THE VALUE OF VARIABLE RATE TECHNOLOGY (VRT)

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Part 2 (of 2 part series)

In his presentation at the 2015 InfoAg Conference, Dan Frieberg, President of Premier Crop Services, said of VRT, "Real world agronomy is integrated and complex; we can't make what is truly complex simple – we can make it easy, but not simple."

Varying rates of fertilizer, seed, water, and other inputs across the field is the easy part. The challenge lies in choosing the information that goes into defining the management zones (MZ). The days of creating MZ solely from a yield map or grid soil sampling are behind us. Decision-making in precision agriculture (PA) has become more data-driven and our ability to incorporate multiple layers of agronomic data into MZ development is greater than ever before. *So, which data layers are most valuable in creating reliable MZ?*

Yield monitoring remains one of the most popular and commonly used data layers in defining MZ. Yield maps can provide a measure of the scale and location of variability in the field, but if used alone without properly understanding the data, they can be misleading. In his presentation at InfoAg 2015, Dr. Raj Khosla, professor of PA at Colorado State University, discussed the process of yield mapping, how to eliminate errors in yield maps (e.g., "cleaning" the data), and how to evaluate multiple years of yield data to create reliable "decision maps" for MZ delineation . Yield maps are good for answering "where" and "how much" variability exists in the field, but they don't say anything about "why."

Soil fertility and other soil properties are often highly correlated with yield as the "why" in spatial variability. The best way to collect a soil fertility data layer is by grid sampling the field. The *Plant Nutrition Today* article "Grid Soil Sampling: How Small? How Often? How Useful?" addresses several questions about grid sampling procedures, but the consensus is that soil sampling density (e.g., grid size) is critical in developing quality soil maps.

Data presented at InfoAg 2015 by Dave Scheiderer of Integrated Ag Services showed that 0.5-A grids were 2 to 4 times more reliable at identifying variability in soil phosphorus, potassium, soil organic matter, and pH than the standard 2.5-A grids.
Smaller grids are more costly, but several currently available options in automated sampling are making high-resolution sampling more economical.

Soil texture, moisture, SOM, slope, elevation, and farmer experience have all been used to create more robust and reliable MZ. Various methods have been used to collect these data such as soil sampling, bare soil and crop
imagery from satellites, planes, and UAVs, and soil EC/EM mapping.

One data layer that many experts agree does not add much value to MZ delineation is a standard soil classification map. “Soil type doesn’t tell us much about yield variability in a field because the mapping units are too heterogeneous,” says Dr. Jason Warren, soil conservation specialist at Oklahoma State University. “The original soil maps were never intended to be used the way we try to use them in precision ag.”

If our current ability to define robust, sophisticated MZ is so easy and reliable, then why aren’t more growers using VRT?

According to the Purdue/CropLife PA survey, almost 70% of retailer respondents offer VR fertilizer services and 50% offer VR seeding, but only 30% and 14% of the market area is using the two services, respectively. Why?

The status quo has been to sell growers a VR prescription without any mechanism in place to evaluate the ROI. Enter the Learning BlockTM concept presented by Dan Frieberg at InfoAg 2015 . By establishing high and low input checks within MZ, growers have access to quantifiable, low-risk results to answer the “Did it pay?” question. Data from millions of acres where Learning Blocks were used show that VRT frequently results in profits for the grower.

Links Mentioned
Dr. Khosla on cleaning yield map data
>http://infoag.org/abstract_papers/papers/paper_328.pdf<

Grid Soil Sampling: How Small? How Often? How Useful?" >http://info.ipni.net/PNT-NA-2014-2<

Frieberg’s Learning BlockTM concept >http://infoag.org/abstract_papers/papers/paper_323.pdf<