Corn Yield and Review
Update 8

Rademacher Farms
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Hey everyone,

I decided on a separate update for corn and soybeans so I can go into more detail about each. Harvest is finished, and wheat and cover crops are planted, both of which coming along great due to some favorable weather. I've been pouring over yield maps to examine what went right, what went wrong, and where to go from here. As always, I'll go over both the good and the bad and what this means in the future. Overall, we are very happy with how this year went and have some great experiences to build on!

Year in Review

This year we had one corn field. It was no-till, cover cropped, Non-GMO corn, with variable rate N. We did population trials, starter trials, skip row corn trials, and a hybrid plot that explored products from Non-GMO companies. Needless to say, there wasn't another corn field in the county (or farther) like it, which we are very happy with. So:

Between the Non-GMO seed and Variable Rate N, we reduced input costs by about 50$ an acre, which is huge. At the same time, the field average was about 205 bu/acre, maintaining the field APH. We are very excited with the results!

What went right:

Non-GMO corn: We had no significant insect damage and furthermore, trapping data shows little insect egg laying pressure for next year. Due to all this, Non-GMO seed is a great option for next year and a great way to cut costs.

Variable Rate N: Lower field areas, which is a large amount of the field, had significant yield reduction from water damage. But more on that later. With variable rate N, we did not waste nitrogen in these areas. If conditions had been good in these areas, N would have been sufficient for good yields. Since low elevation areas flooded frequently, the lower N rates meant that less was wasted. Because of the amount of low area flooding however, it was hard to gauge the effectiveness of the lower N rate. Over time, variable rate N will become even more effective as soil biology increases and soil health improves.

No-till/Cover crop: While we don't have any cover crop check strips on corn, we have some exciting results on beans, but more on that later. Corn looked great from planting to harvest. With this system we effectively had no soil loss and kept roots in the soil almost year round. This is huge considering that average soil loss in the corn belt is 4.1 tons/acre/year.

What Went Wrong

Water, lots and lots of water: As it has a ditch running through it, this field gets a *significant* amount of water from neighboring fields. At least twice in the season, water was running over the road, into our field, across 100 acres of our field, into a ditch. Obviously these areas are going to have serious issues in a year with ample rainfall, while in a dry year, the yield map would be an inverse of a wet year. Yield maps correlate very strongly with elevation maps. Besides the early part of the season, there was plenty of moisture and sporadic 2"+ rainfalls.

Fungicide application woes: Fungicide is applied via airplane. We contact our supplier and they put in the order when corn maturity is correct for fungicide application. Obviously we are at the mercy of the application company and weather. The day fungicide was applied, forecast was clear. However, after application there was a popup storm cell, approximately 10 x 5 miles wide that showered on our field 4 hours after application. While the fungicide label calls for 4 hour dry period, I think we lost a lot of fungicide effectiveness.

Moving Forward

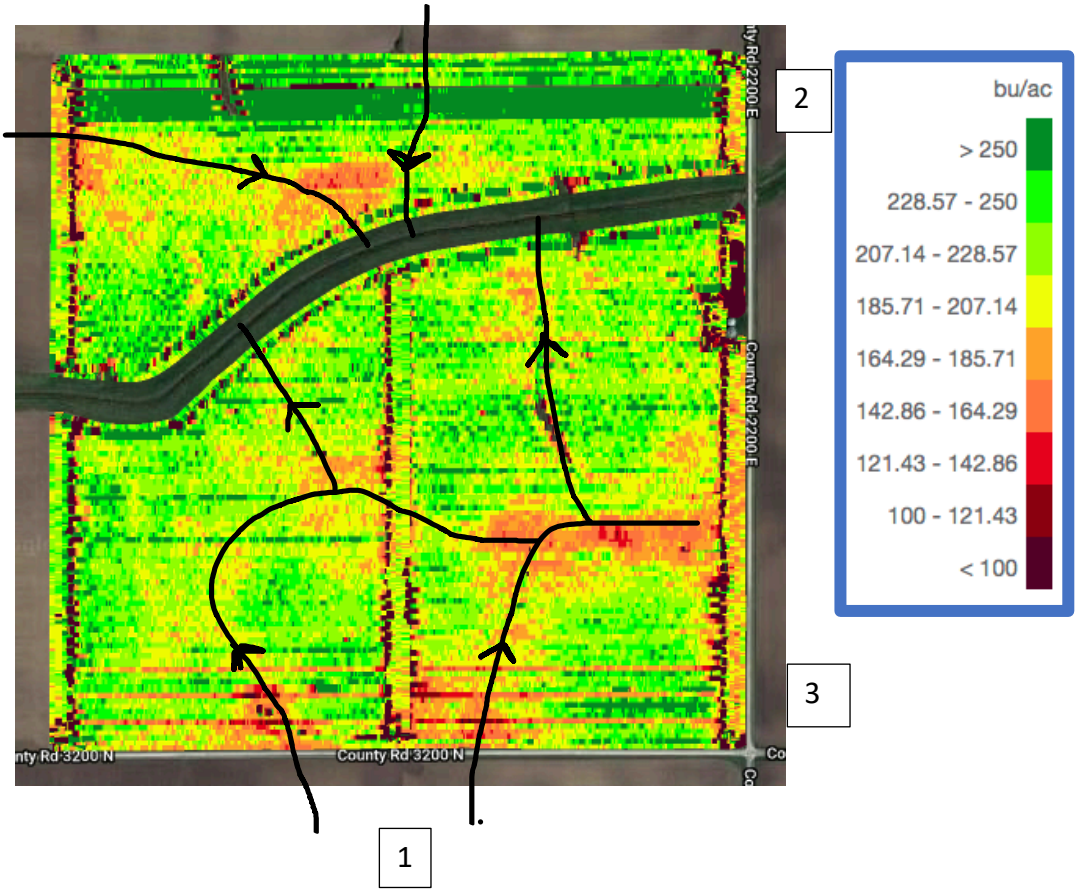
This year our problem was undoubtedly too much water. Our plan is to stay the course. While we can't control the amount of water we get, we can over time control how we handle water. The difference between water infiltration in No-till & Tillage is amazing. There are countless examples. I found one example that timed several water infiltration tests in a tilled field and no-till field. A metal ring is inserted into the soil, an inch of rain is poured in and time is tracked until the water has absorbed, when this occurs, a second inch is poured in and timed. Following is a chart showing the results:

	Time to absorb 1"	Time to absorb 2nd Inch
Tilled Field	0:45	27:13
No-Till Field 1	0:41	4:29
No-Till Field 2	0:27	3:51
No-Till Field 3	0:40	4:46
No-Till Field 4	1:22	8:08

Yikes. There's tons of similar information out there telling the same story and we will be performing these tests on our own to track baseline and improvement over time. Not only can water be absorbed faster, we will over time be able to distribute that water deeper through the profile. I recently heard a presentation that used moisture depth sensors at 6", 12" and 18" in no-till and tilled fields. After a large rain event, they found that the moisture level in the tilled field didn't even make it to the 12" depth while the no-till field sensors registered moisture at 18." Obviously if water has a hard time percolating that far, then roots will similarly be restricted to that depth. While we're seeing a few wetter areas in our short-term no-till, longer term no-till fields have better water handling than ever before. This means that over time we will hold more water, faster, and deeper.

Yield Map

Following is the yield map for our corn field. Yield analysis is a great tool and we've recently improved our mapping abilities in the last couple of weeks. In mapping software, we can manipulate colors to bring out contrasts between different areas and yield levels. No one likes to see red in a yield map, but a yield map that is manipulated to show consistency and look pretty, is effectively useless.



1) I've marked the general flow of water into and through the field. It's clear there's a serious amount of water. While we still get immense amounts of water from neighboring fields, think of the implications if our entire field could infiltrate water at the speed and amounts listed above. Over time we plan on less productive areas becoming more productive by alleviating environmental stresses like poor water flow.
2) This marks a band where we had some yield monitoring issues. As great as yield monitoring is, a million things can be misleading.
3) Marks the area of our plot. While it's nice to try different numbers and get some free seed (11 acres worth!) there wasn't a lot of useful information from the plot or our trials this year. Unfortunately it went through one of the most water damaged areas of the field, causing highly variable yields.

Next year news

I've mentioned several times that we've been looking for a corn premium opportunity. I'm happy to announce that we will potentially be testing out a program for next year. A company we grew non-gmo food grade soybeans for this year also has corn programs. We are most likely going to try a white corn, non-gmo, food grade contract. This contract would carry about a 0.75 cent premium after transportation costs based on our initial talks. While we haven't made any commitments, it looks to have great potential and would increase our per acre profit by about 100$/acre, even at the lower input cost level from this year.

Conclusion

While we didn't meet our yield goal this year, I'm reminded by a saying I read the other day, "Bushels are nice, but dollars pay bills." Coupled with our input costs, which we are pretty confident are near the lowest in the county, we've started a system to increase yields by improving soil health over time. While some things went wrong, many things definitely went right, and the best direction we can take is to learn from our results and continue to refine our practices.