

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Historical Materials from University of
Nebraska-Lincoln Extension

Extension

1996

NF96-305 Precision Farming in Nebraska: A Status Report

William Miller

Ray Supalla

University of Nebraska--Lincoln, rsupalla1@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/extensionhist>



Part of the [Agriculture Commons](#), and the [Curriculum and Instruction Commons](#)

Miller, William and Supalla, Ray, "NF96-305 Precision Farming in Nebraska: A Status Report" (1996).
Historical Materials from University of Nebraska-Lincoln Extension. 1027.
<https://digitalcommons.unl.edu/extensionhist/1027>

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.



NebFact



Published by Cooperative Extension, Institute of Agriculture and Natural Resources,
University of Nebraska-Lincoln

Precision Farming in Nebraska: A Status Report

William Miller and Ray Supalla, Agricultural Economists

Precision farming is a term applied to a broad array of topics that relate to the precise management of small units of land in contrast to the more traditional management of an entire field in a uniform manner. These units of land may be smaller than one acre in size. The opportunity to manage small blocks of land individually has become feasible due to the availability of global positioning systems which can be used to identify exact locations on earth.

The initial interest about precision farming operations has resulted in the adoption of a variety of technologies that are potentially useful for making site specific management decisions. Geographic mapping of characteristics of small land units for management purposes requires obtaining information such as crop yields, soil nutrient levels, soil organic matter, soil moisture content, weed density, and insect numbers for each small plot of land. Any characteristic that has been useful in the past to assist in making good management decisions on a field average basis is a candidate for use on the small units of land managed in site specific farming. The major barrier to the use of a specific item of information may be the cost of obtaining it relative to the benefit of using it.

During both 1995 and 1996 representative surveys of Nebraska farmers were conducted that included some questions about the adoption of certain precision farming technologies. These surveys were mailed to a sample of crop farmers in Nebraska randomly drawn from all crop farmers identified by the Nebraska Agricultural Statistics Service. The 1995 survey was sent to a sample of 10,000 farmers and the 1996 survey was sent to a sample of 3,000 farmers. The questions about precision farming technologies were answered by over 1,600 farmers in 1995 and 500 farmers in 1996. In 1995 the farmers were only asked if they used the technologies, but in 1996 they were also asked if they were planning to adopt the technology in the next five years. Comparison of the two years provides information about how rapidly these technologies are being adopted.

The two precision farming technologies that were selected for study were yield monitors and variable rate applicators. These two technologies appear to be those that are being adopted first by farmers. Yield monitors are mounted in the combine so they can measure the yield produced by each small plot of land as the combine moves through the field harvesting grain. Since the location of the combine is known at

all times through the use of global positioning systems, it is possible to prepare a map of the field that shows the yield on each small unit of land. Variable rate applicators are mounted on planters to vary the seeding rate or on fertilizer applicators to vary the pounds applied on each small plot of land. The location of the applicator in the field is also determined by the use of the global positioning system.

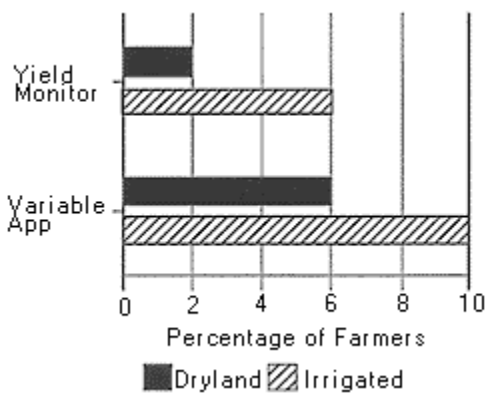


Figure 1. Yield monitor and variable rate applicator use in 1995.

In 1995 only a small proportion of crop farmers were using these two precision farming technologies. Use of these technologies ranged from 2 percent of the persons who operated dryland farms using the yield monitors to 10 percent of the persons operating irrigated farms using variable rate application equipment (*Figure 1*). The most important characteristic that distinguished among operators using precision farming methods in 1995 was whether they had predominately irrigated or dryland farming operations. In the

1995 survey the percentage of persons operating irrigated farms who used yield monitors was three times larger than the percentage of persons operating dryland farms. The percentage of persons operating irrigated farms who used variable rate application technology was almost twice as large as the percentage of persons operating dryland farms.

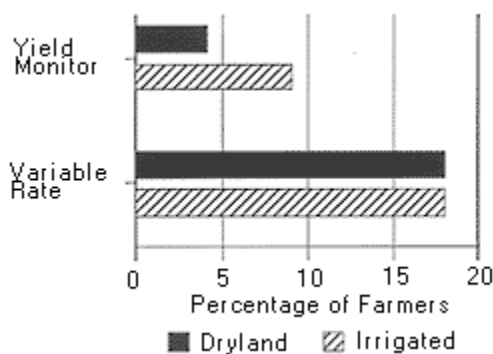


Figure 2. Yield monitor and variable rate applicator use in 1996.

Due to the increasing interest in precision farming, additional questions were added to the 1996 survey asking farmers about their future plans for adoption of these technologies. In less than one year there was a substantial increase in use by persons operating both irrigated and dryland farms. Some farmers had fully adopted the technologies across their entire farm while others had partly adopted the technology and were using it on only a few fields. The proportion of farmers with

irrigation systems who used yield monitors on their farm operations increased from 6 percent in 1995 to 9 percent in 1996 (*Figure 2*). Similarly the use of variable rate applicators by farmers with irrigated operations nearly doubled to 18 percent. Persons with dryland farms increased their use of yield monitors to 4 percent of the farm operations and their use of variable rate applicators to 18 percent in 1996.

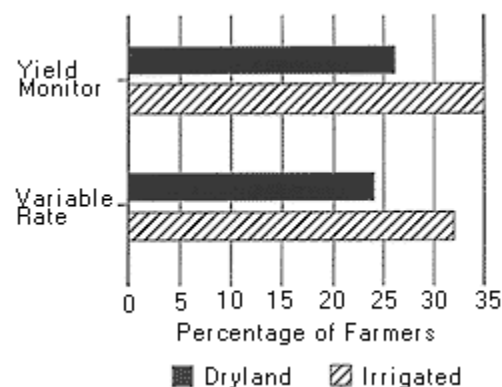


Figure 3. 1996 survey plans to adopt in next five years.

In addition to the increase in use that occurred between 1995 and 1996, a large number of farmers in 1996 indicated they will adopt these technologies during the next five years (*Figure 3*). Thirty-five percent of the persons operating irrigated farms plan to adopt the use of yield monitors and 32 percent of these farmers plan to adopt the use of variable rate application technology during the next five years. Slightly fewer farmers with predominately dryland operations indicated that they had plans to adopt yield monitors and variable rate application technology. Twenty-six percent of

these farmers are planning to adopt yield monitors and 24 percent are planning to adopt variable rate application technology in the next five years.

Demographic information collected in the survey provides insight into the characteristics of those who are adopting these technologies. The patterns of adoption of yield monitors and variable rate applicators are consistent with general expectations. Larger farmers, better educated farmers, farmers with low debt to asset ratios, and younger farmers are more likely to adopt than farmers with the opposite characteristics.

These data on the percentage of farmers who use precision technologies should not be assumed to measure the number of pieces of equipment that have been sold to farmers. In many instances, farmers do not own yield monitors or variable rate applicators. They may be using a technology because the custom operator who combines their crop has a yield monitor on the combine. In addition, fertilizer dealers often have variable rate application equipment for custom applications or for farmers to rent.

It will be interesting to note whether the current plans to adopt will be accomplished during the next five years. Farmers sometimes change plans to adopt a technology when they compare the economic return from that investment to the economic return from alternative investments. If farmers who are using these technologies currently are added to those who plan to adopt, about four of every ten farmers in Nebraska would use these technologies by 2001. Use would range from 50 percent of the persons with irrigated operations using variable rate application equipment to 30 percent of the persons operating dryland farms using the yield monitors.

File NF305 under: FARM MANAGEMENT

N-5, Miscellaneous

Issued October 1996

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.

University of Nebraska Cooperative Extension educational programs abide with the non-discrimination policies of the University of Nebraska-Lincoln and the United States Department of Agriculture.