

# THE LEADING EDGE

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## A PUBLICATION DEDICATED TO MAXIMIZING YIELD POTENTIAL

### **Not Your Grandpa's Farm: Today's Producers are Going High-Tech**

Grandpa did a lot of things right, no doubt. But he couldn't have anticipated the impact precision agriculture technology is having on farming. He's not the only one surprised. Today's growers are still trying to decide if precision agriculture technology is a luxury or a smart investment.

#### **Why precision ag is gaining momentum**

Producers today face a growing number of precision technology options: real time kinetics and other guided steering systems, global-positioning systems with software packages for recording yield and fertilizer data, variable-rate application tools, and row-unit attachments controlled from the tractor cab are some of the options. Although once considered only a convenience available to those with extra cash, now the costs of many of these technologies are dropping.

It's not their dropping costs alone that make these options worth considering. Although the price for corn, soybeans, and other crops has dropped since 2008's highs, input costs have increased. These three factors—lower technology costs, crop prices, and high input costs—result in a greater likelihood that the addition of precision farming technology will pay for producers who make the investment.

An investment in precision technology is also a commitment to stewardship. These systems have the capability to help producers make better use of their resources. As global food demand grows and competition to meet those needs increases, producers using precision ag equipment will be making the best use of their land, inputs, and labor.



On-the-go-adjusted Residue Managers have gotten into the high-tech mix as well.

### And the survey says

Payback on the precision agriculture investment is coming more quickly, sometimes within three years or less. The efficient use of resources and time enabled by these technologies is key. According to an article posted at [www.precisionag.com](http://www.precisionag.com):

- Eighty-five percent of corn growers, 88 percent of cotton growers, and 100 percent of soybean growers indicated their operation has been more profitable using precision ag technology.
- The average input savings per acre for these precision ag users (including seed, fertilizer, herbicides, insecticides, fungicides and time/labor) was \$19 per acre for corn, \$18.50/A. for beans and up to \$39/A. for cotton.
- Fertilizer cost-savings led the way, coming in at \$4 to \$13 per acre depending on the crop.

This research demonstrates that these technologies offer solid return-on-investment in a relatively short period of time. The producers surveyed used more than one precision agriculture technology and many had been using their equipment and adapting practices based on the data provided for three to six years.

**Producers using sprayers should consider adding GPS-controlled spray booms to their precision ag mix. Preliminary research from Auburn University indicates GPS-based spray boom control technology realizes a savings of between 5 and 30% depending on the size and shape of the field.**

### Start off with a guidance system

The key component of almost any precision agriculture system is a global positioning system (GPS) unit. These receivers are capable of many things, but first and foremost, producers often invest in a GPS unit to enable a steering guidance system.

It is a precision ag practice that most producers can easily see the benefits of, and it does not require the commitment to changing management practices.

Adding a guidance system to a tractor greatly reduces stress and hands-on time for producers. Depending on the accuracy of the system, producers may only need to turn their tractor at the end of a pass before the guidance system receives coordinates from satellites and directs the tractor and equipment down the next row. Producers can keep watch over the performance of fertilizer applicators or planters and even work on



laptops as the tractors moves through the field.

Precision guidance systems eliminate overlap for seeding, fertilizing, spraying or harvesting.

From a recently published Ohio State University extension article: a farmer using foam markers instead of a guidance system may actually be farming 102 acres in a 100-acre field. That translates to 2 percent more spent on all associated input costs: seed, fertilizer, fuel, pesticides, and labor.

Growers using guided steering are less stressed and can often put in two to four more productive hours in a day. And operation hours are stretched when application does not depend on human eyesight. If guidance systems are accurate enough, fertilizer can be applied in the dark. An added bonus is less drift—less fertilizer is needed if it is applied at night when wind is less likely to carry it away from its intended target.

### Auto-steer with RTK

Guidance systems vary in accuracy from 20 inches to less than 1 inch. Producers growing crops that require accurate steering, like cotton and vegetables, or those practicing strip-tillage, which depends on precise seed placement, will benefit from more accurate auto-steer systems that make use of real-time kinematics (RTK). It is accurate to less than one inch.

These systems require a receiver in the tractor cab as well as a subscription to receive signals from a network of satellites. Subscriptions and the costs of configuration have come down in price significantly now that cooperatives across the country are investing in RTK technology and offering acces to networks to groups of users who can share associated costs.

### Beyond steering

Precision technologies like variable rate application and yield monitors require the faithful gathering and analysis of data. These technologies are logical next steps after producers have already invested in GPS technology, and they give producers who are willing to use them wisely an incredibly powerful tool— intimate knowledge of their fields. Collecting and interpreting data from precision agriculture technology— data such as yield histories, soil makeup, and other variables-- is the foundation growers need to build targeted management practices.



Yield maps variable rate fertilizer maps, variable rate seeding maps and many other maps can be utilized to make each the most productive it can be while cutting back on wasted inputs.

Yield monitors are an underutilized and poorly understood precision agriculture component that have been around for some time. Combine-mounted monitors collect data such as grain flow, moisture, area covered and global location.

**Producers who farm based on gut instincts and don't take the time to adapt their management practices are more likely to lose money when they invest in precision ag technology.**

Inputting this data to a GPS results in colorful maps that give producers the visual aid they need to determine, zone by zone, the factors that resulted in the crop's final yield.

Variable rate application must be based on accurate nutrient and soil data for each file. Soil samples and yield maps based on aerial imagery of fields or GPS outputs are key components. Producers can compile and analyze the data and then divide each field into application zones. Each zone gets a nutrient application designed to maximize yield without over application. Typically, variable rate technology has been effective only in fields with extremes in yield histories and soil conditions.

However, today's on-the-go sensors that communicate with a computer mounted in the tractor cab are making variable rate application a practice that pays off in more cases. The sensors use light reflected off the crop to determine nitrogen levels or realtime soil sampling and to determine the amount of fertilizer necessary to maximize yield while minimizing costs and the impact on the environment. On applicator-mounted models, the sensor communicates with software that adjusts the amount of fertilizer applied during real-time application. This accurate data will make money by giving producers the confidence to cut rates where indicated.

In most cases, variable rate application is more cost-effective with potassium and phosphorous.

### **Residue managers get into the mix**

Precision technology is available to sprayer booms and fertilizer applicators, so it's no surprise that the technology is expanding to residue management tools. Electronically powered residue managers give producers more control from the tractor cab. Depth adjustments can be made during operation, saving producers time and money.

For example, one model includes an easy-to-use touch screen. Using that touch screen, growers select one row, all the rows, or a select number of rows and enter desired depth changes. The electric actuator on the residue manager raises or lowers the unit to exactly the proper depth for that particular row. Producers can make timely and frequent adjustments to ensure the residue manager is set at the proper height for each row.

### **A decision for precision**

Many experts believe a switch to precision agriculture technology will be required of producers who want to stay in the game as input costs rise and

the agriculture industry becomes more global and more critical to a growing population. A multitude of technologies are available, and producers should carefully consider which can most benefit their operation before investing.

Most importantly, precision ag users must commit to analyzing and storing information, year after year. A producer who invests a few thousand dollars in a mid-range GPS and faithfully considers and acts upon the data it provides will be better off than one who spends hundreds of thousands of dollars but fails to analyze and adapt management practices accordingly. Instead of spending money on technology, growers who are unwilling to change their management practices would be more profitable in continuing to farm just as Grandpa did.

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