

MMM 471

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What are the Break-Even Prices and Yields when Comparing Soybeans 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 soybeans 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 Soybeans and Cotton.

	Non-Irrigated Soybeans	Non-Irrigated Cotton	Irrigated Soybeans	Irrigated Cotton
Harvest Price ^{1/}	\$11.30	\$0.7327	\$11.30	\$0.7327
Yield	35	750	50	1000
Total Variable Costs ^{2/}	\$250.17	\$533.12	\$325.17	\$673.65
Return over Variable Costs	\$145.33	\$132.26	\$239.83	\$213.53

^{1/} The harvest prices are based on the November Soybeans and December Cotton Futures Contract adjusted by harvest-time basis of -\$0.30/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 soybeans and cotton are reported in Table 1. The harvest cash prices for soybeans and cotton are based on the November 2008 soybeans futures contract and December 2008 cotton futures contract, respectively, and are adjusted by the estimated harvest-time basis. For this comparison, the harvest cash price for soybeans and cotton are \$11.30/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 soybeans is \$145/acre while the Return for non-irrigated cotton is \$132/acre (Table 1). Similarly, the estimated Returns over Variable Costs for irrigated soybeans and irrigated cotton are \$239/acre and \$213/acre, respectively (Table 1).

Break-Even Yields and Prices

Based on the assumptions listed in Table 1, soybeans provide 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 soybeans and cotton production. Table 2 reports the Break-Even Yields and Break-Even Prices for soybeans 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 soybeans yielding 22 bu/acre (Table 2) at a price of \$11.30 will just pay for the Total Variable Costs of \$250 (Table 1). Similarly, irrigated cotton yielding 759 lbs. (Table 2) at a price of \$0.7327 will just pay for Total Variable Costs of \$673 (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 soybeans at a price of \$6.50 (Table 2) with a yield of 50 bu. will just pay for the Total Variable Costs of \$325 (Table 1).

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

	Non-Irrigated Soybeans	Non-Irrigated Cotton	Irrigated Soybeans	Irrigated Cotton
Break-Even Yield ^{1/}	22	601	29	759
Break-Even Price ^{2/}	\$7.15	\$0.5564	\$6.50	\$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, 22 bu. non-irrigated soybeans at a price of \$11.30 will pay for the Total Variable Costs of \$250/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, 35 bu. non-irrigated soybeans at \$7.15 will just pay for the Total Variable Costs of \$250/acre.

The break-even price and yield information in Table 2 will help managers evaluate the feasibility of producing soybeans or cotton. For example, managers know that they will need at least \$7.15/bu and yields of 35 bu/acre to be profitable at producing non-irrigated soybeans. Similarly, irrigated cotton producers that produce 759 lbs./acre or better will cover variable costs at a price of \$0.7327/lbs. (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 soybeans 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 soybeans. For example, non-irrigated cotton yielding 828 lbs. has the same Return as 40 bu. non-irrigated soybeans (Table 3). For this example, soybeans are more profitable when yields are greater than 40 bu. or cotton yields less than 828 lbs.

Similarly, Table 4 lists the break-even prices for cotton for a range of potential soybeans 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 soybeans. For example, at a price of \$11.50 for non-irrigated soybeans, non-irrigated cotton must have a price of \$0.7595 to have the same Return (Table 4). For this example, soybeans are more profitable when cotton prices are less than \$0.7595 or soybeans prices are greater than \$11.50.

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 soybeans 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 soybeans 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 Soybeans Yields for Non-Irrigated and Irrigated Production.

Non-Irrigated Soybeans	Non-Irrigated Cotton	Irrigated Soybeans	Irrigated Cotton
5	383	5	456
10	446	10	520
15	510	15	584
20	574	20	648
25	637	25	711
30	701	30	775
35	765	35	839
40	828	40	902
45	892	45	966
50	956	50	1,030
55	1,019	55	1,093
60	1,083	60	1,157
65	1,147	65	1,221
70	1,211	70	1,284
75	1,274	75	1,348
80	1,338	80	1,412

^{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, 825 lbs. non-irrigated cotton has the same Return as 24 bu. non-irrigated soybeans.

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

Non-Irrigated Soybeans	Non-Irrigated Cotton	Irrigated Soybeans	Irrigated Cotton
\$7.75	\$0.5845	\$7.75	\$0.5815
\$8.00	\$0.5961	\$8.00	\$0.5940
\$8.25	\$0.6078	\$8.25	\$0.6065
\$8.50	\$0.6195	\$8.50	\$0.6190
\$8.75	\$0.6311	\$8.75	\$0.6315
\$9.00	\$0.6428	\$9.00	\$0.6440
\$9.25	\$0.6545	\$9.25	\$0.6565
\$9.50	\$0.6661	\$9.50	\$0.6690
\$9.75	\$0.6778	\$9.75	\$0.6815
\$10.00	\$0.6895	\$10.00	\$0.6940
\$10.25	\$0.7011	\$10.25	\$0.7065
\$10.50	\$0.7128	\$10.50	\$0.7190
\$10.75	\$0.7245	\$10.75	\$0.7315
\$11.00	\$0.7361	\$11.00	\$0.7440
\$11.25	\$0.7478	\$11.25	\$0.7565
\$11.50	\$0.7595	\$11.50	\$0.7690

^{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 \$0.77/lb. has the same Return as non-irrigated soybeans at \$7.50/bu.