance of power. It can play a significant role in Asia and counter the influence of western countries in the region. Hence, it is imperative for India to utilize SCO in line with India's policy of "**multi-alignments**". With India hosting the next SCO summit by assuming the rotational presidency, it can demonstrate its ability of being a responsible great power.

Saumya khedwal