Estimating the Economic Incentive to Adopt FiberMax Cotton Variety

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ABSTRACT

FiberMax is the brand name for cotton varieties marketed by Aventis Crop Science. To estimate profit potential for an individual farmer who might adopt the FiberMax 832 variety, various factors are to be considered such as yield potential, fiber quality, response to management, consistency, crop maturity, disease resistance, insect resistance, stress tolerance, and market acceptance. Introduction of new varieties in the market place increases the complexity of variety selection, but offers opportunity to improve profitability. The approach assumes that farms are in perfect competition. The price per pound of lint was estimated based on the quality parameters of fiber. Budget analysis was done to estimate the net benefit to farmers taking into consideration the variable and fixed costs for a typical cotton farm in Nueces County, Texas. The data analyzed from the four locations (Prince Farms, Kocurek Farms, Meaney Annex Farms, and Perry Foundation) in the coastal bend region indicated that yields of four varieties (FiberMax 832, Deltapine 20B, Deltapine Pearl, and Deltapine 33B) tested for performance, were not statistically different. FiberMax 832 had the highest average yield of 751 lb/acre followed by Deltapine 20, Deltapine Pearl, and Deltapine 33B. The price received by FiberMax 832 per pound of lint was highest in all locations. FiberMax 832 produced exceptionally high fiber quality. FiberMax 832 had the highest mean average price per pound of lint (54.17 cents/lb), followed by Deltapine Pearl, Deltapine 20B, and Deltapine 33B. The net projected returns estimated for these four varieties across the four locations, assuming the same costs of operations, showed that FiberMax 832 had the highest mean value of 23.91 dollars/acre followed by Deltapine 20B (-12.93 dollars/acre), Deltapine Pearl (-17.64 dollars/acre) and Deltapine 33B (-48.17 dollars/acre). FiberMax was the only variety with positive mean returns.

KEYWORDS: FiberMax 832, Deltapine 20B, Deltapine Pearl, Deltapine 33B

Many aspects are considered before the adoption of a new crop variety, these include: 1) price of seed, 2) availability of the seed, 3) estimated yield of the new variety and the expected increase in yield over the locally used variety, 4) cost and labor savings, 5) adaptability of the new variety to local weather conditions, 6) disease and pest resistance, and 7) ecological impacts (Dever 2000). Producers adopt new varieties because of expected revenue increases, this requires producers to analyze expected benefits and costs before deciding to adopt a new variety. Other factors affecting the adoption decision are: time to maturity, herbicide tolerance, fiber quality, and price factors (Stapper 1999).

Benefits to a producer are likely to last for a brief period (short run) as other producers adopt the new technology, causing prices to decrease, any extra normal economic benefits will then be competed away (Cramer et al. 1997). This study determined the supply responses of producers as they adopted a new high quality and high yielding variety of cotton, FiberMax 832, in response to other available varieties. Producers need information to quickly evaluate a situation that will change rapidly. A measure of the expected benefit(s) will be helpful to producers weighing such a decision. This study was done to determine whether or not producers in the Texas coastal bend could profit by adopting a new technology, FiberMax 832 cotton variety, compared to other varieties.

MATERIALS AND METHODS

Information used for this research was procured from the Texas Agricultural Extension Service trial plots conducted across Nueces County for the year 2000 (USDA 2000). Variations in the yield and fiber qualities are the contributing factors for the increase in revenue to producers. The price of inputs and costs for the management practices play an important role in cost benefit analysis. Difference in yield multiplied by the estimated benefit/loss due to fiber quality parameters equals the economic profit to producers. Fiber quality parameters such as micronaire, staple length, strength, uniformity, and color grade can affect the price premiums and discounts by three to five cents per pound or fifteen to twenty five dollars per bale.

Yield and quality parameters for FiberMax 832 were compared to other commercially available varieties: Deltapine 20B, Deltapine 33B, and Deltapine Pearl (Texas A&M Extension 2000). Based on their quality grades, the appropriate price premiums or discounts were calculated using cotton loan information. Gross revenue was determined from lint and seed yields received by the producer and the price received per pound of lint based on quality parameters of lint for a particular variety (Farmers Co-op of El Campo 2000). To determine net revenue, a budget analysis was accomplished considering all variable and fixed costs. The difference between the gross revenue and the total costs would be the net revenue for a particular variety. The difference in net revenue generated by growing different varieties will help with the decision whether to adopt a particular variety.

Analysis of variance was used to test for significance in yield, price received per pound, and net projected income. The data was subjected to analysis of variance using Statistical Analysis Systems software (SAS Institute 1996). The least significant difference (LSD) mean separation test was adopted to find statistical differences among varieties.

RESULTS AND DISCUSSION

Four cotton varieties were evaluated at Prince Farms, Kocurek Farms, Perry foundation, and Meaney Annex in Nueces County (Buehring et al. 2000). Analysis of variance showed no significant yield difference ($P = 0.3878$) among the four varieties tested at the 0.05 level of significance. Locations were treated as blocks in the ANOVA and were therefore not evaluated for significance.

FiberMax 832 had the highest average production for three years (2000, 2001, 2002) as determined on Prince and Kocurek Farms versus DP20B and Delta Pearl;

however, differences were not significant. The price per pound of lint (Table 1) was determined by the quality of the fiber considering various factors such as micronaire, fiber length and uniformity, strength of fiber, and color grade of fiber. Based on the quality characteristics the price premium or discount was determined over the base price. The base price for the year 2000 was 51.92 cents per pound of lint. Analysis of variance showed significant difference (P = 0.0424) between the four varieties tested at the 0.05 level of significance (Table 1).

Table 1. Price in Cents Per Pound of Lint for Four Varieties Tested at Four Locations.

	Variety			
Location	FM 832	DP 33B	DP Pearl	DP 20B
Prince Farms	54.77	52.42	51.92	53.37
Kocurek Farms	54.32	45.62	63.87	51.92
Perry Foundation	52.97	45.62	48.62	48.62
Meaney Annex	54.62	53.72	54.57	53.32
Mean	54.17 a*	49.35 b	52.25 ab	51.86 ab

Within the mean row, values not followed by the same letter are significantly different (LSD .05)

The gross returns per acre of the four varieties were estimated across the four locations. The income from cottonseed is considered to be the same from all varieties at a price of seventy-five dollars per ton. The gross returns per acre is a summation of the incomes from cotton lint and cottonseed. The gross returns for the four varieties across four locations is given in (Table 2). Differences were not significant (p=0.2).

Table 2. Projected Gross Returns in Dollars per Acre for the Four Varieties Tested at Four Locations.

	Variety			
Location	FM 832	DP 33B	DP Pearl	DP 20B
Prince Farms	376.53	374.04	269.06	390.28
Kocurek Farms	554.63	388.32	534.18	474.67
Perry Foundation	338.90	270.16	266.99	276.22
Meaney Annex	508.98	417.78	510.62	468.50
Mean	444.76	362.58	395.21	402.42

Based on yields and prices received for different varieties and their respective fiber quality, the net returns to the farmer growing a particular variety at a particular location were estimated. Calculating the variable and fixed costs for a typical cotton farm in Nueces County completed the estimated budget analysis. The net return per acre of land, considering the costs to be the same for all varieties at different locations, was calculated. The net returns, excluding government payments, at different locations for the varieties as given in (Table 3). Analysis of variance showed no significant difference (P = 0.18) between the four varieties tested.

Table 3. Projected Net Returns in Dollars per Acre for the Four Varieties Tested at Four Locations.

	Variety			
Location	FM 832	DP 33B	DP Pearl	DP 20B
Prince Farms	-30.08	-35.06	-118.86	-20.87
Kocurek Farms	112.05	-34.49	94.84	43.97
Perry Foundation	-62.31	-124.68	-123.75	-116.56
Meaney Annex	75.99	1.57	77.22	41.76

Projected Net Returns for the Four Varieties Across the Four Locations

The economic benefit or loss by adopting a particular variety at the four locations is shown in (Table 4). FiberMax 832 was the best variety in terms of projected net benefits at Kocurek farms with an estimated net profit of 112.05 dollars per acre and at Perry Foundation with an estimated net loss of 62.31 dollars per acre. FiberMax 832 was second best at Prince farms with an estimated loss of 30.09 dollars per acre as compared to a loss of 20.87 dollars per acre by Deltapine 20B. At Meaney Annex farms FiberMax 832 was second best. The net projected returns for Deltapine Pearl was 77.25 dollars per acre and for FiberMax 832 was 75.99 dollars per acre.

Table 4. Net Projected Returns for the Four Varieties at Four Locations.

Location	Variety	Yield	Price	TR	TC	Profit/Loss
Prince Farms	FM 832	619	0.5477	376.53	406.61	-30.09
Kocurek Farms	FM 832	952	0.5432	554.63	448.58	112.05
Meaney Annex	FM 832	863.2	0.5462	508.98	432.99	75.99
Perry Foundation	FM 832	569	0.5297	338.9	401.21	-62.31
Prince Farms	DP 33B	642	0.5242	374.04	409.01	-35.06

Table 4. (Cont'd.)

Location	Variety	Yield	Price	TR	TC	Profit/Loss
Kocurek Farms	DP 33B	769	0.4562	388.32	422.81	-34.49
Meaney Annex	DP 33B	707.9	0.5372	417.78	416.21	1.57
Perry Foundation	DP 33B	510	0.4562	270.16	394.84	-124.70
Prince Farms	DP Pearl	446	0.5192	269.06	387.93	-118.90
Kocurek Farms	DP Pearl	922	0.5387	534.18	439.34	94.85
Meaney Annex	DP Pearl	867	0.5457	510.62	433.40	77.25
Perry Foundation	DP Pearl	472	0.4862	266.99	390.74	-123.80
Prince Farms	DP 20B	661	0.5337	390.28	411.15	-20.87
Kocurek Farms	DP 20B	842	0.5192	474.67	430.70	43.97
Meaney Annex	DP 20B	805.3	0.5352	468.5	426.73	41.76
Perry Foundation	DP 20B	491	0.4862	276.22	392.79	-116.60

Yield = Yield in pounds per acre
Price = Price in dollars per pound of lint
TR = Total Revenue per acre
TC = Total Costs per acre
Profit = Estimated profit in dollars per acre

When taken as an average across four locations, FiberMax 832 was the only variety with positive returns (Table 5). Overall differences were not significant (P= 0.05), so T groupings reflect mean separation from unprotected tests.

Table 5. LSD Mean Separation Test Showing the T Grouping and Means of Net Projected Returns for Four Varieties.

Variety	T Grouping		Mean	N
FiberMax 832		A	23.91	4
Deltapine 20B	B	A	-12.93	4
Deltapine Pearl	B	A	-17.64	4
Deltapine 33B	B		-48.17	4

*Varieties with the same T Grouping are not statistically different at p=0.05 level of significance.

CONCLUSIONS

This study estimates the economic incentive for farmers to adopt a new FiberMax cotton variety. The economic incentive was measured in terms of net returns generated by FiberMax 832 cotton versus other varieties. The results at various research stations show that FiberMax 832 yielded more lint compared to other varieties and the quality of the fiber was superior to other varieties.

The net projected returns estimated for these four varieties across the four locations, assuming the same costs of operations, showed that on average FiberMax 832 had the highest mean value of 23.91 dollars per acre as compared to –12.93 dollars per acre for Deltapine 20B, -17.64 dollars per acre for Deltapine Pearl, and –48.17 dollars per acre for Deltapine 33B.

REFERENCES

Buehring, H.L., S.A. Browning, and R.L. Garza. 2000. Result Demonstration Report Texas Agricultural Extension Service Texas A&M University System "2000 Nueces County Cotton Variety Demonstration. Cooperator Prince Farms, Kocurek Farms, Perry Foundation, and Meaney Annex Farms."

Cramer, Gail L., J.W. Clarence, and D.D. Southgate, Jr. 1997. "Competition in the market" Agricultural Economics and Agribusiness. John Wiley & Sons, Inc. 173-193.

Dever, J.K. 2000. Factors affecting cotton fiber quality. Available online at http://www.cottonexperts.com/m02/m020404c.html.

SAS Institute. 1996. SAS User's Guide. SAS Institute, Cary, N.C.

Stapper, J.R. 1999. Result demonstration report: agronomic performance and fiber quality Comparison of cotton varieties. Available online at http://agfacts.tamu.edu/D11/SanPatricio/AG/crops/cotton/99cotadm.htm

Texas A&M Extension 2000. Regional Tests Meaney Annex, Nueces County, Texas. Lint yields, performance factors and fiber quality characteristics observed in 58 cotton varieties.

USDA, 2000. Agricultural Marketing Service, Corpus Christi, Texas. 2000 cotton varieties. Corpus Christi classing office territory.