

Fall 2014, No. 5

4R AND PRECISION AGRICULTURE – WHERE’S THE PAYBACK?

Considering the current state of declining crop prices, discussions at the 2014 InfoAg conference were focused on the return on investment (ROI) of precision agriculture (PA) practices. Growers typically have little control over pricing and attempt to manage profitability in challenging economic times by controlling input costs while continuing to optimize production. However, simply lowering input costs doesn’t guarantee greater profitability if it results in lower production. “Yield matters, even when prices are low”, is a quote I’ve taken home from the conference. It reminds us that spreading input costs over higher yields lowers unit costs of production, thus increasing net returns.

Dale Bartholomew of Growmark said, “ROI [for PA] comes by doing what needs to be done when it needs to be done.” One could also add, “where it needs to be done”, thus implying that the profitability of PA is enhanced when used in accordance with 4R stewardship. Take for instance the idea of “right place”; RTK auto-guidance on planters, tillage equipment, sprayers, and combines has been shown to result in an average savings of 5% (ranging from 2 to 7%) on input costs. Another study conducted by Dr. John Fulton at Auburn University indicated that auto-swath technology could result in a 4.3% average savings on input costs for a farm with a payback of around two years. If the savings due to GPS guidance were included, the total cost savings could be in the 20 to 30% range.

Variable-rate fertilizer technology (VRT) was another popular topic at this year’s InfoAg conference. Allan Baucom of A.L. Baucom Family Farms in N.C., spoke on several ways VRT is being utilized profitably in his operation. Baucom has been using variable-rate applications for nitrogen (N), potassium (K), gypsum, and lime since 1997. One of the keys to their success has been well-defined management zones based on 17 years of consistent soil sampling, harvest data, and other agronomic research. They also supplement the map-based prescriptions with on-the-go, in-season NDVI measurements for fine-tuning N recommendations using a GreenSeeker® crop sensor. In 2014, using PA technology to manage N application in cotton saved Baucom Farms \$12.50/A.

Well-developed management zones can guide not only variable-rate applications, but an entire 4R Nutrient Stewardship program as well. The 4R approach is holistic—considering source, rate, timing, and placement of nutrients simultaneously within a specific cropping system context. The right combination of these factors is driven by many site-specific factors; thus management zones for 4R stewardship should include information on as many of these factors as possible. Tyler Lund of Veris Technologies gave a presentation at InfoAg 2014 that demonstrated how fusing CEC, soil EC, slope, and surface curvature could create “N loss risk” management zones that could be used to minimize N denitrification and leaching losses by guiding source, rate, timing, and placement decisions within a 4R program, optimizing profitability of N fertilizer application, while minimizing environmental risk associated with misapplication.

The profitability of precision management was also evident in presentations on multi-hybrid corn planting and variable-rate seeding. Again, the key to success was management zones. Jason Webster of Beck’s Hybrids said in his presentation, “Without management zones, multi-hybrid planters are worthless.” By clearly delineating high and low yielding zones in the field and changing hybrids between “offensive” in the high potential zones and “defensive” on the low yielding areas (the right hybrid in the right place), Webster was able to raise corn grain yield by 9.5 bu/A and increase net profits by over \$50/A. John McGuire of Simplified Technology Services discussed variable-rate corn seeding and pointed out that profitable variable-rate seeding required two things—knowing where to change rates (right place) and how much to change rates (right rate). His data demonstrated that varying seeding rate from 28,000 to 38,000 seeds/A compared to a flat rate of 33,000 seeds/A resulted in net profits of \$6.53/A in their 2013 studies.

So where’s the payback? A profitable PA program must be based on sound agronomic science, such as the fundamental principles that guide 4R Nutrient Stewardship. Without an agronomic foundation for everything from data collection, data analysis, decision-making, technology implementation, and record keeping, PA will just be gadgets and useless data that don’t result in knowledge leading to more efficient input management, higher yields, and greater profits.

The next InfoAg will be held July 28 to July 30, 2015 at the Union Station Hilton in downtown St. Louis, MO. Stay informed by visiting www.infoag.org and following @InfoAg.

– SBP –

For more information, contact Dr. Steve Phillips, IPNI Director, North America Program, Ph: 256-529-9932; E-mail: sphillips@ipni.net.

Note: *Plant Nutrition TODAY* articles are available online at the IPNI website: www.ipni.net/pnt