COMPARISON OF COSTS FOR CONVENTIONAL TILLAGE AND CONSERVATION TILLAGE PRODUCTION METHODS IN BR COTTON

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Introduction

According to a survey conducted by the University of Georgia (UGA) Cooperative Extension during spring 2005, approximately 53 percent of cotton acreage in Georgia was under some form of conservation tillage (43 percent under strip-till, 3 percent under no-till and 7 percent under reduced-till). Cotton producers often inquire about the cost and benefit trade-off between conventional tillage and conservation tillage. Some benefits are intangible or difficult to place a value upon such as reduced erosion and improved soil quality. Others are more tangible. These tangible costs were analyzed through the use of enterprise budgets.

Materials and Methods

The UGA Cotton Enterprise Budgets are updated annually and modified as needed to accommodate changes in typical production practices, input prices and field operations. In 2008, Extension economists collaborated with Extension specialists on the UGA Cotton Team (an agronomist, entomologist, physiologist, plant pathologist and fertility specialist) to come up with likely production practices for a cotton farm in Georgia for the upcoming 2009 crop year. Furthermore, County Extension Agents, local input suppliers and industry professionals were surveyed to collect local input prices on all inputs associated with producing cotton.

The typical production practices and corresponding input prices were then incorporated into four cotton enterprise budgets for the Bollgard/Roundup Ready (BR) variety of cotton. The budgets were based on the BR variety because it accounted for over 86% of Georgia cotton acres in 2008. Conventional-till and strip-till budgets for both dryland and irrigated cotton were developed.

Although each individual farm operation varies, the budgets were designed to be used as a tool for cotton producers to begin calculating their own costs. The budgets included variable costs such as seed, fertilizer, chemicals, fuel, repairs/maintenance, labor and interest on operating capital. Fixed costs on machinery and equipment were also included in the budgets. These costs included depreciation, taxes, insurance and other overhead costs.

Results and Discussion

Based on the budgets, conventional-tillage and conservation-tillage cotton will likely have comparable costs for fertilizer, insect and disease control, plant growth regulation and defoliant in 2009; however, there are likely to be differences in herbicide, labor, fuel, repairs/maintenance and irrigation costs. Table 1 has a breakdown of these different

inputs and costs between conventional-tillage and strip-tillage cotton for the 2009 crop year.

Table 1. Select variable inputs between conventional-till and strip-till BR cotton, dryland and irrigated, 2009.

Item	Dryland Conv.-Till BR Cotton	Dryland Strip-Till BR Cotton	Irrigated Conv.-Till BR Cotton	Irrigated Strip-Till BR Cotton
Seed ($/A)	$ 65.19	$ 71.71	$ 65.19	$ 71.71
Herbicide ($/A)	$ 32.15	$ 38.00	$ 32.15	$ 38.00
Labor (hrs./A)	2.24	1.95	2.34	2.00
Fuel (gal./A)	13.21	11.53	13.80	11.84
Repairs/Maintenance ($/A)	$ 20.92	$ 18.89	$ 21.07	$ 19.04
Irrigation ($/A)	NA	NA	$ 66.00	$ 57.75

According to the typical production methods outlined in the budgets, strip-till cotton producers are more likely to plant their cotton at a higher seeding rate (2.75 seed/ft compared to 2.5 seed/ft for conventional) resulting in an increased cost of $6.52 per acre. Furthermore, strip-till producers are more likely to spend more on herbicides ($5.85 per acre). This is mostly due to the additional spray required to burndown the cover crop, or winter growth in a fallow field, prior to planting.

Conventional-till cotton producers are likely to make more trips over the field with tillage equipment resulting in higher labor, fuel and repair/maintenance costs. The budgets show that strip-till cotton producers are likely to use approximately 1/3 of an hour, or 20 minutes, less labor per acre than conventional-till producers. In addition, strip-till cotton producers are likely to use 1.68 fewer gallons of fuel per acre of dryland cotton and 1.96 fewer gallons of fuel per acre of irrigated cotton. Repairs and maintenance costs are expected to be approximately $2.03 less per acre for strip-till cotton in 2009.

Also according to the budgets, strip-till cotton producers are more likely to use one less irrigation per acre resulting in a savings of $8.25 per acre. The irrigation savings were based on the assumption that soils in conservation tillage systems have an increased water holding capacity resulting in one less irrigation application than in conventionally-tilled systems.

The total, variable and fixed costs per acre and breakeven cost per pound for conventional-till and strip-till BR cotton are summarized in Table 2.

Table 2. Yield, variable, fixed and total costs per acre, and breakeven costs per pound between conventional- and strip-till BR cotton, dryland and irrigated, 2009.

Item	Dryland Conv.-Till BR Cotton	Dryland Strip-Till BR Cotton	Irrigated Conv.-Till BR Cotton	Irrigated Strip-Till BR Cotton
Yield (lbs./A)	700	700	1,100	1,100
Variable Cost ($/A)	$ 363.73	$ 366.27	$ 465.64	$ 458.20
Breakeven Variable Cost ($/lb.)	$ 0.52	$ 0.52	$ 0.42	$ 0.41
Fixed Cost ($/A)	$ 138.07	$ 131.76	$ 249.36	$ 240.80
Total Cost ($/A)	$ 501.80	$ 498.02	$ 715.00	$ 699.00
Breakeven Total Cost ($/lb.)	$ 0.72	$ 0.71	$ 0.65	$ 0.64

The budgets assumed cotton producers were established in their production practices and that yields between the two different tillage methods were similar. In 2009, conventional-till dryland cotton producers are likely to have slightly lower variable costs at $2.54 per acre as a result of fewer chemicals sprayed and a lower seeding rate. The difference in variable costs between conventional-till and strip-till irrigated cotton is greater at $7.44 per acre, with the advantage going toward strip-till. This was largely because of the expected savings on fuel, labor, machinery and irrigation as seen in Table 1. Even so, when yield is taken into consideration breakeven variable costs per pound were within a penny for both dryland and irrigated cotton.

Fixed costs are likely to be $6.31 per acre higher for dryland conventional-till cotton and $8.56 per acre higher for irrigated conventional-till cotton compared to strip-till. This results in a likely total cost savings of $3.78 per acre to dryland strip-till cotton producers and $16.00 per acre for irrigated strip-till cotton producers. Assuming comparable yields, the budgets showed a total breakeven cost difference of $0.01 per pound between conventional-till and strip-till cotton.

Acknowledgements

The authors greatly appreciate the collaboration with members of The UGA Cotton Team and the efforts of Georgia County Cooperative Extension Agents in updating the 2009 UGA Cotton Enterprise Budgets. The authors would also like to thank the Georgia Cotton Commission and Cotton Incorporated for partial funding and support.

Literature Cited

The 2009 UGA Cotton Enterprise Budgets are available online at http://agecon.uga.edu through the Extension links. The publication, *Conservation Tillage in Georgia Cotton Production: An Analysis of a 2005 Survey*, can be found online at http://www.ces.uga.edu/agriculture/agecon/pubs/comm/agecon-06-112.pdf.