y Laurie Bedord, Advanced Technology Editor

WEATHER WATCHDOGS

TECHNOLOGY MONITORS PRECISE REAL-TIME WEATHER INFO DIRECTLY FROM YOUR FARM.

Weather is the number one factor affecting crop yield, and its unpredictable patterns may differ greatly across any given field.

"Research performed by Iowa State University found that rainfall totals can vary by nearly 2 inches across a 40-acre field," says Jacob Madden, Spectrum Technologies. "Being able to monitor the microclimates within a given field can help aid with proper forecasting for better crop marketing plans and business decisions," he says.

Yet, most farmers gauge current conditions based on general information from their local news or weather stations situated at airports, which may be hours away from a farm field. Also, weather information collected by airport sensors may only be updated every hour.

"This provides an incomplete picture for farmers who must make time- and budget-sensitive decisions based on current conditions and the forecast," says Amena Ali of Earth Networks. "Accessing real-time weather, reported from your own farm, is a vital part of making the best choices for improved operations and maximum yields. Having your own weather station provides precise, hyperlocal weather right from your farm or field whenever you need it."

GROUND TRUTHING

For Towanda, Illinois, farmer Adam Reeves, his three WatchDog 2900ET weather stations have replaced the Weather Channel and rain gauges and have become an important part of monitoring weather and environmental inputs.

"I had rain gauges at each farm, but if it rained .01 inch, it may have evaporated by the time I got to them," he says. "It's not much, but it does add up."

The weather stations log every drop, so he knows exactly what's going on in his fields. "It's not information 30 miles away at the airport," he notes. "It's right here on the farm. It's amazing to see the variations from year to year across the farms where I have the weather stations."

With a little over $3,000 invested, Reeves' stations offer him the ability to measure key parameters such as soil moisture, light, air temperature, relative humidity, rainfall, wind speed and direction, and evapotranspiration.

"I did a solar radiation study to learn how much light hits the ground," he says. "I know for a fact that if sunlight hits the ground instead of being shaded, it uses more water or it evaporates more water. I'm already ▸

Photography: Rich Fee

A system such as the one from Earth Networks empowers your mobile devices with live, local weather, no matter where you are.

in narrow [20-inch] rows, but this study confirmed it's where I need to be."

The stations also allow Reeves to datalog and to track the ways weather affects yield over time. In turn, it has helped him make better, more informed decisions.

"One of my favorite features is the ability to datalog and to look at the soil-moisture profile," he says.

Reeves has two moisture probes – one at 12 inches and one at 24 inches. During a recent drought, the top 12 inches were out of water, but data from the moisture probes revealed there was still moisture above 24 inches.

"I'd have thought it would have been a lot deeper than 24 inches, but there was a lot of moisture above that," he says. "I suspected that, but I thought it was going to be deeper because my area had gone so long without any water. Yet, I still had some really good corn and soybeans in a drought year. I knew there was water down there."

Having that knowledge reaffirmed that his vertical-tillage practices were on target.

"I'm trying to make sure I'm not doing anything mechanically that's going to put in a tillage layer so the roots can't get to the water," he explains. "If I put in a horizontal tillage layer and the roots can't penetrate it, all the water down there won't make one bit of difference. For

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– Amena Ali

Photography: Earth Networks

a long time, I've been doing things to minimize any horizontal tillage so I can get those roots down. This confirmed what I suspected all along."

Yet, ground truthing many of the practices he has in place are only part of Reeves' weather station story.

"The real reason I invested in weather stations was because whenever one farm would yield better than another, I'd hear a farmer say, 'Well, it just didn't get the rain,'" he says. "I thought that by putting up a weather station, I would know exactly how much rainfall I did receive in a particular location."

Besides knowing precisely what the rainfall is in a specific field, he also knows what the rainfall is throughout the growing season, total rainfall for the year, the low and high temperatures, and evapotranspiration for the growing season.

"The data is unbelievable," says Reeves.

THE MISSING LINK

Many farmers have invested in the most advanced equipment available to make their operations as productive and efficient as possible, notes Ali.

"Having the latest weather information is the missing link for many successful agricultural operations," Ali says. "Why make decisions using old weather information from an airport a few hours away?"

Linking real-time weather to his operation provides key information for Reeves not only to better manage a natural resource that is becoming scarcer, but also to use it as a proactive tool.

"The insect modeling feature makes me aware of certain conditions that are present," he says. "For example, if larvae are forming, it helps me scout for it."

Spectrum Technologies is also working on a module that would identify when conditions are ripe for diseases, especially ones you can't see like white mold in soybeans.

This module would work similar to the insect module.

"In the future, I'm going to be able to tell that when I have so many hours of leaf wetness, the humidity is at a certain level and there are so many growing degree units, this disease happens," says Reeves.

An alert would then be sent. "The system would email me and say, 'White mold conditions are present.' Instead of being reactive, I can be proactive. I can get the sprayer fired up, get the insecticide or fungicide ready, and hit it," Reeves says.

"The ultimate goal of any farmer is to maximize yields."

– Jacob Madden

"The ultimate goal of any farmer," notes Spectrum Technology's Madden, "is to maximize yields. The timely measurements obtained from weather stations help rationalize the decision-making process with hard data." SF