

EL NIÑO

Aggravated risk associated with extreme weather

From March 2015 to the first half of 2016, a new phase of the naturally occurring climatic cycle known as the El Niño Southern Oscillation (ENSO) contributed to the highest average global temperatures on record, about 1°C above those of the pre-industrial era, and disrupted weather patterns worldwide.⁵⁹

El Niño's effects depend on the season and vary from one cycle to the next, but evidence from past events suggests that the most likely impacts tend to be lower than average rainfall over Indonesia and northern South America, and the opposite in south-eastern South America, the southern US and eastern equatorial Africa.⁶⁰

A strong El Niño also tends to increase the number of cyclones in the Pacific and reduce

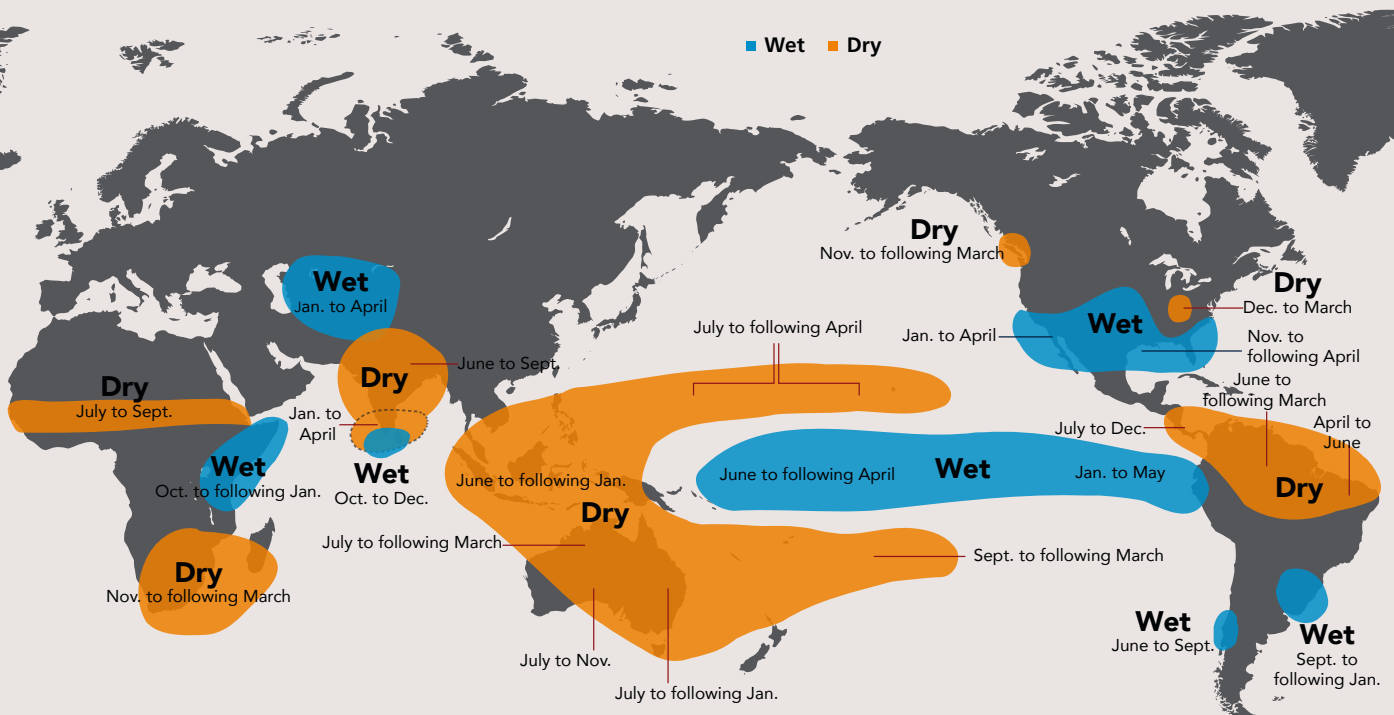
the number of hurricanes in the Atlantic. Both were true in 2015, with an unprecedented 21 category four and five storms in the north Pacific, breaking the previous record of 17 set in 1997.⁶¹

El Niño episodes are associated with above average sea surface temperatures in the central and east-central equatorial Pacific, while the opposite phase of the cycle, known as La Niña, is associated with cooler than average waters. El Niño episodes typically occur every two to seven years. They last for anything from nine months to two years, reaching their maximum strength between October and January and then continuing for some months before decaying.

The latest El Niño peaked in November and December 2015, but its impacts on agriculture

El Niño and Rainfall

El Niño conditions in the tropical Pacific are known to shift rainfall patterns in many different parts of the world. Although they vary somewhat from one El Niño to the next, the strongest shifts remain fairly consistent in the regions and seasons shown on the map below.



Original map: International Research Institute for Climate and Society, Earth Institute, Columbia University

Sources:
1. Ropelewski, C. F., and M. S. Halpert, 1987: Global and regional scale precipitation patterns associated with the El Niño Southern Oscillation. *Mon. Wea. Rev.*, 115, 1606-1626;
2. Mason and Goddard, 2001. Probabilistic precipitation anomalies associated with ENSO. *Bull. Am. Meteorol. Soc.* 82, 619-638



and deteriorating food and livelihood security will continue to be felt throughout 2016 and longer in some parts of the world. As of February 2016, the phenomenon was expected to transition to a neutral ENSO state during the second quarter of the year.⁶² Evidence then points to a possible La Niña setting in later in the year, though at the time of writing it was too early for experts to be certain.

Climate patterns, however, are more complex than El Niño and La Niña alone can account for. Other local or regional tropical weather systems also affect rainfall patterns. The Indian Ocean dipole and the Tropical Atlantic sea surface temperature, for example, may affect the climate on adjacent land masses, and winter conditions in the northern hemisphere are influenced by the so-called Arctic and North Atlantic oscillations.⁶³

Across decades, changes in the global climate brought on by human activity also play a part.

Some studies suggest that El Niño episodes are becoming more intense as a result of changes in the global climate,⁶⁴ but there is no scientific consensus on the extent to which this may be the case. It is simply not known how past and

future interactions between El Niño, La Niña and long-term climate change will play out.⁶⁵ Meanwhile, as the World Meteorological Organization's secretary general has put it: "El Niño is turning up the heat even further."⁶⁶

For the people most exposed and vulnerable to rainfall extremes and higher temperatures associated with the phenomenon, its effects have been devastating and have led to displacement in many parts of the world.

People dependent on agriculture in the Philippines who were initially displaced by conflict in 2015 also faced effects from El Niño and later flooding, leading to crop production losses estimated at more than 24,000 metric tonnes. Photo: © M, Navales/FAO, July 2015