

**STATUS OF COTTON PRECISION FARMING IN NORTH CAROLINA:
2009 UPDATE BASED ON NEW SURVEY DATA**

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Abstract

Using survey data collected in 2009, we present descriptive statistics on the status of cotton precision technology adoption in North Carolina. Information about the utilization of precision technologies for gathering spatial information (i.e. yield monitors, soil sampling, aerial photos, etc.) and for variable rate application of inputs (i.e. fertilizers, pesticides, etc.) in North Carolina are discussed.

Introduction

Precision farming is a set of technologies with substantial promise to both individual economic gains and social environmental benefits. These information technologies, ranging from satellite imagery to grid soil sampling to soil survey mapping, are used to evaluate crop input decisions (seed, nitrogen, phosphorus, potassium, lime, growth regulators, fungicides, herbicides, insecticides, and drainage) and yield variability.

The future of precision farming in cotton depends on how the producers view the precision farming technologies. A thorough examination of producers' experiences with various precision farming techniques and the benefits they have received or expect in 2009 will shed more light on what is driving farmers' decisions to adopt precision farming technologies.

The objectives of this study are: (1) to determine the extent of precision farming adoption by North Carolina cotton farmers in 2009; (2) to understand the reasons behind adoption (and non-adoption) of precision farming technologies by North Carolina cotton farmers in 2009; and (3) to analyze North Carolina cotton farmers' attitudes and perceptions about precision farming in 2009.

Research Methods

A mail survey of cotton producers in 12 Southeastern states (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, Texas, and Virginia) was conducted in early 2009 (February and March) to establish the current use of precision farming technologies in these states. This report represents information on the North Carolina portion of the survey. This survey is similar (although not completely identical) to previous precision agriculture survey conducted in 2001 and 2005.

In North Carolina, 1,036 cotton producers were randomly sampled based on an initial list of cotton producers provided by the Cotton Board in Memphis, TN. Questionnaires were then sent to these cotton producers on February 20, 2009. A reminder and a follow-up mailing of the questionnaire were sent on March 5, 2009 and March 27, 2009, respectively. A total of 169 cotton farmers in North Carolina responded with usable data, giving a usable response rate of 16.3%. This response rate is higher than the 2005 response rate (12.3%), but lower than the 2001 response rate (22%). Using the data from the usable survey responses in North Carolina, we use descriptive statistics to fulfill the objectives of this study.

Results

Our survey results indicate that 67% of the surveyed North Carolina cotton farmers adopt some form of precision farming technology. The most common precision farming practices utilized by North Carolina farmers are precision soil sampling in some form (35%) and the use of soil maps in some form (31%). About 19% of the sampled producers use grid soil sampling and about 17% use zone soil sampling. The adoption rate for yield monitors and aerial/satellite imagery are only about 13% and 12%, respectively. Less than 10% of the survey respondents adopted handheld Global Positioning Systems (GPS), digital mapping, and electrical conductivity precision technologies.

Out of the 169 usable surveys in North Carolina, 41 respondents (24.3%) made variable rate technology (VRT) fertilizer management plans. However, of the North Carolina cotton producers sampled who use VRT, about 22% use VRT to apply lime, 18% use VRT to apply potassium, and 17% use VRT to apply phosphorus. Only 9.5% of the sampled producers who use VRT use the technology for nitrogen fertilization. Majority (65%) of the VRT users believe that this technology do not significantly change their yields.

Most of the North Carolina cotton producers in the survey do not use any GPS guidance systems. Only about 19% of the survey respondents adopted GPS Autosteer systems, while only 13% adopted a GPS Lightbar system.

Potentially having higher profits from precision technologies is the most important reason for adoption based on the responses by the sampled North Carolina cotton producers. From a scale of 1 to 5 (5 being the highest), the importance score of profits as the main reason for adoption is about 4.3. Environmental benefits and being at the forefront of technology have importance scores of 3.8 and 2.0, respectively. In contrast, the most common reason (32%) cited by North Carolina cotton farmers for not adopting any precision farming practices is its cost.

Lastly, about 91% of cotton precision technology adopters in North Carolina think that this technology will still be profitable in the future. But only about 78% of non-adopters believe that this technology will still be profitable in the future.

Conclusions

About 67% of the surveyed North Carolina cotton farmers adopt some form of precision technology. The most common precision farming practices utilized by North Carolina cotton farmers are precision soil sampling, use of soil maps, and grid/zone sampling. North Carolina cotton farmers who use variable rate technology typically uses it for lime application and they tend to observe no changes in yields. Most North Carolina cotton farmers do not use GPS guidance systems. Profit is the most important reason for adopting precision technologies and cost s the most common reason for not adopting. Most North Carolina cotton farmers still think that the use of precision farming techniques will be profitable in the future.