Possible El Nino conditions in India

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Why is in news? Several researchers have already raised an alarm citing an increase in the frequency of extreme El Niño and La Niña events from about one every 20 years to one every 10 years by the end of the 21st century under ag

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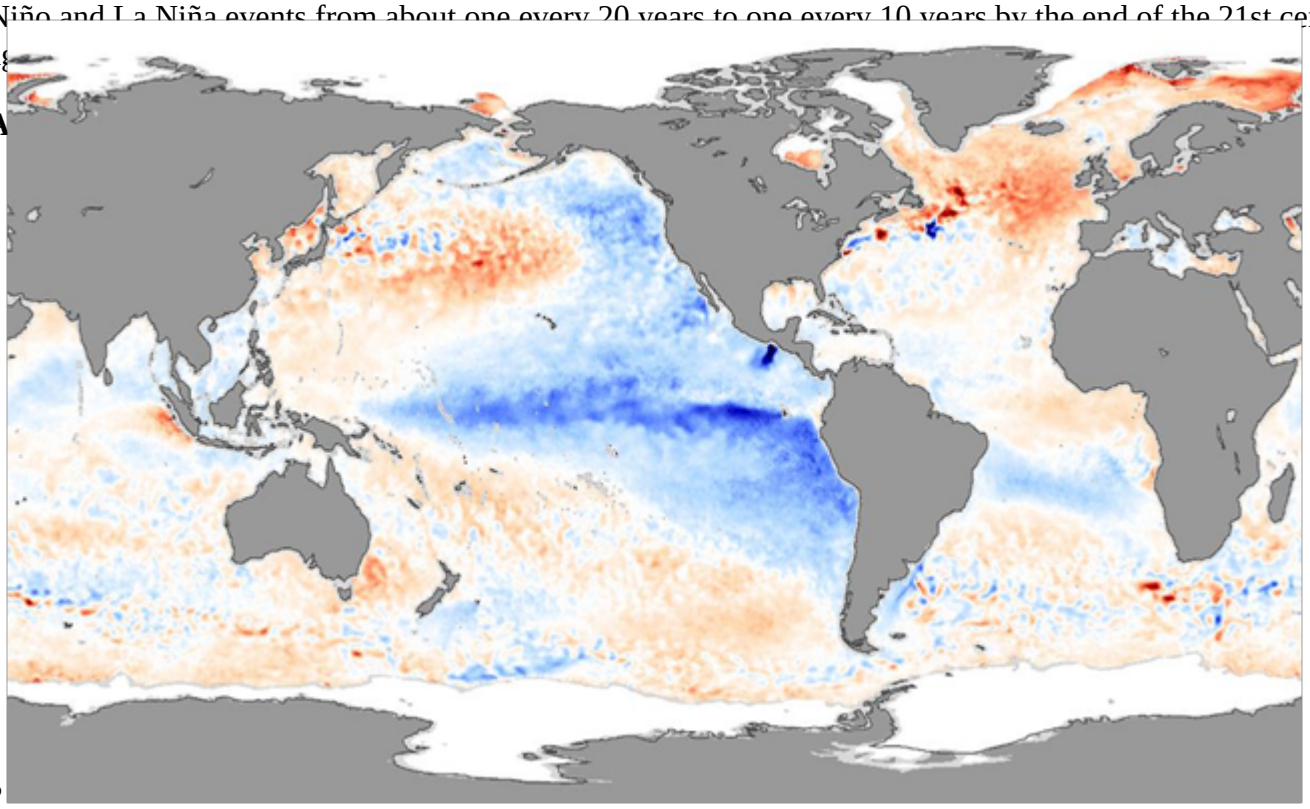

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El Nino and La Nina are climate patterns in the Pacific Ocean that can affect weather worldwide. El Niño refers to a band of warmer water spreading fromwest to east in the equatorial Pacific Ocean.

A La Niña occurs when the band of water spreads east-west and is cooler.

Both phenomena affect the weather worldwide and can have drastic effects on economies that depend on rainfall. Together, El Niño and La Niña make up a cyclical process called the El Niño Southern Oscillation (or ENSO).

Years in which an El Niño occurs are simply called ‘El Niño years’, and global weather patterns in that year tend to be anomalous in certain ways. Similarly, a La Niña occurs when the band of water spreads east-west and is cooler.

El Niño is invariably linked with poor monsoon performance. According to statistics, about 60 per cent of the time there will be a probability of drought in India during an El Niño year However, El Niño conditions have been known to be unpredictable as well, climate experts admit.

For instance, even the strongest El Niño has given normal Monsoon rains of 102 per cent in 1997, while weak El Niño conditions resulted in severe drought in 2004 to the tune of 86 per cent.

Statistics from the year 2000 till 2019 show that there have been four instances of drought years. In 2002 and 2009, the countrywide deficiency was 19 per cent and 22 per cent, respectively, which were considered severe drought years. While in 2004 and 2015 the deficiency stood at 14 per cent each, which was again a drought.

There has been only one instance in the last 25 years, since 1997, when the country saw surplus rain of 2 per cent despite El Niño.

Recent research indicates that the frequency of extreme El Niño events increases linearly with the global mean temperature, and that the number of such events might double (one event every 10 years) under 1.5°C of global warming. This pattern is projected to persist for a century after stabilisation at 1.5°C, indicating continuing high risks.

Frequency of El Nino and La Nina

Episodes of El Nino and La Nina typically last 9-12 months, but can sometimes last for years.

El Nino and La Nina events occur every two to seven years, on average, but they don't occur on a regular schedule, say experts. Generally, El Nino occurs more frequently than La Nina.

According to the latest forecast by National Oceanic and Atmospheric Administration (NOAA), a transition from La Niña to ENSO-neutral will occur mostly during the February-April 2023 season.

Climate models are predicting a potential return to El Niño by May-July, which coincides with the summer monsoon that spans from June- September.

The occurrence of three consecutive La Niña in the Northern Hemisphere is a relatively rare phenomenon and is known as the 'triple dip' La Niña. The latest triple dip La Nina occurred between 2021-23.

During a La Niña, the tropical Pacific soaks up heat like a sponge and builds up the warm water volume. This is the warm water that spills across from the western Pacific to the eastern Pacific during an El Niño.

Three consecutive years of La Niña means that the warm water volume is fully loaded and it is likely that the system is ready to give birth to an El Niño

Impact of El Niño and La Niña

Changes to the frequency of extreme El Niño and La Niña events may also increase the frequency of droughts and floods in South Pacific islands.

During and following El Niño, the global mean surface temperature increases as the ocean transfers heat to the atmosphere.

Warming of the waters, such as during El Niño, eliminates the cloud deck and leads to further sea surface warming through solar radiation.

An El Niño year creates a global-warming crisis in miniature, since the warm water spreading across the tropical Pacific releases a large amount of heat into the atmosphere

El Nino can have a dangerous effect on the monsoon. It can change the monsoon patterns across the Indian subcontinent leading to lower agricultural output and higher prices

Emergence of Elnino can push back output, which will come in the way of not just production but also push up inflation

Conclusion

India will have to wait for the El Niño forecast to be updated in the coming weeks. It will also have to hope for the best and, unavoidably, prepare for the worst. Apart from preparedness, an unfavourable prediction will also test the India Meteorological Department’s suite of forecast products, and efforts to translate its forecasts to usable advisories for fishing, farming, flood alerts, etc.