

# El Nino

March 26, 2019

## Manifest Pedagogy

El nino as geophysical phenomenon and its impact on world climate is important area of preparation. Its impact on Indian monsoon needs to be understood. El nino teleconnection and el nino and its linkage with Indian ocean dipole are other dimensions of the topic.

## In news

US weather agencies predict 60% chances of Elnino during Monsoon

## Placing it in the syllabus

Important geographical phenomena

## Static dimensions

- El Nino phenomenon
- Impact of El Nino

## Current dimensions

- Predictions regarding the occurrence of El Nino.
- El Nino and Telecommunication.
- Relation between Global warming and El Nino

## Content

### What is El nino?

El Niño is a part of a routine climate pattern that occurs when sea surface temperatures in the tropical Pacific Ocean

rise to above-normal levels for an extended period of time.

It's a natural climate pattern where sea water in the central and eastern tropical Pacific Ocean is warmer than average.

As for its name, El Niño means the Little Boy, or Christ Child in Spanish. El Niño was originally recognized by fishermen off the coast of South America in the 1600s, with the appearance of unusually warm water in the Pacific Ocean around Christmas.

### **El nino phenomenon**

- El Niño is a climate cycle in the Pacific Ocean with a global impact on weather patterns.
- The cycle begins when warm water in the western tropical Pacific Ocean shifts eastward along the equator toward the coast of South America. Normally, this warm water pools near Indonesia and the Philippines. During an El Niño, the Pacific's warmest surface waters sit offshore of northwestern South America.



### **El nino and teleconnection**

Changes in the atmosphere in one place can affect weather over 1000 miles away. Scientists are trying to sort out how this works so that they can better understand and predict weather patterns worldwide. They call these patterns teleconnections.

Teleconnection patterns are caused by changes in the way air moves around the atmosphere. The changes may last from a few weeks to many months. Teleconnection patterns are natural. However, they may be changed as Earth's climate warms.



The amount of precipitation changes during El Nino in many areas of the world. There are a number of different teleconnection patterns. Elnino is one of them.

El Niño is a major teleconnection pattern created by El Niño-Southern Oscillation (ENSO) changes to the atmosphere and ocean. During El Niño events cold and dry air is blown into places that typically have warm and moist air. This causes a big change in the weather. For example, the amount of clouds in one

area could lead to changes in precipitation elsewhere. Changes in the temperature of the ocean surface in the tropical Pacific Ocean also affect the weather.

### **El Nino impact on the world climate**

- El Niño affects the global climate and disrupts normal weather patterns, which as a result can lead to intense storms in some places and droughts in others.
- An El Niño creates stronger wind-shear and more-stable air over the Atlantic, which makes it harder for hurricanes to form. However, the warmer-than-average ocean temperatures boost eastern Pacific hurricanes, contributing to more-active tropical storm seasons.
- Strong El Niños are also associated with above-average precipitation in the southern tier of the United States from California to the Atlantic coast. The cloudier weather typically causes below-average winter temperatures for those states, while temperatures tilt warmer-than-average in the northern tier of the United States. Rainfall is often below average in the Ohio and Tennessee valleys and the Pacific Northwest during an El Niño.
- Record rainfall often strikes Peru, Chile and Ecuador during an El Niño year. Fish catches offshore South America are typically lower than normal because the marine life migrates north and south, following colder water.
- El Niño also affects precipitation in other areas, including Indonesia and northeastern South America, which tend toward drier-than-normal conditions.

Temperatures in Australia and Southeast Asia run hotter than average. El Niño-caused drought can be widespread, affecting southern Africa, India, Southeast Asia, Australia, the Pacific Islands and the Canadian prairies.

### **Global warming and El Niño**

The United Nations has declared 2015 the hottest year since record keeping began. It was also a year marked by the occurrence of a **“super” El Niño.**

### **Are the warming temperatures and El Niño connected?**

- Most scientists agree that the warming trend (2011 to 2015 is the hottest five-year period ever) is due to greenhouse gases humans have put into the atmosphere.
- But 2015's warming of 0.9°C above the average for the 20th century was the “largest margin by which the annual global temperature record has been broken,” according to the National Oceanic and Atmospheric Administration, **because of the presence of a strong El Niño.**
- But, due to lack of data, the clarity regarding the connection between global warming and El Niño still not clear among the scientists and it is yet to be proved.

### **El Niño and Indian monsoon**

- Generally, El Niño and the Indian Monsoon rains are inversely related. Trade winds coming from South America normally blow westward towards Asia during Southwest Monsoon. Warming of the Pacific Ocean results in weakening of these winds. Therefore, moisture and heat content gets limited and results in reduction and uneven distribution of rainfall across the Indian sub-continent.
- The most prominent droughts in India, six of them, since 1871 have been El Niño triggered droughts, including the recent ones that occurred in 2002 and 2009.

Nevertheless, it is important to note that all El Nino years do not lead to drought in India.

- The year 1997-98 is a stark reminder as it was a strong El Nino year but that did not cause drought in India, in fact, rainfall was in excess. On the other hand, a moderate El Nino in 2002 resulted in one of the worst droughts.
- From this fact, one thing is clear that El Nino years adversely affect the weather in India in terms of Monsoon rain, with very few exceptions. During an El Nino year, the rainfall is generally below the normal average, which has its negative bearing on crop production.