

MMM 467

January 8, 2008

What are the Break-Even Prices and Yields when Comparing Corn and Cotton for 2008?

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The commodity markets have been bidding for acreage due to bio-fuels creating new markets for corn and soybeans. This demand-driven market may continue to provide marketing opportunities for 2008-2010. Currently, the major decision facing producers is determining the enterprise mix for 2008. 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. 2008 Estimated Return over Variable Costs for Corn and Cotton.

| | Non-Irrigated Corn | Non-Irrigated Cotton | Irrigated Corn | Irrigated Cotton |
|------------------------------------|-----------------------|-------------------------|-------------------|---------------------|
| Harvest Price ^{1/} | \$4.76 | \$0.7327 | \$4.76 | \$0.7327 |
| Yield | 120 | 750 | 160 | 1000 |
| Total Variable Costs ^{2/} | \$305.69 | \$533.12 | \$440.73 | \$673.65 |
| Return over Variable Costs | \$265.51 | \$132.26 | \$320.87 | \$213.53 |

^{1/} The harvest prices are based on the December Corn and December Cotton Futures Contract adjusted by harvest-time basis of -\$0.10/bu. and -\$0.03/lb, respectively, on January 4, 2008.

^{2/} 2008 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 2008 corn futures contract and December 2008 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 \$4.76/bu. and \$0.7327/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 \$265/acre while the Return for non-irrigated cotton is \$132/acre (Table 1). Similarly, the estimated Returns over Variable Costs for irrigated corn and irrigated cotton are \$320/acre and \$213/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 will pay for all of the Total Variable Costs. For example, non-irrigated corn yielding 64 bu. (Table 2) at a price of \$4.76 will just pay for the Total Variable Costs of \$306 (Table 1). Similarly, irrigated cotton yielding 759 lbs. (Table 2) at a price of \$0.7327 will just pay for Total Variable Costs of \$674 (Table 1).

Similarly, the Break-Even Price in Table 2 is the price that will pay for all of the Total Variable Costs. For example, non-irrigated cotton with a price of \$0.5564 (Table 2) yielding 750 lbs. will just pay for the Total Variable Costs of \$533 (Table 1). Similarly, irrigated corn at a price of \$2.75 (Table 2) with a yield of 160 bu will just pay for the Total Variable Costs of \$440 (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/} | 64 | 601 | 93 | 759 |
| Break-Even Price ^{2/} | \$2.55 | \$0.5564 | \$2.75 | \$0.5192 |

^{1/}The Break-Even Yield is the yield that will cover Total Variable Costs at the prices and costs listed in Table 1. For example, 64 bu. non-irrigated corn at a price of \$4.76 will pay for the Total Variable Costs of \$306/acre.

^{2/}The Break-Even Price is the price that will cover Total Variable Costs at the yields and costs listed in Table 1. For example, 120 bu. non-irrigated corn at \$2.55 will just pay for the Total Variable Costs of \$306/acre.

The break-even price and yield information in Table 2 will help managers evaluate the feasibility of producing corn or cotton. For example, managers know that they will need at least \$0.5564/lb and yields of 750 lbs/acre to be profitable at producing non-irrigated cotton. Similarly, irrigated corn producers that produce 93 bu/acre or better will cover variable costs at a price of \$4.76/bu. (Table 2).

Break-Even Yield and Price Sensitivity Analysis

How does yield or price risk affect the analysis of which crop is more profitable? 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 793 lbs. has the same Return as 100 bu. non-irrigated corn (Table 3). For this example, corn is more profitable when yields are greater than 100 bu. or cotton yields are less than 793 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 \$0.8048 to have the same Return (Table 4). For this example, corn is more profitable when cotton prices are less than \$0.8048 or corn prices are greater than \$4.10.

Managers can use Table 3 and Table 4 in guiding their enterprise selection for 2008. 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 | Non-Irrigated Cotton | Irrigated Corn | Irrigated Cotton |
|-----------------------|-------------------------|-------------------|---------------------|
| 30 | 417 | 70 | 638 |
| 40 | 471 | 80 | 692 |
| 50 | 525 | 90 | 745 |
| 60 | 578 | 100 | 799 |
| 70 | 632 | 110 | 853 |
| 80 | 686 | 120 | 906 |
| 90 | 739 | 130 | 960 |
| 100 | 793 | 140 | 1,014 |
| 110 | 847 | 150 | 1,067 |
| 120 | 900 | 160 | 1,121 |
| 130 | 954 | 170 | 1,175 |
| 140 | 1,007 | 180 | 1,228 |
| 150 | 1,061 | 190 | 1,282 |
| 160 | 1,115 | 200 | 1,336 |
| 170 | 1,168 | 210 | 1,389 |
| 180 | 1,222 | 220 | 1,443 |

^{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, 739 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 | Non-Irrigated Cotton | Irrigated Corn | Irrigated Cotton |
|-----------------------|-------------------------|-------------------|---------------------|
| \$3.50 | \$0.7088 | \$3.50 | \$0.6384 |
| \$3.60 | \$0.7248 | \$3.60 | \$0.6544 |
| \$3.70 | \$0.7408 | \$3.70 | \$0.6704 |
| \$3.80 | \$0.7568 | \$3.80 | \$0.6864 |
| \$3.90 | \$0.7728 | \$3.90 | \$0.7024 |
| \$4.00 | \$0.7888 | \$4.00 | \$0.7184 |
| \$4.10 | \$0.8048 | \$4.10 | \$0.7344 |
| \$4.20 | \$0.8208 | \$4.20 | \$0.7504 |
| \$4.30 | \$0.8368 | \$4.30 | \$0.7664 |
| \$4.40 | \$0.8528 | \$4.40 | \$0.7824 |
| \$4.50 | \$0.8688 | \$4.50 | \$0.7984 |
| \$4.60 | \$0.8848 | \$4.60 | \$0.8144 |
| \$4.70 | \$0.9008 | \$4.70 | \$0.8304 |
| \$4.80 | \$0.9168 | \$4.80 | \$0.8464 |
| \$4.90 | \$0.9328 | \$4.90 | \$0.8624 |
| \$5.00 | \$0.9488 | \$5.00 | \$0.8784 |

^{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 \$0.8528/lb. has the same Return as non-irrigated corn at \$4.40/bu.