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

	Non-Irrigated Corn	Non-Irrigated Soybeans	Irrigated Corn	Irrigated Soybeans
Harvest Price [1/]	$4.76	$11.30	$4.76	$11.30
Yield	120	35	160	50
Total Variable Costs [2/]	$305.69	$250.17	$440.73	$325.17
Return over Variable Costs	$265.51	$145.33	$320.87	$239.83

[1/] The harvest prices are based on the December Corn and November Soybeans Futures Contract adjusted by harvest-time basis of -$0.10/bu. and -$0.30/bu., 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 soybeans are reported in Table 1. The harvest cash prices for corn and soybeans are based on the December 2008 corn futures contract and November 2008 soybeans futures contract, respectively, and are adjusted by the estimated harvest-time basis. For this comparison, the harvest cash prices for corn and soybeans are $4.76 and $11.30 per bushel, 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 $266/acre while the Return for non-irrigated soybeans is $145/acre (Table 1). Similarly, the estimated Returns over Variable Costs for irrigated corn and irrigated soybeans are $320/acre and $239/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 soybeans. 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 soybean production. Table 2 reports the Break-Even Yields and Break-Even Prices that cover variable costs for corn and soybeans 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 soybeans yielding 29 bu. (Table 2) at a price of $11.30 will just pay for Total Variable Costs of $325 (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 soybeans with a price of $7.15 (Table 2) yielding 35 bu. will just pay for the Total Variable Costs of $250 (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 Soybeans

	Non-Irrigated Corn	Non-Irrigated Soybeans	Irrigated Corn	Irrigated Soybeans
Break-Even Yield [1/]	64	22	93	29
Break-Even Price [2/]	$2.55	$7.15	$2.75	$6.50

[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 soybeans. 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 corn producers that produce 93 bu/acre 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 soybeans 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 soybeans to be competitive with corn. For example, non-irrigated soybeans yielding 37 bu. 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 soybeans yield less than 37 bu.

Similarly, Table 4 lists the break-even prices for soybeans 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 soybeans to be competitive with corn. For example, at a price of $4.10 for non-irrigated corn, non-irrigated soybeans must have a price of $12.47 to have the same Return (Table 4). For this example, corn is more profitable when soybean prices are less than $12.47 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 soybeans 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 soybeans. 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 Soybeans for Varying Corn Yields for Non-Irrigated and Irrigated Production.

Non-Irrigated Corn	Non-Irrigated Soybeans	Irrigated Corn	Irrigated Soybeans
30	8	50	11
40	12	60	15
50	16	70	19
60	20	80	23
70	25	90	28
80	29	100	32
90	33	110	36
100	37	120	40
110	41	130	45
120	46	140	49
130	50	150	53
140	54	160	57
150	58	170	61
160	62	180	66
170	67	190	70
180	71	200	74

[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, 33 bu. non-irrigated soybeans have the same Return as 90 bu. non-irrigated corn.

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

Non-Irrigated Corn	Non-Irrigated Soybeans	Irrigated Corn	Irrigated Soybeans
$3.50	$10.41	$3.50	$8.89
$3.60	$10.76	$3.60	$9.21
$3.70	$11.10	$3.70	$9.53
$3.80	$11.44	$3.80	$9.85
$3.90	$11.79	$3.90	$10.17
$4.00	$12.13	$4.00	$10.49
$4.10	$12.47	$4.10	$10.81
$4.20	$12.81	$4.20	$11.13
$4.30	$13.16	$4.30	$11.45
$4.40	$13.50	$4.40	$11.77
$4.50	$13.84	$4.50	$12.09
$4.60	$14.19	$4.60	$12.41
$4.70	$14.53	$4.70	$12.73
$4.80	$14.87	$4.80	$13.05
$4.90	$15.21	$4.90	$13.37
$5.00	$15.56	$5.00	$13.69

[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 soybeans at $11.44/bu. have the same Return as non-irrigated corn at $3.80/bu.