



Farm Income and Cost Outlook

Dairy Situation and Outlook

Grain Situation and Outlook

Status of Wisconsin Agriculture

2017

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Introduction

Status of Wisconsin Agriculture, the longstanding agricultural situation and outlook report produced by the University of Wisconsin-Madison College of Agricultural and Life Sciences and UW-Extension/Cooperative Extension, ended its 28 year run in 2014. In 2017, Status is reincarnated with a new look as we re-work the publication under a new Director and Associate Director for the Renk Agribusiness Institute. This year the Wisconsin Agricultural Outlook Forum included the traditional situation and outlook for dairy and grains, as well as farm income. These presentations are available on the Renk Agribusiness Institute web page: <http://renk.aae.wisc.edu/ag-outlook-forum-materials/>. This document expands further on these presentations as the *Status of Wisconsin Agriculture 2017*.

The full agenda for the Wisconsin Agricultural Outlook Forum is on the following page, but the afternoon sessions during the Forum are not part of *Status of Wisconsin Agriculture 2017*. Prior to the afternoon sessions, Dean Kate VandenBosch spoke briefly about the new building projects in the College of Agricultural and Life Sciences. The new Meat Science Laboratory on campus and the new Wisconsin Crop Innovation Center in Middleton are both focused on product and process innovation. The extensive refurbishing and modernization of the Center for Dairy Research in Babcock Hall, funded in part by industry donations, will expand the Center's collaboration with Wisconsin dairy processors in converting new ideas to marketable products.

The afternoon sessions examined broader outlook issues for the state's businesses and agribusiness. First, Jim Wood presented demographic trends that will challenge all Wisconsin businesses in maintaining a well-trained work force. Matt Kures then presented information on the specific challenges facing food processors and other agribusinesses. Finally, John Biondi described UW's Discover to Product (D2P) program that helps bring UW innovations to market. The Renk Agribusiness Institute web page (<http://renk.aae.wisc.edu/ag-outlook-forum-materials/>) has these materials for these presentations.

During the final afternoon session, a panel of university and industry experts talked about past successes and future challenges for four of the state's major food processing/agribusiness sectors: Dairy, Meat, Fermented Beverages, and Vegetables. Again, the Renk Agribusiness Institute web page (<http://renk.aae.wisc.edu/ag-outlook-forum-materials/>) has some materials from these presentations, but they do not capture the verbal presentations or the ensuing discussion.



2017 Wisconsin Agricultural Outlook Forum Agenda

“Innovation in Wisconsin Agribusiness: Successes and Challenges”

Thursday, January 19, 2017, Varsity Hall II, Union South, 1308 W Dayton St,
Madison, WI 11:00 AM – 4:00 PM

Agenda

10:30 – 11:00	Check-In/Registration
11:00 – 11:10	Introduction and Overview (Paul Mitchell)
11:10 – 12:30	Agriculture Situation and Outlook
11:10 – 11:25	Farm Income and Cost Outlook (Paul Mitchell, UW, AAE)
11:25 – 11:50	Dairy Situation and Outlook (Mark Stephenson, UW, CDP)
11:50 – 12:15	Grain Situation and Outlook (Todd Hubbs, U of IL Ag Consumer Econ)
12:15 – 12:30	Panel Discussion and Questions
12:30 – 1:30	Lunch
1:30 – 2:30	Current Trends and Future Challenges (John Biondi emcee)
1:30 – 1:55	Business Trends & Challenges for Wisconsin (Jim Wood, Wood Comm.)
1:55 – 2:20	Trends & Challenges for Wisconsin Agribusiness (Matt Kures, UWEX)
2:20 – 2:30	D2P: Helping University Innovation Meet Emerging Challenges (John Biondi, UW D2P)
2:30 – 2:45	Break
2:45 – 4:00	Wisconsin Agricultural Innovation: Successes and Challenges
2:45 – 2:50	John Biondi: Overview and Introductions
2:50 – 3:00	Dairy (Kent Weigel, UW Dairy Science)
3:00 – 3:10	Meat (Steve Van Lannen, American Foods Group)
3:10 – 3:20	Fermentation (Mark Garthwaite, WI Brewers Guild)
3:20 – 3:30	Seed/Vegetable (Bill Tracy, UW Agronomy)
3:30 – 4:00	Panel Discussion and Questions

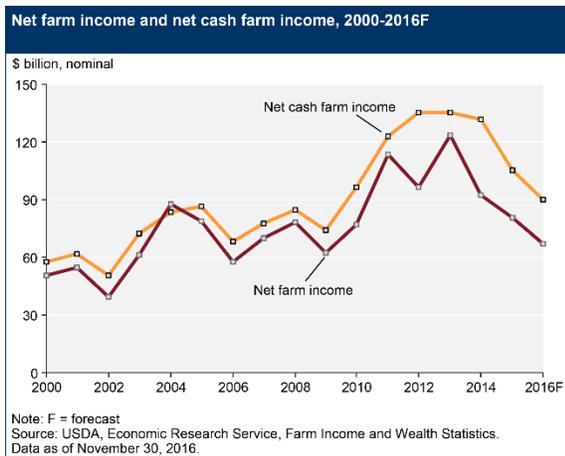
2016 Farm Income and 2017 Cost Outlook

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Email: pdmitchell@wisc.edu Web: <http://www.aae.wisc.edu/pdmitchell/>*

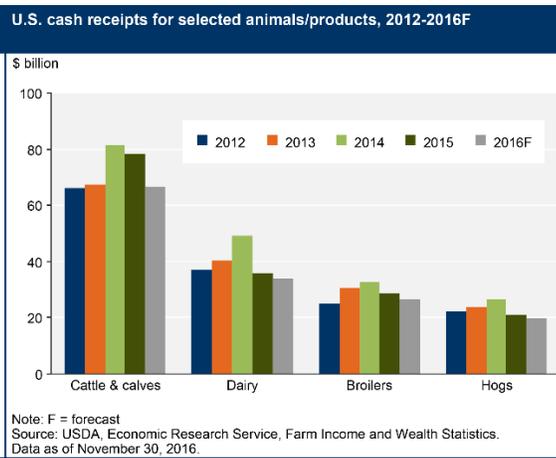
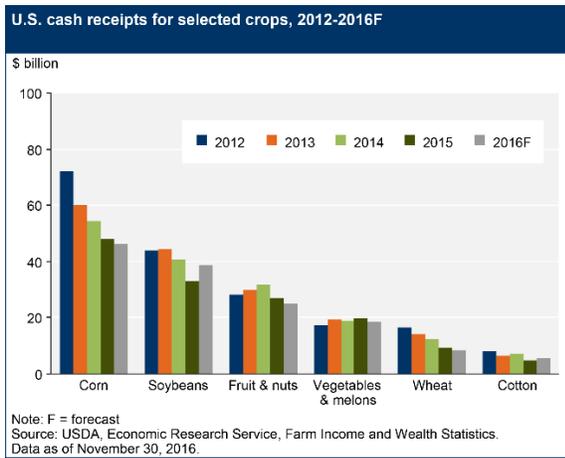
The 2016 crop year was a great year for crop production, setting records for state average corn and soybean yields, but also yielding low prices for major state commodities. As a result, for the third consecutive year, farm income will decline in 2016. Continuing farm income declines are a national phenomenon, not just an issue in Wisconsin. Projected costs for 2017 remain high, implying negative margins for most Wisconsin farmers, though dairy and soybeans look better. Overall, the data seem to show that Wisconsin farmers are stressed financially by continued low prices and high costs, but so far have been able to manage the problem by belt-tightening and increased borrowing. Longer-term, however, this trend cannot continue without a serious agricultural crisis developing.

2016 Farm Income

The USDA Economic Research Service (ERS) report¹ from Nov 30, 2016 shows a projected US net farm income for 2016 of \$66.9 billion, a decline of almost \$14 billion, or more than 17%, from 2015. This is the third straight year of a decline in net farm income at the national level



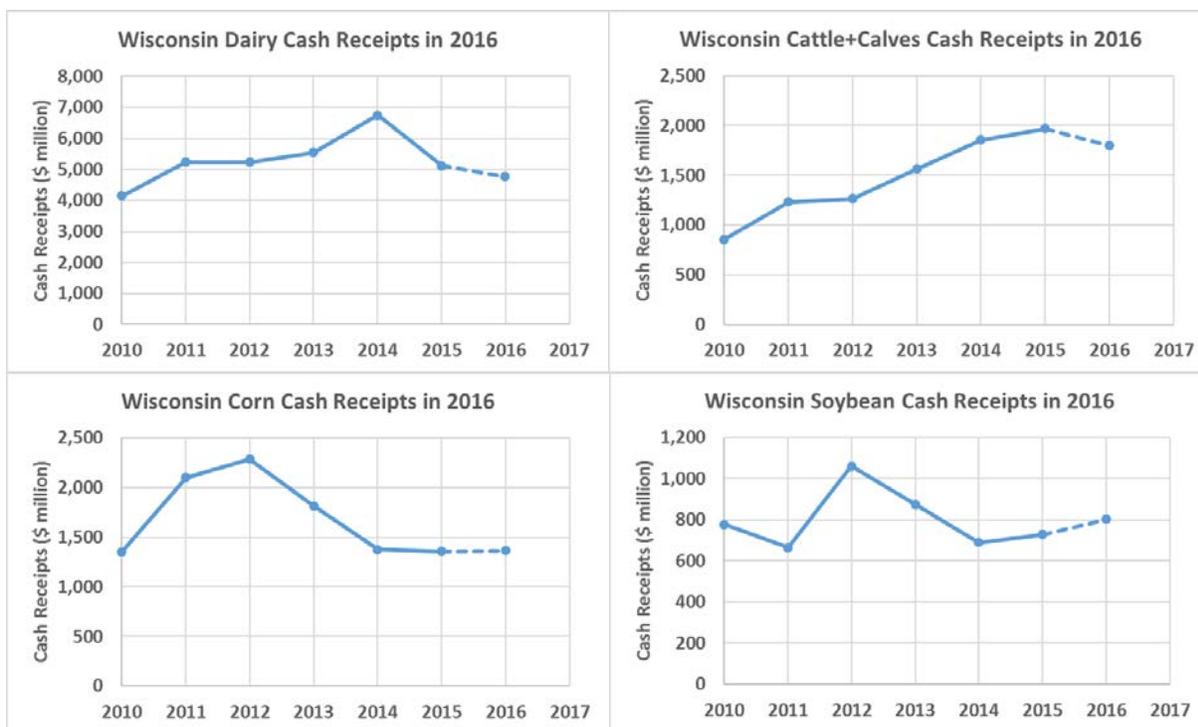
and the lowest net farm income since 2009. The same USDA-ERS report also provides farm cash receipts from the sale of crops and livestock and input cost data. Corn receipts are down four years in a row, soybean receipts show a small increase after two years of decline, fruit receipts down three years in a row, vegetable receipts largely flat, and wheat receipts in decline. Livestock receipts data show declines for beef, dairy, broilers and hogs for two consecutive years. Overall, input costs declined in 2016 by 2.6%, but not enough to offset the decline in cash receipts, and so net farm income fell.



Source: <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/2016-farm-sector-income-forecast/>

¹ <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/2016-farm-sector-income-forecast/>

USDA-ERS farm income data for Wisconsin for 2016 are not yet available, and so projections were made based on the historical relationship between the US and Wisconsin farm commodity distributions.² Based on these projections, dairy cash receipts will decline in Wisconsin for 2016 for the second consecutive year, with the average price for the calendar year around \$1.50/cwt lower than in 2015. Cash receipts from sales of beef are projected to decline as well after several years of increases. Projected receipts from corn sales in Wisconsin were flat relative to 2015, while soybean cash receipts were higher. These changes occurred because the new records set for state average yields offset lower prices. The state average corn yield was 178 bu/A in 2016, 14 bu/A larger than in 2015, while the state average soybean yield was 55 bu/A in 2016, 5.5 bu/A larger than in 2015.³ Anecdotal discussions with county agricultural extension agents indicated that these extra bushels really helped many Wisconsin farmers, as the projected negative margins were reduced due to the increased yields. Using the Wisconsin average prices received for Sep-Nov (the most recent available), these extra bushels on average implied \$44/A more in corn cash receipts and \$51/A in soybean cash receipts compared to what would have occurred if farmers had harvested the same yields as in 2015.



Source: <https://data.ers.usda.gov/reports.aspx?ID=39620>

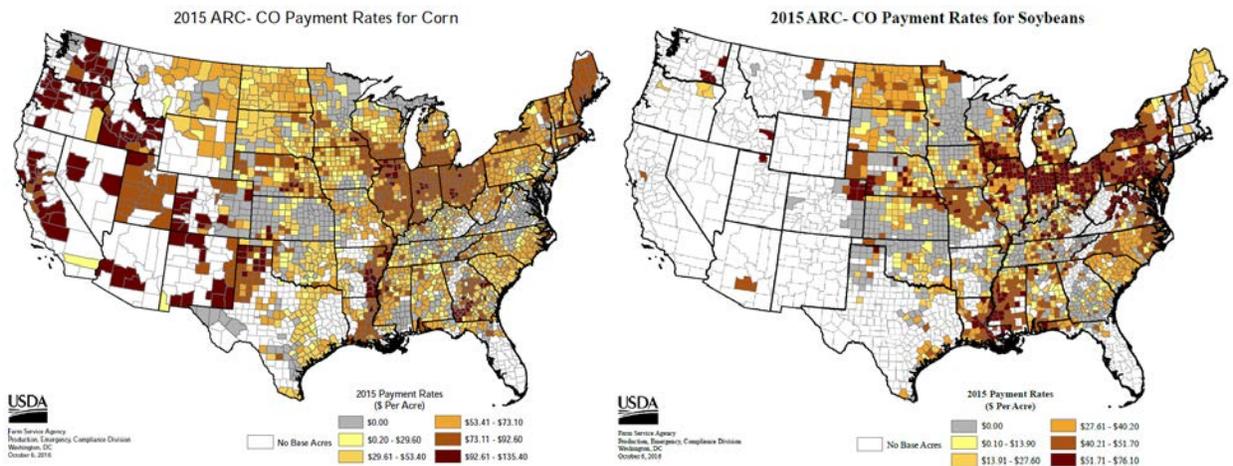
These low prices and declining receipts for most crops resulted in relatively large payments to farmers based on commodity support programs created by the 2014 Farm Bill. Payments for the 2015 crop year totaled more than \$5.1 billion nationally for the ARC and PLC programs,⁴ with many Midwestern farmers receiving these payments in the fall of 2016 after the 2015 marketing year ended. These payments for the 2015 crop year totaled \$222 million in Wisconsin,⁴ with payments exceeding \$70 per corn base acre and \$50 per soybean base acre for many in Wisconsin.⁵ In this year with low farm income, these payments were especially helpful.

² <https://data.ers.usda.gov/reports.aspx?ID=39620>

³ https://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/Crops/2017/WI_Crop_Production_Annual_01_17.pdf

⁴ <https://data.ers.usda.gov/reports.aspx?ID=39626>

⁵ https://www.fsa.usda.gov/programs-and-services/arcplc_program/index



Source: https://www.fsa.usda.gov/programs-and-services/arcplc_program/index

Crop insurance indemnity payments for the 2016 crop year are not yet complete, but they show a relatively low level of activity compared to previous years. The table on the next page shows that as of Jan 16, 2017, almost \$20 million was paid as indemnities in Wisconsin, with additional payments likely yet to be made. For comparison, the total was \$57 million paid for crop losses in 2015 and \$457 million paid for crop losses in 2012, evidence that 2016 was not a bad year in terms of insured losses. The largest loss event of 2016 was the flooding and mudslides after heavy rains exceeding 10 inches in late September, which contributed to problems with grains becoming moldy or sprouting on the ear.⁶ This flooding and damage led the governor to declare a state of disaster for 13 counties in west central Wisconsin.⁷ A similar large rainfall event occurred in July in northern Wisconsin, with the governor declaring a state of emergency in 8 other counties.⁸

Wisconsin crop insurance indemnity information for the 2016 crop year (Jan 16, 2017)

Crop	Number of Policies Paying Indemnities	% of Policies Paying Indemnities	Average Indemnity per Policy	Total Indemnities Paid
Cabbage	3	43%	\$10,826	\$32,478
Apples	10	38%	\$122,502	\$1,225,024
Snap Beans	67	27%	\$29,876	\$2,001,711
Sweet Corn	32	24%	\$26,612	\$851,596
Green Peas	25	21%	\$17,131	\$428,269
Wheat	290	13%	\$3,129	\$907,549
Corn	936	6%	\$9,571	\$8,958,524
Forage Production	106	6%	\$16,108	\$1,707,462
Cranberries	10	5%	\$65,512	\$655,121
Soybeans	468	4%	\$5,061	\$2,368,381
All Other Crops	309	12%	\$2,301	\$710,984
Total	2,256	7%	\$8,797	\$19,847,099

Source: <http://www.rma.usda.gov/data/sob.html>

⁶ <http://www.aae.wisc.edu/pdmitchell/CropInsurance/WetMoldyCorn.pdf>

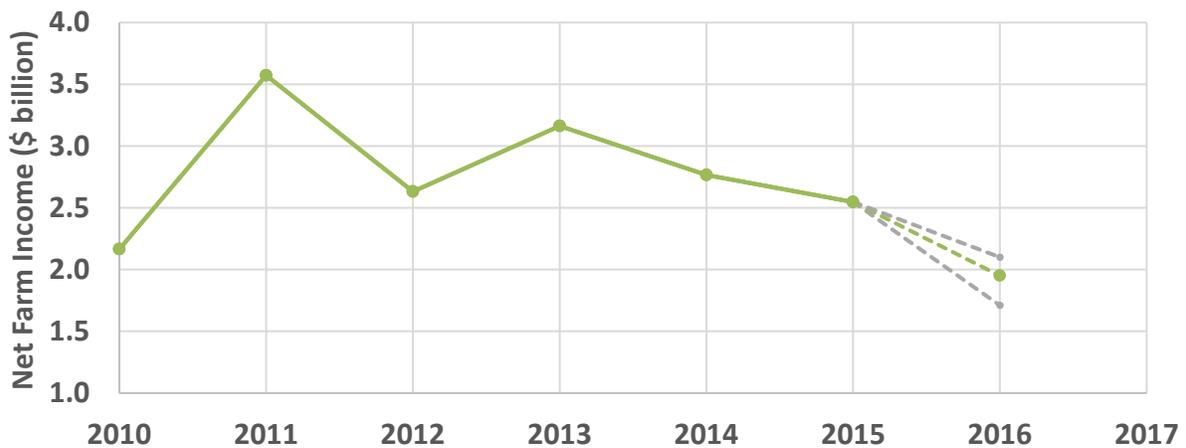
⁷ <http://ready.wi.gov/flooding/WesternWI2016.asp>

⁸ <http://readywisconsin.wi.gov/flooding/NorthernWI2016.asp>

In terms of the total insured value, corn and soybeans accounted for 80% of the Wisconsin total in 2016, but only 57% of the total indemnities paid as of Jan 16, 2017. Looking at individual crops, the largest losses and the crop insurance policies most frequently paying losses were for processing vegetables, apples and cranberries (see table on previous page). Wisconsin has the second largest processing vegetable industry in the US,⁹ and these crops were especially hit hard by the wet weather in late summer and early fall that developed in the state. As of Jan 16, 2017, 21%-27% of green bean, sweet corn and green pea policies in the state paid indemnities, with average payments in the range of \$17,000 to \$30,000 per policy and total payments of more than \$3.2 million. Apple growers in the state suffered large losses, with more than a third of the policies paying indemnities, with an average payment of more than \$120,000 per policy and \$1.2 million in total payments. For cranberry growers, anecdotally the wet summer caused losses of 10-20% for many farmers due to disease problems, which were too small to trigger payments, but a hailstorm resulted in large losses for some cranberry growers, with an average payment per policy of more than \$65,500.

Overall, declining cash receipts for dairy and beef and relatively flat receipts for corn and soybeans led to a projected decrease in net farm income for Wisconsin in 2016. Based on historical relationships, the projection is for almost \$2 billion in net farm income in 2016, the third year in a row with declining income and more than a 20% decline from 2015. Based on historical relationships, the range for the estimate is from \$1.7 billion to \$2.1 billion. From discussions with several agricultural professionals in the state, it is clear that many Wisconsin farmers are financially stressed by these conditions. However, examining the data as part of the outlook presented in the next section, it seems that so far, many farmers have been able to manage this financial stress, though this situation cannot continue without serious consequences.

Wisconsin Net Farm Income



Source: <https://data.ers.usda.gov/reports.aspx?ID=39620>

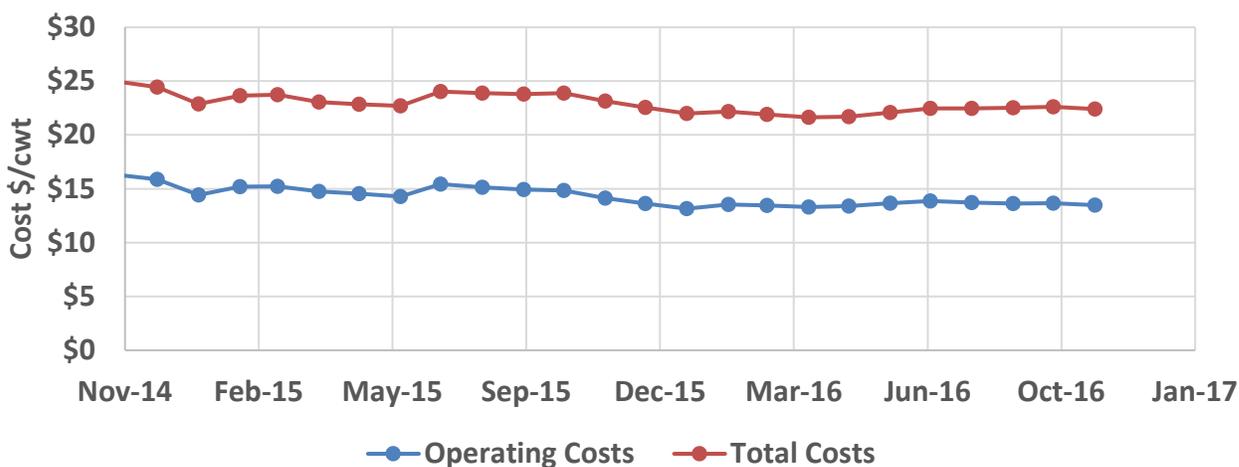
⁹ http://www.aae.wisc.edu/pdmitchell/Crop_impacts_low_res.pdf

2017 Cost Outlook

Dairy

The USDA-ERS estimated a 2.6% decrease in farm costs for all US agricultural production in 2016 and this slow decline likely will continue into 2017. Based on national USDA estimates, the average milk cost of production over the last year has shown no trend and ranged between \$21.50 and \$22.50/cwt, with an average just over \$22/cwt.¹⁰ Note that this USDA-ERS cost estimate includes imputed costs for unpaid family labor, opportunity costs, capital recovery costs, and general farm overhead costs and it should not be viewed as a cash cost of production. This national estimate is likely similar to the Wisconsin estimated average cost as well, as the average cost in the state has converged to the US average in recent years, likely due to the increasing average herd size in the state. Into 2017, this cost will likely not vary much from this range with continued favorable feed costs projected. Hence, for 2017, the projected Wisconsin milk cost likely ranges between \$21-\$24/cwt for most farmers, with higher costs for those with smaller herds and even lower costs for those with larger herds.

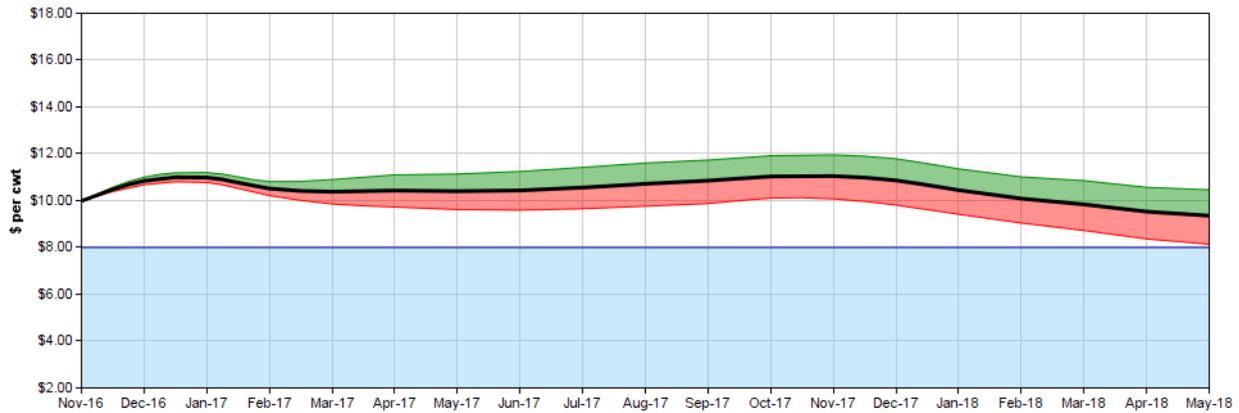
National Milk Cost of Production Estimates



Source: <https://www.ers.usda.gov/data-products/milk-cost-of-production-estimates/>

The plot on the next page is from the Program on Dairy Markets and Policy managed by the UW Center for Dairy Profitability (<https://dairymarkets.org/>). The plot uses futures prices for milk, corn and soybean meal to project the farm level milk margin based on the USDA feed ration formula for the Margin Protection Program (MPP). The values shown reflect futures prices as of Jan 23, 2017. The black line is roughly equivalent to a farm-level estimate of income over feed costs, with the colored bands providing confidence intervals around the estimate. The projected margin ranges between \$9/cwt and \$11/cwt from Jan 2017 through May 2018, showing no clear trend. Over the past 12 months, the actual margin was lower, ranging from less than \$6/cwt in May and June of 2016 to \$10/cwt in recent months. The implication is that projected margins for 2017 should be higher than those observed in 2016, implying higher farm income for dairy farmers than in 2016.

¹⁰ <https://www.ers.usda.gov/data-products/milk-cost-of-production-estimates/>

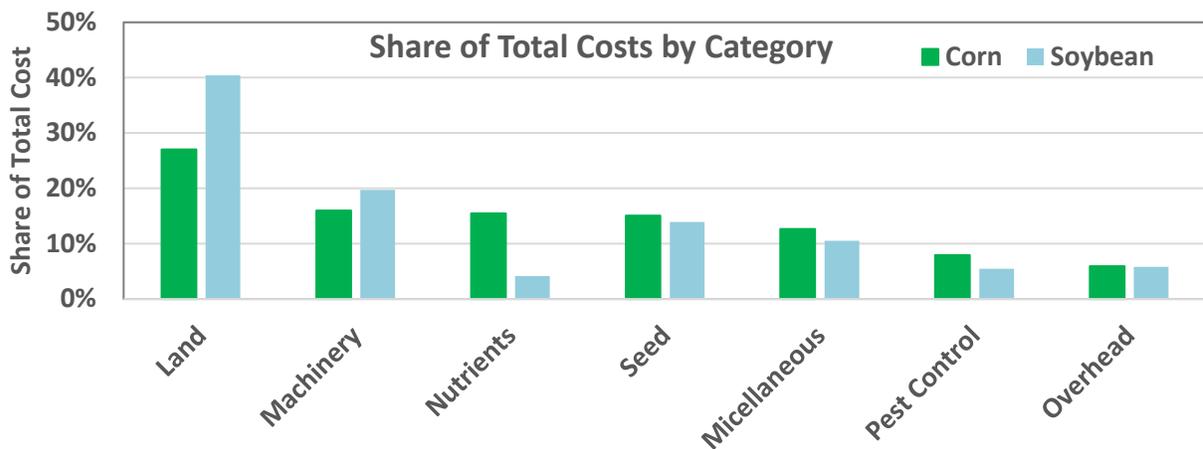


The colored bands show the middle 50% probability interval for forecast margins. There is a 25% chance that the margin could be above the green band and a 25% chance that the margin could be below the red band. The graph data and probabilities are calculated from futures market data available on 01/23/2017.

Source: <https://dairymarkets.org/MPP/Tool/>

Corn and Soybeans

For net returns to corn and soybeans producers, the analysis modifies cost and break-even price estimates for Northern Illinois based on the University of Illinois FarmDOC program, which works with data from members of the Illinois Farm Business Farm Management Association.¹¹ A key advantage is that the budget process has remained consistent over the years, allowing an accurate comparison of cost trends for corn and soybeans in Northern Illinois. First, to focus the discussion, the shares of total costs for major categories are illustrated, showing that land cost (rent) is the largest single cost component for both corn and soybeans, at 27% for corn and 40% for soybeans. The projected total cost is \$839/A for corn and \$575/A for soybeans, with land rent at \$258/A for high quality farmland in Northern Illinois for both crops. For corn, machinery, nutrient and seed costs each have about a 15% share, with pest control at about an 8% share. For soybeans, machinery has a 20% share, while seed has a 14% share, then nutrients and pest control with a 4% and 5% share, respectively. To better understand trends in these costs, data for Wisconsin and Northern Illinois are examined for each cost category.

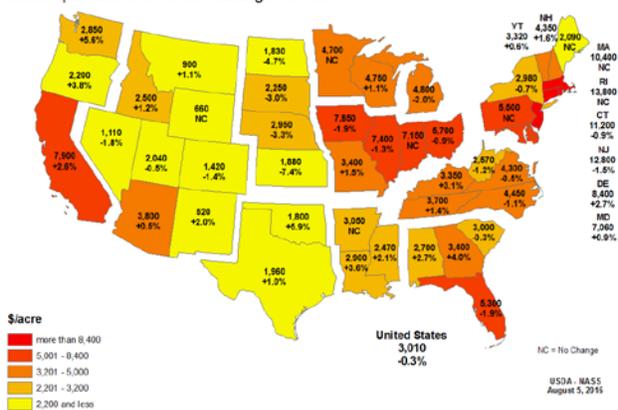


Source: http://www.farmdoc.illinois.edu/manage/2017_crop_budgets.pdf

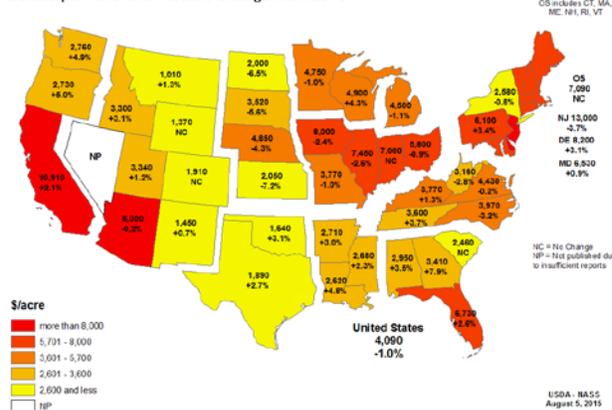
¹¹ http://www.farmdoc.illinois.edu/manage/2017_crop_budgets.pdf

The most recent land value data from USDA-NASS shows that farm real estate values in Wisconsin rose \$50/A or 1.1% in 2016 compared to 2015, while cropland values increased \$200/A or 4.3%. This trend is an outlier for most Midwestern states, with cropland values declining by 1.0% in Minnesota, 1.1% in Michigan, 2.4% in Iowa, and 2.6% in Illinois. No other Midwestern state showed an increase in cropland values. The Great Plains states saw the largest decreases nationally, with a more than 7% decline in Nebraska. In general, agricultural land values did not increase as rapidly in Wisconsin as in some other states during the commodity price boom and so do not have as much downward pressure on them now. Additionally, the continued strength of the dairy industry in the long-term has put upward pressure on cropland prices in the state. What 2017 holds for land values is unclear. The projected negative margins for crops will put downward pressure on prices, but the mildly positive outlook for dairy will put upward pressure on land values. Likely areas with strong growth in dairy herds will see land values hold steady or increase, while areas without this pressure will not, leading to mixed results across the state.

2016 Farm Real Estate Value by State
Dollars per Acre and Percent Change from 2015

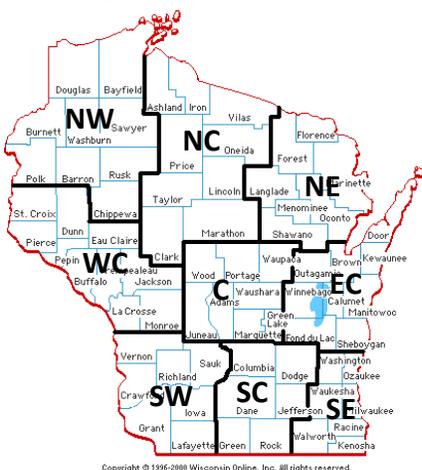


2016 Cropland Value by State
Dollars per Acre and Percent Change from 2015



Source: https://www.nass.usda.gov/Charts_and_Maps/Land_Values/

The four charts on the next page show average cropland rental rates in the state by crop reporting district between 2008 and 2016 based on USDA-NASS cropland rent data,¹² with the map below indicating the boundaries and labels for each crop reporting district.

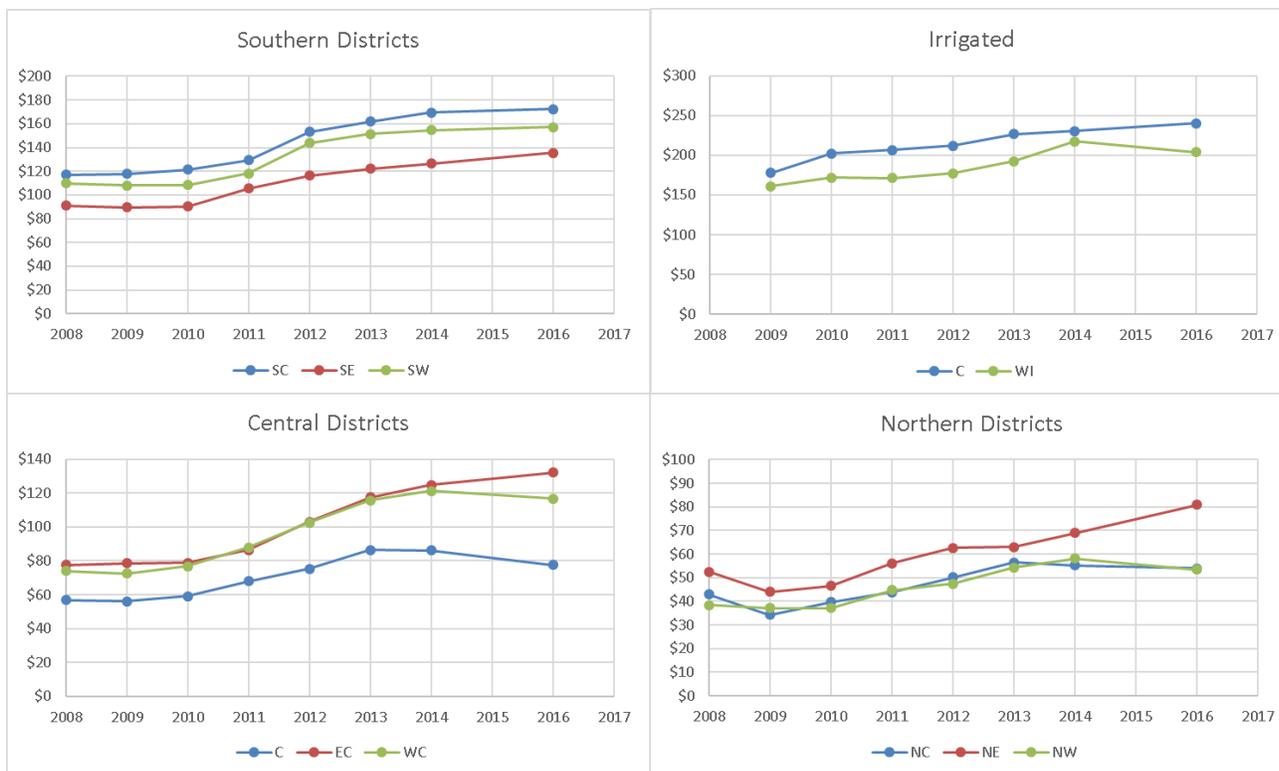


Note that these are average rental rates, with more productive land typically receiving higher-than-average rents and less productive land receiving lower-than-average rents. The plots show that the upward pressure on land rents in Wisconsin has slowed over the last two years. In crop reporting districts with lots of prime farmland, including irrigated land, average land rents continued to rise between 2014 and 2016, such as the southern crop reporting districts and the east central crop reporting district. However, in areas with less productive land, average rents already began to decrease between 2014 and 2016, such as in some northern crop reporting districts. In 2017, projected negative margins for crops will put downward pressure on land rents just as for land values.¹³

¹² https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Cash_Rents_by_County/

¹³ http://fyi.uwex.edu/fieldcroppathology/files/2017/01/TeamGrainsFactSheet_FINAL.pdf

As a result, some softening of average rental rates in productive regions of the state is to be expected, though not as much as in neighboring states. Rental rates for less productive land and in less productive regions of the state will likely continue to decrease, especially in areas where dairy is not as important or not expanding. Overall, the average rental rate for the state will likely decrease slightly in 2017.



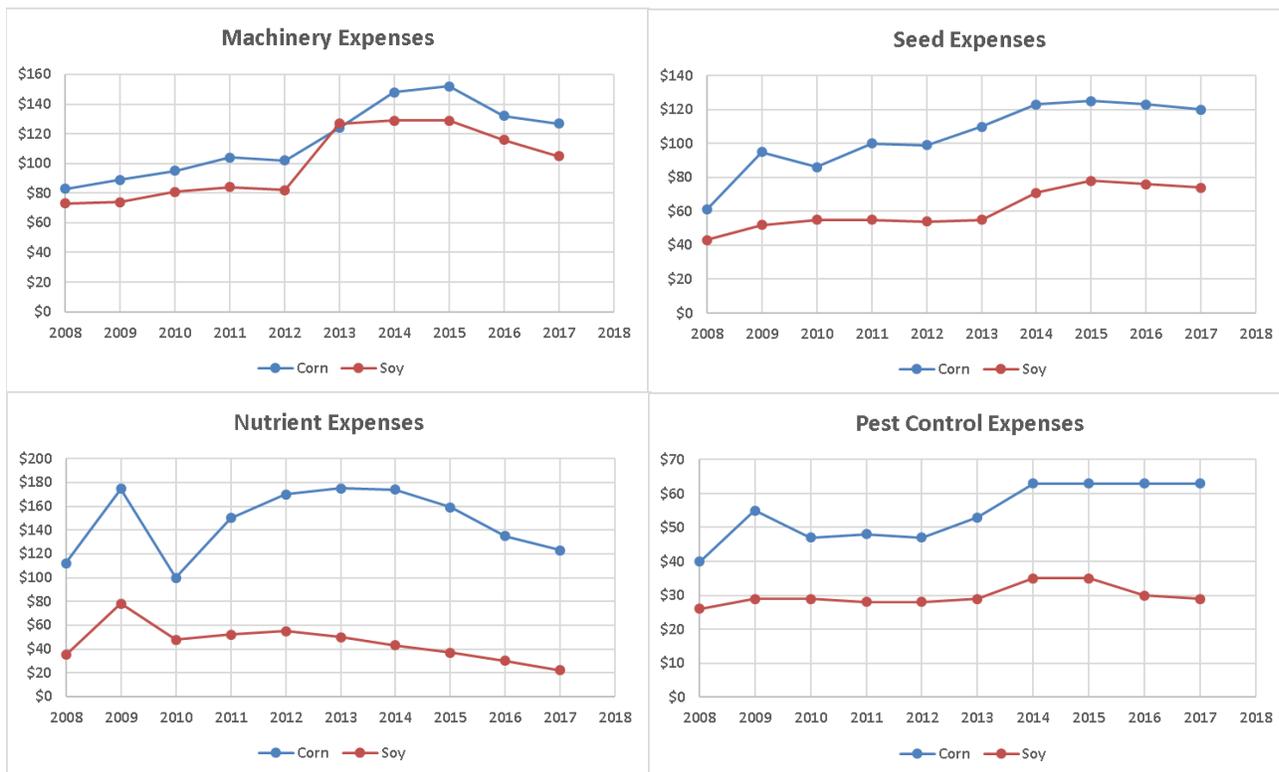
Source: [https://www.nass.usda.gov/Surveys/Guide to NASS Surveys/Cash Rents by County/](https://www.nass.usda.gov/Surveys/Guide%20to%20NASS%20Surveys/Cash%20Rents%20by%20County/)

The four charts on the next page show the trends in projected farm expenses for machinery, seed, nutrients and pest control in Northern Illinois over the last decade based on the FarmDOC program at the University of Illinois.¹⁴ Note that these are projected expenditures, with changes occurring not only due to input price changes, but also due to changing the amount of each input used. Compared to 2016, projected machinery expenses in 2017 declined for the second year in a row, by almost 4% for corn and by more than 9% for soybeans. This decline is not only due to farmers reducing machinery spending and the average number of machinery operations per acre, but also due to declining fuel prices and lower depreciation costs due to more farmers using older machinery. Projected seed expenditures also declined for the second consecutive year, but only slightly each year, about 2.5% compared to 2016. In general, farmers will not be able to reduce seed costs substantially in 2017, as seed companies are also under tremendous fiscal pressure (viz., the mergers of Dow-DuPont; and the purchases of Monsanto by Bayer, and Syngenta by ChemChina). Furthermore, most farmers are not willing to lose access to the best genetics. Projected nutrient expenses decreased substantially in 2017, a 9% decrease for corn and more than a 25% decrease for soybeans, mostly due to continued reductions in fertilizer prices over the last few years.¹⁵ Pest control expenses have remained largely unchanged over the last few years. Chemical prices have not declined due to fiscal pressure on chemical companies, plus problems

¹⁴ http://www.farmdoc.illinois.edu/manage/2017_crop_budgets.pdf

¹⁵ <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1002>

with herbicide resistant weeds have continued to spread, including to Wisconsin, raising herbicide costs for many farmers.

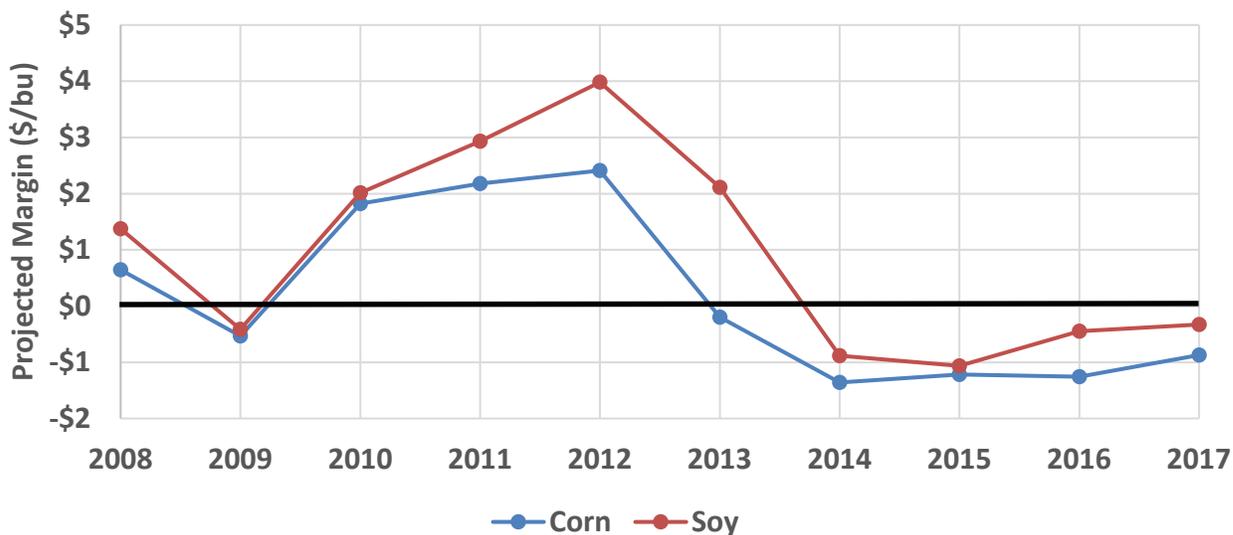


Based on expected yields and these costs, the projected break even prices as \$/bu can be calculated by dividing the total cost (\$/A) by the projected yield (bu/A). Using an average rent of \$258/A (20% higher than the average NASS rent for the Northern Illinois crop reporting districts in 2016 to reflect use of prime cropland), the total cost is \$839/A for corn and \$575/A for soybeans. Expected yields are 192 bu/A for corn and 61 bu/A for soybeans, giving break even prices of \$4.37/bu for corn and \$9.43/bu for soybeans. Note that these are the expected break even prices in the late fall of 2016 using these projected yields, not the actual farm yields. Wisconsin costs will be about the same or slightly higher – expected yields are lower, but rents are as well. Also, machinery costs tend to be higher in Wisconsin compared to Illinois because equipment is smaller on average due to smaller average field sizes. However, fertilizer spending tends to be lower as well, due to the availability of dairy manure for many farmers, plus costs for drying, hauling and storing grain will be lower due to lower yields. Reducing the rent by \$60/A to \$198/A and using a projected corn yield of 175 bu/A and a projected soybean yield of 54 bu/A to reflect Wisconsin conditions for high quality land gives a break-even price of \$4.45 for corn and \$9.54/bu for soybeans.

Data show that costs vary greatly among farmers and the break-even price is sensitive to changes in rental rates and projected yields. In 2017, break-even prices for most Wisconsin farmers are likely in the range of \$4.20 to \$4.60 per bushel for corn and \$9.20 to \$9.60 per bushel for soybeans. Those paying relatively high rents will have higher break-even prices and those with lower-cost management systems will have lower break-even prices. However, tremendous variation exists in farmer costs and so farmers are strongly encouraged to estimate their own

costs of production and their own break-even prices,¹⁶ as these estimates here are broad averages, not intended for individual farmer decision-making.

The figure below shows the projected margins for Northern Illinois farmers over the last decade. Note that these are projected margins in the late fall before planting the crop the following spring, using expected farm-level prices and projected costs and yields, not actual farm prices and actual farm yields. The projected margins for both crops are negative, $-\$0.87/\text{bu}$ for corn and $-\$0.33/\text{bu}$ for soybean using a farm level price of $\$3.50/\text{bu}$ for corn and $\$9.10/\text{bu}$ for soybeans. Note that these cost estimates are the “full” cost of production, including opportunity costs for land and unpaid labor and management, as well as depreciation and general farm overhead costs. Given current soybean futures prices on the Chicago Mercantile Exchange, it is possible that some farmers could earn a small positive margin by forward contracting some of their crop at local futures prices, but for corn, this possibility is unlikely unless markets change. Because these negative margins are based on the “full” cost of production, the implication for those farmers earning negative margins is that they will earn a less than fair return on their labor, management, and assets and may need to use some equity to maintain an adequate household income.



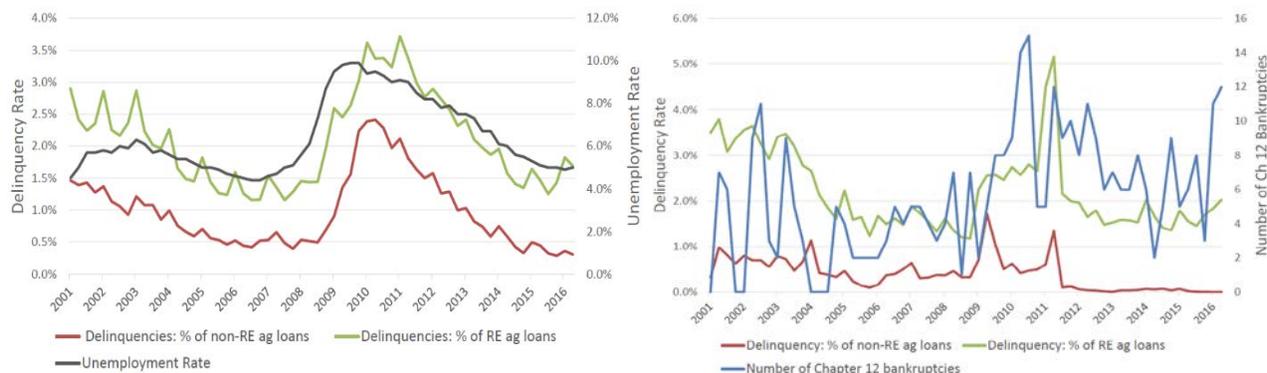
Discussion

The overall outlook for 2017 is better margins for dairy than in 2016, but strongly negative margins for corn and tight margins for soybeans depending on the rental rate and other costs. Overall, many Wisconsin farmers are expecting negative margins for 2017, with projected farm income about the same as for 2016. Discussion with various agricultural professionals in the state indicates a fair amount of financial stress in the state among farmers, with a slightly more positive outlook for dairy giving some hope for relief. More broadly in US agriculture, with declining land values in most of the Midwest and continued projections for negative margins and flat net farm income for three or more years,¹⁷ the question remains, how long can this go on?

¹⁶ http://fyi.uwex.edu/fieldcroppathology/files/2017/01/TeamGrainsFactSheet_FINAL.pdf

¹⁷ <https://www.fapri.missouri.edu/wp-content/uploads/2016/10/Report-06-16.pdf>

The implications of this continued downturn in farm income was the theme for the annual agricultural conference hosted by the Federal Reserve Bank of Chicago in late November 2016.¹⁸ Most of the presentations are available online and from these, a few key figures illustrate points of interest for Wisconsin.



Sarah Tulman, USDA-ERS: <https://www.chicagofed.org/~media/others/events/2016/agriculture-conference/tulman-112916-pdf.pdf>

The chart on the left shows the national unemployment rate and delinquency rates on real estate (RE) loans and non-real estate (non-RE) (operating) loans for US agriculture. The key to note is that the unemployment rate spiked at the onset of the Great Recession and led the spike in farm loan delinquencies by 1-2 years. The previous charts of net farm income and crop margins shows that net farm income and crop margins were quite good in 2010-2012, yet farm loan delinquency rates were spiking. An interpretation is that many smaller farms were relying on off-farm income to subsidize their agricultural operations and when unemployment reduced this off-farm income for some of these operations, loan delinquency became a problem. The chart on the right shows delinquency rates on real estate loans and non-real estate (operating) loans in Wisconsin, as well as the number of Chapter 12 bankruptcy filings. The point to note is that the loan delinquency spike happened in Wisconsin in 2011-2012, at about the same time as nationally, and that the delinquency rate on agricultural operating loans in Wisconsin has essentially fallen to zero since 2012. An interpretation is that agricultural lenders in Wisconsin have not been providing operating loans unless they see a viable plan to pay the loan back.

The last figure is from the same conference.¹⁹ The vertical blue bars report the percentage increase in the demand for agricultural loans relative to that quarter in the previous year and the light blue dots report the US net farm income and its projected value for 2017-2019. The positive blue bars indicate that nationally, demand for agricultural loans has been increasing year over year since late in 2012, implying a growing debt to asset ratio, just as farm income began to fall. In general, it seems that more and more farms have used their working capital reserves and hence increased their demand for agricultural loans as farm income has fallen. Continued negative margins and flat net farm income projected for the next three or more years, combined with falling land values, imply that this trend cannot continue.

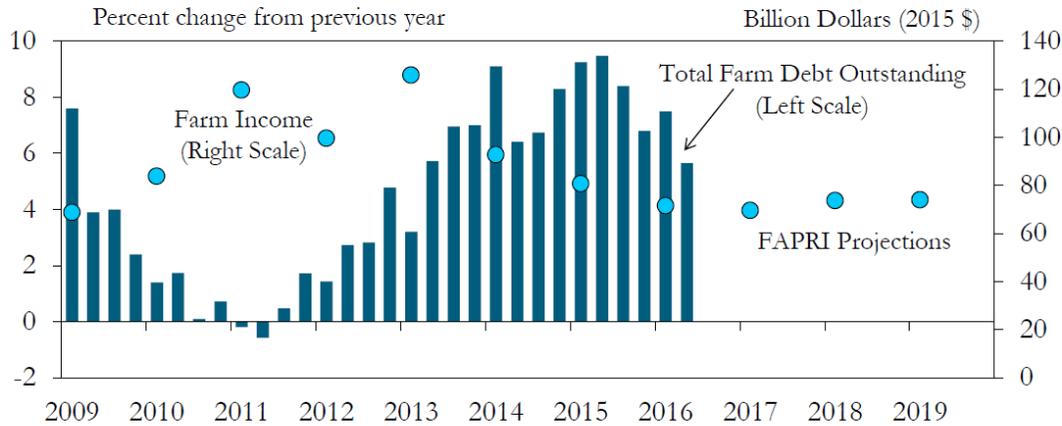
Currently it seems that although farmers are financially stressed by low farm income and negative margins, they have thus far been managing the issue, with loan delinquency rates

¹⁸ <https://www.chicagofed.org/events/2016/ag-conference>

¹⁹ Nathan Kaufman: <https://www.chicagofed.org/~media/others/events/2016/agriculture-conference/kauffmann-112916-pdf.pdf>

remaining low nationally. In 2017, loan delinquency rates will likely increase somewhat, but not at a rapid rate. However, longer-term, these trends cannot continue. With two or three more years of negative or low margins and declining land values, a crisis will likely develop, beginning on the Great Plains where land values have been falling most rapidly. Wisconsin farmers seem to be somewhat insulated from these trends, with land values holding steady and loan delinquencies remaining low, likely due to the strength of the dairy industry, however, the situation bears close watching.

U.S. Farm Debt at Commercial Banks and Farm Income



Sources: Federal Reserve Bank of Kansas City, USDA and University of Missouri FAPRI

FEDERAL RESERVE BANK OF KANSAS CITY



Source: Nathan Kaufman: <https://www.chicagofed.org/~media/others/events/2016/agriculture-conference/kauffmann-112916-pdf.pdf>

Condensed Situation and Outlook for Dairy: 2016-2017

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Domestic Demand for Dairy Products

The U.S. dairy industry has had a number of high-impact trends over the last several decades. One of these has been the increase in per capita consumption of major product categories such as cheese, yogurt and more recently, butter. Both cheese and butter consumption was up about 8 percent per capita in 2016 and we anticipate continued growth in the year ahead. Cheese consumption hit a milestone at more than 35 pounds per capita—more than double what we were eating four decades ago. We should have opportunity for continued growth, based on the fact that cheese consumption is more than 50 pounds per capita in countries like France and Germany.

Not all consumption numbers have been positive. Fluid milk consumption has been on a downward trend for as long as cheese has been going up. Per capita consumption is today one third less than it was 40 years ago. Consumption of ice cream and frozen products has also declined.

On an all-products basis, per capita consumption of milk has been increasing at a rate of about 2 pounds per person per year in the U.S. We are also adding almost 3 million people to the U.S. population every year. Combining population and per capita consumption growth, we will need about an extra 2.5 billion pounds of milk to satisfy domestic demand growth in 2017.

U.S. unemployment rate is below 5 percent and at levels that are considered to be full employment. And, in the last quarter of 2016 we have begun to see wage growth again. There are in fact very few statistics that suggest anything but steady growth in the U.S. economy. This will support continued growth in the domestic sale of dairy products in 2017.

Domestic Supply Factors

Another high-impact trend in the dairy industry is the growth in productivity as measured by milk produced per cow. Milk per cow for many years has exhibited a nearly linear trend of about 284 pounds of increased milk per cow per year. Given this growth in productivity, the math would suggest that we only need the milk from a few more than 8 million cows to satisfy our current domestic needs. However, we have more than 9.3 million cows in the U.S. herd. The rest of the sales are a result of export demand.

Exports have become important to the growth of the U.S. industry since about 2004. While exports have supported growth, the last 5 downturns in milk prices have been accompanied by declines in export sales. The relative success of the domestic dairy industry is related to what is happening in other countries—not only the demand for dairy products from importing countries, but also the competition for sales from other exporting nations.

Dairy farms react to changes in farm profitability. High profits are the signal from customers that the market wants more milk. The additional profit provides not only the message but also the wherewithal to produce more milk. Low profits are just the reverse. As margins contracted from the highs of 2014, milk production growth has also declined, but we saw an increase in growth in the last half of 2016.

Although milk prices are well off their peak in 2014, feed costs are also well below their high-water mark in 2012-13. As farm profit has begun to improve, farms are cautiously responding with greater milk production. The 2016 year began with very modest increases in milk production but it ended with the U.S. milk supply up about 2.5 percent above year earlier levels in the last two months. I expect continued higher-than-average growth in milk production throughout 2017 but probably no more than the 2.5-3.0 percent levels.

World Supply of Milk

The only way that our domestic milk supplies can continue to grow at this rate is because the rest of the milk exporting countries of the world are producing less than they did in the previous year. While U.S. All Milk Prices have been depressed in the \$16-17 range in 2016, the largest exporter—the European Union—has had prices in the \$13-14 range and the next largest exporter—New Zealand—has had prices in the \$10-12 range. These very low prices have caused producers in those countries to contract milk production. Australia and Argentina, two additional exporters, have also contracted milk production even more significantly.

The farm milk price difference between the U.S., the EU and New Zealand has been much larger than is typical. Normally, arbitrage would cause dairy product buyers to look for less expensive sources of supply and drive the prices closer together. U.S. exports have declined significantly during 2015-16 but our relatively robust economy has absorbed most of those products into domestic consumption and somewhat higher stocks of cheese and butter. The EU prices were supported at a higher than New Zealand because the EU intervention policy purchased large volumes of skim milk powder and paid for private storage costs of dairy products. The EU also implemented a temporary program to directly pay farmers for milk that they did not produce. New Zealand simply let the milk price fall to market clearing levels.

By June of 2016, milk production from the major exporting countries was below year earlier levels and continued to decline through the remainder of the year. In fact, the U.S. is the only significant exporter with growth in milk production. This contraction in the world supply is helping to pull down on stocks of dairy products and has encouraged prices to rise. The Global Dairy Trade Index has shown improvement for the last three quarters of 2016 and should continue on into 2017.

Implications for U.S. Milk Price in 2017

The major exporting countries of the southern hemisphere (New Zealand, Australia, Argentina, Uruguay) are primarily grazing dairies with seasonal calving. Their production decisions are largely locked in until the next milk production year, which will not begin until July-August of 2017.

The exporting countries of the European Union are not homogeneous with regard to their production practices, but many of the major exporters (Germany, Netherlands, France and Ireland) also have reasons holding back their supply response in light of improved milk prices.

The Netherlands has implemented restrictions on phosphate application that could lead to culling their dairy herd by 100,000-170,000 cows. Some producers in other countries began breeding dairy cows to beef bulls in their search for better profits. This practice will have a ripple effect on replacement animals for a few years. All-in-all, I don't expect world milk production to respond rapidly to improved prices but it will respond in time.

The U.S. is in a good position with increasing production to re-capture some of the export market share that was lost over the last two years. We may even be able to increase our customer base. I am forecasting the U.S. All Milk Price to increase from \$2.00-2.50 in 2017. I expect the trajectory of the price change to be steady through the first half to maybe the first three quarters of the year. After that, it will significantly depend on what the rest of the world does in response to the improved price.

I am forecasting that the milk powder that the EU has purchased during intervention will begin to come back on the market having a dampening effect on the price recovery. However, if world stocks of dairy products begin to feel tight, buyers could begin to panic-purchase product pushing prices even higher than I am forecasting. In any case, 2017 will be a much better year for dairy producers around the globe.

Dairy Highlights

- Domestic sales of dairy products have been very good in 2016.
- Cheese consumption exceeded 35 pounds per capita
- U.S. exports of dairy products have declined significantly over the last two years
- World prices for dairy products have improved to the point where U.S. prices are again competitive in export markets for cheese and butter sales
- Skim milk powder, whey and lactose prices remained competitive over the last two years but at low levels
- Major export competitors (the European Union, New Zealand, Australia, Argentina) have contracted milk supplies while the U.S. has increased
- Farm milk prices are forecast to improve by \$2.00-2.50 in 2017 when compared to 2016 averages
- It is difficult to gauge the impact of the Intervention stocks of skim milk powder held by the European Union. The world markets may absorb them with little impact, but if world stocks begin to feel tight, prices could move significantly higher by the end of 2017.
- Wisconsin will achieve its goal of 30 billion pounds of milk production next year—well before the year 2020.

Corn and Soybean Situation and Outlook: 2016 - 2017

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Corn and soybean prices weakened considerably in 2016 from the record levels seen from 2010 to 2013. While 2016 halted a declining trend in both corn and soybean prices, this was due to a crop shortfall in South America. Large world stocks for corn and soybeans are building as massive crops are realized in this marketing year. The expectation of large production levels across the globe is building ending stocks in both the U.S. and the world. Continued price weakness should be expected without a production shortfall in one of the world's major producers. The following is an analysis of 2017 price prospects given a decent growing season.

Corn

Corn prices are currently suffering from the large stocks generated by four consecutive big crops in the U.S. Corn exports were strong through the latter half of 2016 due to a poor corn crop in South America, but export demand may weaken in the second half of the marketing year if corn production in South America meets current projections. Domestic corn demand growth is slow with some positive development occurring in ethanol production and potential higher feed use than in 2015-16. Ethanol production is running 2-3% above last year as gasoline demand maintains strength and lower corn prices improve ethanol crush margins. Strong ethanol production is also helped by the growth in ethanol exports due to high sugar prices in Brazil. The potential exists to surpass the estimated 5.325 billion bushels of corn for ethanol use in the 2016-17 marketing year. Livestock production expanded significantly in 2016 and may bode well for feed use. Strong wheat feed substitution and DDGS (distiller's dried grains with solubles) availability may put a damper on feed use numbers.

Projected ending stocks of 2.355 billion bushels for the 2016-17 marketing year are the highest since 1987-88. This ending stock increase is an enormous increase from the low of 820 million bushels in the 2012-13 marketing year and a substantial bump from the 1.74 billion bushels estimated ending stock in 2015-16. The 2016-17 marketing year provides little support at this point for higher prices barring a crop shortfall in South America. Conversely, the possibility of weakening prices is low as well with significant support from ethanol production and export markets.

Planted corn acreage in the U.S. for 2017 is expected to decline. This decline is driven by higher soybean prices relative to corn and lower costs of production for soybean acres. A 3.5 million-acre reduction combined with a 169 bushel per acre trend yield would result in a 2017 crop more than a billion bushels smaller than in 2016. This reduction in production would result in smaller and more manageable ending stocks for the 2017-18 marketing year.

If world production and domestic demand unfold as expected, corn prices will average near \$3.34 per bushel during the current marketing year and be near \$3.65 during the 2017-18 marketing year.

Soybeans

Soybean prices remain relatively high in comparison to corn prices despite three consecutive years of large U.S. crops. The shortage in South American production in 2016 helped to maintain U.S. export levels at a record pace through the first four months of the 2016-17 marketing year. Chinese soybean imports have been impressive thus far. U.S. ending stocks for soybeans grew over the last three years from a low of 92 million bushels in 2013-14. The large crop in 2016 pushed ending stocks to 420 million bushels.

South American production and Chinese imports are shaping up to be key drivers for the 2016-17 marketing year soybean price outlook. Soybean crush is strong thus far in the marketing year, and the possibility of larger biodiesel production resulting from RFS (renewable fuel standard) mandates has the potential to support prices moving forward. The 2017-18 marketing year is dependent on acreage allocations to soybeans. Soybean planted acreage is expected to increase substantially in 2017 due to lower corn and wheat prices and the lower cost of producing soybeans relative to corn.

Recent soybean yields make it difficult to predict possible yield potential in 2017. Three consecutive years of yield substantially above the long-term linear trend calls into question whether the trend model remains accurate. Using a trend yield of 48 bushels per acre with 4.0 million more planted acres would result in a 2017 crop approximately 140 million bushels smaller than the 2016 crop. Despite the smaller crop, 2017-18 ending stocks could still increase even with strong demand potential in export markets and domestic crush levels. The potential for demand growth in export markets is present, but requires negative developments in South American soybean production. Prices are expected to average around \$9.40 during the current marketing year and near \$8.90 during the 2017-18 marketing year if world production unfolds as expected during 2017.

Todd Hubbs' weekly analysis of the commodity market outlook is available online at <http://farmdocdaily.illinois.edu/>

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