ADOPTION OF INFORMATION TECHNOLOGIES IN COTTON PRODUCTION

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Abstract

Precision farming technology has become increasingly important in cotton production. It allows farmers to take advantage of knowledge about infield variability by applying expensive inputs at levels appropriate to crop needs. Essential to the success of the precision farming system is the adoption of site-specific information technologies such as yield monitors, passive remote sensing, and handheld GPS/PDA devices. While the adoptions of the aforementioned information technologies have been evaluated individually in previous literature, there exists a gap in knowledge about the factors affecting the adoption of some of the newer information technologies such as electrical conductivity. The objective of this study is to evaluate the factors influencing the decision by cotton producers to adopt one or more aforementioned information technologies for variable-rate applications of inputs.

Data for this study were from the Cotton Incorporated 2009 Southern Cotton Precision Farming Survey. Post stratification survey weights were used in the analysis to align the survey data with the 2007 USDA Agricultural Census data according to farm size. This helped to correct for the underrepresentation of smaller farms in the survey data.

A Probit limited dependent variable model allowed for the evaluation of the factors influencing farmers' decisions to adopt yield monitors, passive remote sensing, handheld GPS/PDA devices, and electrical conductivity. The factors to be evaluated include farmer characteristics such as age, education, income, percentage of income from farming, and the use of a computer for farm management; farm characteristics such as farm size, percentage of land owned, ownership of livestock, number of farm suppliers at the county level; farm location by ERS Farm Resource Region; and farmers' sources of precision farming information.

Results indicate the factors affecting adoption varies among the selected information technologies evaluated in this study. For example, older farmers were found to be less likely to be adopters of handheld GPS units; farmers with post high school education were found to be more likely to be adopters of electrical conductivity; and farmers with more cotton acres planted were more likely to be adopters of both yield monitors and passive remote sensing. Decisions to adopt selected information technologies also varied regionally. For example, farmers located in the Mississippi Portal were more likely to be adopters of each of the evaluated information technologies than farmers located in the Prairie Gateway. Lastly, farmers' decisions to adopt varied by their sources of precision farming information. For example, farmers who received their precision farming information from trade shows and the internet were more likely to be adopters of yield monitors than those who did not, while farmers who received their precision farming information from crop consultants were more likely to be adopters of passive remote sensing and electrical conductivity than those who did not.

Findings from this research have implications for Extension and agribusiness firms involved in furthering the implementation of precision farming practices. Knowledge of the factors influencing adoption of these specific technologies can prove beneficial in the promotion as well as further development of these technologies. Due to current input price conditions, the use of these information technologies will likely become increasingly important as farmers strive to become more efficient through the use of the precision farming system.