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How Will Combining Risk Management Products Reduce the Risk of Corn Production in 2008?

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Managers have several risk management strategies available to protect their revenue. Management Marketing Memo 475 describes two price risk management strategies and two insurance products corn producers should consider for the 2008 crop. This memo looks at how the price risk management and insurance products can be combined in a way to reduce the risk of not covering variable production costs. Five risk management strategies will be compared and the returns over variable costs for non-irrigated corn production will be determined for potential harvest-time prices and yields.

Potential Risk Management Strategies

Table 1 lists five example risk management strategies available in protecting your revenue. The first strategy is the 'do-nothing' scenario of not using risk management and selling your corn crop at harvest. All of the other strategies will be compared to Strategy 1 to determine the costs and benefits of risk management. Strategy 2 is to cash forward contract 25% of expected production and to sell the remaining 75% of the crop at harvest. Strategy 3 is to forward contract 25% of expected production and to purchase out-of-the money put options at a $4.20 strike price for 25% of expected production with the remaining 50% of expected production sold at harvest. Strategy 4 and Strategy 5 add APH crop insurance at the 65% coverage level to Strategy 2 and Strategy 3, respectively.

Table 1. Description of the Risk Management Strategies Compared in this Memo.

Strategy 1	Cash Sale at Harvest
Strategy 2	Cash Forward Contract 25% / Cash Sale at Harvest 75%
Strategy 3	Cash Forward Contract 25% / $4.20 Put Option 25% / Cash Sale at Harvest 50%
Strategy 4	Strategy 2 + APH Crop Insurance @ 65% Coverage Level
Strategy 5	Strategy 3 + APH Crop Insurance @ 65% Coverage Level

The comparisons are made using the assumptions described in Table 2. The returns over variable costs are determined for a farm with 500 acres of non-irrigated corn using the futures and option prices on January 31, 2008. Historical basis data are used to estimate harvest-time cash prices. The expected yield is 120 bu/acre with production costs defined by Clemson University crop enterprise budgets.

The returns are determined for varying harvest-time prices and yields. If there are low yields and not enough corn is produced to fulfill a cash forward contract, the amount needed to fulfill the contract is assumed to be purchased from the cash market at the cash price. This cash price may be higher than the contract price and the cost of the deficit reduces the profitability of the risk strategy.

Table 2: Assumptions made for the Risk Management Strategies Defined in Table 1.

	Strat. 1	Strat. 2	Strat. 3	Strat. 4	Strat. 5
Corn Acres	500	500	500	500	500
Expected Yield (bu/acre)	120	120	120	120	120
December Corn Futures [1/]	$5.15	$5.15	$5.15	$5.15	$5.15
Cash Basis (December Contract) ($/bu)	-$0.10	-$0.10	-$0.10	-$0.10	-$0.10
Forward Contract Price ($/bu)		$5.05	$5.05	$5.05	$5.05
Put Option Premium for $4.20 Strike ($/bu) [1/]			$0.16		$0.16
APH Premium (120 bu APH) 65% Coverage Level ($/acre)				$16.42	$16.42
APH Price (100% Election)				$4.75	$4.75
Total Variable Costs ($/acre) [2/]	$306	$306	$306	$306	$306

[1/] Settlement prices on January 31, 2008.
[2/] Based on Clemson University crop enterprise budgets. Detailed enterprise budgets for agronomic crops are available from you local Clemson University Cooperative Extension office.

What are the Results?

Strategy 1: Cash Sales at Harvest

The returns over variable costs for Strategy 1 – the 'Do Nothing' strategy – are reported in Table 3. With a 120 bu/acre yield and $5.00 December Corn, the expected return is $282/acre (Table 3). However, there will not be enough revenue to cover variable costs with a 100 bushel yield and $3.00 December Futures. Table 3 shows the risk associated with non-irrigated corn either from lower prices and/or reduced yields.

Strategy 2: Cash Forward Contract 25% of Expected Production

The expected return for Strategy 2 with a 120 bushel yield and $5.00 December corn is $286/acre (Table 4). The benefit of this strategy is that the worst-case scenario is improved from $-161/acre (Table 3) to -$107/acre (Table 4). In general, this strategy improves the returns by $4 to $54/acre depending on the futures contract price at harvest (Table 4). However, implementing this strategy does reduce the profitability if prices increase. The best-case scenario for Strategy 2 is $3/acre less than the best-case for the 'Do-Nothing' strategy.

Strategy 3: Cash Forward Contract 25% and Purchase a $4.20 Put

The expected Return for Strategy 3 with a 120 bushel yield and $5.00 December corn is $281/acre (Table 5). The benefit of this strategy is that the worst-case scenario is improved from $-161/acre (Table 3) to -$76/acre (Table 5). In general, this strategy improves the returns by $11 to $85/acre depending on the futures contract price at harvest (Table 5). However, implementing this strategy does reduce the profitability if prices increase. The best-case scenario for Strategy 3 is $7/acre less than the best-case for the 'Do-Nothing' strategy.

Strategy 4: Cash Forward Contract 25% with APH Insurance 65% Coverage Level

The expected Return for Strategy 4 with a 120 bushel yield and $5.00 December corn is $269/acre (Table 6). The benefit of adding crop insurance with marketing is that the worst-case scenario has improved from $-161/acre (Table 3) to $9/acre (Table 6). In general, this strategy improves the returns by $12 to $170/acre depending on both the yield and the futures contract price at harvest (Table 6). However, implementing this strategy does reduce the profitability if prices increase and if there is no yield loss. The best-case scenario for Strategy 4 is $19/acre less than the best-case for the 'Do-Nothing' strategy.

Strategy 5: Cash Forward Contract 25% and Purchase a $4.20 Put with APH Insurance 65% Coverage Level

The expected return for Strategy 5 with a 120 bushel yield and $5.00 December corn is $265/acre (Table 7). The benefit of this strategy is that the worst-case scenario has improved from $-161/acre (Table 3) to $41/acre (Table 7). In general, this strategy improves the Returns by $14 to $202/acre depending on both the yield and the futures contract price at harvest (Table 7). However, implementing this strategy does reduce the profitability if prices increase and if there is no yield loss. The best-case scenario for Strategy 5 is $24/acre less than the best-case for the 'do nothing' strategy.

What does this Mean?

The benefits of using risk management products to protect the revenue of your 2008 corn crop at these price levels are clear. It is important to remember that the best pricing opportunities historically occur prior to planting. In addition, the deadline to sign-up for insurance is February 28, 2008.

Clemson University Extension has developed educational materials to help you understand how to use price risk management and crop insurance products to manage risk in your farm business. Your local extension office will be able to help you understand your alternatives and to help you make an informed decision for your farm business.

Table 3. Returns over Variable Costs for Non-Irrigated Corn for Various December Corn Futures Prices and Yields for Strategy 1: Cash Sale at Harvest.

	Futures Price					
	$3.00	$3.50	$4.00	$4.50	$5.00	$5.25
Yield						
50	-$161	-$136	-$111	-$86	-$61	-$49
70	-$103	-$68	-$33	$2	$37	$55
100	-$16	$34	$84	$134	$184	$209
120	$42	$102	$162	$222	$282	$312

NOTE: For educational purposes only.

Table 4. Returns over Variable Costs for Non-Irrigated Corn for Various December Corn Futures Prices and Yields for Strategy 2: Cash Forward Contract 25% / Cash Sale at Harvest 75%.

	Futures Price					
	$3.00	$3.50	$4.00	$4.50	$5.00	$5.25
Yield						
50	-$107	-$95	-$82	-$70	-$57	-$51
70	-$49	-$27	-$4	$18	$41	$52
100	$38	$75	$113	$150	$188	$207
120	$96	$143	$191	$238	$286	$310

NOTE: For educational purposes only.

Table 5. Returns over Variable Costs for Non-Irrigated Corn for Various December Corn Futures Prices and Yields for Strategy 3: Cash Forward Contract 25% / $4.20 Put 25% / Cash Sale at Harvest 50%.

	Futures Price					
	$3.00	$3.50	$4.00	$4.50	$5.00	$5.25
Yield						
50	-$76	-$79	-$81	-$75	-$62	-$56
70	-$18	-$11	-$3	$13	$36	$47
100	$69	$91	$114	$145	$183	$202
120	$127	$159	$192	$233	$281	$305

NOTE: For educational purposes only.

Table 6 Returns over Variable Costs for Non-Irrigated Corn for Various December Corn Futures Prices and Yields for Strategy 4: Cash Forward Contract 25% / Cash Sale at Harvest 75% with APH Insurance at the 65% Coverage Level.

	Futures Price					
	$3.00	$3.50	$4.00	$4.50	$5.00	$5.25
Yield						
50	$9	$22	$34	$47	$59	$66
70	-$28	-$5	$17	$40	$62	$74
100	$21	$59	$96	$134	$171	$190
120	$79	$127	$174	$222	$269	$293

NOTE: For educational purposes only.

Table 7. Returns over Variable Costs for Non-Irrigated Corn for Various December Corn Futures Prices and Yields for Strategy 5: Cash Forward Contract 25% / $4.20 Put 25% / Cash Sale at Harvest 50% with APH Insurance at the 65% Coverage Level.

	Futures Price					
	$3.00	$3.50	$4.00	$4.50	$5.00	$5.25
Yield						
50	$41	$38	$36	$42	$55	$61
70	$4	$11	$19	$35	$58	$69
100	$53	$75	$98	$129	$167	$185
120	$111	$143	$176	$217	$265	$288

NOTE: For educational purposes only.