



March Agronomy Update


On-Farm Testing Using Operations Center

Last month I touched on the basics of what a 4R Nutrient Stewardship plan is. In brief, this involves making a plan that you think will improve your fertilizer use efficiency, implementing that plan and then measuring the results. Using the John Deere Mobil Ops Center on your phone and the web based MyJohnDeere.com can simplify things a lot for both the implementing and measuring steps you need to do to make your 4R Nutrient plan work. The tools available there also work just as well for any other type of on-farm trials you want to look at, whether that is evaluating a new herbicide, checking out the ROI on a foliar micronutrient, or investigating whether or not that new biological on the market is worthwhile investing in.

Let's run through a scenario where a producer is focusing on the "Right Rate" of the 4Rs and see where the Operations Center can help. On this hypothetical farm, the producer traditionally uses a 75-30-0 blend on all the wheat acres. But there is one field that always seems to perform a little better than the average, either in yield or in protein, depending on the moisture conditions. So the grower is curious about the best plan for this field in a year of high input costs and low commodity prices. Should he cut nitrogen rates here, knowing it will still perform, or will applying some extra nitrogen result in a better yield and bottom line in those years? And what strategy would pay off best during a high commodity price and low input cost cycle? One season is certainly not going to answer any questions definitively, but gathering information on the field response to nitrogen over several years can certainly help and it is easy enough to repeat the test, creating a lot of data points that take various environmental conditions into account.

To show how easy it is to design a trial in the Operations Center, I spent about 5 minutes on the Agrian Prescription Creator to make a couple of strips of 46-0-0 both 25 lbs of product lower and 25 lbs of product higher than the usual rate (figure 1). I placed the trials in places that I felt were representative of the field and avoided headlands. If you are using a wireless connection, this prescription can be sent directly to the display from the Operations Center files, and if you are using a Gen 4 display it can also be incorporated into the work plan so it will show up along with the 11-52-0 application rate, the seeding rate of the wheat and guidance lines. The operator only needs to accept the work plan into the display and the trial will be executed without any extra worry, stress or loss of time at seeding. The same basic process can be used for any trial, whether it's playing with seeding rates, or maybe trying out a new fungicide.

Figure 1



1. Operation > 2. Analysis

Area ▶

46-0-0 Urea ▼

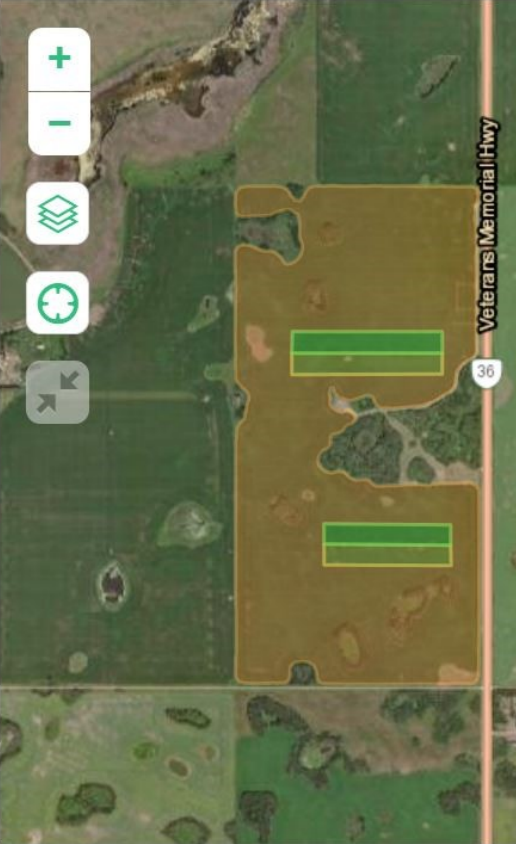
Filename:

Distribute ⌵

Dissolve ↶ ↷

Delete 🗑️

| ZONE | 46-0-0 UREA | AREA |
|------|-------------|---------------------------------|
| 1 | 150 | 239.391 ac |
| 2 | 125 | 14.859 ac |
| 3 | 175 | 14.903 ac |
| | | Total applied 40,374.098 |



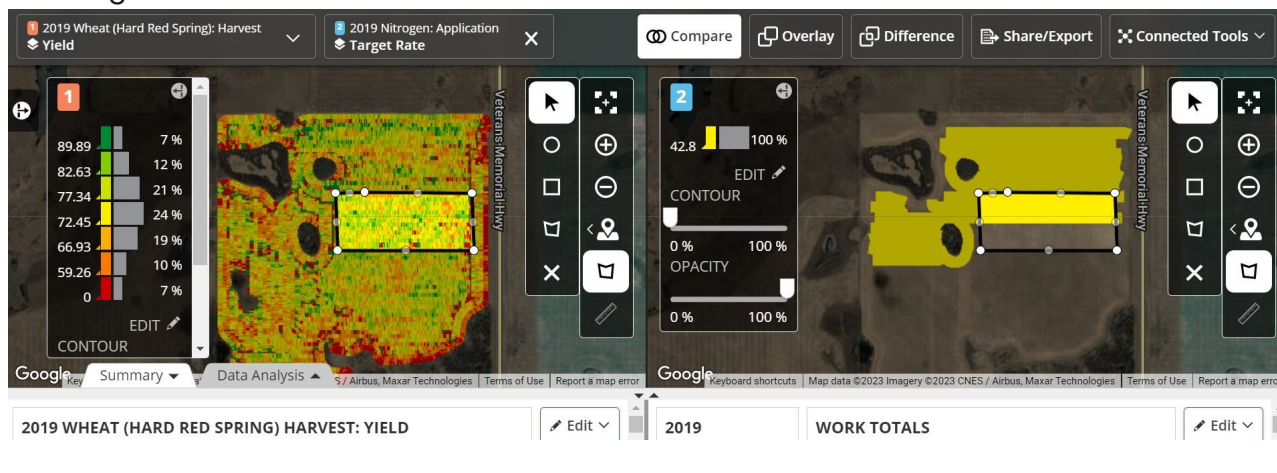
The key to the whole process is accurate harvest data. Yield is the report card on what happened in your field during the growing season, and without that report card you can't analyze your decisions. Whether you have the latest combine with Active Yield or if you use grain cart weights to track your yield and then manually enter it into Operations Center later, it's critical to complete this step. I can't tell you how many times I have seen strip trials done during the growing season that had no value in the end because we couldn't analyze what had happened due to poor yield documentation.

The other thing I see more often than you might suspect is people going to the trouble of doing all the documentation, and then never going back into the Operations center to analyze it. To be fair, past versions of the Operations Center have often made this step more of a chore than it needed to be, but improvements to the platform are happening at breakneck speed these days. Analyzing results has never been easier.

To give you an example, I will go back to 2019 when we did some top dressing trials in wheat on the Battle River Implements Training Field. The field received 80 lbs per acre of nitrogen at seeding. Moisture started out very good and remained excellent well into June so we decided to see what response we would get if we top dressed another 20 lbs of nitrogen as 46-0-0.

Using the analyzer tool (figure 2), I was able to quickly compare the yield and application layers. The next step was to isolate the check strip and a roughly corresponding area of the 46-0-0 treatment on the yield map.

Figure 2



The **data analysis tab** just below the map shows us what the head to head comparison looked like (figure 3). The whole field comparison is not really relevant in this example because we were doing other trials south of the check strip that were impacting yield. The ability to focus in on specific areas of the field makes this a powerful tool.

Figure 3

| 1 Yield — 2 Target Rate | | Work Totals | | Performance | | |
|-----------------------------|----------------|-----------------|---------------|--------------------|---------------|------------------|
| Target Rate (lb/ac) | Area Harvested | Yield | Total Yield | | | |
| | Selected Zone | Whole Field | Selected Zone | Whole Field | Selected Zone | Whole Field |
| 42.8 | 8.2 | 44.4 ac | 78.07 | 75.2 bu/ac | 639 | 3,339 bu |
| Target Rate - Not Available | 7.6 | 209.8 ac | 76.83 | 74.73 bu/ac | 583 | 15,674 bu |
| Totals/Averages | 15.8 | 254.1 ac | 77.47 | 74.81 bu/ac | 1,222 | 19,013 bu |

As you can see, top dressing 20 lbs of extra nitrogen only netted us an additional 1 ¼ bushels of wheat in this case. Since it takes wheat roughly 2 lbs of nitrogen to produce a bushel of wheat, it looks like only about 2 ½ lbs of the added nitrogen went towards additional yield – about a 12.5% nitrogen use efficiency. On the surface, this is not exactly a great return on investment. However protein on this field was higher than expected where we applied extra nitrogen and this was in a year where high protein wheat carried a significant premium. Combine samples grabbed from the test strip showed 12.8% protein vs 13.3% on the adjacent treated crop. This needs to be figured in to the analysis when deciding if the application was worthwhile or not. I had a hard time finding good information on nitrogen conversion to protein; I read papers that implied anywhere from 15 to 42 lbs of nitrogen are needed to increase protein by 1%. However, I do believe it's safe to say the increased protein changed the nitrogen use efficiency number considerably. It also had an additional positive impact on the bottom line for the field.

- Remember that the Operations Center can give you great insight into what is happening in your fields, but you need to understand what data it

captures and what it doesn't. If you want to measure additional variables such as protein, you will need to take the time at harvest to do it. But unless you want to document quality variances such as protein or oil content, you can rest assured that if you set up your plan properly and have accurate data flowing into Operations Center, there are many simple, yet effective trials you can run that will have little or no impact on your time spent in the field during seeding, spraying or harvesting, while at the same time generating great insights into your management practices. And if you do want to track these quality variances in real time just like you do with yield; and also have an S700 series combine, there is a way. John Deere HarvestLab™ 3000 provides on-the-go measuring of moisture, protein, starch and oil values in wheat, barley and canola.

This has been a longer than normal article, but doing on-farm trials is a big subject, and I have only just scratched the surface. The details in my examples are not the important part; knowing that effective tools are available to help you with your management decisions is what I want you to take away from this. And I hope I have given you a feel for how easy it is to use these tools if you are willing to take the time to ensure good data is flowing into your Operations Center. To sum things up;

- Have the goal you want to achieve firmly in mind. Keep your trials simple and try to limit the number of variables you are dealing with.
- Use the available Operations Center tools, such as Agrian Prescription Creator, Work Planner, or Set Up File Creator to plan and execute the trials. The best approach is to have everything set up and ready to go prior to season.
- Use the Field Analyzer tool to compare your measured variables and treatments; don't forget to isolate and zoom in on the treatment area to remove any anomalies.
- Use the Data Analysis tab to display the findings and then apply your costs and revenue to the results to determine profitability.

For those looking for something more sophisticated than the "napkin economics" I used to decide if we wanted to do more top dressing trials in the future, I would suggest looking into a very reasonably priced program called Harvest Profit, which uses Operations Center maps to do a profit analysis on every acre you document. If you are interested check out this link or give us a call.

<https://www.harvestprofit.com/>

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