No-Till Farming Practices Offer Cost Savings and More Profit Potential to Cotton and Grain Sorghum Producers

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Abstract

Farmers progressively seek ways to control costs, sustain yields and improve bottom-line profitability. Adaptation of new varieties, herbicides, insecticides, more efficient tillage practices, and other technology is often necessary to improve performance and profitability.

Introduction

The dominant management practice in the Texas Coastal Bend is conventional tillage, where crop residues are incorporated into the soil after harvest, and several tillage passes are typically made to prepare the field for planting and to manage weeds (Stichler, 2006). Conventional tillage practices can leave the soil prone to wind and water erosion.

"No-till" is the practice of leaving the soil undisturbed throughout the year, except for fertilizer placement (Young, 2018). Under no-till management, weeds are managed with herbicides, as cultivation is not an option. This study illustrates the crop performance and potential profitability of no-till versus conventional cultivation practices in dryland cotton and grain sorghum farming in South Texas.

Assumptions

The Financial And Risk Management (FARM) Assistance strategic planning model was used to illustrate the individual financial impacts of conventional vs. no-till dryland farming practices in South Texas.

Four scenarios were evaluated:

1) conventional cotton;
2) no-till cotton;
3) conventional grain sorghum; and
4) no-till grain sorghum.

Based on seven years of data from a replicated AgriLife Corpus Christi trial, a case study 100-acre farm was developed to project the profit potential of conventional and no-till practices in cotton and grain sorghum over a ten-year period (2018-2027). The 2018 crop yields for each crop and production practice were based on 2011-2017 average research trial yields.

Per acre production inputs, costs, and estimates for overhead charges were based on typical rates and farming practices, and the 2018 District 11 Coastal Bend dryland cotton and grain sorghum budgets. Custom costs include repairs, maintenance and fuel. Debts and assets were not included in the analysis. Crop prices were based on average December 2017 to February 2018 futures market adjusted for discounts and basis for the Coastal Bend ($0.66/lb. cotton and $6.96/cwt. grain sorghum).

The base year for the 10-year analysis is 2018 and projections are carried through 2027. Price trends follow projections provided by the Food and Agricultural Policy Research Institute (FAPRI, University of Missouri) with costs adjusted for inflation over the planning horizon. Net cash farm income (NCFI) per acre was used to measure profitability.

Table 1: Cotton and Grain Sorghum Conventional and No-Till Yields Per Acre, Corpus Christi Research and Extension Center

Year	Cotton (Lbs.)		Grain Sorghum (Cwt.)	
	Conventional	No-Till	Conventional	No-Till
2011	266	277	35.65	36.79
2012	428	415	26.43	39.49
2013	22	190	0.00	0.00
2014	517	565	27.74	34.41
2015	916	1,058	53.42	48.85
2016	953	910	51.29	56.48
2017	1,168	1,286	45.86	47.02
Avg.	**610**	**672**	**34.34**	**37.58**
Case Study Projected Average Yields				
2018	610	672	34.34	37.58
2027	640	705	34.87	38.16

Figure 1: Annual Average Net Cash Farm Income

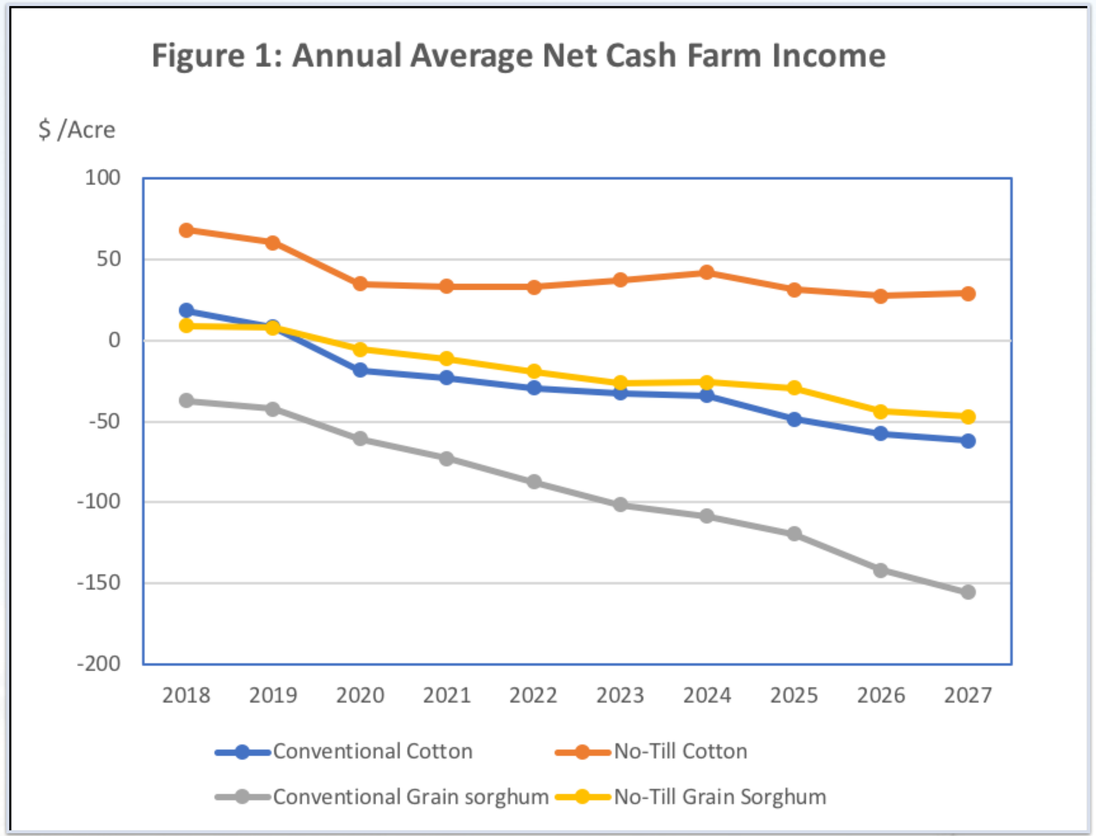

Table 2: 2018 Conventional and No-Till Cotton and Grain Sorghum Production Costs Differences Per Acre

Expenses	Cotton		Grain Sorghum	
	Conventional ($/Acre)	No-Till ($/Acre)	Conventional ($/Acre)	No-Till ($/Acre)
Herbicides (1)	41.24	51.24	35.13	38.26
Insecticides	27.33	27.35	11.15	11.54
Custom (2)	54.48	32.08	69.59	47.24
Harvest (2,3)	155.55	171.36	15.45	16.91
Boll Weevil	4.27	4.70	n/a	n/a
Labor	13.18	7.72	15.07	9.42

(1) Includes defoliants for cotton.
(2) Assumes cotton is custom harvested.
(3) Includes ginning for cotton; hauling and drying for grain sorghum.

References

Stichler, C., A. Abrameit, and M. McFarland. 2006. Best Management Practices for Conservation/Reduced Tillage B-6189. Texas A&M AgriLife Extension Service. College Station, TX.

Young, Mac, J. Foster, Josh McGinty, S Klose, and A. Maeda. Focus 2018-2: No-Till Farming Practices Offer Cost Savings and More Profit Potential to Cotton and Grain Sorghum Producers. Texas A&M AgriLife Extension Service. College Station, TX.

Implications and Considerations

Although not considered in this analysis, no-till may also have a fixed cost advantage over conventional, as less investment in machinery and equipment is typically required. Based on Texas AgriLife Coastal Bend budgets, the savings in depreciation and investment costs of no-till vs. conventional was estimated to be $19.90/acre for cotton and $22.37/acre for grain sorghum in 2018. Savings are primarily due to the elimination of larger horse-power tractors, field cultivators, rippers, and crop cultivators.

However, short-term costs and cash flow implications of an equipment transition must be considered. While the estimated economic cost of ownership may be less expensive for a no-till system, other factors (age of equipment, timing of purchase, required debt, etc.) may not be equal, particularly if you are considering a transition to newer no-till equipment from older conventional equipment. The newer equipment could, in the short-term, create a higher fixed cost of ownership. The higher value asset will mean increased opportunity cost of capital, higher depreciation, and possibly additional cash flow obligations if debt financing is necessary.

Switching to no-till cultivation has the potential to maintain or improve yields, reduce production costs, and increase profitability. Overall fuel, labor, and repairs and maintenance expenses are less due to eliminating several cultivation trips annually. For no-till, herbicide and spraying expenses will likely be higher due to one or two additional applications. Repairs specific to planters may also be higher in no-till systems since the soil may be compacted on the surface. But, the overall costs savings from no-cultivation are expected to offset any additional spraying expenses and planter maintenance.

Actual results will likely vary by producer, actual cultivation practices, production region, and crop markets. Crop producers should continue to implement management practices that improve the bottom-line and financial performance of their operation.

Results

The methodology involved a 10-year financial simulation of returns by tillage practice using stochastic crop prices and yields. The scenarios compare the financial performance of each crop and tillage practice.

Table 3: 2018-2027 Projected Profitability of Conventional vs. No-Till Dryland Crops in South Texas

	Scenario	10-Year Annual Averages		
		Total Cash Receipts ($/Acre)	Total Cash Costs ($/Acre)	Net Cash Farm Income ($/Acre)
1	Conventional cotton	507	535	-28
2	No-Till Cotton	557	517	40
3	Conventional Grain	249	341	-92
4	No-Till Grain	272	291	-19