20/20 VISION ON PRECISION---WHAT THE LAST 20 YEARS HAS SHOWN US / WHAT THE NEXT 20 PROMISES TO GIVE US

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ABSTRACT

When the first ICPA was held, we had a collection of new technologies and a lot of "dreams" about how they might be applied in agriculture. Reliability and compatibility issues made implementation a struggle for most people. The internet was being tested in university labs and some people were projecting that it might someday provide a way to build communications between farmers and their advisers and input suppliers. But the vision for this was far too conservative to predict what we have today for communications, sharing information, transfer of data, and a host of other applications. Sensors were just breaking onto the farm scene. Sensors could monitor grain yields during harvest, moisture content, as some chemical makeup of the grain. Variable-rate fertilizer applicators promised to put the right rate on different parts of a field. Remote sensing imagery showed us changes throughout the growing season in the within-field variability of crop conditions. Soil maps were just beginning to be digitized soil that their data layers could be used in guiding decisions affected by within-field variability. But none of these tools really worked together very well. Many were ideas that could be illustrated in a slide show, but were much more difficult to demonstrate in reality. It took a lot of patience and perseverance to be a precision farmer. Thankfully, there were a few leaders who stepped up to the challenge.

Today we routinely use precision agriculture technologies that have survived the past 15 to 20 years, and perhaps even more that were not even thought about 15 years ago. My son, a Caterpillar engineer, was sitting on our deck this weekend and using his cell phone to check the status and diagnostics data on several of the new bulldozers they had delivered recently. He could access more information about a tractor 2,000 miles away than he could have learned from talking to the operator on site. And within a couple of minutes, he could survey a dozen other machines located across North America, to see if they were all operating up to standards. A farmer friend uses his cell phone to check the status of his center-pivot irrigation systems. Individual row controllers for seed, fertilizer, and pesticides offer other farmers a new level of site-specific input management….and improved efficiency. Geo-referenced data sets from a variety of public and private sources can be integrated in various decision-support tools to guide production system decisions. Real-time, on-the-go sensors and rate controllers, often in conjunction with these geo-referenced data sets, put a new level of sophistication into site-specific crop production. Integration of multiple data layers along with real-time sensor data and historical production records is now possible…although still evolving as a decision tool. These technologies not only are economically beneficial, the also contribute significantly to reducing the environmental footprint of production systems. Improved technologies throughout the production and marketing chain allow for complete field-to-plate traceability of food production that is increasingly being demanded by consumers.

What does the next 20 years offer? What will be the hot topics for the 20th ICPA in 2020? I doubt whether our crystal ball today gives us any better insight into the future than we had 20 years ago. Immediate needs…and therefore research and business opportunities…are for further improvements in compatibility among hardware and software components and more integration of components. Agronomic relationships among crops, soils, and management practices need to be further refined to take advantage of the hardware and software advancements that have been made. Due to changes in direction of agronomic research, and reductions in funding, applied agronomy is currently not keeping pace with the technology. Precision agriculture, along with new communications, sensors, and data management will play a significant role in the development of production systems to meet the expanding global demand for food, feed, fiber, and fuel for a growing world population and increased standard of living. While we may not have a clear view of the future of precision agriculture, we can be assured that it is bright, and that developments over the next 20 years will be even greater than those of the past 20 years.