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Perceived risks and decisions to adopt precision farming methods (an introduction) (4/9/1998)

(This is an expanded version of the article which appeared in the printed edition.)

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Farming has always been a risky business. Farmers have had to cope with adverse weather, pests, volatile markets, and uncertainty in what crops to plant, when to sell crops or livestock, and other farm management decisions. However, producers feel that risk in farming is increasing.

These perceptions of risk will undoubtedly influence decisions about adopting precision farming methods. In the 1997 Iowa Farm and Rural Life Poll, 2,200 randomly selected producers provided their assessments about risk in farming. Two-thirds (66 percent) indicated that risk in farming has increased in the past five years, and 75 percent reported they expect risk to increase even further in the next five years.

Respondents were also asked to rate the likelihood of selected events happening in the next five years that contribute to their views about risks in farming. Some of the key predictions that Iowa farmers made about risk that may ultimately affect their decisions about adopting precision farming methods included:

- 76 percent felt it likely that inputs costs will increase faster than commodity prices and yields
- 69 percent reported that there will be increased commodity price volatility
- 58 percent indicated it is likely that they will experience at least one crop failure (yield loss of 30% or more) due to adverse weather
- 50 percent felt it was likely that they will market their farm commodities are prices at least 20 percent below market highs, and
- 33 percent predict that it is likely that prices for farm products will decline by at least 30% from current levels.

Given these perceptions about increased levels of risk in farming and the likelihood of risk increasing, the survey asked producers what strategies they have adopted to reduce or manage risk. The most commonly used strategies included:

- 67 percent have bought crop insurance
- 55 percent have reduced debt
- 41 percent have diversified their farm by adding livestock
- 36 percent are using forward contracting to sell crops and livestock, and
- 32 percent are using forward contracting to buy inputs.

It would seem that acceptance and adoption of precision farming technologies would be enhanced if it can be demonstrated to either reduce or manage risk. To the extent that precision farming provides better natural resource use and protection, more timely application of pesticides, or reducing pesticide use through improved monitoring of pests, or makes better use of producer time and personal resources, all of which serve to assist in managing risk, then adoption rates should be higher.

However, it is likely that perceptions about precision farming methods may have deleterious impacts on adoption rates. In previous surveys we have found that the majority of farmers rate bookkeeping and record keeping as least enjoyed farm tasks. Adoption of precision farming may be hampered because of producer perceptions that it requires additional record keeping and data management.

There are several factors that may contribute to perceptions that precision farming technologies are complicated and requires too much "office work."

First is the problem of the complexity of the technology. While the concepts of precision farming are more easily understood, the actual transformation of satellite information into useful information for farm level decisions remains complex and mysterious to many. Secondly, given that 40 percent of Iowa farmers are over 55 years of age, most, if not all of them have learned about computers as adult-learners. Many producers lack formal training in computer-communication technology and data manipulation, and have learned about computers through experience and consider themselves self-taught. For many in this age group they may lack confidence in their abilities to effectively use precision farming in their operations.

Given the relatively high levels of technical sophistication needed to gather and interpret information, and to successfully apply this new knowledge to one's own farm, it is likely that producers will rely heavily upon farm computer consultants and outside experts. It is likely that the same factors that prevent farmers from effectively managing existing farm records may also present barriers to the adoption of precision farming.

This suggests that in many cases, farm management consultants, fertilizer and chemical dealers, and farm suppliers may be the more appropriate adopter category rather than producers. For the average producer the complexity of the computer technology needed, equipment costs, and time needed to learn and keep up-to-date with the system will likely exceed what most individuals are willing or able to invest.

To spur adoption of precision farming methods, agribusiness suppliers and consultants will need to demonstrate how it can serve to reduce risks to the producer. Secondly, they will need to demonstrate how the realized savings in purchased inputs, and improved efficiencies will off-set the charges for this service. For many producers, it is likely that they will hire technical assistance

to receive the benefits of precision farming rather than making the investment in the hardware and equipment to collect and interpret the data.

Farming in the next decade will radically change as more focus is placed on identity-preserved crops, genetically altered varieties designed for specific end-use, and more attention is directed to environmental protection and conservation. Precision farming opens up many new opportunities and challenges as farmers are asked to produce more with fewer resources and less environmental damage. Precision farming will likely be another tool in the toolbox for farmers to better manage their farms, but it will not replace good farm management. The best precision farming data if left unanalyzed or mismanaged can have disastrous results.

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