

## Case Studies with MPP-Dairy Financial Stress-test Calculator: A Financially Strained Dairy in Central Valley in California

**Marin Bozic and Annie AcMoody**

*University of Minnesota and Western United Dairymen*

***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 financially strained dairy in Central Valley 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 Dairymen, we illustrate the use of the tool by a financially strained dairy in Central Valley in California.

### **Case Study: Bom Leite Dairy**

Bom Leite Dairy, with its 1,400 cows, is just above the California state average for herd size. The recently renovated facility is located in Fresno County where the owners, John and Teresa Fernandes, reside. Their herd of Holstein averaged 25,500 pounds per cow this year, down 250 pounds from last year due to slightly lower quality feed that was fed earlier in the year. After talking

with their nutritionist, John and Teresa expect to be able to keep at least the same yield in 2016, for an expected production of 35.7 million pounds. John and Teresa established the Dairy's MPP Production History during the sign-up period in 2014 at 35,062,500 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 36,290,637 pounds. John and Teresa own 1,000 acres, on which they grow feed for their operation. They are fortunate enough to have access to some surface water and have abundant well water to serve their needs. This allows them to benefit from a relatively low feed cost of \$9.90/cwt, lower than the area's average of \$10.53/cwt in 2015. The dairy also owns some quota, which was purchased 15 years ago and is now paid off. The quota entitles Bom Leite Dairy to receive an extra \$1.43/cwt on the milk covered by quota, which represents \$239,390 per year. To get the extra value per hundredweight across all milk production, Teresa divided that amount by the expected milk production in 2016 resulting in an extra \$0.67/cwt

### **Bom Leite Dairy Balance Sheet 1/1/2016**

Current Assets	\$2,900,000	Current Liabilities	\$2,000,000
Intermediate Assets	\$5,200,000	Intermediate Liabilities	1,365,000
Long Term Assets	\$15,200,000	Long Term Liabilities	\$6,100,000
<b>Total Assets</b>	<b>\$23,300,000</b>	<b>Total Liabilities</b>	<b>\$9,465,000</b>
		<b>Equity</b>	<b>\$13,835,000</b>

Despite the rumors floating at the coffee shop regarding the value of quota if California was to adopt a FMMO, John and Teresa feel confident their quota will allow them to keep getting the extra revenue. The market value of their quota is currently estimated at \$2.1 million. Working with their accountant, John and Teresa determined that their expenses other than feed have averaged \$6.80/cwt, which is right at the average for their area according to the California Department of Food and Agriculture (CDFA) cost of production data that Teresa has been analyzing. Their income other than milk has been \$1/cwt this year and they expect being able to maintain a similar income stream and budget \$0.95/cwt for 2016 to be on the safe side. John and Teresa feel confident that their IOFC will track the MPP-Dairy margin fairly closely, but realize it is important to determine what it specifically is, and how far away it could get. Looking at their financial statement for the first half of 2015, they found that their IOFC was \$5.50/cwt. After comparing it with the MPP-Dairy margin for the same period (\$7.75/cwt), they found that their basis was -\$2.25/cwt. Realizing that the water availability could be an issue that affects their feed costs differently than the rest of the country, they determine \$2.50/cwt would be a reasonable worst-case scenario margin. From their balance sheet, they calculated their working capital per cow to be \$643 (current assets of \$2,900,000 minus current debt of \$2,000,000, divided by 1,400 cows). They also found that their assets per cow was \$16,643 (total assets of \$23,300,000 divided by 1,400 cows) and their debt-to-asset ratio was 41% (total liabilities of \$9,465,000 divided by total assets of \$23,300,000). They feel good about their financial

<b>Production &amp; Prices</b>	
Cows	1,400
Milk Per Cow (lbs/yr)	25,500
Expenses, Other than Feed (\$/cwt)	\$6.80
Worst-Case IOFC Basis over MPP (\$/cwt)	-\$2.50
Other Revenue (beef, crops, etc.) (\$/cwt)	\$1.00

<b>Risk Management</b>	
MPP-Dairy: Production History	32,062,500
MPP-Dairy: Coverage Percentage	90%
CME & Other: % of 2016 Milk and Feed Hedged	0%
CME & Other: Average Hedged IOFC	\$0.00

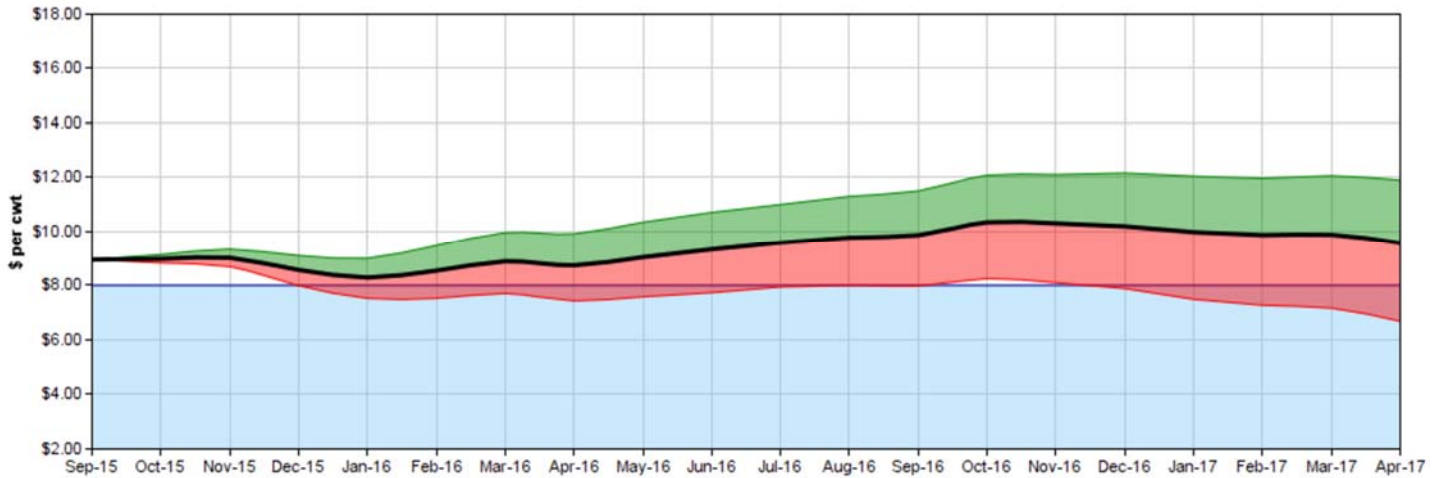
<b>Financials</b>	
Working Capital Per Cow	\$643
Assets Per Cow	\$16,643
Debt-to-Asset Ratio (At Market Value)	41%
Effect of Crisis on Assets Value	-10%

Scenario: Average MPP-Dairy Margin in 2016	\$9.22
--	--------

<b>Diagnostics</b>	
Expected 2016 Milk Production	35,700,000
Cash-Flow Breakeven MPP-Dairy Margin	\$8.30

situation but are concerned their working capital is getting a bit low. Looking at their current ratio of 1.5:1 (current assets divided by current liabilities), they notice that they are a bit below the area's average (2.21:1), as found through a local accounting firm's benchmark information (Frazer LLP, Dairy Trends 2015). John and Teresa think that the market value of their facility is still relatively high and would not lose too much in case of a crisis relative to other facilities since it was renovated only 10 years ago. However, they feel that their quota and livestock could lose more value in case of a major downturn when other dairies would try to curb production and improve their financial situation. Therefore, they think that the value of their assets would decline by 10% in case of a major crisis.

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

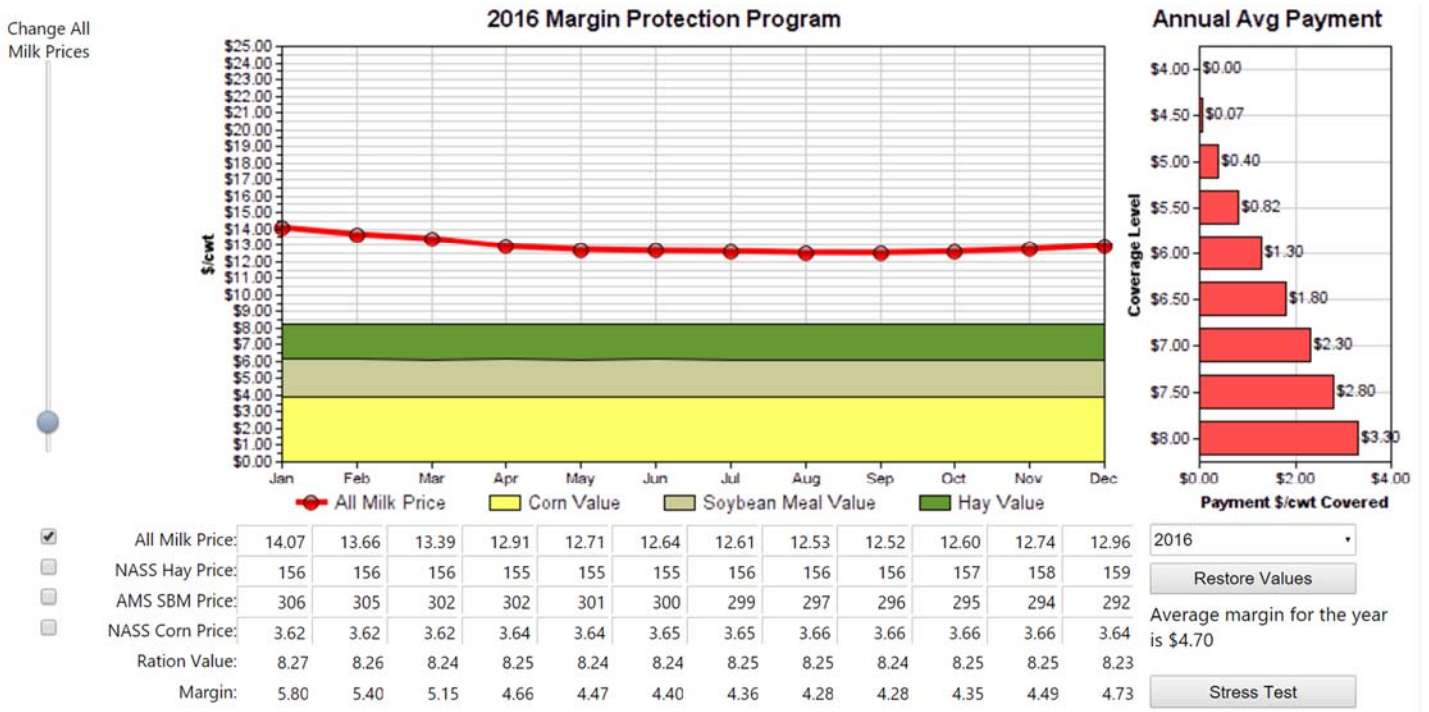


Margin Level	Sep-Oct 2015	Nov-Dec 2015	Jan-Feb 2016	Mar-Apr 2016	May-Jun 2016	Jul-Aug 2016	Sep-Oct 2016	Nov-Dec 2016	Jan-Feb 2017	Mar-Apr 2017
Expected	\$8.96	\$8.79	\$8.41	\$8.81	\$9.18	\$9.68	\$10.11	\$10.25	\$9.93	\$9.73
< \$8.00	-	7%	38%	34%	31%	25%	23%	25%	32%	36%
< \$7.50	-	1%	23%	23%	22%	18%	17%	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 their decision, John and Teresa go to [www.dairymarkets.org/MPP](http://www.dairymarkets.org/MPP) to look at the forecasted margins for 2016. On November 3, 2015, they find that the outlook for 2016 is for above average US margins. Indeed, margins are forecasted to range between \$8.41/cwt and \$10.25/cwt. If this forecast was to be realized, Joe’s net income could be \$1.13/cwt. In that scenario, there would be no MPP-dairy payments, regardless of the level of coverage chosen. In their situation, purchasing protection at \$6.50/cwt, a level that has approximately 5-10% chance to trigger based on the current forecast, could reduce their net profit by \$0.21/cwt, to \$0.92/cwt.

John 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. 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 \$8.30/cwt. This means that if the MPP margin declined to \$7.30/cwt, he could lose \$1/cwt, or \$357,000 (\$1 times 357,000 cwt). If margins fell as low as they did in 2009 (\$4.58/cwt), he could lose \$1,328,040 (\$3.72 times 357,000 cwt). Those scenarios make their banker a little bit nervous.

## Stress-Test Scenario 2: 2016 MPP-Dairy Margins Unexpectedly Decline to \$4.70/cwt



If 2016 MPP-Dairy margins declined to \$4.70/cwt, which is almost as low as they did in 2009, and Bom Leite Dairy had decided to keep its coverage at the minimum \$4/cwt level, the dairy could lose \$3.57/cwt. John and Teresa’s working capital would fall significantly from \$643/cow to -\$267/cow. With the decline in asset values, their debt-to-asset ratio would climb to 48.5%. Investing \$0.11/cwt in MPP-Dairy protection with \$6.00/cwt would reduce their losses sufficiently to keep their working capital from sinking substantially into negative values. Looking at these numbers, Theresa thinks something should be done, but she also thinks they should consider complementing MPP-Dairy with some private-market risk management instruments.

	MPP-Dairy		Profitability	Liquidity	Solvency
	Premium Costs		Net Income	Working Capital/Cow	Debt/Asset Ratio
	Total \$	\$/cwt	\$/cwt	\$/cow	%
No MPP			-\$3.60	-\$276	48.5%
\$4.00	\$100	\$0.00	-\$3.60	-\$276	48.5%
\$4.50	\$5,471	\$0.02	-\$3.56	-\$266	48.5%
\$5.00	\$11,043	\$0.03	-\$3.31	-\$200	48.3%
\$5.50	\$26,556	\$0.07	-\$3.01	-\$125	48.0%
\$6.00	\$40,827	\$0.11	-\$2.66	-\$35	47.7%
\$6.50	\$75,783	\$0.21	-\$2.36	\$42	47.5%
\$7.00	\$215,087	\$0.60	-\$2.34	\$46	47.4%
\$7.50	\$275,577	\$0.77	-\$2.11	\$106	47.3%
\$8.00	\$357,146	\$1.00	-\$1.93	\$150	47.1%

### Conclusions

Before MPP-Dairy, John and Teresa had not used risk management tools but they really liked the idea of insuring their profit margin. That is why they signed up last year at the \$4/cwt level since \$100 seemed like a good deal. They had considered looking at their basis in the past, which gave them an idea that if the MPP-Dairy margin dropped to \$4/cwt, their own IOFC could be only \$1.5/cwt. Using the Advanced Tool to put it in perspective by adding their other non-feed expenses and other revenue, they realized that if the MPP-Dairy margin gets down to close to \$4/cwt, they may lose as much as \$4.30/cwt. That is an amount they feel very nervous about. With the negative working capital, they would have to take on more debt, which would not come at a low cost.

While John and Teresa thought their feed costs were relatively low and their milk income relatively high due to quota, they think that their situation could still be impacted in case of a major downturn. Since they are very risk averse, they think it best to invest some money in insuring a margin that would allow their working capital to remain as close to positive as possible.

In choosing the right strategy, John and Teresa weigh the forecast for MPP-Dairy, but also their own situation, including their cost of production, IOFC basis with the MPP-Dairy margin, balance sheet and different stress-test scenarios.

The DMAp Team includes Marin Bozic, University of Minnesota, Brian Gould, University of Wisconsin, Charles Nicholson, The Pennsylvania State University, Andrew Novakovic, Cornell University, Mark Stephenson, University of Wisconsin, Cameron Thraen, The Ohio State University, and Christopher Wolf, Michigan State University. With respect to any opinions, findings, conclusions, or recommendations, neither the United States Government, the University of Illinois, nor the National Program on Dairy Markets and Policy makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Users bear the sole responsibility for decisions affecting program participation and may want to consult other resources. The National Program on Dairy Markets and Policy is working with the University of Illinois led consortium National Coalition for Producer Education, which is supported by the U.S. Department of Agriculture, Farm Service Agency, under Agreement No. 58-0210-4-002 N. This material is based upon work supported by USDA/NIFA under Award Number 2012-49200-20032.