A Bonnefield Research Paper

Farmland and Commodity Prices

lessons from the 1980s farm crisis

Marcus Mitchell and Tom Eisenhauer
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Table of Contents

Will falling commodity prices change the farmland investment thesis?

Canadian farmland prices appreciated significantly over the past decade, driven by increased profits in the crop-farming sector. Growing worldwide food demand, combined with supply disruptions, raised crop prices well above levels experienced in the preceding two decades. Crop prices spiked further during the 2012 season driven by drought that severely impaired crop yields in the US and in other major farming regions, resulting in record prices for most major commodity crops in nominal terms. The 2013 crop year has seen a rebound in yields for many major commodity crops, helping worldwide inventories to recover somewhat from record lows. As a result, crop prices have fallen below their 2012 peaks, despite the fact that they remain high by historic standards.

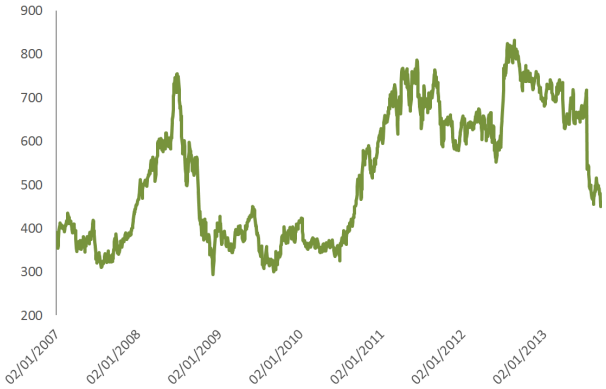
For many farmland investors, volatility in agricultural commodities has raised uncertainty regarding the continued profitability of farming and the implications for farmland values. Have farmland prices risen to unsustainable levels? Are we likely to see a repeat of the farmland price bust that occurred in the early 1980s? Are we facing a farmland price bubble?

This paper addresses these questions, firstly from the farmer's perspective, by examining the extent to which commodity prices determine overall farm profitability and how farmers mitigate commodity price risk. Secondly, it examines key financial metrics that prevailed during the 1980s farm crisis and compares those same metrics with current conditions.

A farm operator perspective

Agricultural commodity prices are prone to volatility. The supply side of the agricultural market is inflexible and is subject to shocks from extreme weather events, while the demand side is characterized by inelasticity and growing demand due to increasing global population and increasing wealth in developing nations. When stores of agricultural commodities are low, as they have been for much of the last decade, this demand inelasticity results in rapid price adjustments in commodity crops as supply conditions vary from season to season. This situation has characterized global commodity markets in recent years and has led to unprecedented price volatility as seen in the following chart of corn prices since 2007 (see Figure 1).

Figure 1: Front month CBOT corn front month futures price - Jan 2007- Aug 2013.



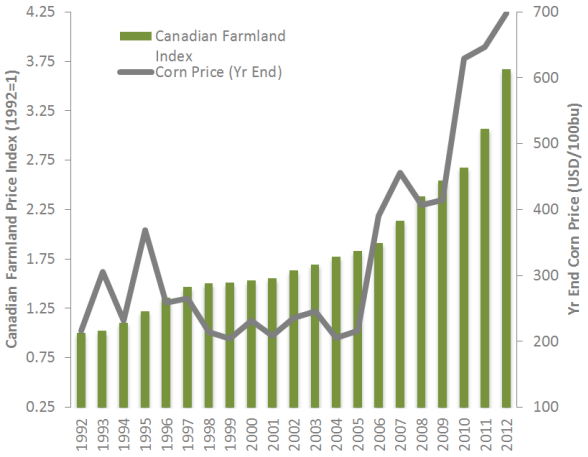
Source: CBOT, Open Financial Data Project

While commodity futures prices reflect expectations for future crop prices, they do not necessarily reflect prices actually received by a farmer. Many farmers forward sell a considerable portion of their production prior to harvest, a strategy that allows farmers to lock in prices to ensure a base level of profitability sufficient to allow them to cover input costs. Farmers with adequate storage also tend to hold some of their inventory after harvest with the expectation that they can receive a better cash price when supplies begin to tighten after the initial glut during and immediately following harvest. In addition, many specialty crop farmers have production contracts negotiated with their customers, which provide substantial insulation from rapidly changing commodity markets. Prices quoted in futures markets, therefore, are typically more volatile than the prices a farmer receives for his harvest.

Canada's farmland is overwhelmingly owned by farmers with only a small proportion held by investors. And farmers do not typically respond to decreases in commodity prices by selling their land unless financial pressures, such as over-leveraging, force them to do so. As a result farmland prices are what economists call "sticky", that is, they tend not to fall in line with declines in commodity prices. This price stickiness is evident in the following chart that compares a Canadian farmland price index with corn futures prices over

the past 20 years. In the decade from 1995 until 2005, corn prices experienced a sustained decline, yet farmland prices continued to appreciate modestly over this period. A less prolonged decline in corn prices in the 2007 to 2009 period experienced a similar pattern (Figure 2).

Figure 2: Corn Futures Prices and Canadian Farmland Value 1990 - 2012.



Source: CBOT, Open Financial Data Project, Farm Credit Canada – Farmland Values Report

Recent changes in commodity prices related to crop production

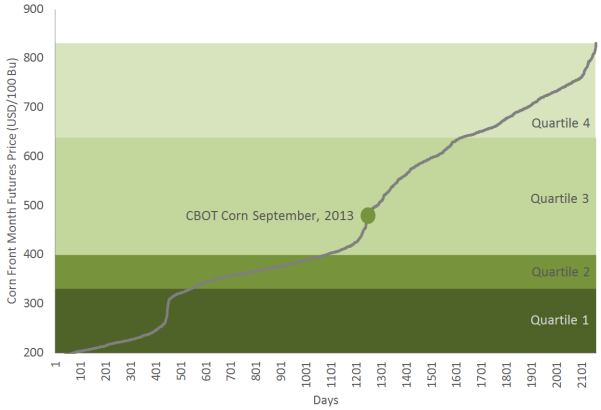
After several years of rising commodity prices, prices for many crops have fallen in 2013. As at September 1, 2013 primary commodity crops produced by Canadian farmers have seen the following changes in futures prices since August 2012:

Corn	-40%
Soybeans	-25%
Canola Oil	-19%
Wheat	-30%
Fertilizer Index	-25%

Source: CBOT, Open Financial Data Project, International Monetary Fund, World Bank

The absolute change in these prices is clearly significant, however, these changes are from record high prices experienced in 2012 and current levels are still high by historical standards. An abundant 2013 crop season may curb the severe scarcity of agricultural commodities, however, stockpiles remain tight and commodity prices remain high by historical standards. Current corn prices, which have seen the most price volatility among cash crops, are still well within the third quartile of daily prices seen since 2005 (See Figure 3).

Figure 3: Ranked Daily Front Month Corn Future Prices January 3, 2005- September 1, 2013.



Source: CBOT, Open Financial Data Project

The impact of lower prices in 2013 have been mitigated somewhat by strong crop yields in many parts of Canada. This has been especially true in Saskatchewan and Ontario. Another bright spot for farmers has been the reduction in prices for some important inputs. The breakup of the Belarusian Potash Company (BPC), one of the largest global potash exporters, in late July 2013 has substantially reduced the price of potash-based fertilizers. Falling natural gas prices in recent years, stemming from the growth of shale gas production, have also contributed to lower costs for nitrogen-based fertilizers. Unlike cash crop prices, the downward adjustment in fertilizer costs are likely to be sustained for the foreseeable future as the world's largest potash producer moves to a pricing model based on production volume and the shale gas boom continues. The reduction in these important elements of crop production costs should help to further insulate farm profits from volatile commodity prices.

Farm profitability and land value

As discussed in a previous Bonnefield research paper *("Factors that Drive Canadian Farmland Prices", September 2011)* farmland value is driven primarily by expectations of the future earning power of the land. Farmers do not appear to base their purchase decision on the current prices for crops observed in the market, but rather on the expected cash flows to be received over the life of the investment. A prudent farmer or farmland investor would not base their farmland decision on the absolute high crop prices seen in the 2012

crop year, nor on crop prices well below those realized over the past five years. A prudent investor using conservative estimates of prices moving forward is unlikely to have significantly altered their expectations for the future based on the very different conditions that prevailed in either the 2012 or 2013 seasons, but rather on an average of conditions likely to prevail over the next 10 years or longer.

Higher yields and continued competition for land

As outlined above, despite lower cash crop prices in 2013 Canadian farmers are still projected to have a profitable growing season because of strong crop yields. As prices have fallen, output has increased. This is particularly true for farmers who hedged at least part of their price risk before the recent drop in commodity prices.

As a result, farmers remain bullish on their long-term prospects for profitability as the secular drivers of demand for agricultural commodities have not changed: global population continues to grow, developing nation diets continue to change to demand more protein, and renewable fuel mandates continue to consume a considerable proportion on annual grain production. Operators who are committed to growing their business recognize these long-term trends will benefit producers who are well positioned to take advantage of future supply shocks by selling into higher price environments. Between crop producers the primary means of competition remains access to land. This has resulted in well-capitalized famers over the past five years reinvesting their profits into their land base. These factors have created very tight markets for farmland, particularly in areas with high concentrations of farmers competing for land. Despite lower crop prices, the 2013 crop season appears set to produce another profitable year for farmers, so it remains highly likely that farmers will continue to compete for land, though they may do so more cautiously given lower crop price projections relative to those seen in 2012.

Local market hotspots

Like any real estate market, there are local markets where price appreciation appears to have exceeded the economic value of the underlying farmland. On balance, Bonnefield believes that the majority of Canadian farmland remains reasonably valued relative to its earning power even assuming current market prices, which are considerably weaker than the previous growing season. There are clearly some local farmland markets in Canada where it appears that farmers have not made their land investments based on reasonable projected future earnings. Land market hotspots, such as pockets of South Western Ontario, have seen cropland trade recently at prices that can only be supported under the assumption that 2012 prices are likely to continue over the course of the investment period. Are these farmers being irrational or are there other factors influencing their purchase decisions?

Impact of supply management and non-agricultural factors

The high prices being paid by farmers for farmland in some local markets do not appear to be justified solely by the underlying economic fundamentals of the land. Such prices, however, do not necessarily indicate that farmers are over paying for land. Rather, it seems that farmers in certain areas sometimes place additional value on attributes of the land that may be unique to their individual business or to the specific location of the land in question.

Some regions in South Western Ontario, for example, have significant concentrations of supply managed agriculture such as dairy operations. It appears that high concentrations of supply managed farm operations tend to drive up the value of farmland in these areas because these operations are typically highly profitable and well capitalized. Some of the value associated with the underlying supply management quota seems to be capitalized in local farmland values. Supply managed operations often have a requirement to manage the animal waste produced from their livestock by spreading it over a minimum area of land. Land in close proximity to a supply managed dairy operation often trades at a premium due to its value in manure management requirements. As a result, a supply-managed farmer may be willing to pay significantly more for farmland in close proximity to his existing operations rather than pay less for equally productive land located elsewhere. While such practices are difficult for third-party investors to account for, local supply managed

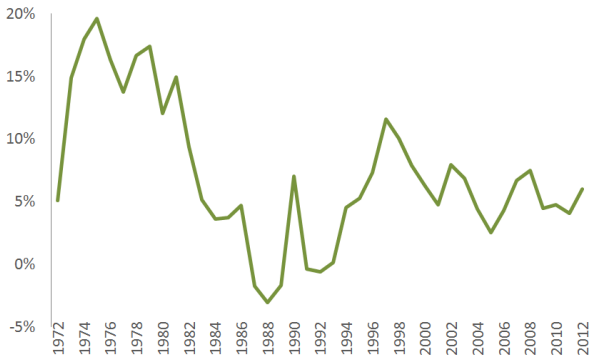
farmers may well be acting rationally by taking such factors into account when determining the price they are willing to pay for farmland.

In addition to the influence of supply management, there are other considerations that may lead farmers to pay a higher price for land than an objective, prudent investor would. For example, property immediately adjacent to a farmer's existing operation will often fetch a premium price because the combined operation may gain significant operational synergies that a third-party investor would not realize. Farmland that may have alternative future uses, such as residential development or wind power, oil and gas or mining uses may also drive the prices paid for such lands well above their base agricultural value.

Are we likely to see a repeat of the 1980s farmland bust?

Some observers have compared the appreciation of farmland in the past several years with the rapid appreciation that occurred in the late 1970s and ended with the 1980s crash. Are we heading for another farmland bust? On the face of it, the parallels between the 1970s and the 2000s are concerning, however, there are key differences in today's agriculture industry that mitigate the risk of a collapse in farmland prices like that experienced in the early 1980s. One significant difference between the 1980s period and today has been the primary sources of capital used to fund farmland acquisitions. Between 1973 and 1981 the absolute debt levels in the Canadian agricultural sector increased at a compound annual rate of 15%; debt loads effectively doubled in nine years. Debt levels soared as farmers sought to capitalize on rapid inflation in the 1970s by borrowing to fund real estate which was rapidly gaining value. When interest rates rose dramatically in the early 1980s, many farmers found themselves over leveraged and were forced to sell land at fire sale prices to reduce debt. By comparison, the absolute change in total debt in the agricultural sector between 2006-2012 has averaged closer to 5.5% per annum, a much more conservative pace than in the 1970s. A more conservative debt picture, combined with the significant increase in farm profits in recent years, suggests that in contrast to the 1970s, farm operators are not taking undue financial risk and creditors are showing restraint in their lending practices to the farm sector.

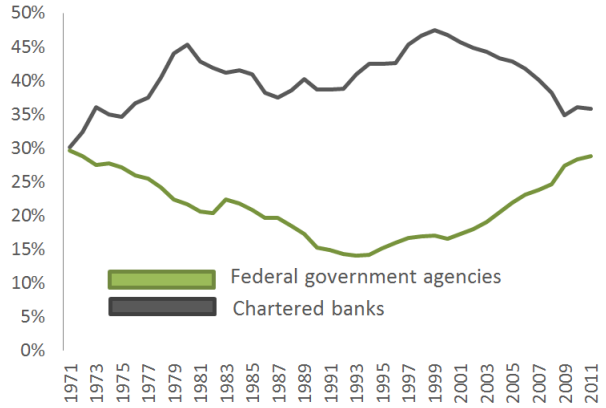
Figure 4: Annual Changes in Total Farm Sector Debt 1972-2012.



Source: Statistics Canada

During the 1970s lenders aggressively increased their credit portfolios in the agricultural sector, which appears to have been the primary driver of farmland values at the time. More recently the reverse has been true. Since 1993, Federal Government agencies in Canada have increasingly provided a larger proportion of the total credit extended to the agricultural sector, suggesting creditors have been conservative in extending credit to the farm sector.

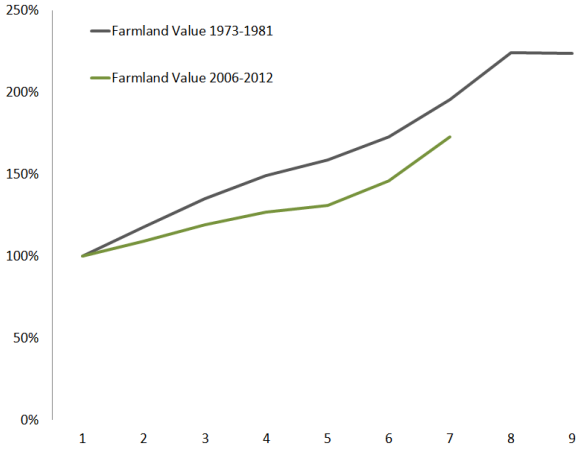
Figure 5: Proportion of Total Farm Sector Debt by Lender 1972-2012.



Source: Statistics Canada

It appears farmland market participants in the 1970s bid farmland prices up more rapidly than has been the case in recent years. Looking at the real rate of change in farmland value, the pace of today's boom lags that of the 1970s (Figure 6).

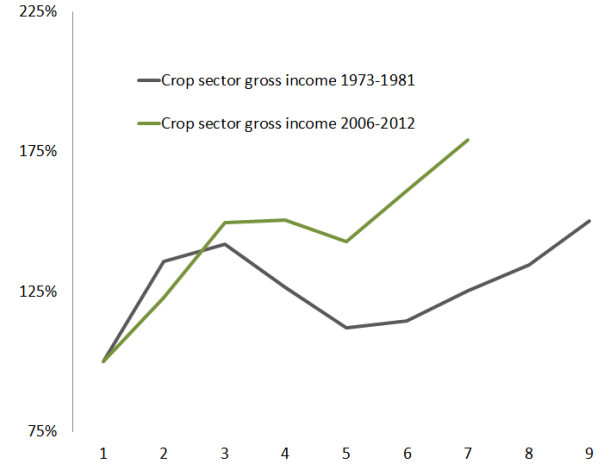
Figure 6: Indexed change in real Canadian farmland total value (2002 constant dollars).



Source: Statistics Canada, Bank of Canada

Despite a faster rate of land value appreciation, real farm profitability during the 1970s increased more slowly than in the period since 2000. Indeed profit growth was largely flat after 1975 in the period leading up to the crash. This has not been the case during the recent boom, where increasing real farm profitability has underpinned increasing land values such that the farmland-price-to-profitability ratio of the primary crop production sector has actually contracted between 2006 and 2012. In contrast, this same ratio saw rapid expansion throughout the 1970s.

Figure 7.1: Indexed change in crop sector real gross income 1973-1981 & 2006-2012 (2002 constant dollars).



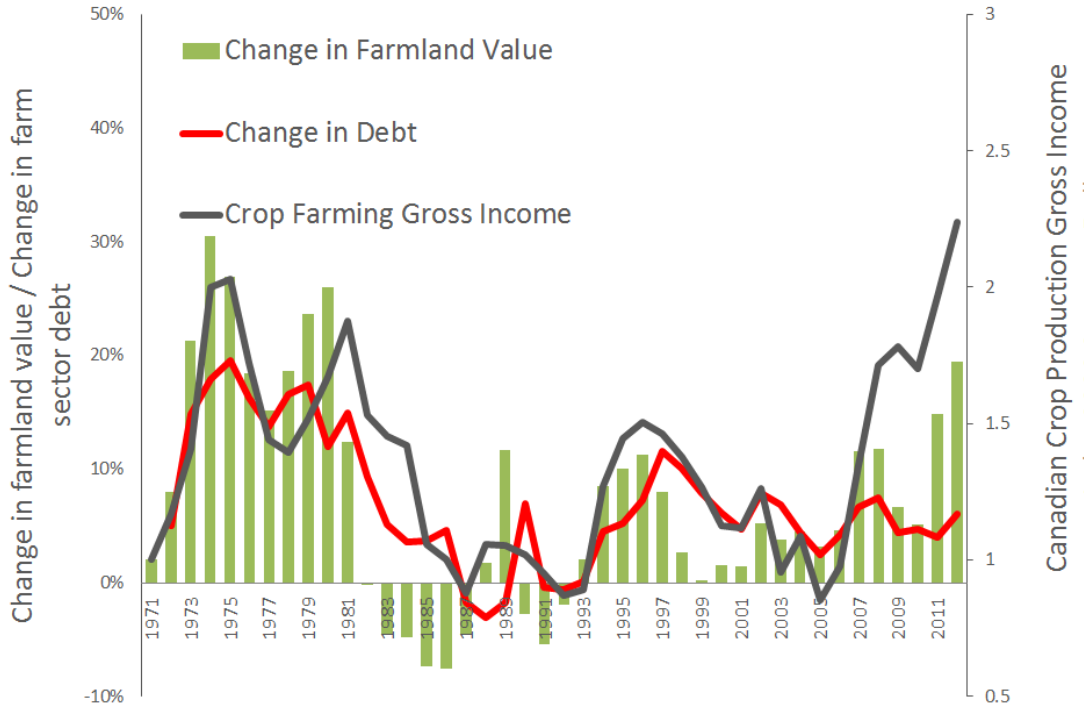
Source: Statistics Canada, Bank of Canada

Figure 7.2:Real farmland value index to real crop sector gross income ratio (2002 constant dollars).

Source: Statistics Canada, Bank of Canada

These fundamental differences suggest that recent appreciation in farmland markets has been driven by rising farm profitability and reinvestment by Canadian crop producers, in contrast to the rise in farmland prices during the 1970s, which was predominantly debt driven. The differing price, income and debt scenarios between the two periods is clearly evident in Figure 8 on the following page.

Figure 8: Changes in Farmland Prices, Debt and Gross Income 1971 - 2012



Reality check: statistical analysis - 1970s vs 2000s

To test the primary conclusion of this paper: that the farmland price increases of the 1970s were driven by debt accumulation, whereas recent farmland prices have been underpinned by rising farm incomes, we undertook a statistical regression analysis. The change in farmland values between 1972 and 2012 was regressed against total change in farm sector debt and the level of real crop sector gross income.

The regression model over the entire period indicates that both the change in debt and the change in gross crop income are statistically significant predictors of the change in farmland values at a 99% significance level. When the study period is trimmed to exclude the early 1980s crash period, the results change dramatically. The regression model for the 1985-2012 period indicates that the real level of gross crop income has continued to be the overwhelming predictor of changes in farmland values since 1985, whereas the change in debt has not been a statistically significant predictor of farmland values. (see Appendix)

These two regression models support the conclusion that gross farm income, not debt, has been the primary driver of farmland appreciation in Canada since the 1980s farm crisis. This analysis suggests that farmland market participants have behaved rationally in recent years, largely relying on profits to reinvest in land rather than taking on excessive debt to finance their acquisitions. Lower rates of debt accumulation in recent years suggest that the Canadian farmland market is in a much more stable financial position that was the case in 1980s.

Conclusion

After seeing record high crop prices during the 2012 season, few are surprised to see a lower price environment in 2013. While prices have fallen due to higher crop yields, those same strong yields suggest Canadian farmers will experience another profitable year in 2013. Despite crop price declines in the current season, prices remain high by historical standards and farmers remain bullish about their prospects for future profitability. Further mitigating lower crop prices, events in the global potash and shale gas industries are contributing to decreased fertilizer input costs going forward.

While lower commodity prices are likely to temper the rate of appreciation in farmland markets, it is unlikely to result in falling farmland prices. In comparing the current farmland market with that of the 1970s and 80s, it is clear that the market in the 1970s and 80s was largely driven by debt accumulation, while today's farmland market appears to be driven by reinvestment of profits.

For farmland investors this analysis suggests that farmers are behaving rationally and that much less debt has been used to capitalize the current farmland market than was the case in the 1970s. The experience of the 1970s and 1980s suggests investors should be wary of rapidly accumulating debt in the farm sector, especially when coupled with falling profitability and rising interest rates. There is little evidence to suggest, however, that current debt levels in the farm sector are reaching dangerous levels or that farm profitability is in danger of declining significantly over a sustained period. Moreover, while interest rates are beginning to increase from their recent historic lows; it is unlikely that rates will climb to the heights witnessed in the high inflationary environment of the 1970s.

Our conclusion is that farmland investors should remain cautious and disciplined in their investment approach, but the investment thesis for farmland remains solid. There is likely to be a cooling of returns after a period of exceptional strength, however, the longer-term investment outlook for Canadian farmland remains bullish.

Appendix – Regression output

REGRESSION SUMMARY OUTPUT - Change in Canadian Farmland Value 1972-2012

Regression Statistics	
Multiple R	0.788
R Square	0.621
Adjusted R Square	0.601
Standard Error	0.062
Observations	41

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0.24081	0.12041	31.07896	0.00000
Residual	38	0.14722	0.00387		
Total	40	0.38803			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.131	0.041	-3.228	0.00257	-0.213	-0.049	-0.213	-0.049
Crop Sector Gross Income	0.109	0.034	3.187	0.00288	0.040	0.178	0.040	0.178
Change in Ag Sector Debt	0.819	0.216	3.796	0.00052	0.382	1.255	0.382	1.255

REGRESSION SUMMARY OUTPUT - Change in Canadian Farmland Value 1985-2012

Regression Statistics	
Multiple R	0.746
R Square	0.556
Adjusted R Square	0.521
Standard Error	0.046
Observations	28

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0.06735	0.03367	15.68387	0.0000386
Residual	25	0.05368	0.00215		
Total	27	0.12102			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.133	0.033	-4.074	0.00041	-0.200	-0.066	-0.200	-0.066
Crop Sector Gross Income	0.143	0.028	5.150	0.00003	0.086	0.200	0.086	0.200
Change in Ag Sector Debt	-0.083	0.275	-0.302	0.76507	-0.650	0.484	-0.650	0.484

About the authors

MARCUS MITCHELL

Marcus Mitchell is Director, Portfolio Operations with Bonnefield Financial. Previously, Marcus was a Research Analyst with Colliers International with a focus on real-estate-related research and analysis.

Marcus holds a B.A. (Gold Medal) with a specialization in Urban Development from the University of Western Ontario. His professional designations include the Ontario Real Estate Association sales license, and has completed Level 2 of the CFA program.

TOM EISENHAUER

Tom Eisenhauer is President of Bonnefield Financial and has over 25 years of finance industry experience. Prior to Bonnefield, Tom was the founder and Managing Partner of Latitude Partners a private equity fund manager. Previously, Tom was Managing Director of TD Securities and a Managing Director of Lancaster Financial.

Tom holds a M.A. Economics from Queen's University with a specialization in natural resource economics. He holds a B.A. (Gold Medal) in Economics and Russian Literature from Dalhousie University. His professional designations include the SME Board Effectiveness Program from the Institute of Corporate Directors and the Rotman School of Management and the PDO from the Canadian Securities Institute.

Bonnefield is Canada's first national farmland management and investment company that protects the integrity of farmland while increasing its long-term value. We work with Canadian farm operators to help them diversify their assets and grow without debt while promoting good farming practices and wise business choices. We provide individuals and institutions with the means to invest in and hold farmland for long-term capital appreciation and income. Bonnefield is headquartered in Ottawa, Canada with offices in Toronto.

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