CropAlert Report – June 2013

We are pleased to provide you with the first CropAlert® Growing Conditions Report of the 2013 season. CropAlert is produced on a monthly basis and provides a current estimate of future crop yields based on season-to-date weather observations. AIR updates these estimates throughout the growing season. At this time we would like to provide you with an update of our corn and soybean yield models and where we stand with respect to current weather influences in crop development and potential impact on end-of-the-season yield as of June 22. Before discussing the current AIR yield estimates, we will discuss the significant changes in the U.S. MPCI program rating that have been implemented by the Risk Management Agency (RMA) and have a significant impact in reinsurance premium and the probability of portfolio gains and losses for the 2013 crop growing season.

Significant Changes in MPCI Premium Estimates for the 2013 Crop Year

In recent years, the U.S. MPCI program has undergone several revisions of premium rates by the RMA for the key program crops with direct implications for the program's overall premium as well as crop insurers' and reinsurers' probability of gains and losses. These revisions are structural, and it appears that the RMA will continue making annual adjustments to the program.

As background, in November 2011, RMA announced a new rerating methodology that changed the premium rates for corn and soybeans for the 2012 crop growing season.[1] As a result, AIR released to the industry an impact study using the new corn and soybeans premium rate changes.[2]

Then, in November 2012, RMA announced that the base rate for corn, cotton, sorghum, soybeans, rice, and wheat would change again for the 2013 crop growing season.[3] According to the RMA Premium Rate Study Update document, this was done as a result of a continuous rerating procedure implemented to adjust premium rates to actuarial sound values given the latest data and experience.[4] Again, AIR immediately issued a new impact study to the industry to communicate the implications of the change on MPCI probable gains and losses.[5] Given the limited amount of technical information provided by RMA on the rate changes, the key assumption used in the AIR study was that the rate changes for 2013 were

[1] http://www.rma.usda.gov/help/faq/rerating.html
[2] http://www.air-worldwide.com/publications/white-papers/documents/impact-of-2012-corn-and-soybean-premium-rate-changes-on-mpci-gain-and-loss-probabilities
[3] http://www.rma.usda.gov/news/2012/11/rateadjustment.html
[4] http://www.rma.usda.gov/news/2012/11/2013premiumrateqa.pdf
[5] http://www.air-worldwide.com/publications/white-papers/private/documents/impact-of-2013-premium-rate-changes-on-gain-and-loss-probabilities-in-the-air-u-s--mpci-model

restricted to the base rates, as was the case for changes implemented during the 2012 crop growing season. The resulting AIR estimate for overall premium of 1.2% was very close to the RMA estimate. According to the RMA Premium Rate Study Update document, "The estimated impact on the overall book of business is small – around a 1 percent decrease in premium. The impact on AIP's is expected to be similarly small."

While performing Fund Designation services for crop insurers for the spring planted crops, we discovered a discrepancy between the company's expected premium volume and the modeled premium volume. Further investigation led us to conclude that the 2013 premium rate change was not limited to changes in the base rate of key program crops, as was the case for the 2012 premium rate change. The new rerating implemented by RMA included a whole set of factors within the rating procedure, such as reference yields, exponents, and trend adjustments. Overall, the impact of the rerating is a much larger reduction in crop insurance industry premiums compared to the values originally announced by RMA.

The Farmdoc team at the University of Illinois analyzed the 2013 premium rate changes in more detail using a premium estimation procedure that includes all factors of the premium calculation and not just the base rate.[6] They concluded that, for Illinois, the premium rate for corn will drop by approximately 5%, with some counties showing a 20% (or more) drop. A few counties in the southern part of Illinois are showing an increase in premiums of approximately 10%. A similar picture was presented by Farmdoc for soybeans, with premium rates declining by approximately 20%.

These results are in stark contrast to the base rate change for Illinois for corn and soybeans announced by RMA of -4% and -9%, respectively, which could be roughly cut in half due to the fact that most of the insurance policies in Illinois are revenue products, and the base rate only affects the yield portion of the policy's risk. Further investigation by AIR using the RMA actuarial master document and our internal policy premium calculator indicated the following premium reductions for key Corn Belt states: -13% for Illinois, -14% for Iowa, -16% for Minnesota. **For 2013, the overall premium reduction for all of the U.S. is about -10%.** These estimates incorporate all factors that affect the premium values, including price and volatility changes.

The Role of Commodity Prices and Price Volatilities in Premium Volume

In addition to the rerating performed by RMA, there are two more factors impacting the overall level of crop insurance premiums in the U.S. MPCI program. The first is commodity prices, and the second is the commodity price volatility determined by the Chicago Mercantile Exchange (CME) futures market.[7] Table 1 shows an example of the impact of prices and volatilities on premium reduction computed by AIR using a large sample of Corn Belt counties. In general, commodity prices changed slightly from 2012 to 2013 and their impact on premium reduction is approximately 2%. On the other hand, commodity price volatilities changed slightly as well, but for corn this change led to a significant impact on premiums: The reduction of the price volatility from 0.22 to 0.20 resulted in a premium reduction of about 5%.

[6] http://www.farmdoc.illinois.edu/IFES/2012/IFES-2012-Sherrick.pdf
[7] http://www.rma.usda.gov/tools/pricediscovery.html

Table 1: Impact of changes in commodity prices and volatilities on U.S. MPCI crop insurance premiums for 2013

	Price USD			Volatility		
	Corn	**Soybeans**	**Wheat**	**Corn**	**Soybeans**	**Wheat**
2012	5.68	12.55	8.62	0.22	0.18	0.26
2013	5.65	12.87	8.78	0.20	0.17	0.24
Impact on Premium	-0.53%	2.55%	1.86%	-5%	-2.5%	-2%

Table 1 shows that the price increase and the volatility decrease compensate each other for soybeans and wheat. For corn, the combined effect from these two factors is a 5.5% drop in 2013 premium compared to 2012. Given the volume of the corn premium in the U.S. MPCI program compared to the rest of the program crops, this will lead to an overall premium reduction of approximately 2%.

In summary, AIR estimates that for 2013, premiums are about 10% lower than for 2012 relative to total sums insured.[8] This is in large part due to all other changes in the premium calculation procedure implemented by RMA (coverage level differentials, reference rates, exponent factors, etc.) following their rerating for 2013. From conversations with industry, the expectation was that RMA would only change prices, volatilities, and the base rate. AIR estimates that if only prices, volatilities, and the base rate changed (as the industry expected RMA would do), then the premium reduction for 2013 would have been about 3.5%.

Recent U.S. MPCI Model Changes Implemented by AIR

To accommodate the significant changes to the program that can occur on a yearly basis and are built into the structure of the program itself, AIR has introduced several important model updates with the CATRADER Version 15 released this June. Model users[9] will now have access to three different price volatility catalogs that will allow for more refined crop portfolio analysis given the increasing uncertainty in commodity market prices. Another important update to the model is that it now allows users to modify industry premiums by adjusting default values lower or higher, as the RMA most probably will continue changing premium rates of the key program crops, as announced. Also, the historical event catalog has been updated to incorporate the years 1974 through 2011 and additional data cube reporting tools have been added for easy manipulation and visualization of model results.

[8] Uncertainties in our estimate include the actual size of the corn and soybeans book given the delayed planting season, change in coverage levels due to bad experience during the 2012 drought, and shifts in unit structures (enterprise versus basic). We do not know exactly the premium levels for 2013 and will have to wait for the acreage and premium reports submitted in June 2013, but indications point to a lower premium level than 2012. In 2012 there was a similar situation when originally premiums were estimated to be about USD 12.5 billion for the whole program but volatility changes (larger than from 2012 to 2013) and base rate changes reduced the premiums to USD 11.1 billion.

[9] If you are not currently licensing the AIR U.S. MPCI model but would be interested in a model demo, please contact Oscar Vergara at overgara@air-worldwide.com

The uncertainty in the estimation of corn and soybean yields for 2013

The major drought event of 2012 mainly affected the corn crop and reduced its yield potential considerably. In fact, 2012 is the third year in a row in which corn yields are below the trend yield. For yield modeling purposes, this complicates the fitting of a linear trend line that is not heavily biased by the low corn yields observed in the last three years. Table 2 and Figure 1 show the extrapolated corn yields based on various time periods used to establish the linear trend line. In can be clearly seen that the trend line including the year 2012 determines a much different trend yield for 2013 than when using only the years from 1990 to 2011 or excluding the last three consecutive years of low yields.

Table 2: U.S. corn yields: trend values extrapolated to 2013 based on different time windows

Year	Yields Utilized	Extrapolated to 2013
2009	1990 - 2008	166.1
2010	1990 - 2009	168.0
2011	1990 - 2010	166.3
2012	1990 - 2011	163.5
2013	1990 - 2012	156.9

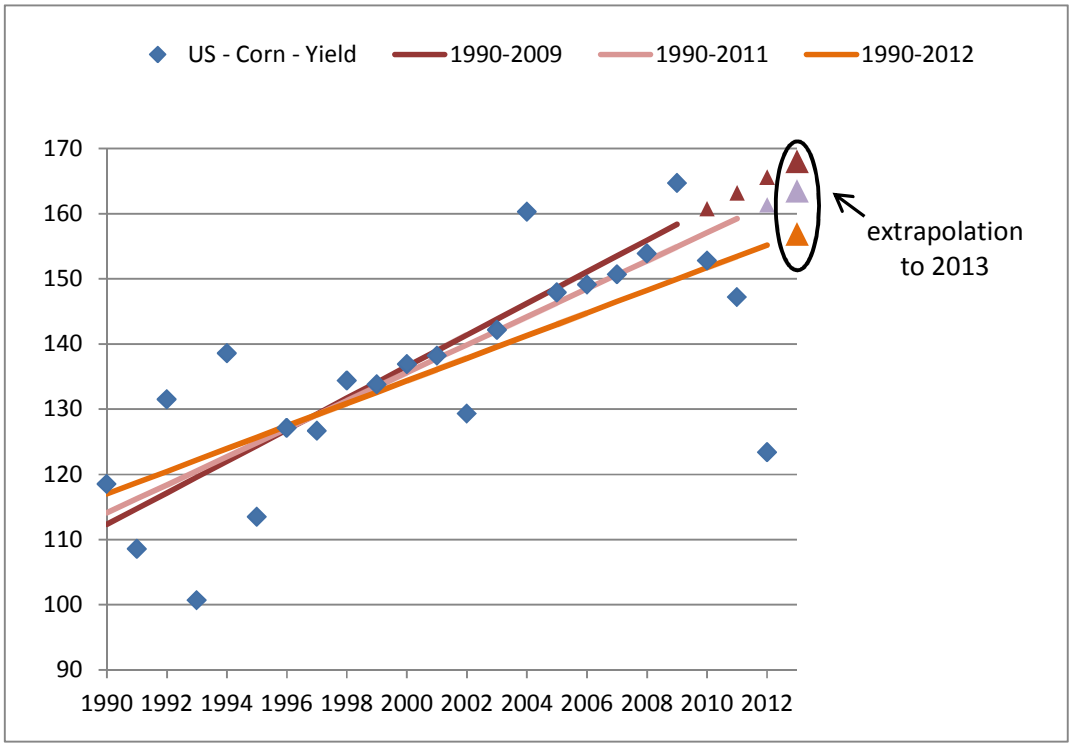

Figure 1: Observed U.S. corn yields from 1990 to 2012. Three trend lines included in Table 2 and the extrapolated corn yield values for 2013

This is not the only challenge for accurately predicting the trend yield value for 2013. As discussed in last year's CropAlert of June 2012[10], there is mounting evidence that the yield increase from year to year has slowed down in many regions of the U.S. due to expanding the acreage to marginal land, which is not as productive, as well as a possible slowing down in the levels of technological improvements and adoption for crop production.

AIR corn and soybean yield estimates for 2012

The AIR methodology to establish a trend line for corn and soybeans is based on the Agricultural Weather Index (AWI), which first establishes the contribution of weather to the actual low yields of the past three years and determines the trend line from a "weather-corrected" yield time series that is more representative of current technological improvements than the original observed yield time series.

AIR Baseline

Utilizing the AIR-AWI weather-based modeling technology, the AIR baseline trend yield for 2013 is **159.8 bushels/acre for corn** and **45.1 bushels/acre for soybeans**.

Current growing season and AIR estimates up to date

The start of the 2013 crop growing season has been affected by very wet conditions in key regions of the Corn Belt that delayed planting activities for corn and soybeans. The weather-based AIR model already factors the adverse weather effect on the expected end-of-the-season yield.

As can be seen in the CropAlert maps, there has been plenty of precipitation in the Corn Belt during the months of May and June. The current crop moisture map indicates that the soil moisture content is very favorable for crop development. The downside of having a wet start to the growing season is that the corn plant is less stressed due to the appropriate levels of moisture and tends to develop shallower roots, which may become a problem if there is a dry spell during the summer. Also, corn with shallow roots is more susceptible to wind damage, as was observed during the 2008 crop growing season, which also had a wet start. In September of 2008, the remnants of Hurricane Ike severely damaged a significant amount of corn acreage in Illinois, Indiana, and Ohio as a result of winds blowing down corn stalks that were not sufficiently anchored to the soil due to shallow root systems.

Given the weather that the young crops have experienced so far, our current yield estimates are **156.6 bushels/acre for corn** and **45.2 bushels/acre for soybeans**. These values might change substantially depending on the weather conditions for the remaining of the growing season. The most critical part of the growing season is still ahead and the good moisture conditions at the start will be very beneficial later in the growing season once temperatures peak in July-August.

[10] http://www.air-worldwide.com/Publications/Crop-Alerts/June-2012-Crop-Alert/

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Corn and Soybean Yield Forecasts for End of June, 2013

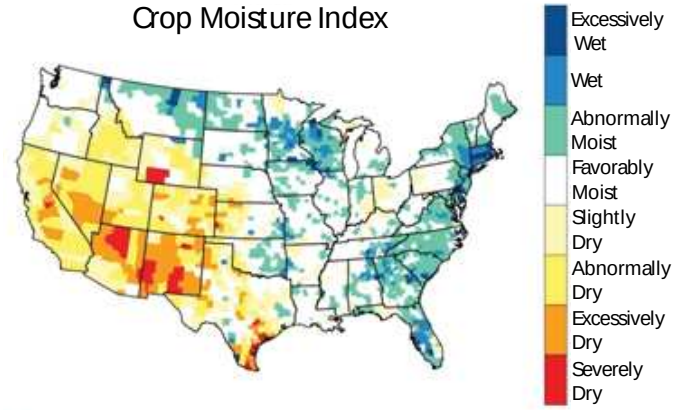
CORN				
State	AIR Current yield projection* Valid through June 22, 2013	AIR Percent of normal yield Valid through June 22, 2013	WASDE Yield forecast: May, 2013	WASDE Yield forecast: June, 2013
IA	174.5	**97.0%**	**-**	**-**
IL	163.2	**97.3%**	**-**	**-**
MN	172.2	**97.8%**	**-**	**-**
IN	157.9	**97.5%**	**-**	**-**
OH	164.5	**97.7%**	**-**	**-**
MO	132.9	**97.4%**	**-**	**-**
WI	149.9	**96.5%**	**-**	**-**
NE	169.4	**99.5%**	**-**	**-**
US	156.6	**98.0%**	**158.0**	**156.5**

SOYBEAN				
State	AIR Current yield projection* Valid through June 22, 2013	AIR Percent of normal yield Valid through June 22, 2013	WASDE Yield forecast: May, 2013	WASDE Yield forecast: June, 2013
IA	53.0	**100.0%**	**-**	**-**
IL	50.7	**100.2%**	**-**	**-**
MN	42.8	**99.8%**	**-**	**-**
IN	51.0	**101.0%**	**-**	**-**
OH	49.5	**99.4%**	**-**	**-**
MO	42.4	**101.2%**	**-**	**-**
WI	42.8	**97.5%**	**-**	**-**
NE	53.4	**100.4%**	**-**	**-**
US	45.2	**100.2%**	**44.5**	**44.5**

* Current Projection: Yield predictions based on observed crop growing conditions to current date

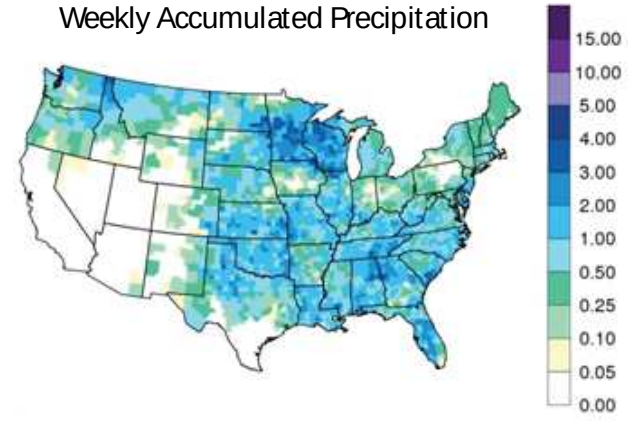
This Week's Observed Crop Growing Condition
(Valid for the week ending June 22, 2013)

Crop Moisture Index



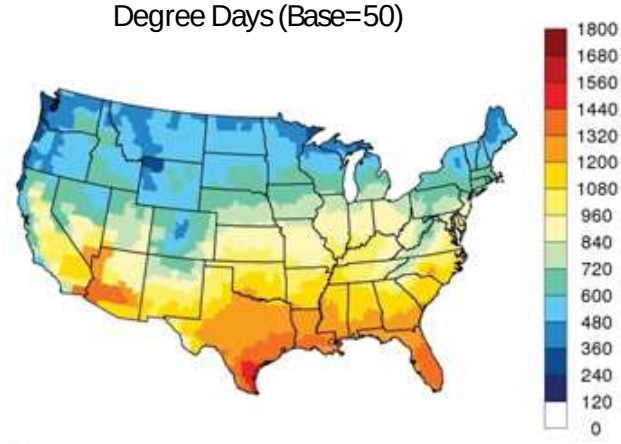
AIR WORLDWIDE

Weekly Accumulated Precipitation



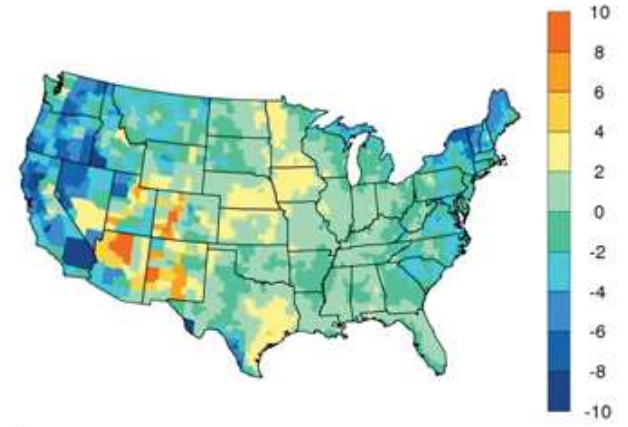
AIR WORLDWIDE

Accumulated Growing Degree Days (Base=50)



AIR WORLDWIDE

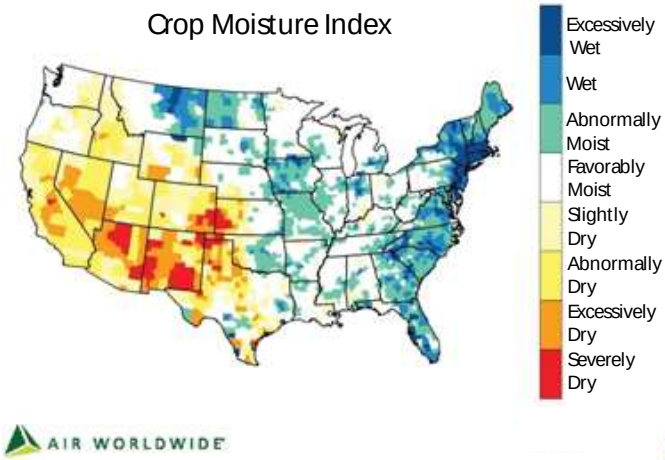
Weekly Average Temperature Anomaly



AIR WORLDWIDE

Last Week's Observed Crop Growing Condition
(Valid for the week ending June 15, 2013)

Crop Moisture Index



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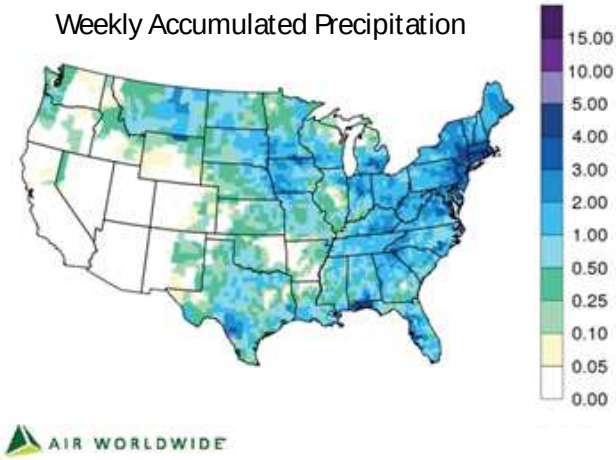
Weekly Accumulated Precipitation



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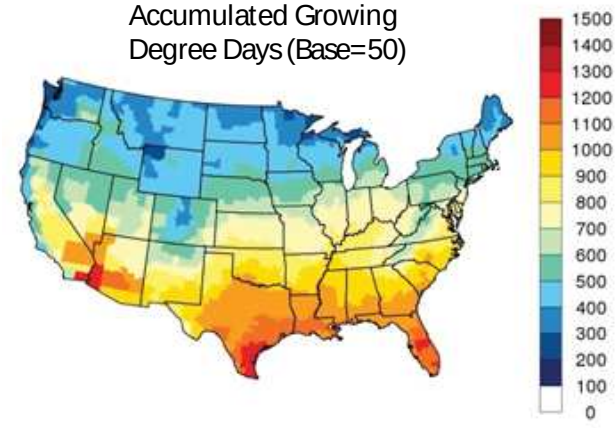
Accumulated Growing Degree Days (Base=50)



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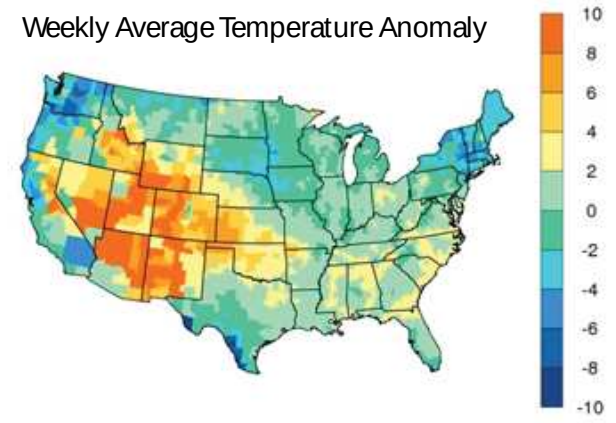
Weekly Average Temperature Anomaly



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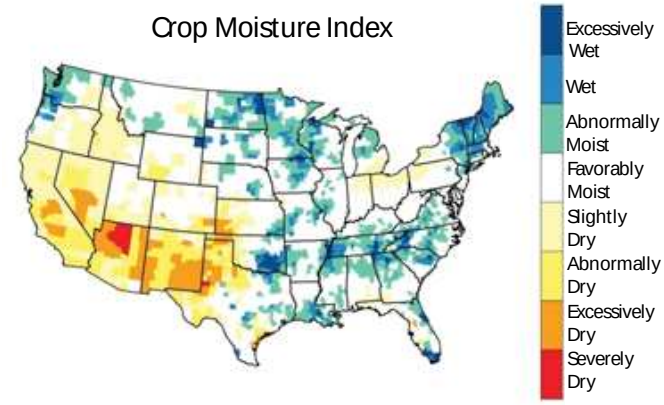
Last Month's Observed Crop Growing Condition
(Valid for the week ending May 25, 2013)

Crop Moisture Index



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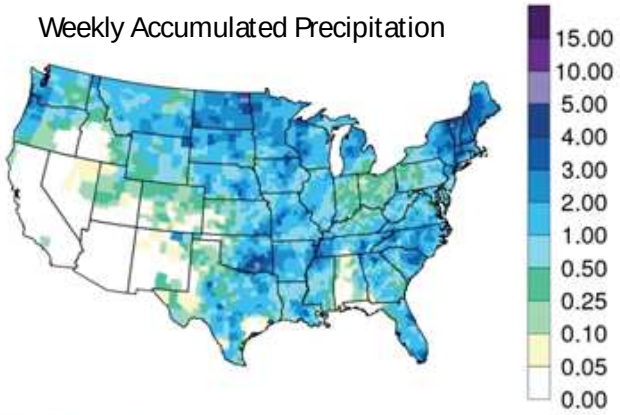
Weekly Accumulated Precipitation



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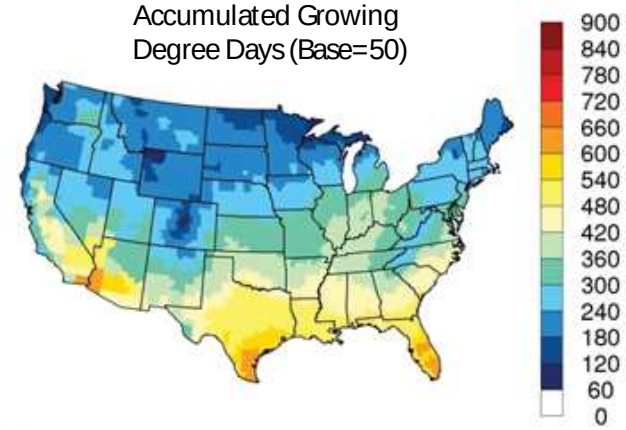
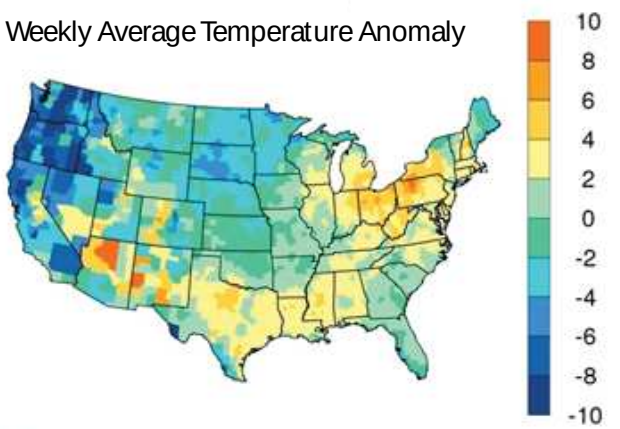
Accumulated Growing Degree Days (Base=50)



AIR WORLDWIDE

Weekly Average Temperature Anomaly



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How to contact us:

AIR is the industry-leading provider of agriculture risk modeling solutions and currently offers multiple-peril crop models for the United States and China. AIR's models are used to assess potential gains and losses to crop insurance portfolios, to inform fund designation strategies, and to price risk transfer options for an upcoming growing season. Crop insurers, reinsurers, and financial and agribusiness companies rely on AIR's software and consulting services to manage their agriculture risk. If you would like to learn more about AIR's solutions, please contact Oscar Vergara at overgara@air-worldwide.com

About AIR Worldwide:

AIR Worldwide (AIR) is the scientific leader and most respected provider of risk modeling software and consulting services. AIR founded the catastrophe modeling industry in 1987 and today models the risk from natural catastrophes and terrorism in more than 90 countries. More than 400 insurance, reinsurance, financial, corporate, and government clients rely on AIR software and services for catastrophe risk management, insurance-linked securities, detailed site-specific wind and seismic engineering analyses, and agricultural risk management. AIR is a member of the Verisk Insurance Solutions group at Verisk Analytics (NASDAQ: VRSK) and is headquartered in Boston with additional offices in North America, Europe, and Asia.