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GMO vs. Conventional Cotton Under Furrow Irrigation in the Lower Rio Grande Valley

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Planting conventional cotton seed may or may not offer the potential to improve profitability.

The costs and inherent risks involved in cotton production have increased significantly in recent years. Higher prices for inputs such as seed, fuel, and fertilizer along with escalating machine replacement costs have pressured producer profit margins. As a result, producers have begun to scrutinize various inputs and implement alternative strategies where possible.

Planting conventional cotton seed instead of GMO (genetically modified) is one option often considered by producers. “Tech” fees substantially increase the cost of GMO cotton seed to producers. In 2010, for example, estimated GMO cottonseed costs were \$75-\$85/acre, compared to \$10-\$20/acre for conventional planting seed. Conversely, advocates of GMO cottonseed praise the advantage of reduced insecticide costs and higher expected yields. The purpose of the study is to evaluate the financial incentives for planting conventional versus GMO cotton seed.

Assumptions

The Financial And Risk Management (FARM) Assistance financial planning model is used in the analysis to estimate

profitability and measure financial risk. Financial projections were simulated over a 10-year planning horizon. The initial year of the financial projections is 2011.

Table 1 provides the actual per acre production costs for conventional and GMO under furrow irrigation with poly-pipe. For the purpose of evaluating these seed technologies, actual 2010 per acre production costs and overhead charges were obtained from a producer in the Lower Rio Grande Valley. The \$57.52/acre irrigation cost assumes two irrigations. Water costs were \$15 and labor \$9.64 for each irrigation. Poly-pipe was estimated at \$8.24/acre. Harvest costs assumes custom picking rates and ginning, bags, ties and other related fees. All production costs are assumed to be typical for the region and were not changed for analysis purposes.

Cotton and cotton seed prices were set to reflect current market conditions and long-term projections. The average prices received in 2011 were \$1.11 per pound for cotton and \$185 per ton for cottonseed. Based on yields actually received by the producer, per acre yields in 2011 were assumed to be 977 lbs for conventional and 1,062 lbs for GMO. These yields are intended to be relevant to a wide range of producers in the Lower Rio Grande Valley area. A 10-year county yield history and prices were used to account for production and price variability. Moreover, for each 10-year outlook projection, commodity price trends follow projections provided by the Food and Agricultural Policy Research Institute (FAPRI, at the University of Missouri) with costs adjusted for inflation over the planning horizon.

Table 1: Conventional and GMO 2010 Production Costs Per Acre for Furrow Irrigation Cotton

Variable Production Costs	Cotton Seed Scenario	
	Conventional	GMO
Seed	\$10.00	\$78.99
Fertilizer	\$41.10	\$41.10
Herbicides	\$23.11	\$48.26
Insecticides	\$27.49	\$12.66
Custom Application	\$77.08	\$77.08
Irrigation	\$57.52	\$57.52
Harvesting, Ginning, etc. (\$/lb)	\$0.26	\$0.26
Harvest Chemicals (\$/lb)	\$12.76	\$12.76
Boll Weevil	\$28.00	\$28.00
Labor	\$13.33	\$13.33
Crop Insurance	\$12.00	\$12.00

Table 2: 10-Year Average Financial Indicators for Furrow Irrigated Cotton, Lower Rio Grande Valley

Cotton Seed Scenario	10-Year Averages/Acre			Cumulative 10-Yr Cash flow/Acre (\$1000)
	Total Cash Receipts (\$1000)	Total Cash Costs (\$1000)	Net Cash Farm Income (\$1000)	
Conventional	1.132	0.712	0.420	2.529
GMO	1.234	0.828	0.406	2.450

The conventional and GMO fields were located in close proximity to each other and considered a controlled experiment for comparison purposes. Any differences in soil types, rainfall, and management practices were assumed not to affect irrigation production costs and yields.

Results

Comprehensive projections, including price and yield risk for furrow irrigation, are illustrated in Table 2 and Figure 1. Table 2 presents the average outcomes for selected financial projections in both scenarios. The graphical presentation in Figure 1 illustrates the full range of possibilities for net cash farm income for both conventional and GMO cotton. Cash receipts average \$1,132/acre for conventional and \$1,234/acre for GMO cotton over the 10-year period. Average cash costs range from \$712/acre for conventional and \$828/acre for GMO.

Profitability measures the extent to which a business or enterprise generates income from the use of its resources. Net cash farm

income (NCFI) is one way to measure profitability and the financial incentives for planting conventional versus GMO cottonseed. Using average NCFI as a barometer, conventional is more profitable than GMO by about \$14/acre or 3.4% on average over the 10-year projection (Table 2; Figure 1). A visual review of Figure 1 reflects that the difference between conventional and GMO cotton may be statistically insignificant when the full range of price and yield possibilities are evaluated. In fact, an ANOVA test shows that the difference is not statistically significant at the 99 percent confidence level. The inherent risk of planting high cost GMO seed may also be perceived as a disadvantage to producers despite the potential for higher yields.

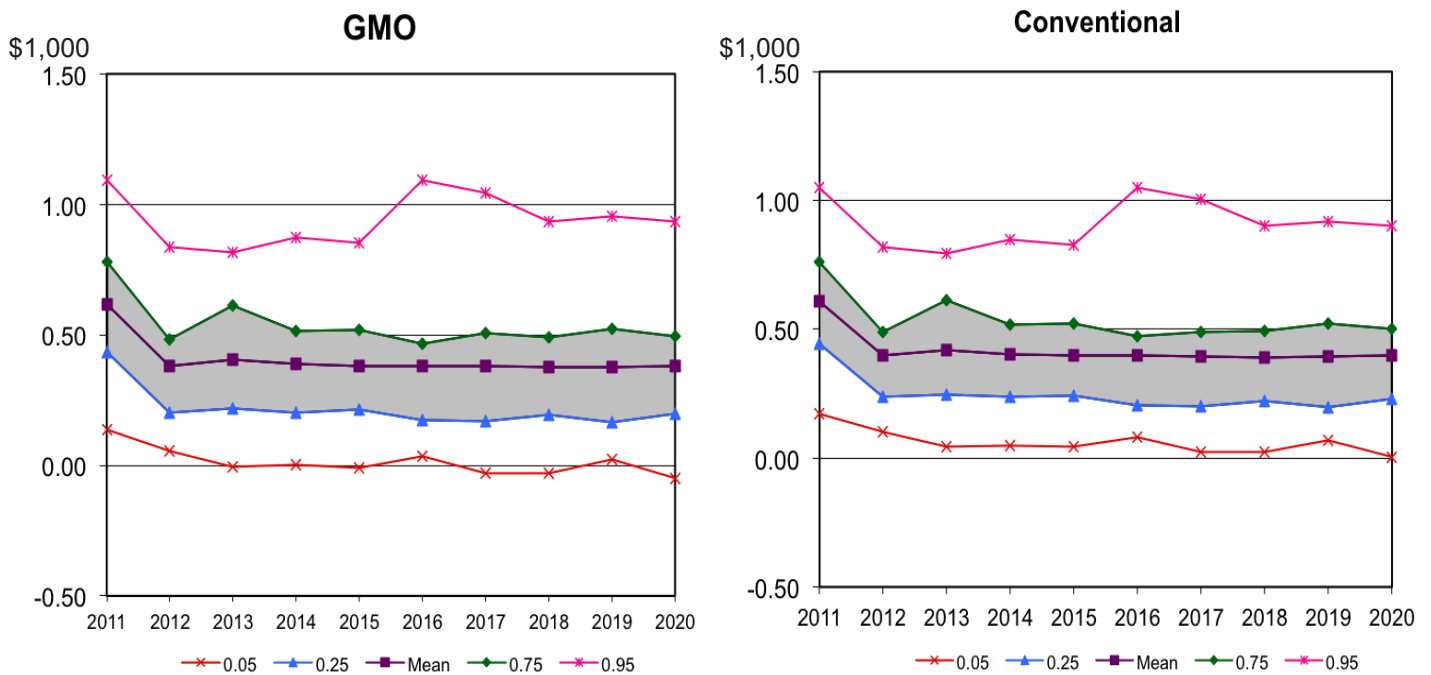
Liquidity or cash flow also improves with conventional cotton. Higher NCFI in the conventional scenario perpetuates a growth in ending cash reserves over the 10-year projection period (Table 2). After-tax ending cash reserves are expected to grow to \$2,529/acre for conventional, 3.2% more than GMO.

Summary

Planting conventional cotton seed may or may not offer the potential to improve profitability. Although lower conventional costs override higher GMO yields, a one-year comparison may not totally reflect actual yield variations as well as differences in per acre production costs. The 2010 crop year with its higher than normal rainfall also may not be a typical year to actually determine yield and cost variability between conventional and GMO. All-in-all, the profit potential between GMO and conventional is not statistically different from each other. Therefore, the results do not show any advantage of producing GMO over conventional or vice versa. Further analysis, including a more proven yield history and annual cost comparisons, is needed to quantify the economic incentives of GMO vs. conventional cotton. Additionally, any future analysis should be expanded to include dryland production where a higher yield variability/risk is normally expected. Future studies should also consider a thorough analysis of varieties.

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Figure 1. Projected Variability in Net Cash Farm income Per Acre for GMO vs. Conventional Cotton, Furrow Irrigation with Poly-Pipe.



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