

## Case Studies with MPP-Dairy Financial Stress-test Calculator: An Efficient Large Dairy in California

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***A financial stress-test tool has been created to help dairy farm managers in determining how MPP-Dairy might assist in farm financial risk management. This case study illustrates the use of the stress-test tool by a very efficient large dairy in California.***

The National Program on Dairy Markets and Policy released Advanced MPP-Dairy Calculator in July 2015 to support risk management decision making by U.S. dairy producers. The advanced tool enables dairy producers to create their own stress-test scenario with low milk prices, high feed costs or a combination of both. The tool evaluates the impact of low IOFC margins on a dairy farm profitability, liquidity and solvency. In this case study, produced in collaboration with Western United Dairywomen, we illustrate the use of the tool by an efficient large dairy in California.

### **Case Study: Smiling Cows Dairy**

Smiling Cows Dairy, located in Kern County, has 3,000 cows. The owner, Joe De Vries, has focused on a targeted feeding program and on keeping efficient animals, which has allowed his current herd of Holstein cows to reach an average of 26,000 pounds of milk per year. He expects to be able to keep the same yield in 2016, for an expected production of 78 million pounds. He

does not grow much of his own feed so he relies on outside purchases. His feed cost, at \$10.45/cwt, is close to the area’s average of \$10.53/cwt in 2015. The Dairy’s MPP Production History established when Joe first signed up was 77,350,000 pounds. The production history from form CCC-781 has been since multiplied by 1.0087 and by 1.0261, so the total production history for 2016 is 80,059,344 pounds. Working with his accountant, Joe determined that his expenses other than feed have averaged a very efficient \$5.90/cwt. Looking at the California Department of Food and Agriculture (CDFA) cost of production data, Joe found that he has been doing better than the \$6.76/cwt average for his area in 2015. He managed to bring his expenses down mainly due to economies of scale and good relationships with his long time employees and with his suppliers. His income other than milk has been \$1.35/cwt this year and he expects being able to maintain a similar income stream and budgets \$1.25/cwt for 2016 to be on the safe side since his cow sales were a bit higher than average this year.

#### **Smiling Cows Dairy Balance Sheet 1/1/2016**

Current Assets	\$6,000,000	Current Liabilities	\$2,600,000
Intermediate Assets	\$11,100,000		
Long Term Assets	\$6,000,000	Long Term Liabilities	\$4,000,000
<b>Total Assets</b>	<b>\$23,100,000</b>	<b>Total Liabilities</b>	<b>\$6,600,000</b>
		<b>Equity</b>	<b>\$16,500,000</b>

To determine his worst-case scenario income-over-feed-cost (IOFC) margin basis relative to MPP-Dairy margin, Joe looked at his financial statement to find his exact IOFC for the first half of 2015. He then compared that value (\$4.30/cwt) with the actual MPP-Dairy margin for the same period (\$7.75/cwt). After comparing that difference with historical differences between California's IOFC and MPP-Dairy, he deemed the difference of \$3.45/cwt to be a reasonable worst-case scenario margin. Looking at the past five years of California Food and Agriculture (CDFA) cost of production data, he found that the average IOFC in California since 2009 was \$1.50/cwt below the MPP-Dairy margin. Since 2015 basically represented the worst-case scenario for him, he decided that he should use that number. With the lingering drought in the state preventing a substantial easing in feed prices or the current whey value in the Class 4b formula leaving the Class 4b below Class III, he did not anticipate the situation would improve much in 2016.

His financial situation is fairly steady, as evidenced by his balance sheet. Due to decent cattle prices, the largest asset of the dairy is the livestock. From his balance sheet, he calculated his working capital per cow to be \$1,133 (current assets of \$6,000,000 minus \$2,600,000, divided by 3,000 cows). He also found that his assets per cow was \$7,700 (total

assets of \$23,100,000 divided by 3,000 cows) and his debt-to-asset ratio was 29% (total liabilities of \$6,600,000 divided by total assets of \$23,100,000). He feels very comfortable with his financial situation: his debt-to-equity ratio of 40% is lower than his area's average (57%), as he found through this accounting firm's benchmark information (Frazer LLP, Dairy Trends 2015). Joe thinks that the market value of his building and dairy equipment is already somewhat low due to all the dairies that have gone out of business in California in recent years. Therefore, he is somewhat optimistic that the value of his assets would decline by only 5% in case of a major crisis.

<b>Production &amp; Prices</b>	
Cows	3,000
Milk Per Cow (lbs/yr)	26,000
Expenses, Other than Feed (\$/cwt)	\$5.90
Worst-Case IOFC Basis over MPP (\$/cwt)	-\$3.45
Other Revenue (beef, crops, etc.) (\$/cwt)	\$1.25

<b>Risk Management</b>	
MPP-Dairy: Production History	80,059,344
MPP-Dairy: Coverage Percentage	90%
CME & Other: % of 2016 Milk and Feed Hedged	0%
CME & Other: Average Hedged IOFC	\$0.00

<b>Financials</b>	
Working Capital Per Cow	\$1,133
Assets Per Cow	\$7,700
Debt-to-Asset Ratio (At Market Value)	29%
Effect of Crisis on Assets Value	-5%

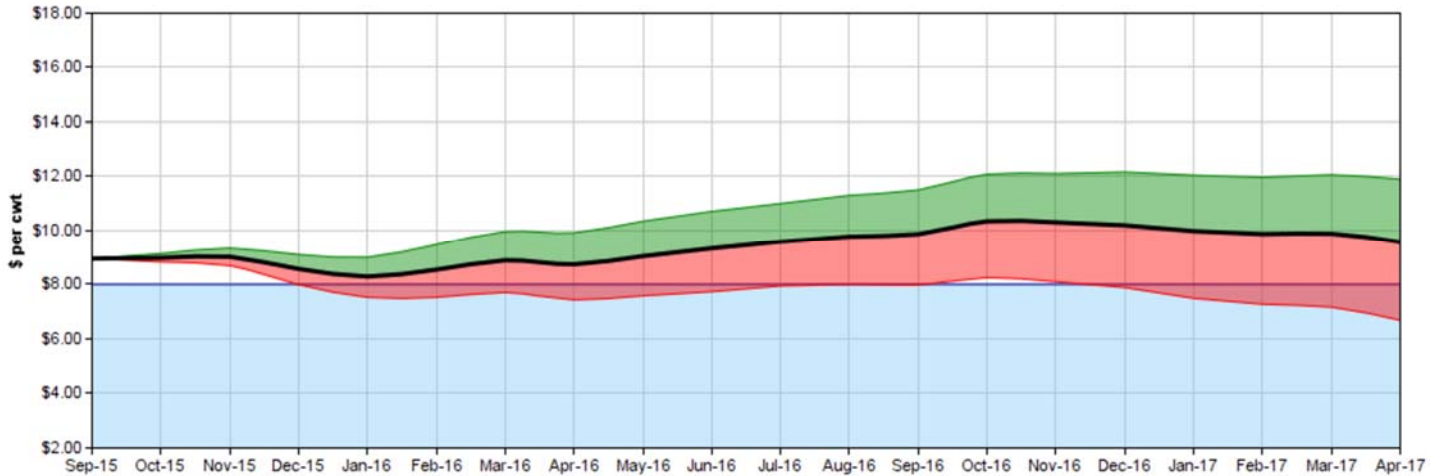
  

Scenario: Average MPP-Dairy Margin in 2016	\$9.29
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<b>Diagnostics</b>	
Expected 2016 Milk Production	78,000,000
Cash-Flow Breakeven MPP-Dairy Margin	\$8.10

**Stress-Test Scenario 1: Expected 2016 MPP-Dairy Margin**



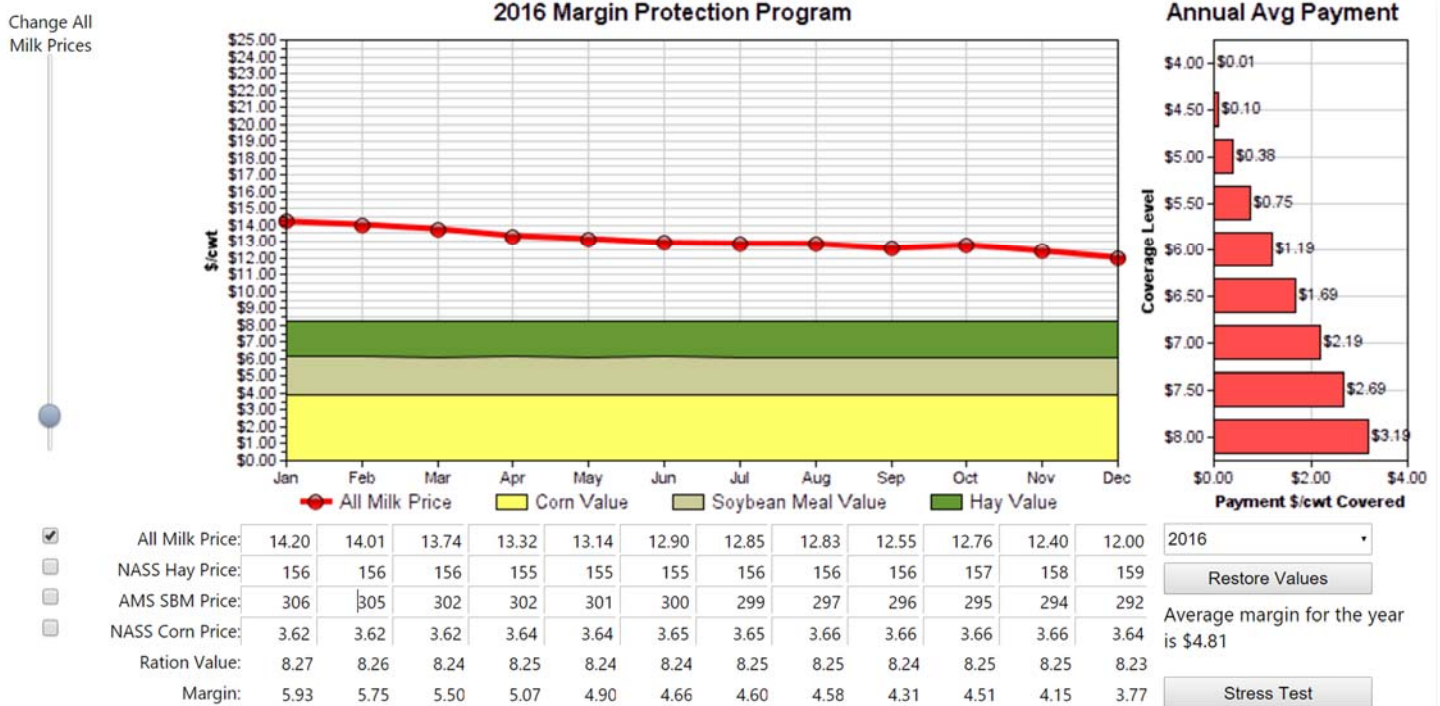
Margin Level	Sep-Oct 2015	Nov-Dec 2015	Jan-Feb 2016	Mar-Apr 2016	May-Jun 2016	Jul-Aug 2016	Sep-Oct 2016	Nov-Dec 2016	Jan-Feb 2017	Mar-Apr 2017
Expected	\$8.96	\$8.79	\$8.41	\$8.81	\$9.18	\$9.68	\$10.11	\$10.25	\$9.93	\$9.73
< \$8.00	-	7%	38%	34%	31%	25%	23%	25%	32%	36%
< \$7.50	-	1%	23%	23%	22%	18%	17%	19%	26%	31%
< \$7.00	-	-	12%	14%	15%	12%	12%	14%	21%	25%
< \$6.50	-	-	5%	8%	9%	7%	8%	10%	16%	21%
< \$6.00	-	-	2%	4%	5%	4%	5%	6%	11%	17%
< \$5.50	-	-	-	2%	3%	3%	3%	4%	8%	13%
< \$5.00	-	-	-	1%	1%	1%	1%	2%	5%	9%
< \$4.50	-	-	-	-	1%	-	1%	1%	3%	6%
< \$4.00	-	-	-	-	-	-	-	-	2%	4%

To start analyzing his decision, Joe goes to [www.dairymarkets.org/MPP](http://www.dairymarkets.org/MPP) to look at the forecasted margins for 2016. On October 30, 2015, he finds that the outlook does not look terrible. Indeed, margins are forecasted to range between \$8.41/cwt and \$10.25/cwt in 2016. If this forecast was to happen, Joe’s net income could be \$1.19/cwt. In that scenario, there would be no MPP-dairy payments, regardless of the level of coverage chosen. In Smiling Cows Dairy’s situation, purchasing protection even at a low level such as \$5.50/cwt could reduce the net profit by \$0.09/cwt, to \$1.10/cwt. Since he remembers that no forecast accurately predicted how bad

2009 was going to be, he decides to take a look at the MPP-Dairy Advanced Tool to help his decision-making process and look at a different and less pleasant scenario.

Joe believes that margins in 2016 will be similar to 2015, but since he knows things can turn rather quickly in the dairy industry, he wants to make sure his farm is protected in case margins fall substantially.

## Stress-Test Scenario 2: 2016 MPP-Dairy Margins Unexpectedly Decline to \$4.81/cwt



If 2016 MPP-Dairy margins declined to \$4.81/cwt, which is almost as low as they did in 2009, and Joe had decided to keep his coverage at the minimum \$4/cwt level, he could lose \$3.29/cwt. Without taking new loans, his working capital would fall significantly from \$1,133/cow to \$279/cow. With the decline in asset values, his debt-to-asset ratio would go up to 34.6%. He turns to the MPP-Dairy margin Advanced Tool and finds out, based on his cost of production, worst-case scenario and other revenue, that his cash-flow break-even MPP-dairy margin is \$8.10/cwt. This means that if the MPP margin declined to \$7.10/cwt, he could lose \$1/cwt, or \$780,000 (\$1 times 780,000 cwt). If margins fell as low as they did in 2009 (\$4.58/cwt), he could lose \$2,745,600 (\$3.52 times 780,000 cwt).

	MPP-Dairy		Profitability	Liquidity	Solvency
	Premium Costs		Net Income	Working Capital/Cow	Debt/Asset Ratio
	Total \$	\$/cwt	\$/cwt	\$/cow	%
No MPP			-\$3.29	\$278	34.6%
\$4.00	\$100	\$0.00	-\$3.28	\$279	34.6%
\$4.50	\$14,111	\$0.02	-\$3.21	\$298	34.5%
\$5.00	\$28,321	\$0.04	-\$2.98	\$358	34.1%
\$5.50	\$69,753	\$0.09	-\$2.69	\$434	33.8%
\$6.00	\$107,783	\$0.14	-\$2.33	\$527	33.3%
\$6.50	\$201,055	\$0.26	-\$1.99	\$616	32.8%
\$7.00	\$573,623	\$0.74	-\$2.01	\$611	32.9%
\$7.50	\$733,466	\$0.94	-\$1.75	\$679	32.5%
\$8.00	\$944,626	\$1.21	-\$1.55	\$729	32.3%

### Conclusions

Joe really likes the convenience and straightforwardness of the MPP-Dairy program. That is why he signed up in the first place. Unfortunately, seeing that a lot of California dairy families who signed up at levels higher than \$4/cwt did not receive any payment in a year where he is losing money makes it difficult for him to justify the cost for 2016. On one hand, he would like to minimize losses in case of a major downturn; on the other hand, he does not want to pay a premium he will not get a return on next year. In the event of a major downturn, signing up at \$6.50/cwt would reduce his losses by \$1.20/cwt and could be a big difference in having to take a substantial amount of debt.

Despite knowing that his IOFC basis with MPP-Dairy margin was likely large, Joe had not considered the impact of his expenses other than feed and his revenue other than milk on his margin when analyzing the impact of MPP-Dairy on his net income and balance sheet. While his feed cost may trend higher than the MPP-Dairy feed calculation, he has other efficiency gains in expenses other than feed that could allow him to make up for some of the negative basis he has on the IOFC.

In choosing the right strategy, Joe weighs the forecast for MPP-Dairy, but also his own situation, including his cost of production, his IOFC basis with the MPP-Dairy margin, his balance sheet and different stress-test scenarios. Ultimately, he will measure his strategy against profitability, solvency and liquidity. To keep the working capital above \$400/cow in the worst-case scenario, while also keeping his MPP-Dairy premiums low, he is leaning towards selecting \$5.50/cwt coverage level.

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