

MANAGEMENT MARKETING MEMO

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MMM 438

January 25, 2007

What are the Break-Even Prices and Yields when Comparing Corn and Cotton for 2007?

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The corn and soybean markets have been bidding for acreage due to a bullish final crop report for 2006. With bio-fuels creating new markets for corn and soybeans, this demand-driven market may continue to provide marketing opportunities. Currently, the major decision facing producers is determining the enterprise mix for 2007. This memo compares the Returns over Variable Costs for corn and cotton and analyzes the break-even yields and prices for non-irrigated and irrigated production.

Return over Variable Costs

Table 1. 2007 Estimated Return over Variable Costs for Corn and Cotton.

	Non-Irrigated Corn	Non-Irrigated Cotton	Irrigated Corn	Irrigated Cotton
Harvest Price ^{1/}	\$4.05	\$0.60	\$4.05	\$0.60
Yield	100	750	160	1000
Variable Cost ^{2/}	\$278	\$476	\$403	\$599
Return over Variable Costs	\$127	-\$26	\$245	\$1

^{1/} The harvest prices are based on the December Corn and December Cotton Futures Contract adjusted by harvest-time basis of +0.15 and -\$0.03, respectively, with potential harvest-time LDP of \$0.00 and \$0.03 for corn and cotton, respectively.

^{2/} 2007 Clemson University Crop Enterprise Budgets (<http://cherokee.agecon.clemson.edu/budgets.htm>).

The estimated Returns over Variable Costs for corn and cotton are reported in Table 1. The harvest cash prices for corn and cotton are based on the December 2007 corn futures contract and the December 2007 cotton futures contract, respectively, and are adjusted by the estimated harvest-time basis and potential LDP. For this comparison, the harvest cash prices for corn and cotton are \$4.05/bu. and \$0.60/lb., respectively (Table 1). The variable costs are based on Clemson University Extension crop enterprise budgets. Based on the assumptions listed in Table 1, the estimated Return over Variable Costs for non-irrigated corn is \$127/acre while the Return for non-irrigated cotton is -\$26/acre (Table 1). Similarly, the estimated Returns over Variable Costs for irrigated corn and irrigated cotton are \$245/acre and \$1/acre, respectively (Table 1).

Break-Even Yields and Prices

Based on the assumptions listed in Table 1, corn provides a greater Return over Variable Costs than cotton. Since prices, yields and costs will vary from these assumptions, managers need to understand the break-even yields and break-even prices when comparing corn and cotton production. Table 2 reports the Break-Even Yields and Break-Even Prices for corn and cotton produced with and without irrigation.

The Break-Even Yield in Table 2 is the yield that makes the two Returns over Variable Costs equal. For example, non-irrigated corn yielding 62 bu. (Table 2) at a price of \$4.05 and Variable Costs of \$278 (Table 1) will have the same Return as non-irrigated cotton yielding 750 lbs. at a price of \$0.60 and Variable Costs of \$476 (Table 1). Similarly, irrigated cotton yielding 1407 lbs. (Table 2) at a price of \$0.60 and Variable Costs of \$599 (Table 1) will have the same Return as irrigated corn yielding 160 bu. at a price of \$4.05 and Variable Costs of \$403 (Table 1).

Similarly, the Break-Even Price in Table 2 is the price that makes the two Returns over Variable Costs equal. For example, non-irrigated cotton with a price of \$0.804 (Table 2) yielding 750 lbs. and Variable Costs of \$476 (Table 1) will have the same Return as non-irrigated corn yielding 100 bu. at a price of \$4.05 and Variable Costs of \$278 (Table 1). Similarly, irrigated corn at a price of \$2.53 (Table 2) with a yield of 160 bu and Variable Costs of \$403 (Table 1) will have the same Return as irrigated cotton yielding 1000 lbs. at a price of \$0.60 and Variable Costs of \$599 (Table 1).

Table 2. Break-Even Yields and Prices for Non-Irrigated and Irrigated Corn and Cotton.

	Non-Irrigated Corn	Non-Irrigated Cotton	Irrigated Corn	Irrigated Cotton
Break-Even Yield ^{1/}	62	1,005	100	1,407
Break-Even Price ^{2/}	\$2.52	\$0.8040	\$2.53	\$0.8440

^{1/} The Break-Even Yield is the yield that equates the Returns over Variable Costs for the two commodities at the prices and costs listed in Table 1. For example, 62 bu. non-irrigated corn at \$4.05 has the same Return as 750 lb. non-irrigated cotton at \$0.60.

^{2/} The Break-Even Price is the price that equates the Returns over Variable Costs for the two commodities at the yields and costs listed in Table 1. For example, 100 bu. non-irrigated corn at \$2.52 has the same Return as 750 lb. non-irrigated cotton at \$0.60.

The break-even price and yield information in Table 2 will help managers evaluate when corn is more profitable than cotton. For example, non-irrigated corn at \$4.05 with yields greater than 62 bu. is more profitable than non-irrigated cotton with a price of \$0.60 yielding 750 lbs. Similarly, irrigated corn yielding 160 bu. with prices greater than \$2.53 is more profitable than irrigated cotton yielding 1000 lbs. at a price of \$0.60 (Table 2).

Break-Even Yield and Price Sensitivity Analysis

How does yield or price risk affect this analysis? Table 3 lists the break-even yields for cotton for a range of potential corn yields at the prices and costs listed in Table 1. Managers can use Table 3 to understand the yields necessary for cotton to be competitive with corn. For example, non-irrigated cotton yielding 870 lbs. has the same Return as 80 bu. non-irrigated corn (Table 3). For this example, corn is more profitable when yields are greater than 80 bu. or cotton yields are less than 870 lbs.

Similarly, Table 4 lists the break-even prices for cotton for a range of potential corn prices at the yields and costs listed in Table 1. This table tells managers what price is needed from the market for cotton to be competitive with corn. For example, at a price of \$4.10 for non-irrigated corn, non-irrigated cotton must have a price of \$0.8107 to have the same Return (Table 4). For this example, corn is more profitable when cotton prices are less than \$0.8107 or corn prices are greater than \$4.10.

Managers can use Table 3 and Table 4 in guiding their enterprise selection for 2007. By using their own price and yield expectations, managers will have a better idea of the relative profitability of corn and cotton for both production systems.

Where do I go for Help in Making this Decision?

Clemson University Extension has developed budgets for the major agronomic crops to help you evaluate their profitability for your farm business. There is also a decision spreadsheet available that can be used to compare the Returns over Variable Costs for corn and cotton. The budgets and decision spreadsheet are available at <http://cherokee.agecon.clemson.edu/budgets.htm>. Your local extension office will be able to help you download these budgets and the decision spreadsheet and can help you understand how to use this information in making this comparison.

Table 3. Break-Even Yields for Cotton for Varying Corn Yields for Non-Irrigated and Irrigated Production.

Non-Irrigated Corn Yield	Non-Irrigated Cotton Yield ^{1/}		Irrigated Corn Yield	Irrigated Cotton Yield
50	668		100	1,002
55	701		105	1,035
60	735		110	1,069
65	769		115	1,103
70	803		120	1,137
75	836		125	1,170
80	870		130	1,204
85	904		135	1,238
90	938		140	1,272
95	971		145	1,305
100	1,005		150	1,339
105	1,039		155	1,373
110	1,073		160	1,407
115	1,106		165	1,440
120	1,140		170	1,474
125	1,174		175	1,508
130	1,208		180	1,542
135	1,241		185	1,575
140	1,275		190	1,609

^{1/} The Break-Even Yield is the yield that equates the Returns over Variable Costs for the two commodities at the prices and costs listed in Table 1. For example, 938 lbs. non-irrigated cotton has the same Return as 90 bu. non-irrigated corn.

Table 4. Break-Even Prices for Cotton for Varying Corn Prices for Non-Irrigated and Irrigated Production.

Non-Irrigated Corn Price	Non-Irrigated Cotton Price ^{1/}		Irrigated Corn Price	Irrigated Cotton Price
\$2.70	\$0.6240		\$2.70	\$0.6280
\$2.80	\$0.6373		\$2.80	\$0.6440
\$2.90	\$0.6507		\$2.90	\$0.6600
\$3.00	\$0.6640		\$3.00	\$0.6760
\$3.10	\$0.6773		\$3.10	\$0.6920
\$3.20	\$0.6907		\$3.20	\$0.7080
\$3.30	\$0.7040		\$3.30	\$0.7240
\$3.40	\$0.7173		\$3.40	\$0.7400
\$3.50	\$0.7307		\$3.50	\$0.7560
\$3.60	\$0.7440		\$3.60	\$0.7720
\$3.70	\$0.7573		\$3.70	\$0.7880
\$3.80	\$0.7707		\$3.80	\$0.8040
\$3.90	\$0.7840		\$3.90	\$0.8200
\$4.00	\$0.7973		\$4.00	\$0.8360
\$4.10	\$0.8107		\$4.10	\$0.8520
\$4.20	\$0.8240		\$4.20	\$0.8680
\$4.30	\$0.8373		\$4.30	\$0.8840
\$4.40	\$0.8507		\$4.40	\$0.9000
\$4.50	\$0.8640		\$4.50	\$0.9160

^{1/} The Break-Even Price is the price that equates the Returns over Variable Costs for the two commodities at the yields and costs listed in Table 1. For example, non-irrigated cotton at \$0.8107/lb. has the same Return as non-irrigated corn at \$4.10/bu.