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“Super” El Niño Poised to Disrupt 2015 Cotton Harvest Season

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Comparison of Previous Strong El Niño Years with 2014 - 2015

The fall seasons of 1997 and 2009 are two previous strong El Niño seasons that would be in most producers’ memory and we should certainly review history to better prepare us for the future considering the current strong El Niño forecast. The fall / winter of 2014 and winter of 2015 were classified as a neutral year. The charts may be an indicator of what to expect from this El Niño forecast.

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<tbody>
<tr>
<td>El Nino 1997 - 1998</td>
<td>3.01</td>
<td>3.10</td>
<td>8.32</td>
<td>6.72</td>
<td>4.34</td>
<td>7.17</td>
<td>8.80</td>
<td>2.44</td>
<td>43.90</td>
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<td>El Nino 2009 - 2010</td>
<td>3.51</td>
<td>4.76</td>
<td>2.26</td>
<td>10.42</td>
<td>8.83</td>
<td>3.83</td>
<td>2.17</td>
<td>2.39</td>
<td>38.17</td>
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<td>Neutral 2014 - 2015</td>
<td>1.34</td>
<td>4.30</td>
<td>2.41</td>
<td>5.13</td>
<td>2.77</td>
<td>3.58</td>
<td>1.70</td>
<td>4.47</td>
<td>25.70</td>
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The rainfall amounts during September 1997 through April 1998 in Headland, Alabama were 70.8 percent greater in the El Niño year 1997 compared to rainfall received during the same months of 2014 – 2015. When comparing El Niño during 2009 through early 2010 the rainfall amount was 48.52 percent greater than during the same time period of the neutral year 2014 – 2015.

However the rainfall events also play a factor during harvest season and not just the amounts. Most of the time it would just take a small rain shower, without much rain, which will delay an entire day and it being lost to harvest time. Interestingly enough both 1997 and 2009 El Niño years had 82 days each season as being recorded as rainfall days. When comparing this to the 2014 harvest season, which was recorded as a neutral season, there were only 68 days recorded as rain event days. This is a 20.5 percent increase in loss harvest time.

When comparing the prime harvest months of September – November the El Niño years were somewhat different. The rains started much earlier in the 2009 El Nino season than the El Niño did in 1997. This really impacted harvest with an increase in lost harvest time by 52.35 % when compared to the neutral year 2014. The loss time was not as much but still significant with a loss of 19 % in harvest days when comparing the El Nino year of 1997 and the neutral year of 2014 for Headland, Al
**Tropical Pacific Heating up** - Over the past several months, water temperatures in the central and eastern Pacific Ocean have been warming at an alarming rate, building one of the strongest El Niño’s in decades. El Niño refers to the appearance of unusually warm water along the equator from the coast of South America to the central Pacific that occurs every 2 to 7 years. Though commonly measured by sea surface temperatures, El Niño is actually a coupled ocean-atmospheric phenomenon that disrupts climate and weather patterns around the world.

Every El Niño differs in the timing of its evolution and the eventual strength, but this year’s El Niño has come on earlier and stronger than any recorded since 1950. Sea surface temperatures in the monitoring region soared to 2.2 degrees Celsius warmer than normal in August, a record for the month. The all-time record is 2.7 in November of 1997 during the strongest El Niño of this century. Forecasting centers around the world predict the current event to continue building in the next few months and it could approach the strength of the 1997/1998 and 1982/1983 events. It is virtually certain that this El Niño will affect our weather patterns through the spring of next year.
Sea surface temperature departures from normal (°C) for the week of August 24-30, 2015.

**Already Seeing Impacts** – One unique feature of the current El Niño is how early in the year it formed. The usual life cycle begins with ocean temperatures starting to warm in the mid to late summer, and then reaching El Niño thresholds (greater than 0.5 °C warmer than normal) in the fall and peak strength in the winter months. The current event marked 1.0 °C warmer than normal (double the 0.5 °C threshold) in April and the warming has not slowed since.

The warm ocean surface triggered the flooding rains in Texas and Oklahoma in May of this year, with satellite images showing a clear connection between the warmth and moisture in the tropical Pacific and the abundant atmospheric moisture during the flood events. Texas and Oklahoma recorded their wettest month ever in May 2015, as did the contiguous U.S. as a whole.

Even with the flurry from Danny, Erika, and Fred in the last two weeks, the Atlantic hurricane season is unusually quiet this year, as was forecast. El Niño creates an environment of unfavorable vertical shear (winds changing with height) that tears apart tropical systems before they can take form and strengthen. Different measures show vertical shear at unprecedentedly high levels over the Atlantic and Caribbean for most of this summer.

El Niño also ushered in warm and dry conditions across much of the Southeast United States in the second half of summer. Though El Niño is not usually much of a player in our summer weather patterns, similar strong and early forming events brought late summer dryness in the past. The west coast of Florida is a glaring exception,
where persistent westerly, moist flow caused one of the rainiest July-August on record for Tampa (28.31 inches) and surrounding areas.

**Major Shifts in Fall and Winter** – While El Niño is already impacting summer patterns in the Southeast, more profound and predictable changes are on the horizon for the region as fall and winter approach. With the changing of the seasons, the jet streams over North America begin their yearly migration south and become more of a player in the passage of weather systems (like low pressure storms, cold fronts) from week to week. El Niño modifies the usual jet stream patterns and favors a strong subtropical jet that steers frequent winter storms, drenching rains, and cooler temperatures over the northern Gulf Coast and peninsula of Florida. The frequent rains usually commence around November and persist throughout the winter and into the month of March. However, the onset of the El Niño rains is hard to predict and can begin as early as the first week of October, as happened in 2009.

![Typical jet stream (red dashed line) and storm track during strong El Niño’s.](image-url)
How Much Rainfall? – Predicting the exact amount of rainfall and the timing is much more difficult than the general winter trend. The pattern of an active subtropical jet will come and go throughout the winter months, so periods of more or less “normal” weather will be interspersed with periods of recurring winter storms and heavy rainfall. For the winter as a whole, Florida’s dry season will be impacted the most with expected rainfall totals nearly doubling normal. The northern Gulf coast, including Southern Alabama and Georgia, should see a more modest increase of 10%-30%, partly because normal winter rainfall is much greater than peninsular Florida. One common misconception, a “super” El Niño does not necessarily mean that much more rainfall than a moderate one, just a greater confidence the overall pattern will repeat. However, 1997/98 (November-March) did bring record rain totals to the Southeast and Florida in particular.
Severe Weather a Threat – A more southerly storm track and the subtropical jet stream enhancing upper level winds means a more favorable environment for severe weather and deadly tornado outbreaks across the Florida peninsula. Winter is the preferred season for stronger and long-path tornadoes here and studies have shown that El Niño can enhance the threat. Both of Florida’s deadliest tornado outbreaks happened during El Nino, February 1997 killing 42 and February 2007 killing 21.

Management Strategies With this El Niño

There are some strategies that we should employ when approaching this harvest season. There may be increased harvest cost in some options but harvest loss and decreased quality is an opportunity cost still the same if we are delayed by excessive rainfall.

1. **Defoliate sooner** – don’t delay harvest. Once the Upper most boll that you intend to harvest has reached physiological maturity this should trigger defoliation. The upper most cracked first position boll and the five nodes above this first position cracked boll are considered to be physiologically mature.

2. **Start Early and run longer** – On days that cotton can be harvested your management should be to be ready to start as soon as the seed will crack and run later in the evening even with night lights until the dew has fallen or about to fall. Adding 2 to 3 hours a day can add up over a week’s time.

3. **Hire Custom Harvesters** – I realize the expense of contracting custom harvesters when you have your own cotton harvester, but harvest and quality loss that can occur from weathering and storms could very well be money well spent.

4. **Run more equipment** - Some farms may have a spare cotton harvester and only use it as a spare or if you have more acres to harvest than what a single machine could comfortably harvest during a regular non El Niño season, then you should look at operating that spare machine or purchasing an additional machine to get through this El Niño harvest season.

5. **Operate two harvest crews** – In peanut country I often witness farmers harvest the peanuts first and then harvest the cotton crop. I understand the logic because peanuts are underground and the threat of losing them in the ground is real and the cotton is on a stalk and the thought is that the
cotton will wait on you. That approach may work several years but with the strong El Niño forecast, farmers need to look at the two years that are being compared as strong El Niño years and determine if that were to be this year’s harvest season, how they could reduce the problems that can be inflicted by such a weather pattern. Hiring more labor and operating two harvest crews, one for peanuts and one for cotton, may be an option. It is obvious that this will increase management stress, but so does the loss of the crop and the quality of the crop due to inclement weather patterns.