



Transforming Climate Variability and Change Information for Cereal Crop Producers

Success Stories

INTRODUCTION

Useful to Usable (U2U): Transforming Climate Variability and Change Information for Cereal Crop Producers was a USDA-NIFA funded research and extension project focused on improving the usability of climate information for agricultural production in the Midwestern United States. Beginning in 2011, a diverse team of biophysical and social scientists from nine Midwestern universities spent six years working with the agricultural community to develop climate-based decision support tools and resources to enhance farm resilience to a variable and changing climate.

PRAISE FOR THE APPROACH AND WEBSITE

What advisors said about usability of the tools

"I have used the U2U tools in a number of ways. I use the tools quite often in my newsletter to illustrate El Niño trends, typical accumulated Growing Degree Day (GDD) for corn hybrid selection, and the impact of warm summer temperatures on corn yield. I used the GDD tool last summer for producers who wanted information on replanting after a storm. The GDD tool was easy to see how many GDDs we may receive from a certain date. We predicted when the field would be planted and we were able to project the accumulated GDDs from there. It worked very well."

- Nebraska Extension Educator

"...I think it's great to make things easily accessible for the people who will use it on the ground...to get that information out to people in a usable way is awesome. It helps us do our job better."

- Iowa Extension Educator to 500 farmers and 500 advisors, with 6 years of experience

"I think the website is definitely far more user friendly for both advisors and for farmers than a lot of other climate websites are."

- Iowa Extension Educator to 2,500 farmers and 500 advisors

"I like it for couple of reasons. One is everything is located there. Navigation is easy. Graphics are great. Straight numbers are really hard to use. So graphics are excellent, and especially if you're doing a presentation, they're so much better than scrolling through numbers."

- Iowa CCA to 500 farmers and 15 advisors, with 34 years of experience

METHODS

This project was supported by USDA-NIFA grant 2011-68002-30220. Data for this factsheet were collected in late 2016 and early 2017 from 1) surveys of Midwest corn farmers* and their advisors*, 2) interviews with farm advisors in Iowa and Nebraska, and 3) success stories shared by U2U team members, project partners, and tool users.

* In 4 key outreach states (IA, IL, IN, NE)

+ Across 12-state U2U region

U2U Project Area



"It's pretty simple and straightforward and it's not complicated... to explain to other folks how to utilize it to their advantage... There's some stuff out there that is good, but...you need three PhDs to work your way through the mess...And I think that the stuff you guys generate is very easy to understand...you don't have to have five years of background yield data ...that some of the other tools I've seen out there ask for."

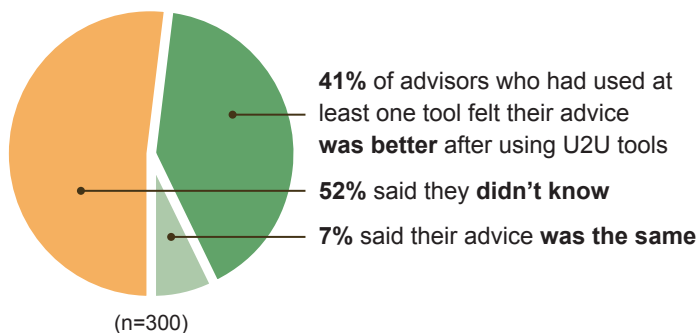
- Iowa based Certified Crop Advisor (CCA) to 500 farmers and 35 advisors, with 30 years of experience

"Rather than speaking from previous experience I now have data and real time information upon which to base my decisions."

- Ohio Extension educator to 200 corn farmers, with 24 years of experience

"It has given me another avenue to go down to help the clients I work with to be more profitable and better managers."

- Wisconsin private advisor to 6 farmers, with 5 years of experience



What advisors said about usefulness of the project and tools

When asked about the U2U approach (multi-state, land grant universities, engaging the agricultural community to co-produce decision tools) – advisors thought it was a good way to deliver better weather and climate information to Midwest farmers and advisors.

Referring to getting input from farmers and advisors while creating DSTs: “I think that gives you more of a balanced approach...it’s just better when you have grassroots input into the programming...how is it used and how is it useful and getting you feedback...I think that makes a really strong program. And then whatever tools you develop I think are more user-friendly.”

- Nebraska Extension Educator to 320 farmers and 16 advisors, with 26 years of experience

“Well, we’ve had a couple of training sessions...and I’ve been able to use it. I have a tendency of using it more so in the spring time because that’s usually when people are needing to make decisions...and say you have a hail event that comes through...and it’s getting a little bit late to plant something else to come in, unless they’re going to plant a cover crop. So that’s where those tools help me the most, is in that time of year.”

- Nebraska Extension Educator to 320 farmers and 16 advisors, with 26 years of experience

Using U2U tools to respond to climate and weather risks

Farmers 65%

Advisors 75%

In 2016, 65% of farmers and 75% of advisors were “moderately” or “very” concerned about climate or weather affecting farm management in their area.

“What probably comes to my mind the most would be the hail event that went through and, people wondering, ‘Okay, what should I be growing?’ I had some cases where the farmer had wanted to raise some sorghum, and then the insurance company was questioning whether he should do that or you’d be better off to go to soybeans. So I was kind of trying to come in as the unbiased, ‘this is what the research is showing, this is what the research tools show.’ And I shared, I think, U2U as a resource that I have looked at and then shared that with the person, then the insurance industry. And then that helped them know why I made the decision or recommendation.”

- Nebraska Extension Educator, talking about the Corn GDD tool

“...because whether we like to admit it or not-- there is no such thing as normal [weather] anymore...So, utilizing information like that is very useful in convincing guys that, they need to be proactive instead of reactive, and utilizing all the information that they can possibly use.”

- Iowa Illinois Indiana CCA to 500 farmers and 35 advisors, with 30 years of experience

“In this past year, this past growing season we had guys getting corn in the ground in April, and then Mother Nature decided it was time for the monsoon season to start. And some guys that didn’t get back out to plant corn until June. So, if you’re not going to return seed for shorter season and you’re going to your full season hybrid what’s the probability that that hybrid is going to be physiologically mature prior to killing frost. And so, I sent out some of those U2U scenarios. It’s part of risk management. Mother Nature blessed us this fall with unbelievably warm weather, so everybody that hung on to their full season hybrid [and] planted in June...it not only reached physiological maturity but it also dried on the vine, so to speak.”

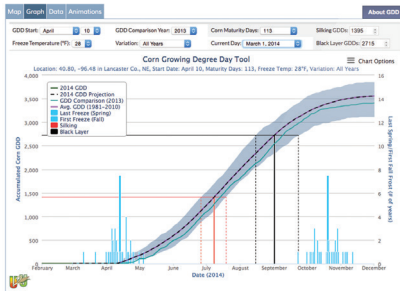
- Nebraska Extension Educator to 1,500 farmers and 200 advisors

“...we had a storm go through here mid-June last year. So, the guys were wondering, what’s the chances of corn if we replanted, what’s the chance of that getting matured by the time we get frost? It really did help them make a decision.”

- Iowa Extension Educator to 2,200 farmers and 90 advisors, with 30 years of experience, talking about the Corn GDD tool

TOOL-SPECIFIC SUCCESS STORIES

U2U Decision Support Tools - Corn GDD



Corn GDD_{DST}

Track real-time GDD accumulations and learn about climate risks for corn development

GDD.AgClimate4U.org

Main uses for the tool

Farmers

- Harvest and planting schedules
- Selecting varieties of seed
- Estimating plant maturity during growing season

Advisors

- To help farmers with seed purchase
- Crop selection decisions

Recommend tool to others

Farmers 52%

Advisors 82%

52% of farmers and 82% of advisors who had used the Corn GDD tool would recommend the Corn GDD tool to others

Praise for the tool

Tool users like that it's simple, specific to their location, "useful year in and year out."

- Iowa CCA

"[name removed] is a company rep for a seed company. He related the story of using the GDD tool this year. Because of weather, Missouri in particular had a difficult time with planting. Lots of folks were forced to plant late and were talking with their seed companies about getting different maturities than they originally ordered. He said that he got on the GDD tool and showed his farmer customers different scenarios around what the impact of later planting with different hybrids would be—shared in an "Agronomy update" factsheet. Farmers made changes to their seed decisions. He indicated that he shared this method with his fellow dealers all the way up to North Dakota and every one of them did the same thing. Kansas, Nebraska, the Dakotas and Minnesota also developed similar fact sheets based on the GDD tool to share scenarios with farmers that year. On a follow-up phone call, the advisor said the GDD tool was 'extremely useful in that scenario.'"

- U2U team member reporting a story from an outreach event in Missouri, July 2015

"The GDD calculator in particular is useful and helps in hybrid selection and harvest planning."

- Indiana Extension advisor to 75 corn farmers, trains 15 advisors a year, with 27 years of experience

"InField Advantage is an Indiana State Department of Agriculture program that attempts to address nitrogen management on farm through aerial imagery, stalk sampling, and replicated strip trials of varying nitrogen rates. The program is one way Indiana is helping growers keep nutrients out of our waterways. InField Advantage (<http://infieldadvantage.org/>) uses the U2U GDD tool to schedule their stalk nitrate sampling. Before this tool, samplers had to check fields periodically to see how close to black layer/maturity they were. I estimate one day of work saved per sampler by having access to the tool. 8 hours at an average annual salary of about \$40,000 (samplers are SWCD, ISDA, NRCS, and Purdue personnel) comes out to something like \$153 saved per sampler. With 31 participating watersheds and an estimate of 3 samplers per watershed, that's 93 samplers total. Comes out to \$14,307 [saved by using the tool]. Before we used the tool, we also had a higher incidence of sampling while in the same field with the combine, so that's the safety aspect you cannot put a number on."

- Story from an Indiana Extension Educator

"I use the Corn GDD and CPV tools quite extensively in public presentations, and they provide much better graphics and data visualization than other similar sources such as CPC or NOAA."

- South Dakota Extension educator to 1,000 farmers, with 5 years of experience

Corn GDD_{DST} continued

“In the last several years, where we’ve had later planting dates and guys questioning whether they need to drastically change relative maturity for whatever crop. Your Corn GDU calculator has been an extremely useful tool. Some guys really want to ‘early up’-- well beyond what they probably need to, to maximize their yield...but...having 30ish years of historical weather data did help...It eases their mind, or maybe even convinces them that they’re making too much of a drastic decision or maybe not making a drastic enough decision.”

- Iowa-Illinois-Indiana CCA to 500 farmers, 35 advisors, with 30 years of experience

“I’d kind of use that if I was seeing a certain pest. If it was a good idea, based on if we’re getting close to tassel and if we would try to hold back a fungicide application, that kind of thing. I would use that information to see how close we were to that stage if that was possible, if we want to apply an insecticide. But if we’re close to tassel, if we could wait a little longer... and we have to make two applications to keep too much damage from occurring.”

- Nebraska CCA to 200 farmers with 29 years of experience

“It has helped me inform growers. Especially the GDD tool for choosing hybrid maturity with late planting.”

- Nebraska CCA to 300 corn farmers, with 4 years experience

“[I used the tool for] Selecting corn varieties based on maturities in order to harvest dry corn, but still maximizing yield.”

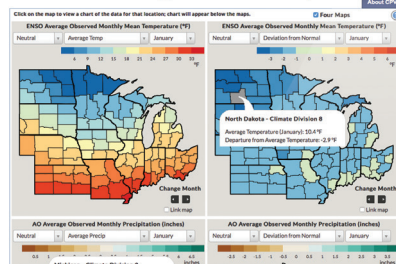
- Indiana farmer with 130 acres of corn, with 56 years of experience

“Used to determine split planting timing for seed corn, male and female.”

- Indiana farmer with 900 acres of corn, 700 acres of soy, with 41 years of experience

U2U Decision Support Tools - Climate Patterns Viewer

Welcome to Climate Patterns Viewer - connecting global climate conditions to local climate impacts.



Climate Patterns Viewer_{DST}

Connect global climate conditions
to local climate impacts

CPV.AgClimate4U.org

Main uses for the tool

Farmers

- Selecting varieties of seed
- Harvest and planting schedules

Advisors

- Crop selection
- Conservation practice choice
- Predicting drought

Recommend tool to others

Farmers 44%

Advisors 77%

44% of farmers and 77% of advisors who had used the Climate Patterns Viewer would recommend the Climate Patterns Viewer to others

Praise for the tool

“I use it a lot to illustrate seasonal climate variability and quickly show local impacts from ENSO [El Nino Southern Oscillation] and AO [Arctic Oscillation]”

- South Dakota Extension educator to 1000 farmers in the North Central Region, with 5 years of experience

“Determining what acres to plant to beans versus corn, due to moisture predictions.”

- Iowa farmer with 380 acres of corn and soy, 36 years of experience



AgClimate View_{DST}

Customize historical climate and crop yield data for the U.S. Corn Belt

ACV.AgClimate4U.org

Main uses for the tool

Farmers

- Harvest and planting schedules
- Level of crop insurance to purchase

Advisors

- Fertilizer application timing
- Crop selection

Recommend tool to others

Farmers 40%

Advisors 75%

40% of farmers and 75% of advisors who had used the AgClimate View tool would recommend the AgClimate View tool to others

Praise for the tool

"This year [2016] I had some cases where we had a late frost. And we had exceptionally early planting so I used [GDD] to see how far along that crop might've been. And then I'll look at the maximum and minimum temperatures in an area, and I'll also look at soil temps, see how cold we got...who would've had issues with that. And then I'll go back and ground truth frost injury by taking stand counts in some fields. So yeah, we're off X number of plants per acre probably because of the frost ... sometimes a farmer will say 'well, that seed didn't come up very good' or 'it's no good'. And in reality, it might've come up out of the ground and stand was excellent but we got to frost... And just because he wasn't out there to see the frost before sun up, he thinks maybe he didn't get frosted. Well, I can start a conversation with some of this history [in the ACV tool], record keeping on the weather to explain that. So, I do that kind of stuff quite a bit."

- Iowa CCA to 500 farmers and 15 advisors, with 34 years of experience

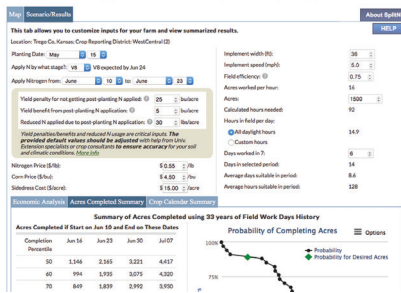
"I can kind of go county by county and do some comparisons to see what's going on. So it helped me tailor my answer to which part of the region you're talking to. If I'm talking to somebody from Monona County in West Central versus Lyon County in the Northwest corner, there's quite a climate difference there and I can track it better. So that's going to change how I'm going to respond to some questions. So it's helpful really from that perspective."

- Iowa Extension Educator to 2,200 farmers and 90 advisors, with 30 years of experience

"The tool has been useful in pointing out the opportunities to fine tune fertilizer applications. It has also help with pointing out the need for conservation practices on more fields."

- Illinois advisor with 23 years of experience

U2U Decision Support Tools - Corn Split Nitrogen Application



Corn Split N_{bst}

Determine the feasibility and profitability of using in-season nitrogen application for corn production

SplitN.AgClimate4U.org

Main uses for the tool

Farmers

- Planning fertilizer and irrigation scheduling
- Monitoring growth for disease scouting

Advisors

- Fertilizer application timing
- Machine/equipment investment

Recommend tool to others

Farmers 56%

Advisors 72%

56% of farmers and 72% of advisors who had used the Corn Split N tool would recommend the Split N tool to others

Praise for the tool

“I used it in a train-the-trainer event to instruct those in the fertilizer application industry.”

- Illinois Extension educator to 500 farmers, also trains 500 advisors per year, with 6 years of experience

“Helped to save N and to improve yields.”

- Indiana farmer with 46 years of experience, farming 2,000 acres (500 corn, 500 soy, 1000 pasture)

“It helps me talk to customers about nitrogen.”

- Iowa CCA to 500 farmers and 15 advisors, with 34 years of experience

“Discussion of reducing environmental impact of fertilizer applications. Especially in our highly erodible soils.”

- Illinois advisor to 50 farmers and 15 advisors, with 23 years of experience

PARTNERS



FUNDED BY



This project is supported by Agriculture and Food Research Initiative Competitive Grant no. 2011-68002-30220 from the USDA National Institute of Food and Agriculture.