

El-Nino and its Connection with Indian Monsoon

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Abstract

The unpredictable nature of monsoon affects directly the Indian economy. Earlier El Nino phenomena was thought to be affecting only the west coast of South America but now it is linked to Indian monsoon. El Nino refers to all the conditions associated with warmer than normal water in the Tropical Pacific region. The La-Nina is just opposite to El Nino. La Nina favors monsoon in India but El Nino does not. The accurate prediction of the El-Nino effect will certainly help the planners for making correct food policies in future.

Keywords: El-Nino; La-Nina.

Introduction

Sun is the only source of energy for driving all natural process on the earth. The uneven heating of earth causes general circulation of the ocean and atmosphere and determines broadly the annual climatic condition. Majority of the atmospheric circulations occurs in troposphere. The tropical atmospheric circulation is extended up to 50% or more of the earth's surface. Ocean currents also play important role in determining the weather conditions of atmosphere. The cool oceanic currents favour the stable weather and warm currents favors the instability in the weathers. The vagaries of southwest monsoon are well known for its influence on Indian economy. In recent years erratic dry and wet spells of weather in many parts of the world have drawn our attentions of the ocean on weather. Many experts have expressed their view that the weak monsoon activities over India in some years may be attributed to the famous El-Nino effect.

El Nino and Indian Monsoon

The Indian Meteorological Department, in its first long-range forecast for 2015 monsoon season predicted only 93 per cent of the "normal" rainfall during the season, due to El Nino phenomena. The IMD said parts of the northwest and central India are

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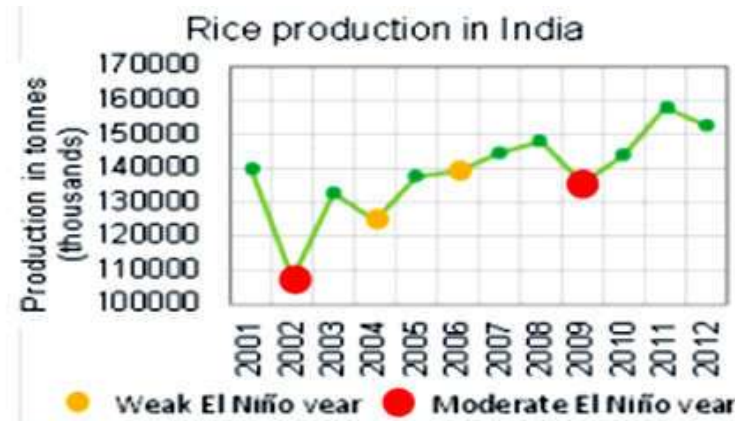
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likely to be affected the most with less rainfall. This is a typical El Nino feature where northwest India and central India will receive less rainfall. There are 70 per cent chances that El Nino will continue during this monsoon, DS Pai, Head of the IMD's Long Range Forecast department, said. This is be the second consecutive year that India may witness reduced rainfall. From the times immemorial the fate of agriculture has been inseparably with the weather. The farmers have always been at the mercy of weather for raising the agriculture crops.

Of all weather elements, rainfall is the single most important factor affecting plant growth, agricultural production, irrigation schedule and generation. Summer monsoon which is also known as Southwest monsoon (June-September) rainfall constitutes about 75-80% of the total rainfall occurs in India and nearly four-fifth of the country receives rain during this season.



Graph 1:

Note: The impact of El Niño on rice production is experienced the same year of the event
 source: FAO Statistical database available from <http://faostat.foa.org/>

Table 1:

Year	Occurrence	Impact	Monsoon*
2004	El Niño	Drought	88%
2005	neutral	normal	101%
2006	neutral	normal	103%
2007	La Niña	excess	110%
2008	La Niña	Above normal	105%
2009	El Niño	severe drought	79%
2010	La Niña	normal	100%
2011	La Niña	normal	104%
2012	Mide El Niño	Below normal	92%
2013	neutral	Above normal	106%

monsoon as percentage of 50- year Avarage
 source: skymet

The term El-Niño has come from the Spanish speaking people who live along the Pacific coast of Peru. Each year in late December, a southward moving current warms the water. The Peruvians started calling the warm current El Niño i.e. boy child, for the infant Jesus – because it comes around Christmas.

In an irregular interval, in every few years, the ocean warming is greater than normal and leads to disruption of the usually abundant fish and other marine life. El Niño was thought to be affecting only the west coast of South America. Now we know it has become a part of a global chain of ocean and atmospheric events.

El Niño is a condition in which the temperature of sea in the equatorial Pacific Ocean become unusually warm. It is known to have an effect on weather events worldwide, including the monsoon. La Niña means The Little Girl in Spanish.

El Niño is a condition in which the ocean temperatures in the equatorial Pacific Ocean become unusually warm. It is known to have an effect on

weather events worldwide, including the monsoon. At the end of year, ocean surface temperatures warm along the coasts of Ecuador and northern Peru. referred to this annual warming as “El Niño,” meaning “The Child,” owing to its appearance around the Christmas season. The appearance of El Niño signified the end of the fishing season. Every 2-7 years a much stronger warming appears along the west coast of South America, lasting for several months and is often accompanied by heavy rainfall in the arid coastal regions of Ecuador and northern Peru. Over time the term El Niño began to be used to refer to these warm episodes.

El Niño Southern Oscillation (ENSO), refers to the effects of a band of sea surface temperatures which are abnormally warm or cold for long periods of time that develops off the western coast of South America and causes climatic changes across the tropics and subtropics.

The “Southern Oscillation” is the variations in the temperature of the surface of the tropical eastern

Pacific Ocean, with warming known as El Niño. When air pressure is high around Australia, it is low in Tahiti. This is called southern oscillation. The pattern of low and high pressure over the Indian and Pacific Ocean gives rise to a vertical circulation along the equator (Walker circulation) with its rising limb over the low-pressure area and descending limb over the high pressure area. The location of the low pressure and hence the rising limb over Indian Ocean is considered to be favorable for good monsoon rainfall over India.

It's shifting towards east from its normal position augers poor monsoon rainfall in India. By 1970's, scientists realized that El Niño and the southern oscillation are part of a huge ocean-atmosphere system that changes storm tracks. The effects are felt far away from its tropical home. The El Niño was linked to the World Meteorological Organization (WMO) began the Tropical Ocean and Global Atmosphere (TOGA) Programme. From 1985 to 1994, scientists tried to learn if some of the El Niño's effects could be predicted. As part of the experiment, approximately 70 weather buoys were moored across the tropical Pacific.

These radioed back air and ocean temperature via satellite to weather centers. By comparing the collected data to the weather events around the world, TOGA scientists developed computer models to predict El Niño's effects. The buoys situated in Tropical Pacific are still sending back the data and the computer models are constantly showing how El Niño and La Niño directly affecting the weather in Tropics. By 1996, Peru, Brazil and Australia were using forecast to predict El-Niño drought or rain three months ahead.

The forecast enabled the farmers to plant crops to make the best use of the most suitable conditions. Now El-Niño is being used to forecast the season in the tropical locations, but to estimate the effects more accurately some other factors have to be taken into

account. The success of El-Niño predictions generated great interest among the scientists to use the ocean conditions in predicting the weather, especially to forecast what kind of average conditions in predicting the weather, especially to forecast what kind of average conditions to expect months or even a year in future. Now it has been well established that El Niño is the part of a cycle occurring in the Pacific Ocean.

Conclusion

The accurate forecasting of El Niño will go a long way to help the population over the whole globe. The southwest monsoon is highly variable in all time scale. The year-to-year variability is quite large. Over the last more than a decade the monsoon rainfall has been almost normal over the country, although there were variations from one region to other. The Indian Agriculture is dependent on timely receipt of rains, therefore correct forecast of the season incorporating the El-Niño effect will go a long way to help the planners for making correct food policies for the next season.

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