



## Mains Practice Question

**Q.** What are the concepts behind El Niño and La Niña events? How do these phenomena impact the monsoon and air quality in India? (250 words)

26 Feb, 2024 GS Paper 1 Geography

### Approach

- Give a brief introduction to El Niño and La Niña events.
- Discuss the impacts of these phenomena on monsoon and air quality in India.
- Conclude suitably.

### Introduction

El Niño and La Niña are opposite phases of the El Niño-Southern Oscillation (ENSO) cycle, a natural climate phenomenon characterized by fluctuations in sea surface temperatures (SSTs) in the central and eastern tropical Pacific Ocean.

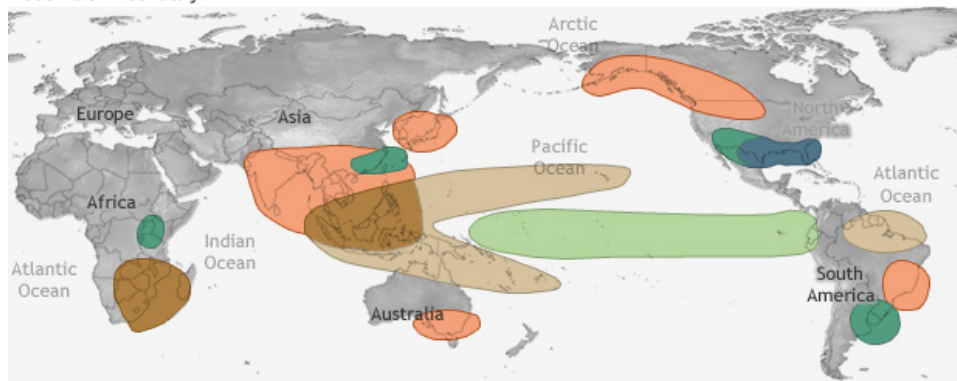
### Body

- **El Niño:**
  - During El Niño events, warmer-than-average sea surface temperatures develop in the central and eastern Pacific Ocean, disrupting normal atmospheric circulation patterns.
  - This disruption leads to changes in global weather patterns, including altered rainfall patterns and atmospheric circulation.
  - In India, El Niño generally tends to weaken the monsoon, resulting in drier-than-average conditions and reduced rainfall. This can lead to droughts, water shortages, and agricultural losses.

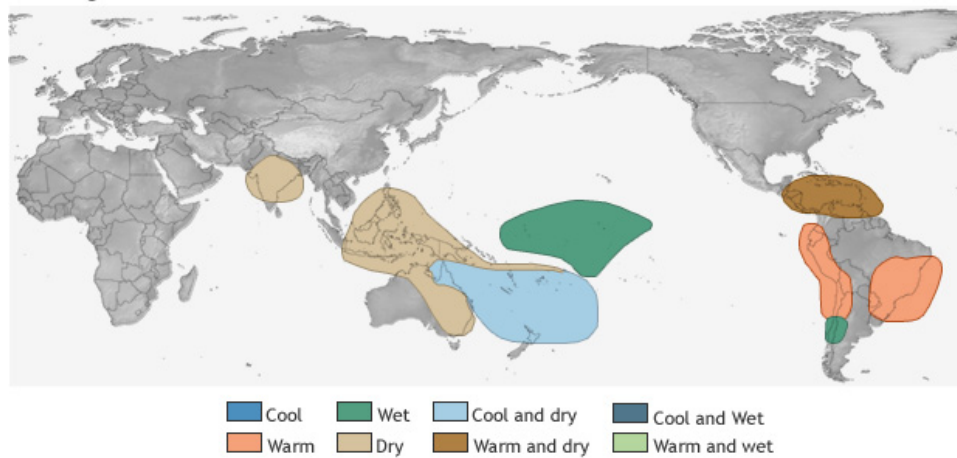
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## EL NIÑO CLIMATE IMPACTS

December-February



June-August



### La Niña:

- La Niña events are characterized by cooler-than-average sea surface temperatures in the central and eastern Pacific Oceans.
- La Niña typically strengthens the Indian monsoon, resulting in increased rainfall and wetter-than-average conditions in India. This can lead to flooding and waterlogging in some regions.

Impacts of these phenomena on air quality in India :

- **El Niño:** El Niño can **exacerbate air pollution** in India by contributing to stable atmospheric conditions and reduced rainfall, which can trap pollutants closer to the surface and lead to poor air quality.
- **La Niña:** La Niña can have varying impacts on air quality in India, depending on regional weather patterns. Increased rainfall associated with La Niña **can help to alleviate air pollution by removing pollutants** from the atmosphere through wet deposition. Nevertheless, these effects have experienced numerous anomalies.
  - In 2022, a study suggested that PM2.5 concentrations in Ghaziabad and Noida reduced significantly, while in contrast, Mumbai and Bengaluru experienced rises in PM2.5 levels.

## Conclusion

A thorough understanding of El Niño and La Niña phenomena is essential for India to effectively manage its water resources, agriculture, and air quality, as well as to develop adaptive strategies to mitigate the impacts of climate variability and extreme weather events on various sectors of the economy and society.

