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THE TIME IS RIGHT FOR PRECISION AGRICULTURE TECHNOLOGIES

Precision agriculture technologies have not always been economical for small to medium-sized farming operations. However, with precision agriculture equipment becoming less expensive, tools such as guidance systems, yield monitors, and variable-rate fertilizer applicators may now be profitable for nearly all growers. The rising costs of inputs and higher commodity prices considerably increase the risk of making the wrong management decision. Thus, even small farms can profit from using technologies that improve production efficiency.

Some technologies, like RTK auto-steering, can improve efficiency without changing management practices. Using a GPS-guided steering system can eliminate sprayer overlaps and planter skips that can result in lower profits. The magnitude of savings depends on how well the grower was doing without the guidance system. Considering an example from an Ohio State University extension article, a grower using row or foam markers on the planter and sprayer, conservatively speaking, might be farming 102 acres in a 100-acre field. This extra area might not seem significant, but when one considers that this translates into spending 2% more on all associated inputs such as seed, fertilizer, pesticides, fuel, and labor, even small application errors can become quite costly. An RTK guidance system with 1-in. driving accuracy can eliminate this risk.

Despite the fact that yield monitors have been around over a decade, many growers still don't fully understand how to use them to improve farming efficiency. This lack of knowledge is being actively addressed in a series of extension programs and classroom courses developed at North Carolina State University. This training involves on-farm demonstrations, hands-on classroom training using "Virtual Yield Monitor" custom software, and introduction to spreadsheet-based analysis of yield monitor data, yield-limiting factors, and potential changes in management that could increase yield. Efforts like this provide growers the knowledge needed to fully utilize yield monitor technologies to better manage on-farm spatial variability.

Variable-rate fertilizer applications have been shown to improve efficiency and increase profits in many grower fields. Several universities and USDA-ARS research units have developed strategies for using on-the-go, sensor-based applicators to improve fertilizer use efficiency. Profits have come in the form of increased grain yields without increasing total nutrient inputs or as sustained production at lower input levels. Most of these systems consider both spatial and temporal variability, which can affect production. Current work is focused on incorporating additional layers of data such as real-time weather, soil EC, and other spatial information into the processes used to determine fertilizer application rates.

Precision management pays more now than ever. Current grain and fertilizer prices greatly increase the value of precision agriculture technologies. The information generated using precision agriculture equipment and the decisions based upon it can help mitigate the growing risk of yield loss. To learn more about precision agriculture technologies, consider attending the 9th International Conference on Precision Agriculture (ICPA) in Denver, Colorado, July 20-23, 2008. The ICPA will provide a forum for presentations on the current state of precision agriculture research and applications. Also, dedicated sessions for practitioners entitled "Precision A to Z Tracks" will offer practical advice from international authorities on key topics of precision agriculture for producers and professionals. Visit the website: www.icpaonline.org.

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Abbreviations: RTK = real time kinematic; GPS = global positioning system; EC = electrical conductivity.