

GPS & Yield Mapping: A Producer's Experience

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I began generating yield maps back in 1996 when we purchased a CaseIH 2188 with the Advanced Farming Systems option. It included a yield monitor to gather yield, moisture and elevation data and a GPS receiver to locate the position of that data. The idea was simple; find the location of lower yielding areas of our fields, identify the problem and correct it. TA-DA! Profitable farming made easy!

Well, somewhere along the way I discovered that not only was it not easy, but could be expensive too. Not that I am disappointed about purchasing the system. I still believe in the technology and I still believe that new combines should include the optional yield monitors. The hardware in the system has worked almost flawlessly for seven harvests (the combine stayed in the shed for 2002), requiring only the replacement of the impact plate due to wear. However, I have discovered that, as with all things on the "bleeding edge", there is a steep learning curve to yield mapping. There are two concerns I have with the whole process:

1. Software required to create the yield map and maintain records
2. Lack of agronomic information to effect change to farm practice

1. Software

The addition of the yield monitor and the GPS system is a relatively simple one for a farmer. In my opinion, the most difficult part is creating the yield map and utilizing the data collected. To create the maps from the data requires two things, software and computer skills. I consider myself a competent computer operator within the Windows environment, so that really was not a limiting factor for us. For someone who is not computer literate, you could save yourself a lot of hassle by simply hiring someone to handle the data. Generally, the software is relatively expensive and all too often becomes outdated and requires replacement. For now, I have decided to not buy software and hire someone to do the job.

A software suite did come with the price of the AFS, but it was full of bugs and did not really work all that well. The first year we had our maps done by the AFS staff free of charge. Designed for U.S. producers, it had shortcuts to cut down input time, but they were for U.S. crop protection products. So I had to manually input all of the products that we used on the farm and that was really time consuming. Eventually I gave up trying to keep records with the software and went back to using a notebook. In 1997, I purchased updates for the software at the cost of about \$1500.00. At the time, I was naïve enough to think that it would be a one-time purchase and that once applied to enough acres the cost would be a negligible expense. Regrettably, that was not the case. Remember Y2K? While most would think that the year 2000 had little or no effect compared to what the doomsday predictors were saying, I found one program that did not work after the New Year. It very conveniently put all my 2000 yield data along with the 1997 data. Once again, I gave up.

I decided the best thing to do was ask other producers what software that they used. I tried demo versions of two well-known products. While I was pleased with them both, before I had to make

a decision, I stumbled across someone who offered to create the maps for me with SSToolbox at a reasonable price. I have found this to be much more convenient for me. I burn the data to a CD and send it off in the mail. SSToolbox is a much more comprehensive program that offers more features than the programs I was using. I now have better results with less effort. No more struggling for hours at the computer to get mediocre results and no more hassles of low quality software that crashes constantly.

2. Agronomics

While problems with software have initially limited our gains with yield mapping, the biggest impediment to making large-scale changes to our farm practice has been a lack of agronomic information. We started down this path as an effort to spend our fertilizer dollars more effectively. We wanted a way to either reduce costs or increase returns.

In 1996, the conventional wisdom was that there were two ways to variable rate fertilizer. One was to use a yield monitor to identify the high yielding areas, reduce fertilizer inputs there, and put that fertilizer in the low yielding areas. The other was to soil sample on a grid and apply nutrients to grids that were deficient. After our first year, I was skeptical of both approaches.

There was no agronomic research done in Saskatchewan that proved either theory correct. We found in '96, the lowest and presumably most fertile areas were lower yielding than mid slope positions. I thought both theories ignored all the other variables that effect yield. Increasing fertilizer inputs to an area that had decreased yield due to disease pressure would not increase farm profitability. We had grid soil sampled a field and found that the cells with the highest nutrients were not necessarily the highest yielding. Since the cost of grid soil sampling was very high, we did not pursue that avenue. I was also skeptical how I could make fertilizer decisions for durum based on yields that I had the year previous with lentil. Dad and I decided that we would wait until we had yield maps of our entire crop rotation before we would start making changes to fertilizer rates. And while we have actually taken more time than one complete rotation, there have been more than a few times that I have been pleased with that decision.

After seven harvests over eight years, I am confident enough to start variable rate fertilizer applications. In 2004, I will be starting a project with some support from the SSCA and Saskatchewan Agriculture Food and Rural Revitalization that will test a method of delineating management zones I have developed based on what I have seen with the yield monitor. Not to criticize others in the province that have undertaken variable rate projects, I feel that I have found a method that is cheap and effective. As a way to prove it, I am not using public money to buy any precision farming hardware. My intent is to use public funds for agronomic support and to publish the results.

My theory is that since moisture and nitrogen use are related, by mapping the soil moisture I can discover the most profitable rate of nitrogen. In a soil profile saturated with water, it is easy to make a decision on N rates, but when the soil is only partially recharged, I hope to find the best rate of N. My method will allow top dressing of N if rainfall is plentiful after seeding, based on the presumption that each part of the field will generally receive the same amount of rain.

My intent is to use the yield monitor to check the results of my nitrogen rates and determine the most profitable one.

Since we have had a yield monitor and maps since '96 and have yet to variable rate fertilizer, one question I am often asked is "Have you made any money with this thing?" In a word, yes. I would say the way we have made the most money is with variety selections. There is a multitude of canola and pea varieties out there. Most, if not all producers make their variety selections based on data from the Variety Trials. What we have found is that while a variety may work well in the trials, it does not perform any better on our farm than our current one. We have dumped two canola varieties, two pea varieties and one durum variety based on what we have seen with the yield monitor. We have seen varieties that are supposed to have significantly higher yields that do not. We have also seen one lentil variety that was only supposed to have slightly higher yields turn out to be very responsive. Therefore, unless a new variety shows me some quality or harvestability advantage I stick with the old one. I am not going to name varieties here since what

I have found on my farm might not be what you would find. My suggestion to growers is to ask a seed rep to do a variety comparison on your farm. They are normally randomized and repeated twice, so that should take any variability out of the equation. Then use the yield monitor to make your decision on what variety is right for you. It is a win-win for both the seed company and the grower.

Before you consider adding a yield monitor to your combine, remember this; the easy part is collecting the data, the hard part is utilizing it. Focus on the goal at all times, to increase your farm profitability. If you do your own data manipulation, management time can be intensive. If your management time is already at a premium, you might want to consider hiring that aspect out before you start yield mapping.