RESULTS FROM PRECISION AGRICULTURE COTTON SURVEY: LOUISIANA

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Abstract

We analyzed the electronics uses pattern by cotton farmers in Louisiana using graphical and frequency analyses. The results indicated that 65% of farmers have used computers in farm management, the same percentage of farmers have used autosteer as a GPS guidance system, and an average of 2.5 precision farming information gathering technologies have been adopted by farmers. Farmers used the variable rate technology mostly to apply nitrogen, phosphorus, potash and lime. Most of the farmers indicated that uncertain benefit and too high cost are the reasons behind their nonadoption of precision farming technologies. Results from this study should help farmers to understand the precision adoption pattern and concerns of other similar producers. Policy makers can understand the concern related to nonadoption and potential remedy to improve the nonadoption pattern given the fact that precision farming technologies are environmentally beneficial and economically profitable.

Introduction

Electronics uses have been increasing in American Agriculture. Some of these electronics are simple equipment such as a cellphone whereas others are real complex and evolving. Farmers are now using insect monitoring devices, variable rate technologies, remote sensing technologies, and censors to manage pests, apply inputs, and harvest crops. Although cereal grain producers are major users of these technologies, cotton farmers are increasingly adopting these new technologies as well.

The objective of this research is to report the status of electronics use specifically the use of precision agriculture technology adoption by cotton producers in Louisiana.

Materials and Methods

Results presented here come from the survey conducted cooperatively by representatives from several universities in the Southeastern U.S. states. A mailing list of cotton farmers for the 2011 marketing year was obtained from the Cotton Board, Memphis, Tennessee. Survey questionnaires were sent to 462 Louisiana cotton farmers on February 1, 2013 using the Dillman's (1978) survey protocol. We received 72 usable survey responses from Louisiana farmers making the response rate 15.5%. This response rate was slightly above than the national response rate of 13.76%.

Results and Discussion

Computer use for farm management and other devices used in the field

Computer use has potential to increase profit because of data keeping and ease of data retrieving. Several studies have been conducted to identify the factors affecting the use of computers in farm management since Putler and Zilberman's article published in 1988. We find that 65% of Louisiana cotton farmers who have responded to this survey have used computer in farm management. Farmers or the workers have used several electronic devices in the field. Most prevalent among these devices is smart phone. Farmers also indicated that almost 92% of their fields have cellphone coverage.

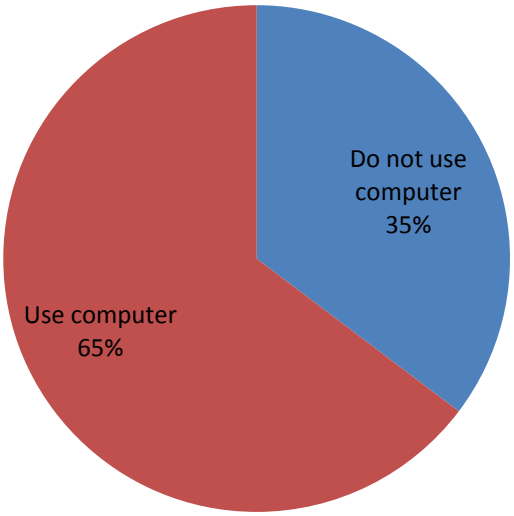

Figure 1. Computer Use for Farm Management

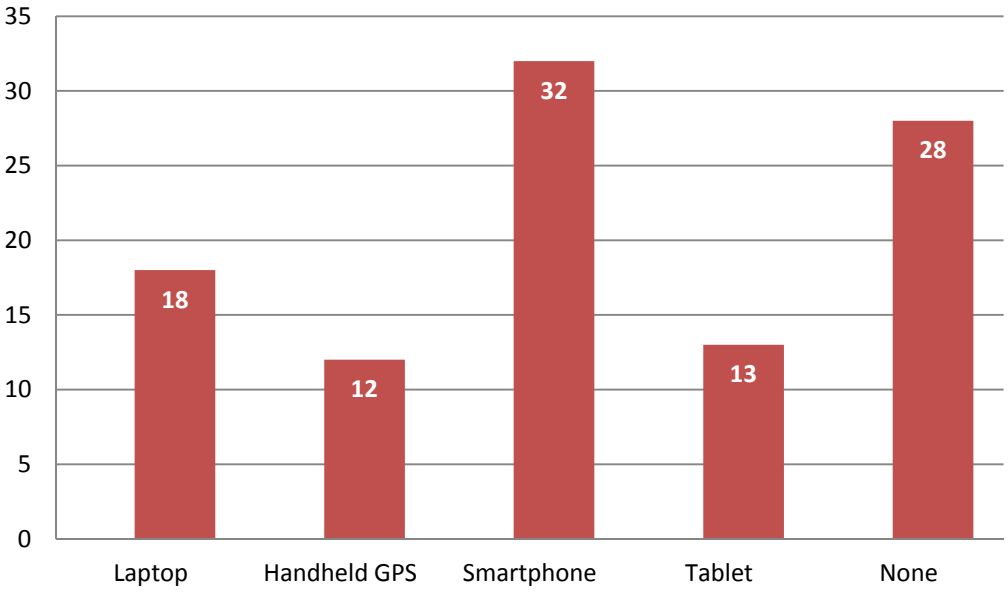

Figure 2. Devices Used by Workers in the Field for Farm Management

2. GPS guidance System

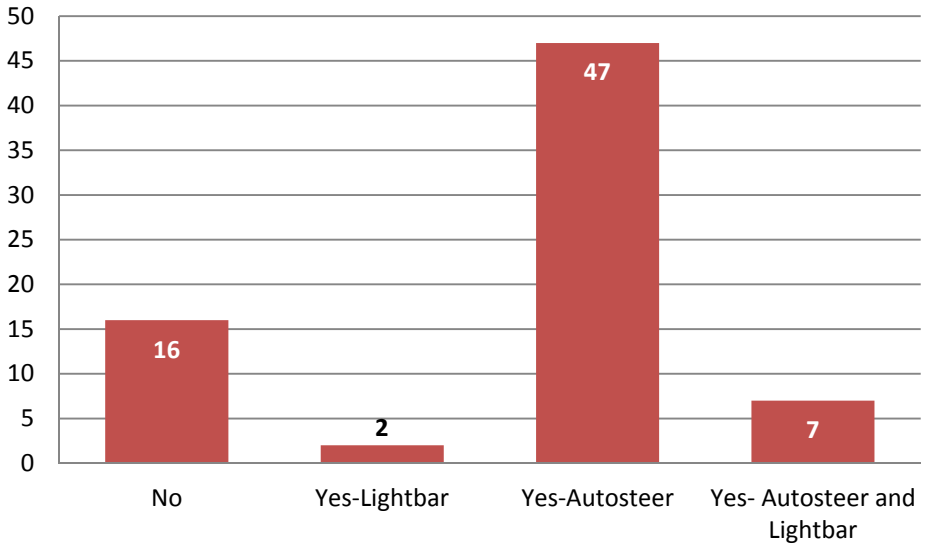

Figure 3. Use of GPS Guidance System

GPS based guidance system such as lightbar and autosteer helps farmers to focus on operation and implementation of equipment rather than steering it. Farmers can save cost by adopting the guidance system (Dantoni et al. 2012). Lightbar uses global navigation satellite system to steer a vehicle. Guidance system is one of the most prevalent technologies used by farmers across the United States. Our survey indicated that out of 72 farmers, 16 have not adopted any GPS guidance system. Autosteer is the most prevalent form of guidance system use with 47 farmers responding that they have adopted it in the farming system. Seven farmers mentioned that they have adopted both autosteer and lightbar.

Precision Ag Technology Used

Farmers have used several information gathering technologies. Among these technologies, Louisiana cotton farmers adopted GPS guidance system, yield monitoring with GPS, and Geo-referenced grid sampling. The lowest adopted information gathering technologies were COTMAN plant mapping and digitized mapping. Some of the farmers (24 farmers) have not adopted any of these information gathering technologies. The maximum number of these technologies adopted was 7 which were adopted by farmers. The average number of information gathering technologies used was 2.5. The average size of the farms of those who adopted at least one technology is 551 acres in 2012.

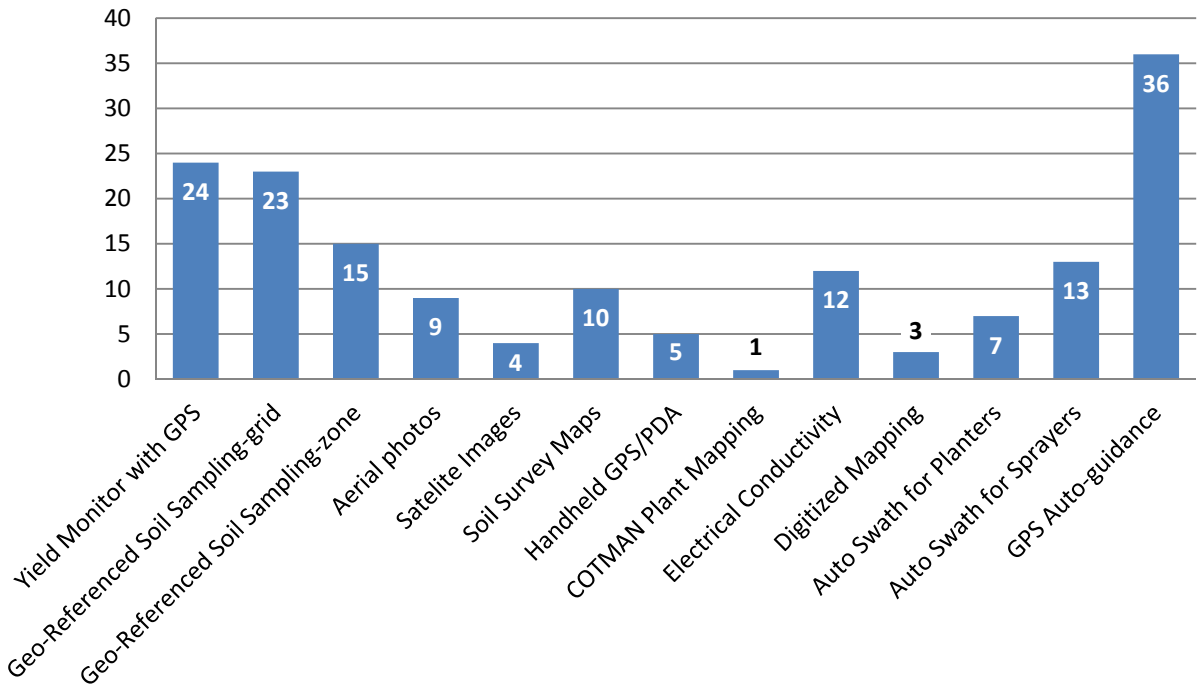

Figure 4. Number of Farmers Adopting Precision Technologies

Variable rate application for inputs

Most of Louisiana cotton farmers have used variable rate application to apply phosphorus, potassium and lime. Farmers have not adopted variable rate application to apply herbicide and irrigation.

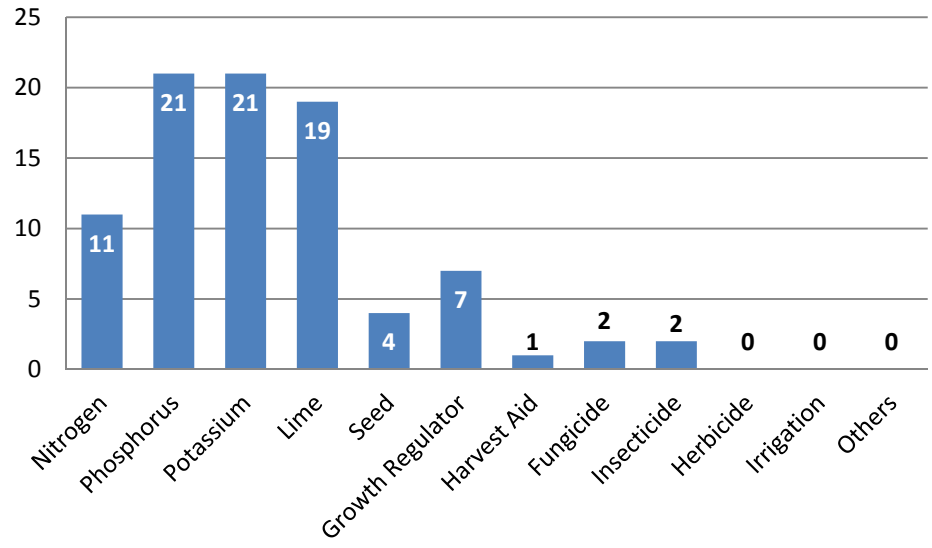

Figure 5. Variable Rate Application for Inputs

Primary barriers to using precision farming

It is reasonable to assume that a technology with profit potential gets adopted by farmers. There are several reasons why that may not be the case. In case of precision farming, we asked about the primary barrier for its adoption. Most of the Louisiana respondents indicated cost being too high, benefits being too uncertain and technology being too

complex as some of the reasons for the technology adoption barriers. Farmers did not state too much time consumption or too risky as the primary reason for nonadoption.

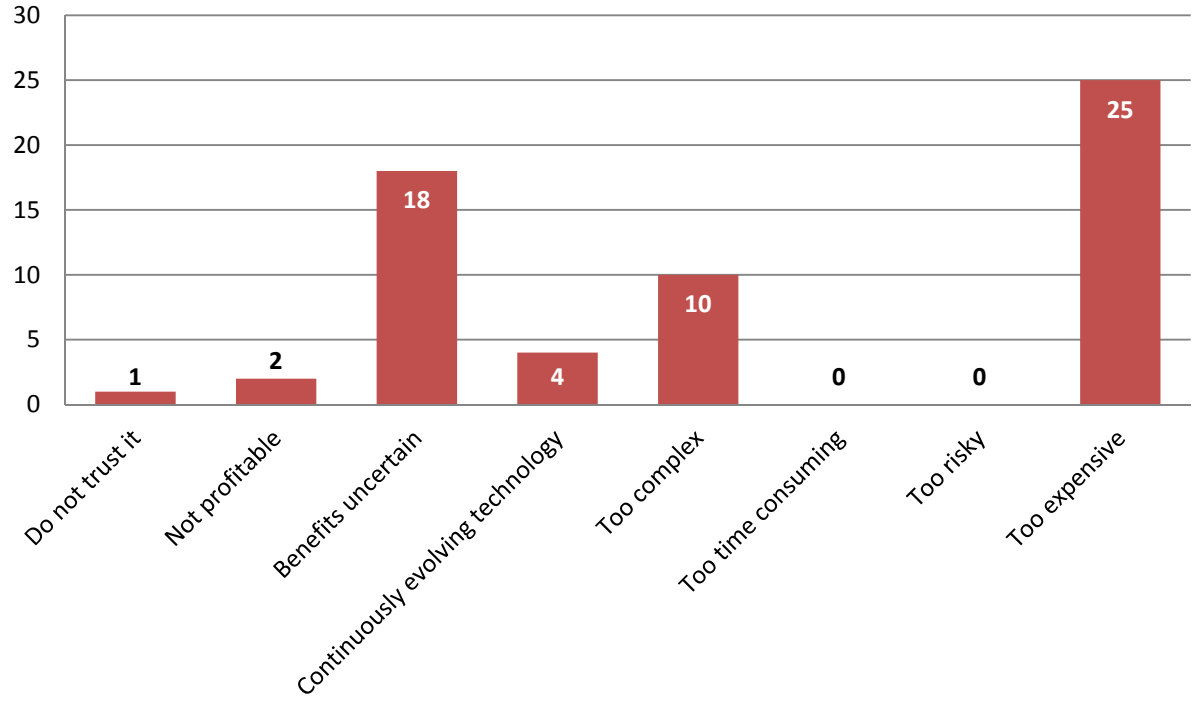

Figure 6. Primary Barriers to Using Precision Farming

Summary

Cotton farming has been changing substantially over the last few decades. Farmers now have a disposal of various electronics in the farm to improve farm management and input applications. Precision farming and component technologies are capable of providing a profitable farming operation but farmers are concerned about uncertain benefits, lack of know-how and cost of adopting the component technologies. Education from university cooperative extension on the technology and assistance on purchasing precision farming equipment in terms of cheaper loan rate may help improve adoption of precision farming even at a higher level than at the current. Adoption of these technologies may not only increase profit but also provide environmental benefits, and more leisure time to cotton farmers.

Acknowledgements

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Putler, D.S. and D. Zilberman. Computer Use in Agriculture: Evidence from Tulare County, California. *American Journal of Agricultural Economics* 70(1988):790-802.