▸ Tillage Systems And Cover Crops In Cotton Production: Do Higher Fuel And Fertilizer Prices Matter?

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Introduction

Alternative tillage systems and cover crop combinations for cotton production have been evaluated in the past for their potential to increase profitability. These evaluations were generally done in an era of relatively low fuel and fertilizer prices. This presentation takes another look at alternative tillage and cover crop systems with the current higher prices for fuel and fertilizer. The agronomic research on which this analysis is based was designed to evaluate irrigated cotton response to tillage practices, winter cover crops and nitrogen rates. The economic analysis focuses on tillage practices and winter cover crops. Standardized enterprise budgeting techniques were used to develop budgets for each of the production systems considered. Actual input levels (fertilizer, seed, fuel, etc.) used in the experiment was incorporated into the enterprise budgets. Equipment sizes representative of commercial cotton farming operations were used to estimate costs on a per acre basis. Yields were estimated for each system at the mean over the life of the experiment. The output price used was an average of historical prices. Input prices were current input prices used by the Department of Agricultural Economics and Agribusiness at LSU to estimate 2008 enterprise budgets for Louisiana. Constant prices and average yields were used to compare the relative profitability of the various systems.

A total of 12 production systems were included in the economic analysis. These included three types of tillage; no-till, no-till with cultivation, and surface-till; four types of winter cover crops, native cover, vetch, wheat, and hairy vetch. All experiments were conducted under dryland conditions. Results of the budget analysis indicate that variable costs for the no-till systems are generally somewhat lower than variable costs for comparable surface tillage systems. Perhaps more important than the cost differences between the two types of systems, is the composition of cost differences. Surface tillage systems require tillage equipment and tractors to perform the tillage operations. Therefore, surface tillage production systems require more labor and equipment costs than the no-till systems. Further, the equipment required to perform tillage operations gives rise to fixed costs (costs associated with owning equipment). On the other hand, no-till systems generally require more herbicide to control winter vegetation.

In addition to cost differences due to labor and equipment, higher fuel and fertilizer prices also influence differences among the various production systems. Those systems utilizing tillage operations incur higher costs because of the increased fuel prices. Production systems that require higher levels of nitrogen fertilizer are also likewise penalized with increased costs. Surface till systems require more trips over the field and therefore use more diesel fuel per acre than no-till production systems. Utilizing wheat as a cover crop requires more nitrogen to offset the requirements for the decomposing wheat straw in the spring. Therefore, higher fuel and fertilizer prices shift the advantage to production systems that use less of these inputs.

Diesel fuel cost accounted for as much as $10 per acre difference between treatments. Lowest fuel costs were in the no-till treatments without cultivation. Highest fuel costs were in surface-till treatments with cultivation. While higher fuel prices contributed to widening the spread between no-till and surface-till treatments, fertilizer prices also contributed to differences. The most dramatic differences attributable to fertilizer were between those treatments with and without wheat cover crop. Utilizing wheat as a cover crop required an additional 45 pounds of nitrogen fertilizer per acre. With nitrogen priced at $0.70 per pound of N, this adds approximately $31.50 per acre to those treatments utilizing wheat as a cover crop.

Given the higher price for nitrogen fertilizer, will the use of a nitrogen fixing cover crop reduce the need for commercial fertilizer? Based on results of the treatments in this experiment, the answer is no. Treatments utilizing hairy vetch as a cover crop did not require additional commercial nitrogen fertilizer. However, the cost of hairy vetch seed more than offset the cost of commercial nitrogen. Therefore, replacing commercial nitrogen with a hairy vetch cover crop is not economical considering only the cost of the hairy vetch cover crop and the cost of commercial nitrogen. There may be other benefits derived from the use of hairy vetch as a cover crop, but those are not included in this analysis.

No tillage production systems for cotton offer advantages in terms of efficiency and cost advantages. The no-till systems have lower labor and equipment requirements than production systems utilizing tillage operations. The recent increase in fuel and fertilizer prices has magnified the cost advantage of the no-till production systems for cotton. Consequently, the no-till systems produce cotton for the least cost per pound of lint for the systems included in this analysis.

Improving Furrow Irrigation With Help Of "Phaucet" Computer Program

Presented by Phil Tacker
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Presented by Steve Stevens
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The Phaucet computer program, developed by the NRCS in Missouri, helps improve furrow irrigation. The program offers the potential for reducing irrigation and field runoff by providing the following;

1. Design of holes sizes to punch in irrigation tubing
2. Calculation of pressure (head) changes along the tubing
3. Adjustment of hole sizes for different row lengths in the same irrigation set
4. Ability to evaluate different layout options for the field and irrigation tubing
5. More uniform watering of the field in shorter time period

Following is the field information needed to run the program;

1. Field size and dimensions
2. Accurate measurement of flow rate from well
3. Maximum number of hours that can pump in one set without causing problems
4. Row lengths in the field, not each row length but long and short rows in a set
5. Length and slope of turn row for irrigation tubing
6. Row spacing and preference on irrigating every furrow or every other furrow

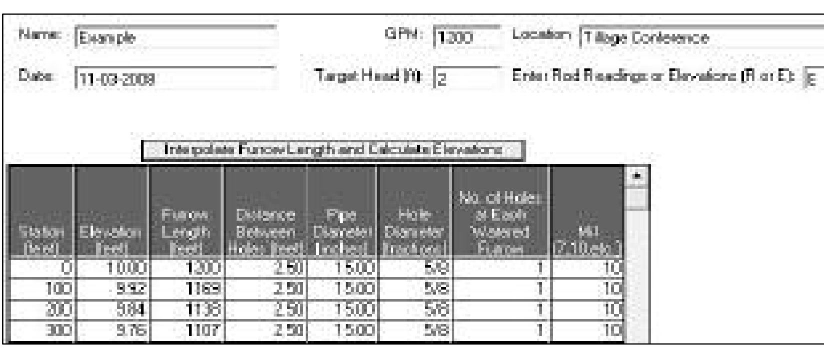

Figure 1. Example of the program input data screen.