



## Addressing the Agriculture Efficiency Cycle: It's Time to Drive Down Production Cost Per Unit

### AgriThought

AgriBank provides financial solutions to meet the needs of production agriculture in America's heartland. We feature our research and analysis in AgriBank Insights as part of our AgriThought initiative to help inform the financial decisions among those we serve.

*Through hard work and favorable economic conditions in recent years, crop farmers across America's heartland have generally enjoyed a period of significant financial progress. However, in 2013, prices for key commodities such as corn and soybeans, as well as other key indicators, began to moderate. Net farm income is projected to fall over the next decade. Farm balance sheets, while strong today, are at risk of weakening. Is this the start of a "down cycle" in the crop production sector that could lead to a 1980s-type farm crisis? Not necessarily. Producers who see today's environment as an "agriculture efficiency cycle"—and find ways to drive down cost per unit of production—can position themselves for continued success.*

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### Highlights

- **NET FARM INCOME FALLING.** After the record \$129 billion in 2013, the U.S. Department of Agriculture (USDA) projects aggregate nominal net farm income to decline in 2014 and 2015, reaching a five-year low of \$73.6 billion in 2015. Most of the expected decline can be attributed to lower crop and livestock prices and receipts.
- **FARM BALANCE SHEETS STRONG BUT MODERATING.** The U.S. farm sector debt-to-asset ratio, a measure of overall farm financial health, reached an all-time low of 10.6 percent in 2014 and is projected to increase only slightly to 10.9 percent for 2015—still well below the values that prevailed in the 1980s and 1990s. This compares to the high of over 22 percent during the height of the 1980s farm crisis.
- **AGRICULTURE EFFICIENCY CYCLES REQUIRES COST CUTS.** While strong balance sheets provide a window of opportunity for producers to adjust to changing market conditions, the expected decline in net farm income means producers must bring income and expenses in line. A solution in periods like this is to drive a higher level of efficiency into operations, which can reduce the cost per unit of production.

# Net Farm Income

## *Net farm income projected to decline over next decade*

Following the 1980s farm crisis, American agriculture experienced several decades of rising net farm income. Average aggregate nominal net farm income reached a record \$129 billion in 2013. However, the inevitable downturn in the market cycle has returned, especially in the crops sector, as falling prices and rising expenses are starting to take their toll on income statements.

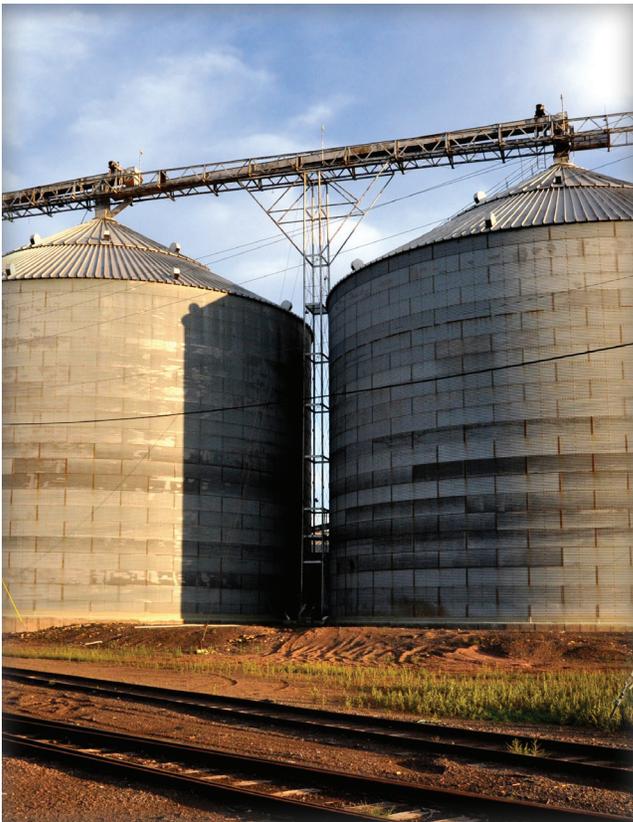
## *2014-2015: Lower crop and livestock receipts, higher cash expenses*

After the record \$129 billion in 2013, the USDA projects aggregate nominal net farm income to decline 16.3 percent in 2014 and 31.8 percent in 2015, reaching a five-year low of \$73.6 billion in 2015. Most of the decline in 2014 can be attributed to sharply lower crop receipts (down \$20.3 billion) and much higher cash expenses (up \$17.6 billion). In 2015, the culprit is much lower cash receipts for both livestock (down \$10.1 billion) and crops (down \$15.6 billion), while cash expenses increase only modestly (up \$1.6 billion).

After increasing \$15.7 billion in 2014, due mainly to much higher feeder livestock and labor expenses, total farm production expenditures are projected

to increase only \$2.2 billion in 2015. Feeder livestock purchases are expected to still be a major contributor (up \$3.5 billion) along with labor expenses (up \$1.4 billion), but these are counterbalanced by sharp declines in petroleum, fuel, and oil (down \$4.6 billion) and fertilizer (down \$1.1 billion). Feed purchases also are expected to decline by \$1.6 billion due to lower crop prices.

Producer capital expenditures are projected to significantly decline in 2015 after declining slightly in 2014. Total capital expenditures, including operator dwellings, are expected to decline by \$3.1 billion in 2015 compared to a \$123 million decline in 2014. This would represent a 7.4 percent one-year decline from 2014 to 2015. A majority of the decline is projected to be absorbed by vehicles and machinery purchases, which are forecast to drop by \$1.8 billion (-6.0 percent) in 2015. Buildings and land improvement expenditures, including operator dwellings, are projected to decline by \$1.3 billion (-11.4 percent) in 2015.



# USDA Aggregate U.S. Farm Income Statement, 2011-2015 Calendar Years

	CALENDAR YEAR (billion \$)					ABSOLUTE CHANGE (billion \$)		PERCENT CHANGE (percent)	
	2011	2012	2013	2014F	2015F	2013/2014F	2014F/2015F	2013/2015F	2015F/2015F
<b>Cash income statement</b>									
a. Cash receipts	\$368.7	\$404.8	\$401.3	\$407.4	\$381.6	\$6.1	\$(25.8)	1.5	(6.3)
Crops 1/	\$204.7	\$236.1	\$218.5	\$198.2	\$182.6	\$(20.3)	\$(15.6)	(9.3)	(7.9)
Livestock	\$163.9	\$168.7	\$182.8	\$209.2	\$199.0	\$26.4	\$(10.1)	14.4	(4.9)
b. Direct Government payments 2/	\$10.4	\$10.6	\$11.0	\$10.8	\$12.4	\$(0.2)	\$1.6	(2.2)	15.0
c. Farm-related income 3/	\$26.1	\$28.5	\$31.5	\$27.3	\$27.3	\$(4.2)	\$0.0	(13.4)	0.0
<b>d. Gross cash income (a+b+c)</b>	<b>\$405.2</b>	<b>\$443.9</b>	<b>\$443.9</b>	<b>\$445.5</b>	<b>\$421.3</b>	<b>\$1.6</b>	<b>\$(24.1)</b>	<b>0.4</b>	<b>(5.4)</b>
e. Cash expenses 4/, 5/	\$277.7	\$306.8	\$312.7	\$330.3	\$332.0	\$17.6	\$1.6	5.6	0.5
<b>f. Net cash income (d-e)</b>	<b>\$127.5</b>	<b>\$137.1</b>	<b>\$131.1</b>	<b>\$115.1</b>	<b>\$89.4</b>	<b>\$(16.0)</b>	<b>\$(25.8)</b>	<b>(12.2)</b>	<b>(22.4)</b>
<b>Farm income statement</b>									
g. Gross cash income (a+b+c)	\$405.2	\$443.9	\$443.9	\$445.5	\$421.3	\$1.6	\$(24.1)	0.4	(5.4)
h. Nonmoney income 6/	\$22.8	\$20.2	\$23.4	\$24.0	\$23.8	\$0.6	\$(0.2)	2.6	(1.0)
i. Value of inventory adjustment	\$(1.7)	\$(19.1)	\$13.7	\$6.4	\$(1.2)	\$(7.3)	\$(7.5)	NA	NA
<b>j. Total gross income (g+h+i)</b>	<b>\$426.3</b>	<b>\$445.0</b>	<b>\$481.0</b>	<b>\$475.9</b>	<b>\$444.0</b>	<b>\$(5.1)</b>	<b>\$(31.9)</b>	<b>(1.1)</b>	<b>(6.7)</b>
k. Total expenses	\$312.5	\$342.4	\$352.0	\$367.9	\$370.4	\$15.9	\$2.5	4.5	0.7
<b>l. Net farm income (j-k)</b>	<b>\$113.8</b>	<b>\$102.5</b>	<b>\$129.0</b>	<b>\$108.0</b>	<b>\$73.6</b>	<b>\$(21.0)</b>	<b>\$(34.4)</b>	<b>(16.3)</b>	<b>(31.8)</b>

1/ Includes CCC loans.

2/ Note: Government payments reflect payments made directly to all recipients in the farm sector, including landlords. The nonoperator landlords' share is offset by its inclusion in rental expenses paid to these landlords and thus is not reflected in net farm income or net cash income.

3/ Income from custom work, machine hire, recreational activities, forest product sales and other farm sources.

4/ Excludes depreciation and prerequisites to hired labor.

5/ Excludes farm households.

6/ Value of home consumption of farm products plus the imputed rental value of operator and hired labor dwellings.

Source: USDA Economic Research Service (ERS) February 2015 Farm Sector Income and Finances Forecast Release, <http://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances.aspx>



After falling by \$247 million in 2014, direct government payments to producers are projected to increase by \$1.6 billion to a total of \$12.4 billion in 2015. Some of these will be delayed 2014 payments under the new Farm Bill. While fixed payments will go from \$4.5 billion to zero in 2015, it is projected that approximately \$6.2 billion in payments under the Price Loss Coverage (PLC) and Agricultural Risk Coverage (ARC) programs will be made in 2015. An additional \$178.4 million in loan deficiency payments and marketing loan gains also are projected for 2015. No payments are projected under the new Dairy Margin Protection Program, as most forecasts do not expect the margin to drop below the \$8.00/cwt maximum coverage threshold.

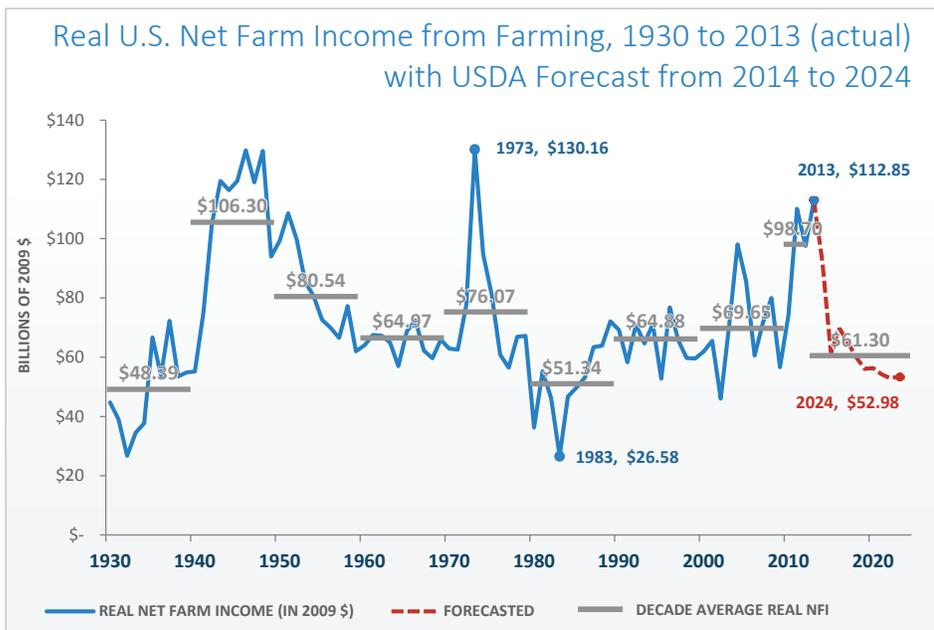
## USDA long-run farm income projections: Back to the 1980s?

The accompanying chart shows real (2009 dollars) U.S. net farm income from 1930 to 2013 and the 10-year USDA forecast. The forecast shows real net farm income falling rather sharply in 2015 (more significant in magnitude than 2006 and 2009) before leveling off at a slightly lower level. In real terms, the forecast shows net farm income continuing to lose ground to inflation over time, averaging \$61.3 billion from 2014 to 2024.

The USDA forecasts reflect the February 2015 financial update release for 2014 and 2015, while the remaining years (2016 through 2024) come from the USDA Agricultural Baseline Projections that were released in early January. This likely explains part of the rather abrupt increase from 2015 to 2016. It is likely that, if revised, the 2016 through 2024 forecasts would be shifted downward to reflect the downgrade in the 2015 revision.

How does the projected average real net farm income, which averages approximately \$61 billion over the next decade, compare to previous time periods? As the chart indicates, the Great Depression/

Dust Bowl decade of the 1930s had the lowest average real net farm income at approximately \$48 billion. The Farm Crisis decade of the 1980s was slightly higher at around \$51 billion, recovering to around \$65 billion in the 1990s. The average forecast of the next decade would land somewhere between the decade averages for the 1980s and 1990s in terms of average real net farm income measured in 2009 dollars.



Source: USDA National Agricultural Research Service and USDA Office of the Chief Economist

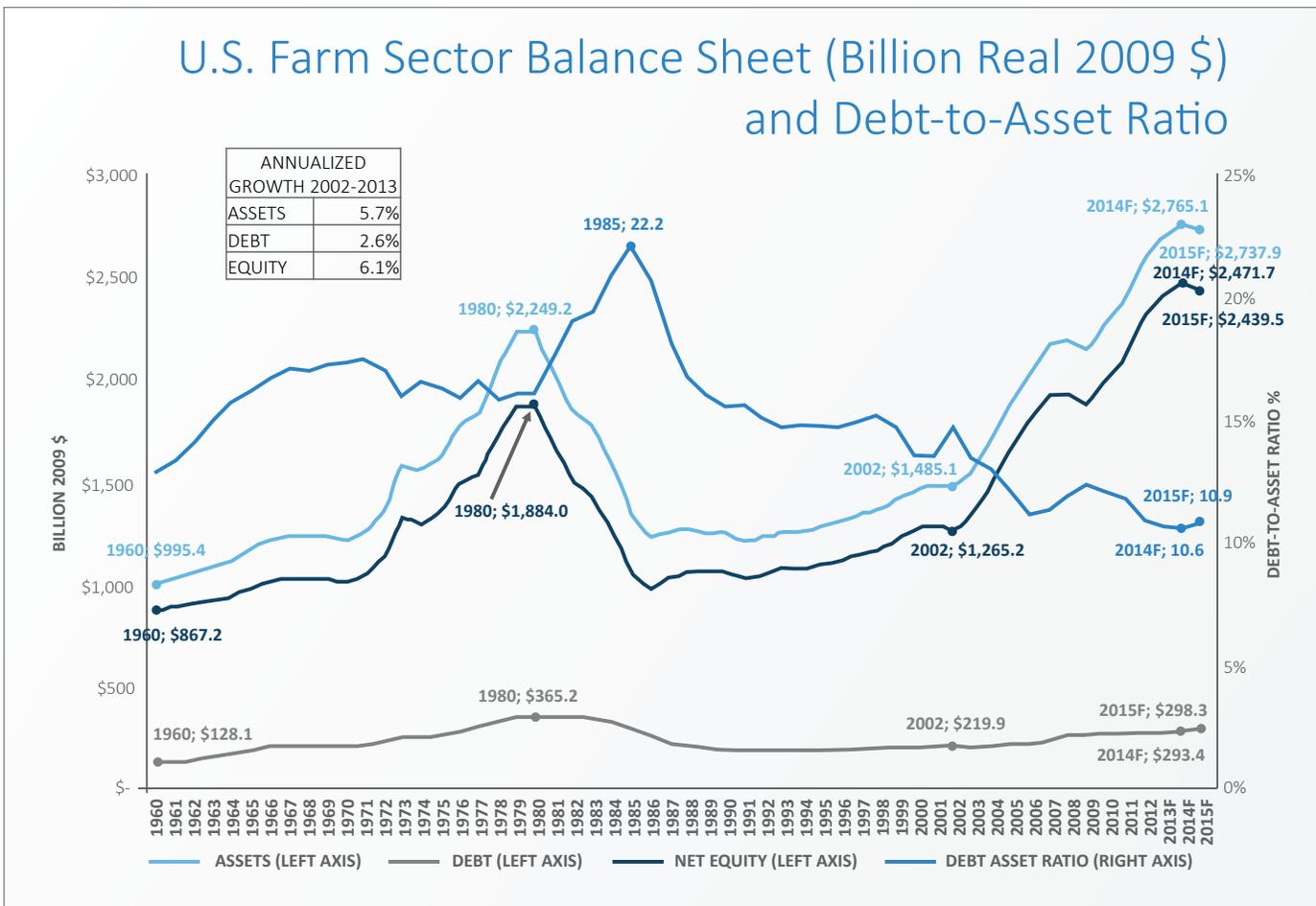
## Beware of forecasts

One word of caution regarding long-run baselines and forecasts in general: It is almost certain that reality will be far different than what is forecast. The baseline forecast merely represents what is expected to happen if everything follows the prevailing trends and the forecast assumptions over the projected time period. These baseline forecasts do not account for any shocks to the system such as weather events, economic trends, technological change, political events, and so forth. They also do not account for changes in producer behavior and practices to operate more efficiently and potentially improve net margins by reducing costs and/or increasing revenues. This may include major changes to the mix of crops they produce.

# Farm Balance Sheets

## Farm balance sheets strongest in a generation

The greatest reason the coming decade is different from the 1980s-1990s may be the overall financial health of the U.S. farm economy—which entered 2015 in perhaps its strongest financial condition in over 50 years. While slowing, real (\$2009) farm asset values and equity reached all-time highs in 2014. The U.S. farm sector debt-to-asset ratio, a measure of overall farm financial health (lower is better), reached an all-time low level of 10.6 percent in 2014 and is projected to increase only slightly to 10.9 percent for 2015—still well below the values that prevailed in the 1980s and 1990s.



Source: USDA Economic Research Service (ERS), 1960-2015F (forecasted)

By comparison, during the 1980s farm crisis, the debt-to-asset ratio reached a 50-year high of 22.2 percent in 1985. From the mid-1980s through 2014, the ratio showed steady improvement with the exception of a few brief periods when a slight reversal in the long-term downward trend occurred in response to a downturn in the general economy.

Current overall debt levels, measured in real dollars (2009), are significantly lower than in the early 1980s, and overall assets are higher. In addition, and very positive for agriculture, interest rates today are dramatically lower than in the 1980s.

Of course, note that individual producer financial conditions can vary widely, and some pockets of financial distress could arise if these long-run forecasts are realized. Also, the large majority of aggregate farm asset value is held in real estate (about 81.7 percent in 2014), so major declines in farmland value can have a substantial impact on the aggregate balance sheet for U.S. agriculture.



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## *Ag Efficiency/Cost Structure*

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### *The answer to lower net farm income? Agriculture efficiency*

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The current market conditions and resulting long-run forecasts suggest we are in the beginning of a down cycle in economic returns primarily for crop production, the largest segment of agriculture across the 15-state AgriBank District. Lower receipts and higher expenses have led to a decline in current and projected net farm income. While strong balance sheets give individual producers a window of opportunity to adjust to changing market conditions, the ultimate solution in times of tighter margins must involve bringing income and expenses in line. Historically, the successful implementation of this solution must start with implementing a higher level of operational efficiency that drives down the cost per unit of production. If current price forecasts are correct, enhancing gross receipts will be very difficult, but pricing opportunities will still present themselves. Adept marketing and risk management by producers will still have a substantive payoff in this economic environment.

Note our use of cost per unit (or bushel) of production as distinguished from total cost of production. Some avenues exist whereby total cost of production may increase but unit production increases enough so that cost per unit of production decreases. An example of this would be implementing new machinery technologies or seed genetics.

## Corn: Reducing the cost per bushel of production

Producers can begin by focusing on achieving efficiencies in the largest cost categories for the commodities they produce. In these categories, even a small increase in efficiency can result in a significant reduction in the cost per bushel of production.

Consider corn, the largest crop in terms of total production in the AgriBank District. The accompanying pie chart shows the USDA 2015 forecast for corn cost of production. The top four cost categories, by share of total costs per acre, are land, fertilizer, capital recovery (i.e., depreciation on buildings, machinery and equipment) and seed.

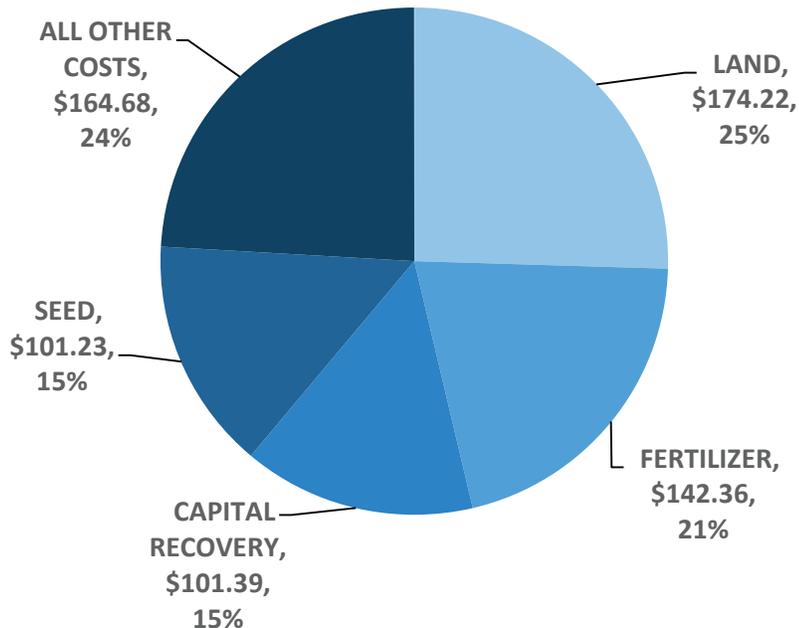
The greatest opportunity for corn producers is to become more efficient in their cost of land, fertilizer, buildings, machinery and equipment, and seed. If you're a corn producer, you need to answer some tough questions. Are you in a position to negotiate more favorable terms to rent cropland? What is the trade-off on your fields between fertilizer/chemical usage and the choice of seed (genetically modified or not)? Would it be more cost-effective to delay purchases of new equipment when compared to the anticipated maintenance costs for new equipment? Could use of precision farming and Enterprise Resource Planning (ERP) improve your productivity and realize enough cost savings to justify the investment? The answers to these and related questions likely will be different for each producer, depending on their unique circumstances.

The USDA forecasts for net farm income don't account for any "shocks" to the system such as weather events. Nor do they account for changes in producer behavior. Producers should not accept the forecasts as inevitable. They can help shape the future—and potentially do better than the forecasts—if they can reduce their cost structure on a per unit basis.

### USDA 2015 Corn Cost of Production Forecast

#### Top 4 Cost Categories with Cost Per Acre and % Share of Total Costs

Source: USDA Economic Research Service (ERS) November 2014 Cost of Production Forecasts



## The cost of borrowing: Farmers in a stronger position today than in the 1980s



Another potentially significant cost for ag producers is the cost of borrowing. The cost of borrowing money for equipment, home mortgages, farm real estate and operations is substantially lower today than in the 1980s.

In 2012, approximately 4 percent of U.S. farmers held 68 percent of total U.S. farm debt. This contrasts with the time period just prior to the farm crisis years (around 1979) when approximately 30 percent of U.S. farmers held approximately the same share (70 percent) of U.S. farm debt. While a smaller share of the total farm population, the 4 percent of U.S. farmers holding most of the debt in 2012 produced a larger share of aggregate net farm income (approximately 48 percent) when compared to the 30 percent of farmers in 1979 (approximately 42 percent). In 2012, approximately 75 percent of U.S. farming operations were debt-free compared to just 32 percent in 1979. Note, however, that the USDA counts small hobby farms as farming operations and these are a more significant portion of the U.S. farm population total when compared to 1979.

In contrast to the double-digit rates of the 1980s, interest rates remain near historically low levels today. Also, there is greater availability of fixed long-term rates on agricultural loans today, which allows borrowers to lock in current low rates. Total aggregate farm interest expense, which exceeded aggregate net farm income in 1983 by \$6.3 billion (150 percent of NFI), was just 14 percent of aggregate net farm income in 2012.

As producers look for ways to drive down input costs such as land, fertilizer, machinery and seed, they can also look for ways to lower their cost of financing.

1980s	TODAY
In 1979, 70% of the farm debt was held by approximately 30% of the farming operations. This 30% of the farming operations produced approximately 42% of the net farm income.*	In 2012, 68% of the farm debt was held by approximately 4% of the farming operations. This 4% of the farming operations produced approximately 48% of net farm income.*
In 1979, the percentage of farming operations with no debt was approximately 32%*	In 2012, the percentage of farming operations with no debt was approximately 75%*
Historically high interest rates. Prime rate in 1981 was 21%, and Fed Funds rate in 1981 was as high as 19%.	Historically low interest rates. Prime rate is 3.25%, and Fed Funds rate is 0.25%.
Most loans had variable interest rates	More use of fixed interest rates, with many borrowers having already locked in record-low rates
In 1983, total farm interest expense was approximately 150% of net farm income*	In 2012, total farm interest expense was approximately 14% of net farm income*

*Source: USDA Ag Census (1979 data) and Agricultural Resource Management Survey (2012 data), financial data, and AgriBank internal calculations.*

## *Insurance, risk management tools designed to protect farm income*

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With the prospect of falling net farm income over the next decade, in addition to restructuring production costs, producers should consider protecting their income with insurance and risk management tools. New programs and products that have been introduced since the 1980s will help reduce the odds of a repeat of the 1980s farm crisis. The following are two such resources:

- **CROP/REVENUE INSURANCE.** The aggregate farm income statement presented by the USDA does not include crop/revenue insurance premiums, subsidies, and indemnities. In the past two Farm Bills, a greater emphasis of producer support has shifted to the crop insurance title programs and away from the traditional commodity title programs. In the 1980s and 1990s, the crop insurance program had much lower participation rates, revenue insurance only became available as a pilot program in 1994, and almost all government support came through the commodity title programs. By excluding crop/revenue insurance, the USDA aggregate income statement may understate the level of government support to producers when compared to previous decades.
- **MARKET RISK MANAGEMENT TOOLS.** Producers today have a greater array of market risk management tools available and are much more adept at using these tools when compared to the 1980s and 1990s. Commodity options were reintroduced on a pilot basis for corn and soybeans in 1984 and eventually became available on all commodity futures by the end of the 1990s. Over-the-counter (OTC) contracts, including commodity swap products such as AgriHedge (available from Farm Credit Associations affiliated with AgriBank), were rarely available in agricultural commodities until the early 2000s and then were mostly tailored to the needs of commercial users. Only in the past five years have OTC products with more producer-friendly features become more widely available.

## *Taking the bull by the horns*

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Producers are not able to control market forces, such as commodity prices, that affect their financial well-being. But they can control how they respond to those forces as they plan how to protect their income statements and balance sheets. If you're a producer, the following are steps you can take to adapt to today's agriculture efficiency cycle:

- Understand all of the primary factors that determine your cost per unit of production
- Research and thoroughly evaluate those practices, techniques and technologies that have the potential to reduce the major cost of production categories. Adopt those that can have a major impact on your cost per unit of production.
- Take advantage of historically low interest rates by locking in fixed rates when appropriate
- Use crop/revenue insurance and sound, prudent marketing strategies to protect and enhance the gross revenue side of the farm income statement

Don't let today's market cycle keep you down. The forecasted decline in net farm income is not a given if producers take control of their income statements and their future through the prudent deployment of cost-reduction and risk management strategies.

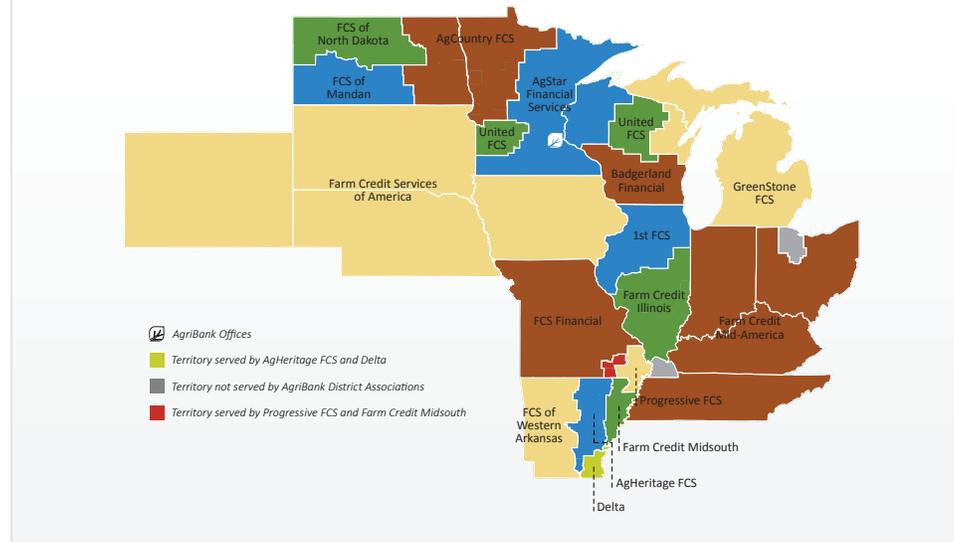
## For more information

**USDA ECONOMIC RESEARCH SERVICE (ERS) FARM INCOME AND WEALTH STATISTICS.** Much of the data comes from the annual Agricultural Resource Management Survey (ARMS), which is jointly administered by the USDA-ERS and National Agricultural Statistics Service (NASS) and surveys approximately 30,000 farms each year across 48 states. <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>

**USDA AGRICULTURAL BASELINE.** This site contains projections of farm receipts, expenses and income in Table 36. This information is presented in the form of a simplified income statement and includes projections of both net cash income and net farm income. <http://www.usda.gov/oce/commodity/projections/index.htm>

**FARM CREDIT.** Whether farmers, ranchers or other borrowers are looking to manage day-to-day operations, expand operations, take advantage of new opportunities or prepare for changing economic cycles, Farm Credit can help them access needed financing and other financial solutions. Find a local Farm Credit Association at [www.AgriBank.com](http://www.AgriBank.com).

## Associations in the AgriBank District



## About AgriBank

AgriBank is one of the largest banks within the national Farm Credit System, with more than \$90 billion in total assets. Under the Farm Credit System's cooperative structure, AgriBank is primarily owned by 17 affiliated Farm Credit Associations. The AgriBank District covers America's Midwest, a 15-state area stretching from Wyoming to Ohio and Minnesota to Arkansas. About half of the nation's cropland is located within the AgriBank District, providing the Bank and its Association owners with expertise in production agriculture. For more information, visit [www.AgriBank.com](http://www.AgriBank.com).

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