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## Welcome Note

*Welcome to our annual outlook issue of the Purdue Ag Econ Report (PAER), where we look back at last year and ahead at economic conditions for agriculture in 2020.*

*The past year brought a number of challenges for Indiana agriculture, weather being at the top of the list. Rain and flooding impacted the ability to get into fields, and led to difficult decisions about whether to delay planting or take prevented planting insurance. These delays then led to a late harvest. While weather had significant effects in different parts of the state; nationwide, there were only modest improvements in*

*commodity prices .*

*Looking ahead, there continues to be uncertainty in trade policy and the macroeconomic environment. African Swine Fever in China is having, and will likely continue to have, major impacts in global markets. As a result of this and other factors, global food prices are on the rise, although domestic food price inflation is projected to remain low.*

*In the following PAER articles, Agricultural Economics Faculty at Purdue provide insight on these and other issues, including land values, rental rates, and agricultural policy.*

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## Our Long, Slow, Steady Expansion Should Continue

**LARRY DEBOER, PROFESSOR OF AGRICULTURAL ECONOMICS**

### The longest expansion

Our current expansion in Gross Domestic Product (GDP) began in July 2009. In July 2019 it reached its 121st month, making it the longest expansion in U.S. history. There was no recession in the decade of the 20-teens. That's the first such decade in U.S. history. The unemployment rate was 3.5 percent in November. It hasn't been lower in more than 50 years. Inflation remains low, 1.8 percent over the past year. The core rate excluding volatile oil and food prices was only 2.3 percent.

That's a lot of good news. Yet 2019 had its concerns. Real output growth fell back to a disappointing 2 percent, its average during this expansion, after near 3 percent growth in 2018. Recession signals flashed warnings. Manufacturing employment declined. Financial markets were unsettled. The yield curve inverted. The Federal Reserve reversed course and began cutting its policy interest rate.

We have reasons to be optimistic. We have reasons to be pessimistic. What will happen in 2020, the first year of a brand-new decade?

### Production capacity constrains growth

Growth is constrained by spending during the early

years of recovery from recession. Plenty of resources are unemployed and ready to produce products. What matters is whether consumers, businesses, the government or the world want to buy those products. Once resources are fully employed, though, output is constrained by the growth in available resources, and productivity growth. Spending increases beyond capacity growth merely causes inflation.

It's hard to tell exactly when an economy's resources are fully employed. For twenty years we thought that a 5 percent unemployment rate marked full employment. Unemployment hit 5 percent in September 2015. Then it continued to fall, but inflation remained low.

The Bureau of Labor Statistics counts people as unemployed if they are not working but searching for work. The BLS also measures job openings, when businesses have an open position and are searching for an employee. In March 2018 the number of job openings first exceeded the number of people searching for work. The unemployment rate was 4.0 percent that month. As of September 2019, there were 1.2 million more job openings than unemployed people.

By this measure, the U.S. economy reached capacity

in the first quarter of 2018, at 4 percent unemployment. Since then growth has been constrained by the capacity for production.



### Growth of capacity

Real GDP growth can be divided into four components on the production side: population, labor force participation, the unemployment rate and productivity. That's how many people *could* be working, how many *want* to be working, how many *are* working, and *how much* each employee is producing.

The BLS measures the non-institutional population 16-years-of-age and older. Population growth depends mostly on fertility 16 years ago, plus current mortality and net immigration. It's been growing by one percent per year on average during this expansion, and by eight-tenths percent per year since the first quarter of 2018. This growth should continue.

Labor force participation measures the percentage of the population who are working or searching for work. It's 63.2 percent in November 2019. Participation has been edging upward, adding 0.4 percent per year to output growth. Participation peaked at 66.2 percent before the last recession. Ten years into this expansion, it's clear that we're not going to approach that high rate. Rising labor force partici-

pation is unlikely to add more than a few tenths to output growth going forward.

Each one-tenth drop in the unemployment rate adds about a tenth to real GDP growth. The unemployment rate is 3.5 percent in November 2019, down from 4.0 percent in March 2018. The last time it was lower was in May 1969, at 3.4 percent. The last time it was lower than that was in October 1953, at 3.1 percent. The unemployment rate cannot fall much further, so there is no added growth to be had here.

The wild card is productivity, measured by real GDP per employee. Productivity depends on the skills of the workforce, and the quantity and quality of the tools and materials they use. Since the first quarter of 2018 productivity been rising slowly, at one percent per year. That's also the average since 2006, at the end of the productivity boom associated with information technology. One percent is a good guess for productivity growth.

Add it up: eight-tenths from population growth, four-tenths from labor force participation, no change in unemployment, and one percent from productivity growth. That's real GDP growth of 2.2 percent. It's the new normal.

If we are to forecast departures from that normal, we'd better have good reasons. Only labor force participation and productivity seem likely to vary on the capacity side.

There are 1.2 million more job openings than people searching for work. This should cause wages to grow, and they did, by 1.9 percent above inflation in 2019. This is slower than during the low unemployment years of the late-1990s, but about as fast as peak growth during the 2001-07 expansion.

Wage growth may be a reason why labor force participation has been edging upward. With labor scarce, wages should continue to rise, and perhaps this could add to growth.

Predictors of productivity growth are hard to come by. Investment in research and development has picked up in the past two years, growing by about 10 percent a year compared to 6 percent earlier in the expansion. But investment in business buildings and equipment is actually lower now than a year ago. Let's take a wait-and-see perspective on productivity growth.

## Spending

Increased spending cannot add much to growth with output at capacity. More rapid spending would add to inflation. A spending drop could pull output below capacity, though. That's a recession.

Consumer spending continues to grow, and consumers remain confident. The University of Michigan's consumer confidence survey shows no change from the optimism of the past five years. Low unemployment, rising wages and rising home prices are reasons.

Businesses investment, on the other hand, has decreased over the past 2 quarters, despite very low corporate bond interest rates. Orders for durable goods have dropped in 2019. Uncertainty over trade policy and a lack of exciting investment opportunities may be the reasons.

The Federal government is contributing to spending growth. The Federal deficit is increasing. The 2017 tax cut does not appear to have increased investment, but it probably has added to consumer spending. Retiring baby-boomers are behind the increase in Social Security and Medicare spending.

Both exports and imports have declined as a share of GDP. The trade war is a reason. The export share has actually fallen more than the import share, so the trade balance has moved towards a bigger deficit. That's a subtraction from spending.

Consumers and the Federal government are contributing to spending growth. Investment and trade are not. An extraordinary spending jump to fuel infla-

tion seems unlikely. But what about an extraordinary drop, to cause recession?



## Will there be a recession in 2020?

The yield curve inverted in May 2019. Ordinarily the ten-year Treasury bond interest rate is higher than the rate on 3-month Treasury bills. But lenders and investors move their money to long-term bonds when they fear recession. Interest rates on those bonds decrease; rates on short-term bills increase. They invert when the short-term rate moves above the long-term rate.

Over the past 50 years yield curve inversions have been perfect predictors of recession. All seven recessions since 1970 have been preceded by inversions, and every inversion was followed by a recession, 5 to 16 months later. So, our inversion in May forecasts a recession by September 2020.

But go back 53 years, to 1966. The yield curve inverted and a recession did not follow within a year and a third. The Federal Reserve had increased interest rates in response to low unemployment and rising budget deficits, fearing inflation (correctly, as it turned out). Financial markets became pessimistic. Under pressure from President Johnson, the Fed reversed course.

Our Fed has reversed course as well. They increased the federal funds interest rate 9 times from December 2015 to December 2018, in response to low unemployment and rising budget deficits. Financial markets became pessimistic, the President

applied pressure, and the Fed changed its policy, cutting the rate three times in 2019. Perhaps this will be enough to prevent a recession, as it did in the 1960's.

### A Forecast.

Let's suppose that recession is avoided in 2020, and the expansion moves into its 12th year. Real GDP will grow at the normal rate, 2.2%. The unemployment rate will remain at its rock-bottom low of 3.5%. The all-items inflation rate tends to move

towards the core rate, which is 2.3%, so expect inflation at that rate. The Fed says they're done reducing the federal funds rate unless the economy deteriorates. The 3-month Treasury bill interest rate moves in lock-step with the Fed's policy rate, so it should remain near 1.7%, where it was in November. Rising inflation should increase the 10-year bond interest rate by half-a-point, to 2.3 percent.

In other words, it's a prediction for another normal year in our longest, slowest, steadiest expansion.

## Trade and trade policy outlook for 2020

**RUSSELL HILLBERRY**, ASSOCIATE PROFESSOR OF AGRICULTURAL ECONOMICS

This year's international trade outlook focuses primarily on trade policy, which should once again dominate market-based developments in its significance for export-oriented U.S. agriculture. News media coverage of trade policy has focused on the on-again, off-again negotiations with China and the prospects for Congressional ratification of the revised North American Free Trade Agreement (NAFTA). We review these as well as longer term developments that are less visible, but probably more important. Most notably, we discuss the President's efforts to depart from the rules-based international trading system that has come to serve U.S. agriculture so well. But we begin with a short summary of the U.S. Department of Agriculture's forecast for agricultural trade in 2020.

### USDA Forecast

The U.S. Department of Agriculture's November forecast for agricultural exports in 2020 is \$139 billion, up \$2 billion from the August forecast (Daugherty and Jiang, 2019). Rising prices for soybeans added \$1.2 billion in forecast exports, while increased demand for imported pork in China contributed to an increase of \$400 million in predicted

pork exports. Falling beef prices reduced the value of expected beef exports by \$200 million. Exports to China in 2020 are forecast to total \$11 billion, up \$3.5 billion from the value expected in August.



### Short term trade policy issues to be resolved in 2020

The trade policy story that has garnered the most news attention in 2019, and should continue to do so in 2020, is the ongoing negotiation with China. The President does not have much leverage. He will be up for re-election next year, and probably

needs to reach a deal of some kind. Rural voters in the Midwest were critical to his election in 2016, and they have borne a heavy share of the burden associated with the trade war. The issue that motivated this conflict, China's inadequate enforcement of international rules on intellectual property, will be difficult to resolve credibly within the President's short time horizon. If a deal is reached, it will probably involve a short-term commitment by China to purchase large quantities of agricultural goods. This would not be a solution to the larger issues, nor is it likely that it would undo the damage already done to U.S. agricultural interests during the trade conflict.

The Chinese leadership, of course, is not facing an election next year. Moreover, it does not appear that the prices of China's exports to the U.S. have fallen in response to the tariffs (Foy, 2019); the implication being that Chinese firms have not been forced to respond to U.S. tariffs by reducing their prices. The United States is only one market in a global economy. The emerging evidence makes it seem likely that China's exports that would have been sold in the U.S. were instead diverted to other markets. Substitution across markets also seems to have been an important part of Chinese buyers' responses to China's tariffs on U.S. agricultural exports (Khan, 2019). Chinese tariffs on U.S. soybeans need not impose a large burden on Chinese buyers so long as other suppliers like Brazil and Argentina can meet their needs. The existence of other markets limits the leverage the U.S. has in any go-it-alone trade war, which is one reason that previous Presidents employed trade policy strategies that involve international institutions and/or coalitions of like-minded governments.

Another trade policy issue that will likely be resolved in 2020 is the question of whether Congress will ratify the renegotiated NAFTA, now known as the U.S.-Mexico-Canada Free Trade Agreement (USMCA). The renegotiated agreement offers a modest update to the original NAFTA. It maintains most of the structure and provisions of the old agreement, but includes new provisions for digital trade, longer patent lives for biologic pharmaceuticals, and increased North American content rules for automo-

biles. There are a number of provisions relevant to agriculture; the most relevant being an opening of dairy and poultry markets in Canada (Krug, 2018). Openings of this kind were negotiated by the Obama administration as part of the Trans Pacific Partnership (TPP) agreement, but were abandoned when President Trump withdrew from the agreement on his first day in office. USMCA is a vehicle for restoring the Canadian portion of this lost market access.



Although you would not know it from the news headlines, Article I, section 8 of the U.S. Constitution gives Congress the authority to set U.S. tariffs. Since it would be difficult for Congress to negotiate directly with foreign leaders, in modern times Congress grants the President temporary authority to negotiate trade agreements on its behalf. Usually presidents consult heavily with Congress during the negotiations, recognizing that they will likely need bipartisan support, regardless of which party controls Congress (each party contains numerous trade skeptics, so a strictly partisan process is unlikely to succeed). USMCA was negotiated at a time when Republicans controlled the House of Representatives, and the President's negotiating team did not pursue priorities that Democratic leadership wanted in a NAFTA update. With the Democratic takeover of the House of Representatives in 2018, that calculus had to change. The current status of the agreement is that the President's team is negotiating with Democratic leadership, which wants changes to the agreement prior to a vote on the floor.

The implications of the USMCA for agriculture depend on what it is being compared to. Under an

assumption that a ‘No’ vote would simply mean a reversion to NAFTA, a Purdue University study found that the agreement would increase U.S. agricultural exports by a modest \$454 million (Chepeliev et al, 2019). The bulk of this growth would occur in dairy and poultry products. Although it seems unlikely that he would have the legal authority to act without Congress, the President has threatened to withdraw from NAFTA if the USMCA is not passed (see: Lawder, 2017). The same Purdue study found that withdrawal from NAFTA would decrease U.S. agricultural exports by \$21.8 billion (that’s billion with a “b”). From the point of view of agriculture exporters, at least, it would seem that a key reason to pass the USMCA is to preclude any further damage that the trade war might do to US exports.



### Longer term issues in U.S. & global trade policy

In addition to occasionally giving the President authority to negotiate trade agreements, in the post-World War II period Congress granted the Presidency a number of discretionary and/or emergency powers to impose import tariffs. The unwritten understanding was that Presidents would use these powers sparingly: First because the President presides over the whole nation, and the costs of tariffs to the entire economy outweigh the benefits to tariff-protected sectors; and second because the President is responsible for American foreign policy, and aggressive use of tariffs would undermine traditional U.S. foreign policy goals such as the spread of peace and prosperity and the development of market-oriented economies around the world. President Trump seized on these emergency/discretionary powers to levy tariffs as a way to implement his own trade policy. One of the longer-term issues in U.S. trade policy is whether Congress will seek to reclaim its au-

thority to set the broad course of trade policy. At least three pieces of legislation in the Senate address this issue (Behsudi, 2019).

One of the most significant trade policy issues of the upcoming Presidential election will be the future relationship of the United States and the World Trade Organization. In the post-World War II period, the United States has been the most influential advocate for an international trading system that focused on opening markets through negotiation, agreed-upon rules that constrain governments’ ability to arbitrarily raise tariffs or other trade barriers, and rules that limited governments’ ability to discriminate in favor of one country’s exports against those of another member. In 1995, with U.S. support, this process created the World Trade Organization, an international body that embodied the mindset that U.S. negotiators had pushed for 50 years: that a rules-based system would limit economic conflict, and increase prosperity by giving exporting firms more certainty about their access to foreign markets. Prior to President Trump, Presidents of both parties had stressed the importance of these principles, even if they sometimes strayed from them in the face of domestic political pressures.

President Trump, by contrast, has threatened to withdraw the United States from membership in the WTO, although it is unlikely that he could do this without authorization from Congress (BBC, 2018). His chief trade negotiator, U.S. Trade Representative Robert Lighthizer, is a steel industry lawyer known in Washington for his brass-knuckled use of political muscle and obscure U.S. trade laws to support the interests of his clients (Peterson, 2018). Ambassador Lighthizer has recently taken this approach to the World Trade Organization, hobbling the WTO’s system for settling disputes among its membership, a topic we discussed last year (Hillberry, 2018).

Ambassador Lighthizer’s approach to negotiating trade agreements reflects a disregard for WTO rules, and it seems, a disregard for Congressional oversight. A hallmark of trade negotiations under this

president has been the idea that trade negotiations proceed in “phases.” The U.S.-Japan Agreement recently notified to Congress is described as “phase one” of an ongoing process of negotiations with Japan. In phase one, the U.S. is to give Japanese autos preferential access to the U.S. market in exchange for restoration of the access to the Japanese market that U.S. agricultural products lost when President Trump withdrew from TPP. This “mini-agreement” seems to violate WTO rules requiring that preferential agreements between two WTO member countries liberalize “substantially all” trade between them (GATT, 1947, Article XXIV). The agreement was also negotiated without input from Congress. In the House Ways and Means committee hearing on the topic, a hearing at which neither Ambassador Lighthizer nor his deputies chose to testify, several members of Congress noted the lack of consultation with Congress and the limited breadth of the U.S.-Japan agreement (SIFMA 2019). The administration’s approach on phase one of the agreement seems consistent with the president’s general instincts on trade policy. If the Japan-U.S. agreement is a template for future U.S. agreements, then it raises very important questions about the future of U.S. trade policy and its place within global institutions (Olson, 2019).

The future course of trade policy under a Democratic president is also somewhat hard to predict. While Presidents Clinton and Obama engaged in protectionist rhetoric on the campaign trail, in office President Clinton signed enormous trade agreements while President Obama negotiated the ambitious TPP agreement. What we might expect from the next Democratic president is perhaps more uncertain than usual. It seems likely that candidates from the moderate and progressive wings of the party would take different approaches, though these differences have not yet been well-articulated. It also seems likely any future President’s approach to trade policy will have been affected by President Trump’s executive action in this area, whether that President were to take office in 2020 or in 2024.

Uncertainty about the future of U.S. trade policy has left the international trading system adrift

(Economist 2019). The lack of intellectual property protection in China is an ongoing issue that the multilateral system has found difficult to address. The mere entrance of China into global markets caused economic dislocations across the globe, even as it delivered new opportunities for China and for its trading partners. Now the United States, long the system’s most important advocate, appears to be turning away from its own handiwork. It seems unlikely that the rules-based trading system can survive continued misbehavior by its two largest members.



A key question remains: how to handle China, especially with respect to its inadequate protection of foreign intellectual property? Purists would say that intellectual property protection has no place in international trade agreements (Bhagwati, 2005). But the U.S. owners of intellectual property have provided much of the domestic political muscle supporting international engagement by the U.S., and Presidents can hardly ignore their interests. Moreover, if a rules-based system is to have integrity then it must also enforce these rules along with the others. President Obama’s approach to the China issue was to negotiate the TPP, a large and deep trade agreement in Asia that excluded China. Prospective Chinese membership in the TPP was meant to be a carrot that would induce better behavior by China over time. Another strategy would have been to build an international coalition that would apply a big WTO-consistent stick. President Trump discarded these options early in his presidency, choosing instead to apply the smaller stick of U.S. policy alone. Three questions that should have been asked more force-

fully before these choices were made are 1) Can U.S. policy alone be successful in changing China's behavior? 2) Are whatever benefits that would arise worth the costs that a U.S.-only policy imposes on other sectors of the U.S. economy? and 3) With China on the brink of surpassing the U.S. as the world's largest economy, should the U.S. really be advocating a return to the Law of the Jungle?

The international trading system – including both the WTO and regional trade agreements that are WTO-compliant - was painstakingly built over almost seven decades. In the last two decades especially this system has served U.S. agriculture very well. A breakdown of the rules-based international system is thus a huge risk for U.S. agriculture. U.S. withdrawal from the WTO would also have enormous consequences for U.S. agriculture, as it would give other agricultural exporters preferential access to most of the global economy. A strategy of weakening the WTO from within also risks damaging export-oriented sectors like agriculture. It is difficult to know exactly what the future holds, as much depends on the outcome of the election, and how the election affects politicians' behavior. Altogether, it seems quite possible that 2020 will be the most important year for U.S. agricultural trade policy since at least the mid-1990s.

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## 2020 Outlook: Farm Policy

**ROMAN KEENEY**, ASSOCIATE PROFESSOR OF AGRICULTURAL ECONOMICS

Farm policy was once again dominated by ongoing trade disputes. Beginning in 2018, increased tariffs and reduced demand for export agriculture have exacerbated financial conditions in the sector and prompted a series of ad hoc transfers to farm operations based on expected damage from the trade war. These payments were continued in 2019 at a total level of \$16 billion, with the first half of those being distributed in the summer and an additional 25% tranche given in late November and early December. A third and final (25%) tranche of assistance payments are forthcoming in January 2020 if deemed necessary.

The importance of this additional aid to the farm economy has been apparent with all farm program payments (including trade damage assistance) reaching 40% of national net farm income (\$33 bn/\$88 bn). The increasing role of government transfers in farm income is consistent with a number of concerning indicators for farm financial health, including the much reported 24% increase in farm bankruptcies and real farm national debt approaching inflation adjusted levels of the early 1980s ahead of the last major farm crisis.

The second year of trade damage assistance to farmers featured a considerable expansion. More crops and livestock products now qualify farmers for assistance and program payments are calculated as a single county level rate. All planted acres (not exceeding 2018 plantings) by a farm for commodities that are covered in the program receive the stated rate as calculated by USDA.

Looking ahead to 2020, most policy proposals and debate will be filtered through the national election for president and congress. Completion of the newly negotiated North American trade pact is the nearest term agenda item, with the US Congress looking to gain commitments for environmental and labor

standards before signing off on the new trade rules for the continent. De-escalation of the dispute with China to provide some additional demand certainty would be critical for reorienting farm fortunes to markets and the competitive advantages of US farm production.



The \$16 bn in potential transfers to farms from trade assistance is on par with the combined payments for commodities and crop insurance anticipated at the passage of the 2018 farm bill. This effective doubling of support may help stave off short term financial and cash flow stress but does little to promote the kind of sustained growth that might flow from productivity and investment responding to market signals.

In regard to the 2018 farm bill, the need for ad hoc assistance in response to trade disputes indicates that the current suite of farm programs are not equipped to deal with the level of negative impacts currently in place. This provides some slight irony given that the shift to all payments being counter-cyclical was perceived to be a counter to consistent use of emergency assistance. The resort to emergency legislation might normally accompany calls to redo farm legislation, but the prospects of doing so in a presi-

dential election cycle mean that reconsideration of the full farm bill will probably not begin until summer 2021. This means that the administration through the USDA would be well served to formalize the process for its market facilitation package in advance of 2020 planting to alleviate some of the uncertainty around the government component of farm earnings for the coming 2020 crop year.

The advantages of formalizing the market facilitation program are the same that exist for having five-year farm bills that outline the policy parameters farm operators must manage. This would allow farmers as well as their creditors, input sellers, and landowners to more accurately price in an important revenue source and increase the odds of the sector shifting to a more efficient track with less excess production and less dependency on government transfers through both scale and product mix adjustments. This could also lead to clearer eligibility

rules including implication of payment limits and trying to bring emergency payments into alignment with broader farm economy objectives as expressed through the farm bill.

Historically, farm sector stressors have been met with additional payments to producers and the current trade disputes' exacerbation of sector declines are no exception. Negotiating a final trade agreement with China is clearly the most important policy outcome on the horizon for US agriculture. However, the continued uncertainty surrounding those negotiations and the level of needed trade adjustment required argues strongly for USDA providing farm producers a clear set of guidelines in advance of planting to understand their protection from trade related losses. This would include not only the parameters that determine county level assistance but also an outline of national indicators that trigger differing levels of gross assistance.

## Food Price Inflation is on the Rise Globally but Steady at Home

**JAYSON L. LUSK**, DEPARTMENT HEAD & DISTINGUISHED PROFESSOR OF AGRICULTURAL ECONOMICS

After a steady decline in global food prices throughout most of 2017 and 2018, this summer in 2019, prices began to rise. In October 2019, the last date data are available, global food prices rose 6% relative to the same month a year earlier. It has been

more than two years since prices rose at this pace. The recent global food price spike is primarily caused by rising meat prices, which have increased more than 10% in each of the last two months relative to the same months in 2018. Reductions to the sup-

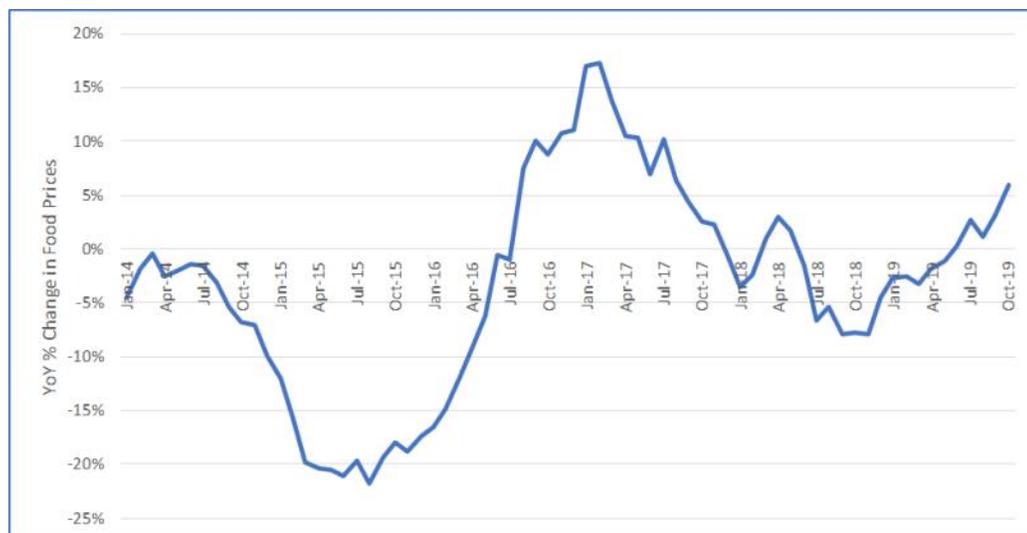


Figure 1. Year-over-Year Percent Change in Global Food Prices (source: United Nations Food and Agricultural Organization)

ply of pork in China, due to African Swine Fever, have played a major role in contributing to the upswing in global food prices. Reports of rising prices of onions in India and supply disruptions in Turkey and Nigeria are additional contributors. Still, the 6% year-over-year monthly increase in global food prices is modest in historical terms. From March 2007 to March 2008, global food prices rose 58%, and after falling more than 30%, rose again by almost 40% in mid-2011.

In the United States, retail food price inflation has remained modest over the past year. From October 2018 to October 2019, prices of food away from home increased 3.3% and prices for food bought for at home consumption increased only about 1%. The

USDA Economic Research Service is projecting an overall annual inflation rate for food consumed away from home of between 2% and 3% for both 2019 and 2020. More modest annual inflation of 0.5% to 1.5% is projected for food bought in grocery outlets for at home consumption. These figures are low in historical terms, but are slightly higher than the annual retail food inflation experienced over the past three to four years. Annual inflation rates for food away from home were 2.9%, 2.6%, and 2.3% and for food at home were -1.3%, -0.2% and 0.4% in 2016, 2017, and 2018, respectively. Helped by lower commodity prices, food at home prices have risen at a rate slower than overall non-food price inflation, which averaged about 2.1% per year from 2016-18.

## Farmland Market Outlook for 2020

**TODD H. KUETHE**, ASSOCIATE PROFESSOR, SCHRADER ENDOWED CHAIR IN FARMLAND ECONOMICS

**CRAIG DOBBINS**, PROFESSOR OF AGRICULTURAL ECONOMICS

Indiana farmland prices have moderated in recent years from the historic peak in 2014. Average quality farmland prices have declined 2.5% per year since 2014. The 2019 Purdue Farmland Value Survey indicated that average quality farmland was valued at

\$7,011 per acre, 12.1% below the peak. Several market forces suggest that downward pressure is likely to continue in 2020, but many market participants still view farmland as a good long-term investment.

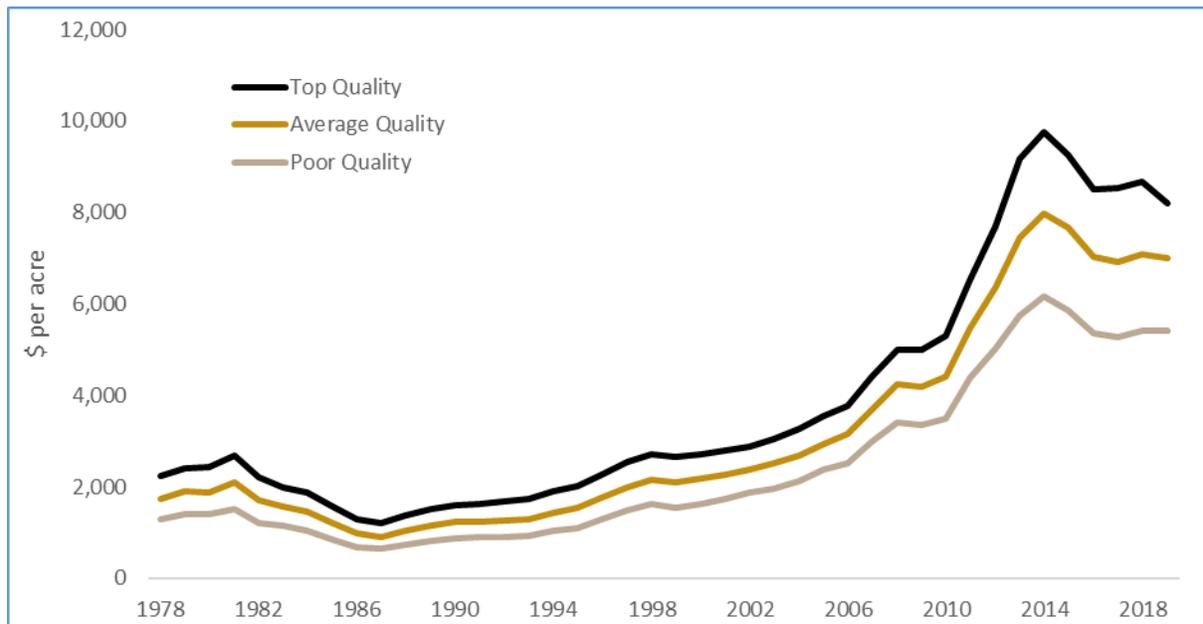


Figure 1: Purdue Farmland Value Survey, 1978 – 2019

Farmland prices are determined by their stream of future returns, discounted over the life of the asset. As a result, farmland market participants closely monitor changes in farm profitability (future returns) and interest rates (or discount rates).

Farmland returns have declined in recent years in Indiana and across the Corn Belt, as the results of low commodity prices. Respondents of the 2019 Purdue Farmland Value Survey suggest that current net farm income was the primary driver of farmland prices declines in 2019. The USDA's recent forecasts suggest that US net farm income will increase in 2019 to \$92.5 billion, just above the historical 2000–2018 average. However, a significant portion of USDA's forecasted income increase is due to Market Facilitation Program payments which were provided to offset some of the losses associated with disruption in trading relationships with China.

It is difficult to predict what will happen to interest rates in 2020. In 2015, the Federal Reserve's Federal Open Market Committee began slowly increasing the federal funds rate, the benchmark short-term borrowing rate. The committee reversed course at

the end of 2019 over fears of a potential recession and intense political pressure to reduce rates. Despite these changes to short-term rates, farm mortgage rates have remained relatively stable. The stable long-run interest rates helped buoy farmland prices despite declines in farm income.

Despite the high uncertainty related to farm returns and interest rates, many still see farmland as a good long-term investment. Optimists point toward the long-run earning (revenues minus costs) potential for farmland as a way to justify higher expected farmland prices. Long-run earning potential is supported by the growing demand for calories and proteins supplied by agricultural commodities and by the potential of emerging technological developments to boost yields and improve production efficiency. These changes, however, are not expected to impact farmland markets in the near term. At the current time, there does not appear to be anything in the market that will cause the demand for agricultural commodities to outpace supply. Therefore, earnings are likely to see only modest improvements, resulting in fairly steady farmland values in the near term.

## Increase in Indiana cash rent seems unlikely in 2020

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The 2018 Purdue Farmland Value Survey reported an increase in Indiana cash rent; however, the 2019 Purdue Farmland Value Survey reported a decline. Since the significant decline in ethanol production growth and a downward adjustment in cash rents from 2014 to 2016, Indiana's cash rent market has remained fairly stable (2016 to 2019) across all three farmland qualities, as shown in the following figure. While cash rents have been fairly stable, variations in other items have provided producers continued challenges.

As 2019 draws to a close, it is likely many Midwest producers are hoping 2020 will be a more normal

weather year. With 2019 resulting in record planting delays for the 2019 crop, yield results were better than many expected. The state average yield for both corn and soybeans were down from 2018 levels. The estimated 2019 yield for Indiana corn of 165 bu. per acre and the estimated yield for Indiana soybeans of 45 bu. per acre represent a decline of 15% for corn and soybeans. While yields at the 2019 level are not a production disaster, the decline from 2018 to 2019 is one of the largest year to year declines over the past 20 years.

With a decline in production and the supply of U.S. corn and soybeans, it seems reasonable to expect an

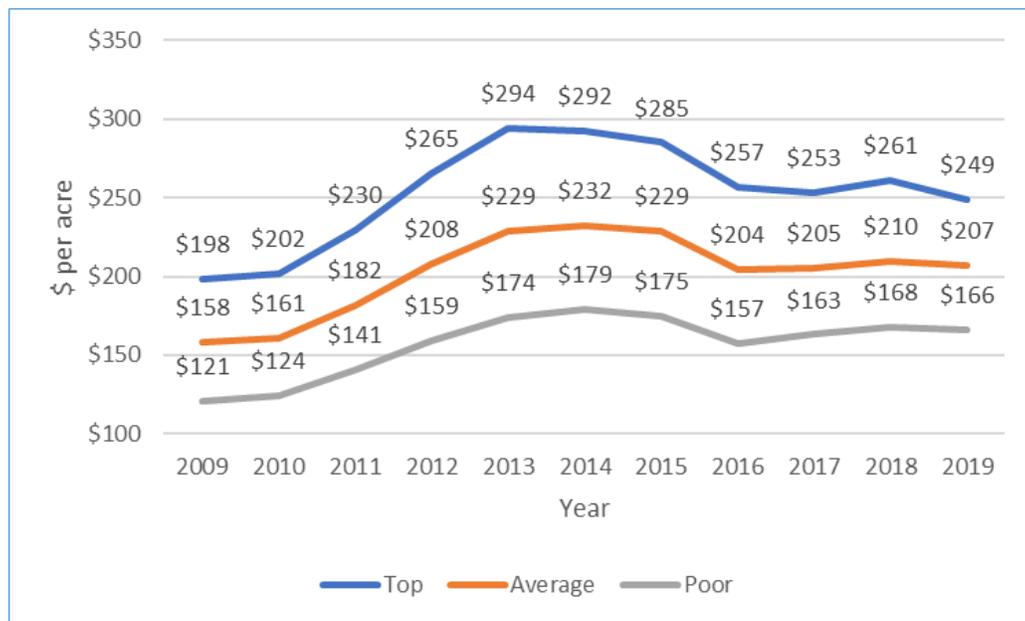


Figure 1. Indiana cash rents from the Purdue Farmland Value Survey for 2009 - 2019 by land quality

increase in price. However, even with lower yields, world stocks of corn and soybeans are still larger than demand. This supply-demand situation continues to place downward pressure on the contribution margin (money left for unpaid family labor, return on the investments in machinery and storage facilities, and land). With limited price enhancement opportunities, that leaves reducing per unit costs of production as a way to improve margins.

Comparing annual per bushel production costs from the Purdue Crop Cost and Return Guide indicates progress in lowering per unit costs of corn production have been made. In 2013, per unit variable costs for rotation corn was \$2.83 per bushel on average farmland. In 2016, this cost was \$2.43, a decline of 16%, Table 1. From 2016 to 2019, per unit cost has declined by only an additional \$0.06 per bushel.

Table 1. Estimated per bushel costs and earnings for a 3,000-acre corn and soybean farm - 2016, 2017, 2018, 2019, & 2020										
	2016		2017		2018		2019		2020	
	Corn	Beans	Corn	Beans	Corn	Beans	Corn	Beans	Corn	Beans
Yield (bu.)	165	50	170	52	172	53	174	54	176	54
Price per bu.	\$3.50	\$8.40	\$3.60	\$9.50	\$3.60	\$9.70	\$3.70	\$8.80	\$3.70	\$9.20
Variable Cost per bu.	\$2.43	\$4.12	\$2.44	\$4.48	\$2.39	\$4.72	\$2.50	\$4.52	\$2.37	\$4.43
Contribution Margin per bu.	\$1.07	\$4.28	\$1.16	\$5.02	\$1.21	\$4.98	\$1.20	\$4.28	\$1.33	\$4.77
Operator Labor & Machinery Overhead	\$0.86	\$2.84	\$0.82	\$2.67	\$0.80	\$2.58	\$0.70	\$2.26		
Cash Rent	1.24	4.08	1.21	3.94	1.22	3.96	1.19	3.83		
Crop Earnings	-\$1.03	-\$2.64	-\$0.86	-\$1.60	-\$0.81	-\$1.56	-\$0.69	-\$1.81		
Rotation Earnings	-\$1.83		-\$1.23		-\$1.19		-\$1.25			

The change in per unit production cost for rotation soybeans has been different. In 2013, rotation soybean production costs were \$4.43 per bushel. These costs declined to \$4.12 in 2016, a decline of 7%. Since 2016, there have been increases in the per unit production costs to \$4.77 in 2020, an increase of 11%.

Subtracting per unit production costs from the price of corn and soybeans provides the contribution margin, the return to pay rent, unpaid family labor, and our investment in machinery and facilities. This estimated margin is \$1.33 per bushel of corn and \$4.77 per bushel of soybeans, an increase over 2019. Based on a corn and soybean rotation, this margin averages \$3.05 per bushel or \$246 per acre. In 2019, cash rent was \$1.18 per bushel of corn or \$207 per

acre. After rent, this leaves only \$39 per acre. While this is an improvement over 2019, a number this size indicates the likelihood of cash rent increasing is small and there is still downward pressure on cash rents. Additional adjustments to the cost structure of corn and soybean production in Indiana may still be needed.

Each analysis of this type will result in a different contribution margin. Each party to the cash rent lease will have a different opinion about the adjustments to make and the size of an adequate contribution number for unpaid labor, machinery and facilities investment, and the risk the tenant is taking. Getting to an agreement will take open and frank discussions.

## More milk, consolidation continues, but still an improved 2020 price outlook

**NICOLE OLYNK WIDMAR, PROFESSOR OF AGRICULTURAL ECONOMICS**

Milk production forecasts for 2019 and 2020 have been raised to 218.6 billion pounds (+0.4 billion) and 222.4 billion pounds (+0.8 billion), respectively, per the November 15th, 2019 United States Department of Agriculture (USDA) Economic Research Service (ERS) release.<sup>1</sup> Fundamentally aggregate milk production is a product of cow numbers and milk yield per cow; whilst cow number growth has slowed, the higher average production per cow is currently expected to offset cow numbers. USDA National Agricultural Statistics Service (NASS) estimated September 2019 production 1.3% higher than 2018, whereas September cow numbers were 2,000 head lower than August 2019 (at 9.315 million head).

Given the challenging market situation facing dairy producers, the ending stocks for dairy products have been closely monitored and heavily reported on in 2019. September ending stocks (as reported in November) were significantly (159 million pounds on a milk-fat basis) higher for 2019 than they were a year earlier (Sept 2018). August 2019 was up, by comparison, only 21 million pounds over August 2018, indicating an acceleration in ending stock growth from August to September. Speaking to specific products, ending stocks were up year-over-year notably for butter (7.0%), dry whey (14.0%), whey protein concentrate (5.9%), and lactose (38.8%). Lending strength to the milk and dairy markets has been

<sup>1</sup> Sources: USDA: National Agricultural Statistics Service, Agricultural Marketing Service, Foreign Agricultural Service, and World Agricultural Outlook Board. Published by USDA, Economic Research Service, in Livestock, Dairy, and Poultry Outlook. Updated 11/15/2019. Data available for download at <https://www.ers.usda.gov/publications/pub-details/?pubid=95371>

domestic use; Quarter 3 2019 saw a 0.2% increase over Quarter 3 2018 on a milk-fat basis (0.9% higher on a skim-solids basis). Speaking to product-specific forecasts, USDA ERS is projecting \$1.685 per pound for cheddar cheese, bolstered by growth in domestic use, and \$2.32 per pound for butter also continuing to be supported by domestic demand.

Cost of production on farm remains top-of-mind for dairy producers. Table 1 combines data across dairy farm sizes as reported by USDA ERS costs and returns per hundredweight of milk by dairy farm size category for years 2016-2018.<sup>2</sup> Feed costs remain the single largest expense, comprising 76% of operating costs in 2016, and 75% of total operating costs

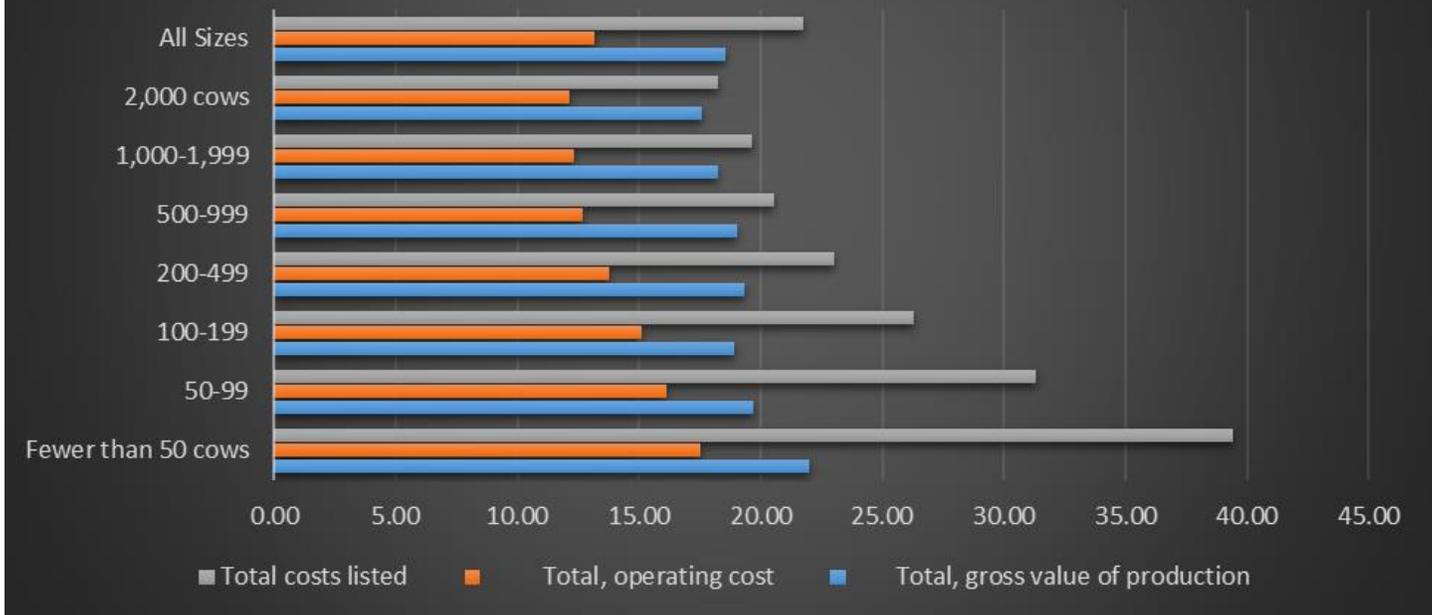
in 2017-2018. The value of production less operating costs fell rather substantially in 2018, which fueled the concerns regarding dairy farm survival which have been discussed broadly in both farm and popular press. Feed price outlooks have been uncertain as major weather events have plagued much of the growing regions of the country in 2019, ranging from flooding and prevented planting to snowstorms pre-harvest. As of the November USDA outlook corn prices were raised 5 cents to \$3.85/bu, soybean meal was forecast unchanged from October at \$325/short ton, and the 5-sate weighted average for premium alfalfa hay in Sept was \$204/short ton, which was down slightly from August. As always, hay markets are expected to be highly variable across

Table 1: Milk production costs and returns per hundredweight sold, all sizes combined, 2016-2018

Item	2016	2017	2018
Gross value of production:			
Milk sold	16.80	18.21	16.79
Cattle	1.47	1.37	1.24
Other income	0.54	0.50	0.50
Total, gross value of production	18.81	20.08	18.53
Operating costs:			
Feed--			
Purchased feed	6.68	6.49	6.76
Homegrown harvested feed	2.60	2.69	3.08
Grazed feed	0.07	0.07	0.08
Total, feed costs	9.35	9.25	9.92
Other--			
Veterinary and medicine	0.77	0.75	0.76
Bedding and litter	0.20	0.19	0.20
Marketing	0.18	0.18	0.18
Custom services	0.67	0.65	0.66
Fuel, lube, and electricity	0.52	0.59	0.67
Repairs	0.61	0.62	0.64
Other operating costs	0.00	0.00	0.00
Interest on operating capital	0.03	0.06	0.14
Total, operating cost	12.33	12.29	13.17
Allocated overhead:			
Hired labor	1.83	1.87	1.99
Opportunity cost of unpaid labor	1.71	1.77	1.82
Capital recovery of machinery and equipment	3.77	3.86	4.00
Opportunity cost of land (rental rate)	0.02	0.02	0.03
Taxes and insurance	0.18	0.18	0.18
General farm overhead	0.53	0.54	0.55
Total, allocated overhead	8.04	8.24	8.57
Total costs listed	20.37	20.53	21.74
Value of production less total costs listed	-1.56	-0.45	-3.21
Value of production less operating costs	6.48	7.79	5.36

<sup>2</sup> <https://www.ers.usda.gov/data-products/milk-cost-of-production-estimates/>

**Figure 1. Total Gross Value of Production, Operating Costs, and Total Costs (\$ per cwt sold) by Dairy Farm Size, 2018**



Note: Data was collected from <https://www.ers.usda.gov/data-products/milk-cost-of-production-estimates/> where it is referenced as being “Compiled by ERS using Agricultural Resource Management Survey data and other sources.” Graphic was developed by Nicole Widmar by presenting only total values (excluding specific line-item costs) for 2018 data only. 2016 through 2018 data are available for download at the link provided.

regions. Hay prices are notoriously difficult to forecast nationally as production and availability vary widely, and transport is difficult due to sheer bulkiness and handling difficulty.

Much attention has been placed on dairy farm closures and continued consolidation in the dairy industry. Even outside of farm-press there has been growing attention on the number of dairy herds of various sizes over time. Bloomberg had an Economics piece by Justin Fox in June 2019 entitled “A Productivity Revolution is Wiping Out (Most) Dairy Farms”<sup>3</sup> that employed University of Wisconsin Center for Dairy Profitability Data to explain that big dairies are more profitable. There are a number of reasons why spreading overhead costs over more heads of cattle, as well as having increased capital available for investment in efficient equipment and/

or technology may contribute to this fact. Furthermore, and as articulated by Cornell’s Andrew Navokovic in the Bloomberg article, there is a chicken-and-an-egg phenomena. Better managed dairies are likelier to invest in growth (get larger) in the first place. Regardless of the reasoning, explicit investigation into costs and returns by farm size (measured in number of cows) has become central to dairy industry conversations. Total costs, total operating costs, and total gross value of production on a per cwt basis are presented in Figure 1 across farm sizes; in graphical form the higher costs per cwt for smaller farms is easily evident.

Looking ahead to 2020 ... The USDA raised Class III milk price forecast for 2020 to \$17.50 per cwt while lowering the Class IV milk price forecast to \$15.95 per cwt. In total, the all-milk price forecast

<sup>3</sup> <https://www.bloomberg.com/opinion/articles/2019-06-05/dairy-farms-fall-victim-to-the-productivity-revolution>

for 2020 is unchanged at \$18.85 per cwt as a higher Class III price forecast is largely offset by a lower Class IV.



## 2020 Purdue Crop Cost & Return Guide

**MICHAEL LANGEMEIER**, PROFESSOR OF AGRICULTURAL ECONOMICS

**CRAIG DOBBINS**, PROFESSOR OF AGRICULTURAL ECONOMICS

The 2020 Purdue Crop Cost and Return Guide, which is available for free download from the Center for Commercial Agriculture website ([here](#)), gives estimated costs for planting, growing and harvesting a variety of crops, as well as estimated contribution margins and earnings. The guide is updated frequently as grain futures prices change and the costs of inputs, such as seed, fertilizer, pesticides and fuel, fluctuate. This article discusses estimates made in late November.

The guide presents cost and return information for low, average, and high productivity soils. The discussion in this article will focus on the estimates for average productivity soil. Table 1 presents crop budget information for continuous corn, rotation corn, rotation soybeans, wheat, and double-crop soybeans for average productivity soil. Double-crop soybeans are typically planted after wheat so it is typical to combine the contribution margin for these two crops when comparing to continuous corn, rota-

**Table 1. 2020 Purdue Crop Budget for Average Productivity Soil.**

	Continuous Corn	Rotation Corn	Rotation Soybeans	Wheat	Double-Crop Soybeans
Expected Yield per Acre	165	176	54	77	38
Harvest Price	3.70	3.70	9.20	4.80	9.20
Market Revenue	\$611	\$651	\$497	\$370	\$350
Less Variable Costs					
Fertilizer	127	116	47	74	35
Seed	111	111	67	44	78
Pesticides	58	58	50	30	45
Dryer Fuel	30	24	0	0	5
Machinery Fuel	18	18	11	11	8
Machinery Repairs	22	22	18	18	15
Hauling	17	18	5	8	4
Interest	12	12	7	6	6
Insurance and Miscellaneous	38	38	34	9	9
Total Variable Costs	\$433	\$417	\$239	\$200	\$205
Contribution Margin	\$178	\$234	\$258	\$170	\$145

See ID-166-W for more detail, November 2019 Estimates.

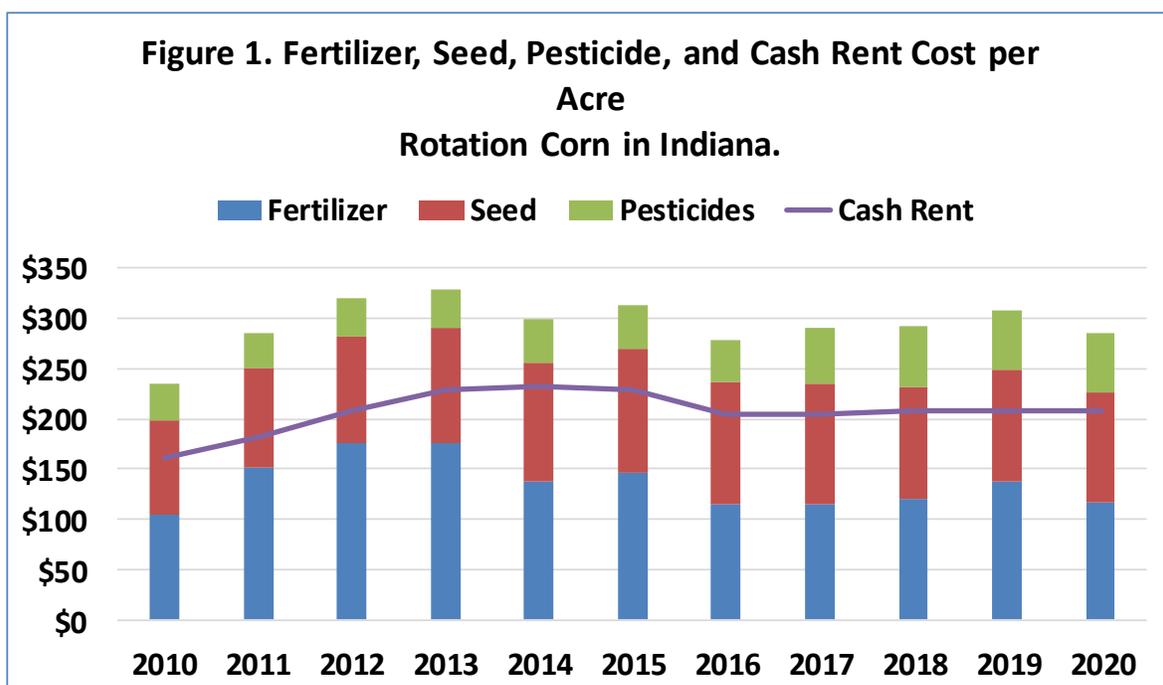
tion corn, and rotation soybeans. It is important to note that crop yields have been modified in this year's guide. The current yield estimates reflect trend yields for Indiana for each crop. The contribution margin, obtained by subtracting total variable cost from market revenue, ranges from \$178 per acre for continuous corn to \$315 per acre for wheat/double-crop soybeans. The contribution margins for rotation corn and rotation soybeans on average productivity soil are \$234 and \$258 per acre, respectively. It is important to note that the contribution margin is used to cover overhead costs such as machinery costs, family and hired labor, and cash rent. Failure to adequately cover these overhead costs typically puts downward pressure on cash rent and land values.

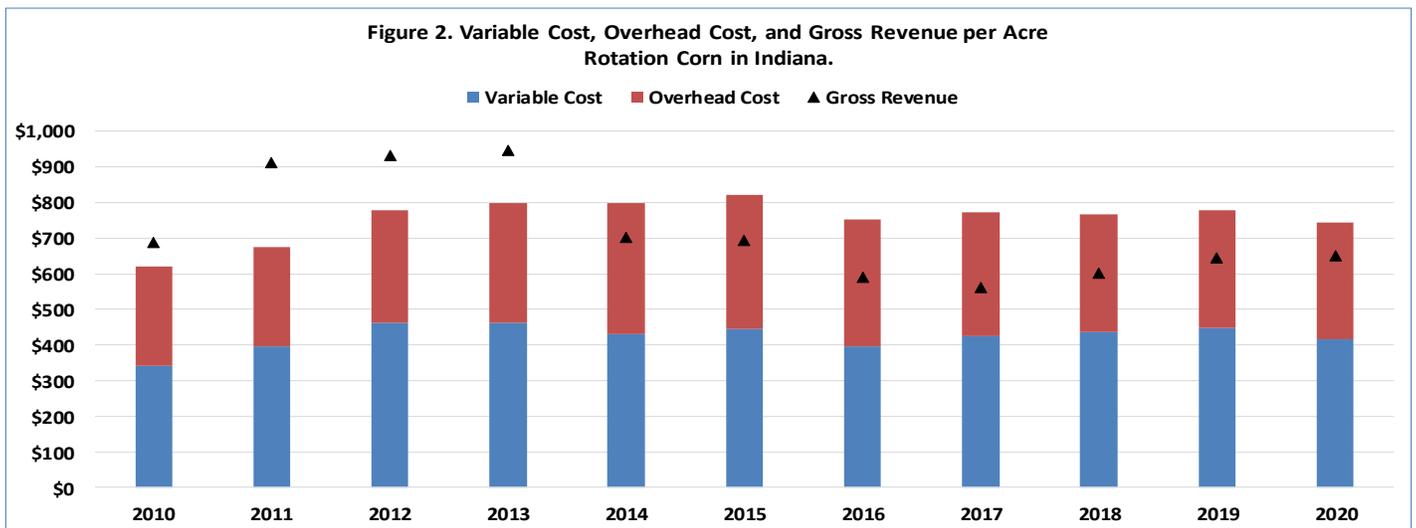
From 2007 to 2013, the contribution margin for rotation corn was higher than the contribution margin for rotation soybeans. The average difference in the contribution margin was \$38 per acre during the 2007 to 2013 period. The situation was considerably different from 2014 to 2018. The average difference in the contribution margin during this period was an approximate advantage for soybeans of \$81 per acre. The difference in contribution margins between corn and soybeans since 2018 has been relatively small.

Figure 1 illustrates the trends in fertilizer, seed, pesticide, and cash rent costs for rotation corn on aver-

age productivity soil from 2010 to 2020. Fertilizer cost peaked in 2013 at \$176 per acre (\$1.08 per bushel). In 2020, fertilizer cost per acre is projected to be \$116 per acre (\$0.66 per bushel). Cash rent per acre peaked in 2014 at \$232 per acre (\$1.42 per bushel). At \$208 per acre (\$1.18 per bushel), projected cash rent is \$24 per acre (\$0.24 per bushel) lower than it was at the peak in 2014. Partially due to resistant weed problems, pesticide cost per acre in 2020 is expected to be higher than its level in 2013 and 2014, the peak cost years for fertilizer cost and cash rent.

Gross revenue (market revenue plus government payments), variable cost, and overhead cost per acre for rotation corn on average productivity soil is illustrated in Figure 2. Variable cost per acre peaked in 2013 at \$462 per acre (\$2.83 per bushel), and is projected to be \$417 per acre (\$2.37 per bushel) in 2020. Fixed cost (overhead cost) per acre peaked in 2015 at \$375, and is projected to be \$327 per acre in 2020. The breakeven price needed to cover variable and fixed costs varied from \$4.77 to \$4.98 per bushel from 2012 to 2015. In 2016 and 2017, the breakeven price declined to approximately \$4.55 per bushel. The breakeven price in 2018 and 2019 was approximately \$4.45 per bushel. The projected breakeven price for 2020 is \$4.25 per bushel. Gross revenue for rotation corn has declined from \$945 per





acre in 2013 to \$651 per acre in 2020. The expected loss per acre for rotation corn in 2020 is \$79 per acre.

Figure 3 illustrates the trends in fertilizer, seed, pesticide, and cash rent costs for rotation soybeans from 2010 to 2020. Fertilizer cost and cash rent have declined since their peaks in 2013 and 2014. Resistant weed problems have put upward pressure on pesticide cost for rotation soybeans.

Gross revenue (market revenue plus government payments), variable cost, and overhead cost per acre for rotation soybeans on average productivity level

is illustrated in figure 4. Primarily due to higher herbicide cost, variable cost per acre in 2020 is projected to be \$239 per acre (\$4.43 per bushel), which is similar to the variable cost in 2013. Like corn, fixed cost per acre peaked in 2015 at \$375, and is projected to be \$327 per acre in 2020. The breakeven price needed to cover variable and fixed costs declined from \$11.94 per bushel in 2015 to \$11.08 in 2018. In 2019 and 2020, the breakeven price for soybeans is expected to be \$10.65 and 10.50, respectively. Gross revenue for rotation soybeans has declined from \$670 per acre in 2013 to \$497 per acre in 2020. The expected loss in 2020 for rotation soy-

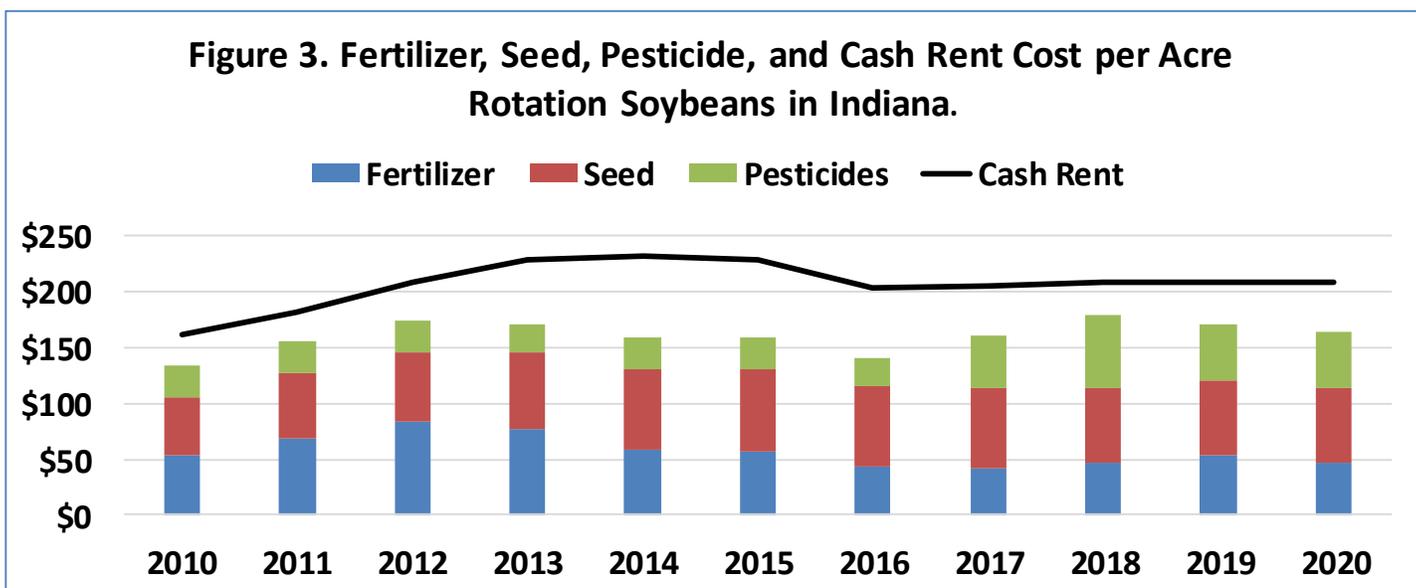
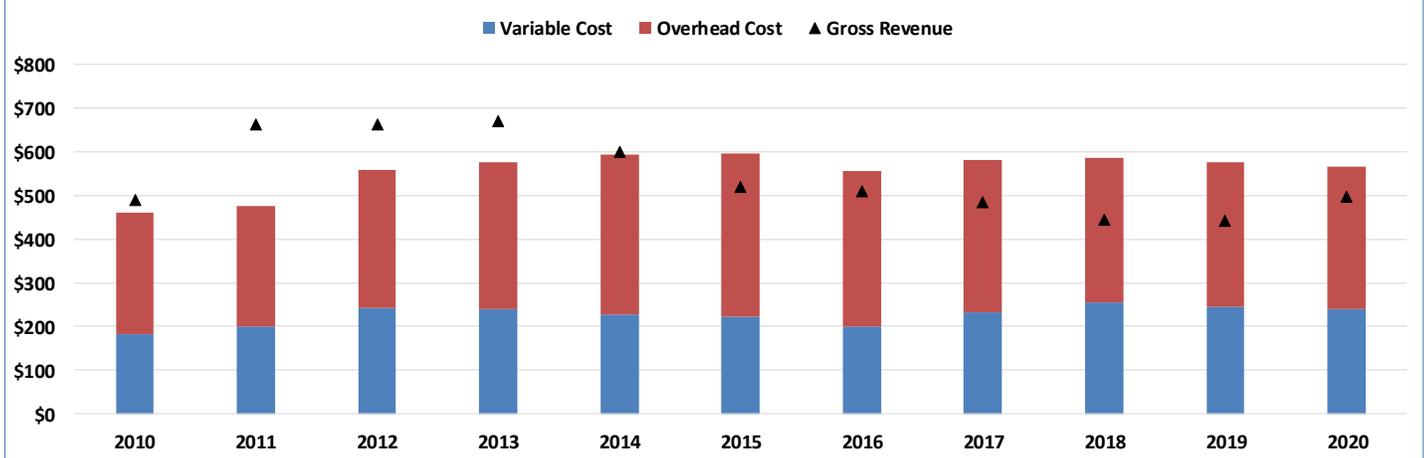


Figure 4. Variable Cost, Overhead Cost, and Gross Revenue per Acre  
Rotation Soybeans in Indiana.



beans is \$69 per acre.

The breakeven prices for rotation corn and rotation soybeans discussed above were for average productivity land. For high productivity land, the breakeven prices for rotation corn and rotation soybeans are expected to be \$3.84 and \$9.63 per bushel, respectively. The breakeven prices for low productivity land are expected to be \$4.65 and \$11.50 per bushel for corn and soybeans, respectively. Thus, unless prices rise above \$3.84 per bushel for corn and \$9.63

per bushel for soybeans, earnings per acre will be negative for low, average, and high productivity levels.

In summary, margins will be tight again in 2020. This increases the importance of carefully scrutinizing input and crop decisions. Producers are encouraged to create crop budgets and in general improve their record keeping. Lower crop margins will adversely impact a farm's liquidity position and financial performance.

## 2020 Corn Price Outlook

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**MINDY MALLORY**, ASSOC. PROFESSOR, CLEARING CORPORATION CHARITABLE FOUNDATION ENDOWED CHAIR

After enduring innumerable planting and harvest headaches, U.S. corn and soybean farmers were at least rewarded with a modest improvement in crop prices. After a historically difficult planting and harvest season for 2019, the season average corn price is now expected to average \$3.85/bushel, its highest level since 2013 and 7% higher than in 2018. The national average corn yield for 2019 is expected to be 5% off from last year and 2% below trend at 167 bushels per acre, according to the USDA's November *Crop Production* report. The result is a 2019 corn crop projected to total 13.7 billion bushels, which will be the smallest U.S. corn crop since 2015. It's

possible that the 2019 crop estimate will be revised down further, depending on yield reductions and acreage abandonment attributable to delayed harvest and early snow on late-to-mature crops in the Northern Corn Belt.



Although corn production declined 800 million bushels, the production decline is likely to be partially offset by an anticipated usage decline of over 500 million bushels, both compared to the 2018/2019 crop year. The combination of smaller production and usage is expected to produce a modest draw down in the corn carryover into the 2020 marketing year of about 200 million bushels, helping to support this year’s prices. Although corn used for ethanol in the upcoming year is expected to hold steady, reductions in feed usage and smaller exports are expected to push total usage down by nearly 560 million bushels. Recent weeks have shown signs of strength in exports and prospects for feed demand based on livestock placements, however, according to USDA reports. Watch these key usage categories in the coming weeks; strength here will help keep prices strong compared to recent years.

Ethanol margins have improved to at least breakeven levels in recent months, which should keep existing

capacity online. This coupled with the E10 blend wall will keep corn demand for ethanol linked to gasoline demand. Rulemaking for the 2020 and 2021 blending requirements, as well as the judicial review<sup>1</sup> of the Small Refinery Exemption of the Renewable Fuel Standard could impact prospects for the ethanol use category in 2020 and 2021.

The anticipated decline in U.S. corn ending stocks by the end of the 2019/2020 marketing year marks the third consecutive reduction in U.S. ending stocks. The U.S. stocks-to-use ratio is expected to come in at 13.7%, down from 14.6% last year. The stocks situation is somewhat encouraging for price prospects. As recently as 2016 we had a stocks-to-use ratio of nearly 16%, which contributed to the lowest prices in recent history. Importantly, the world corn supply/demand balance is expected to continue tightening, a trend that’s also been underway since 2016. World stocks are projected to decline to 26% of total usage, down from 28% last

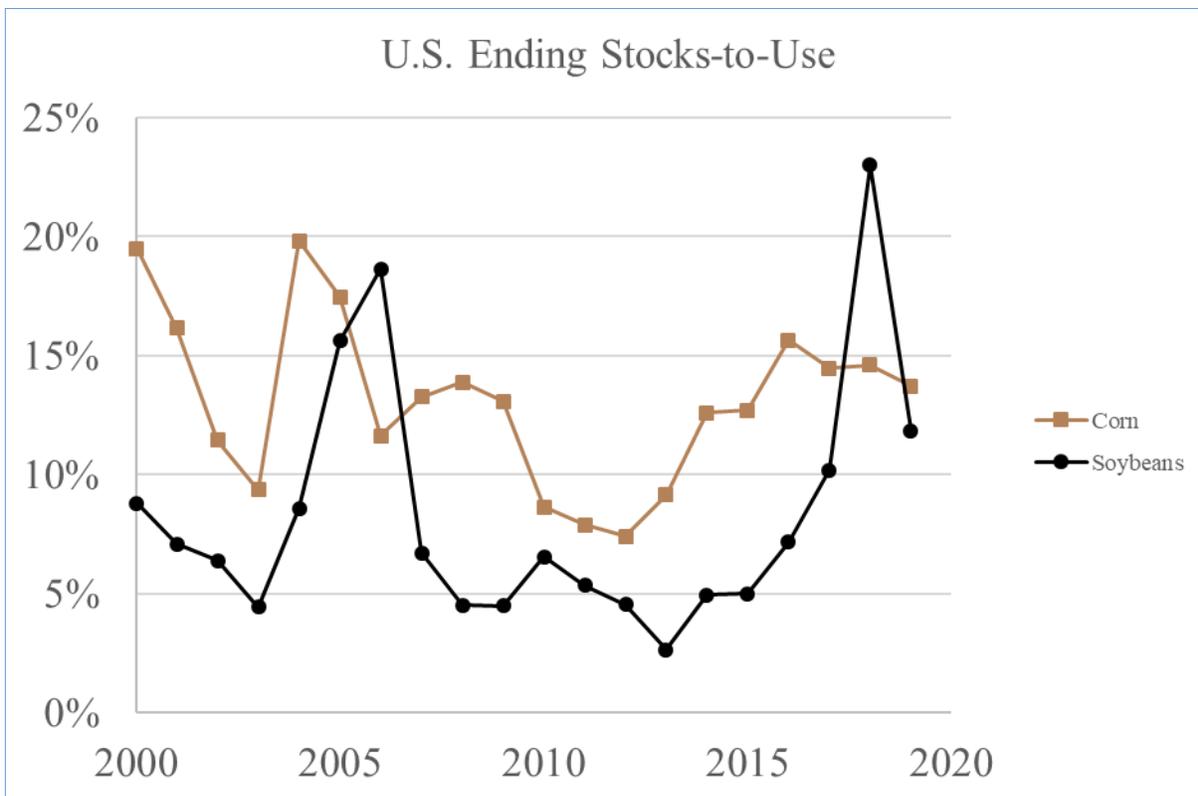


Figure 1. U.S. Ending Stocks-to-Use

<sup>1</sup> Petition for review filed by the Renewable Fuels Association, American Coalition For Ethanol, Growth Energy, National Biodiesel Board, National Corn Growers Association, and National Farmers Union v. US EPA, <https://ethanol.org/Website%20Uploads/Website%20Documents/Petition%20for%20Review%20of%202018%20SRE%20Decision%2010.22.2019.pdf>

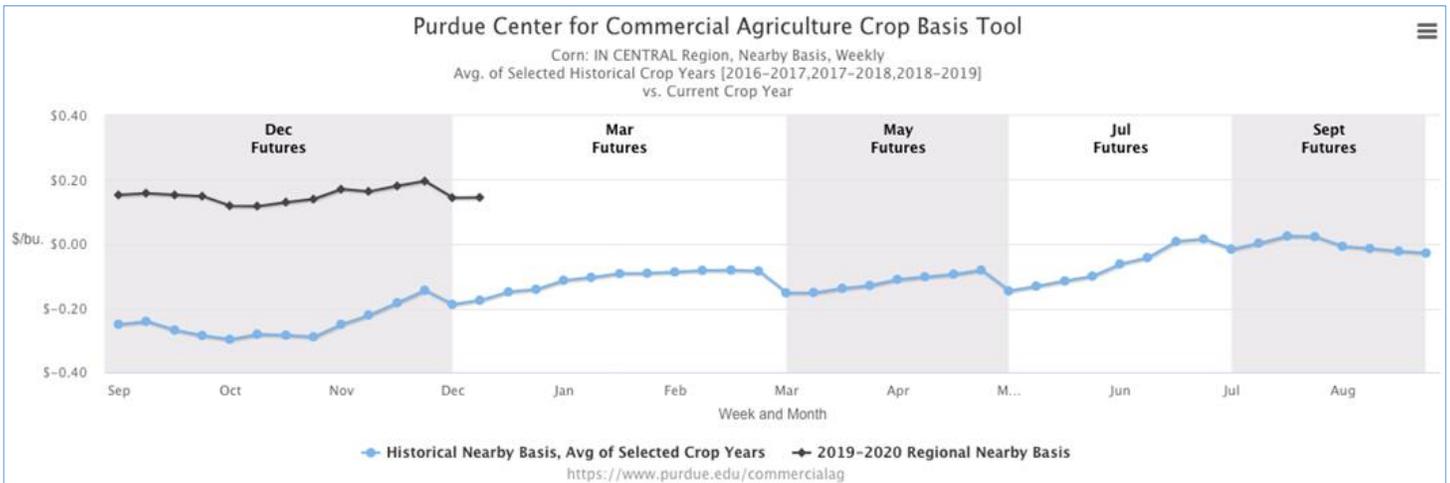


Figure 2. Purdue Center for Commercial Agriculture Crop Basis Tool. Average of selected historical crop years (2016-2017, 2017-2018, 2018-2019) versus current crop year for corn.

year and well below the 33% stocks/usage ratio recorded in 2016. In the next few months, weather in South America will reset expectations for global stocks. The tightening stocks situation means additional acreage/yield losses in the U.S. and any weather worries in South America could provide a boost to prices.

Corn basis has been especially strong in the Eastern Corn Belt this year. Strong local corn demand from livestock feeders and ethanol plants in the face of historically large prevented plantings of corn pushed corn basis up this past summer and it has remained strong through harvest. The Center for Commercial Agriculture's *Crop Basis Tool* (available at [purdue.edu/commercialag](https://www.purdue.edu/commercialag)) indicates early December corn basis bids were running \$0.20 to as much as \$0.32 per bushel above the most recent 3-year average across Indiana. The strongest Indiana basis bids have been in the northwest, northeast and central regions of the state. Producers will want to keep a

close eye on basis bids this winter and spring as the basis improvement that typically takes place from fall to late spring could be smaller than usual, especially if early prospects for the 2020 crop are good.

An early look at crop budgets for 2020 indicate a shift back towards corn is likely, suggesting that we will push U.S. corn acreage back above 90 million acres. Combined with a return to trend line yields for 2020 this implies a substantial boost to U.S. and world corn supplies is likely, pushing the corn carryover up substantially and putting pressure on prices. However, there is a quite a bit that can happen between now and when planters could start rolling in early spring. Uncertainty about final 2019 U.S. corn production, weather in South America and uncertain trade prospects impacting both corn and soybean demand could still alter the economics for corn versus soybean plantings significantly between now and planting time.

## 2020 Soybean Price Outlook

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A wet spring that led to severe planting delays in much of the Corn Belt, combined with a corn prevented planting option under federal crop insurance that was more attractive than late planting of soybeans, led to a sharp drop in U.S. soybean acreage in 2019. U.S. farmers planted just 76.5 million acres of soybeans in 2019, down almost 13 million acres compared to 2018. U.S. soybean planted acreage was the smallest since 2011 which, combined with an estimated national average yield that at 46.9 bushels per acre was down nearly 4 bushels per acre, resulted in a 20% decline in estimated 2019 soybean production compared to 2018. Although there is still some uncertainty about final harvested acreage and yield because of adverse harvesting weather, there is less uncertainty regarding soybeans than corn. As of early December, USDA estimated that U.S. soybean harvest was 96% complete compared to a 5-year average of 99% with North Carolina (75% harvested), Michigan (85% harvest-

ed) and North Dakota (92% harvested) falling farthest behind.

We are in the early stages of our third marketing year with U.S. producers facing 25% tariffs on soybean exports to China. The tariff war sharply reduced U.S. soybean exports in the 2018/2019 marketing year. Total exports of U.S. soybeans to all destinations averaged 2.15 billion bushels in the 2016/2017 and 2017/2018 marketing years, but fell 19% below that average in the 2018/2019 marketing year. Although the global supply chain did reshuffle with South America gaining market share in China and the U.S. gaining market share to other destinations, gains in exports by the U.S. to other markets were not large enough to offset reduced access to the Chinese market. U.S. soybean exports to all destinations totaled 1.75 billion bushels in 2018/2019 and USDA anticipates exports in the current marketing year to be just slightly larger, reaching 1.78 billion bushels. Settle-

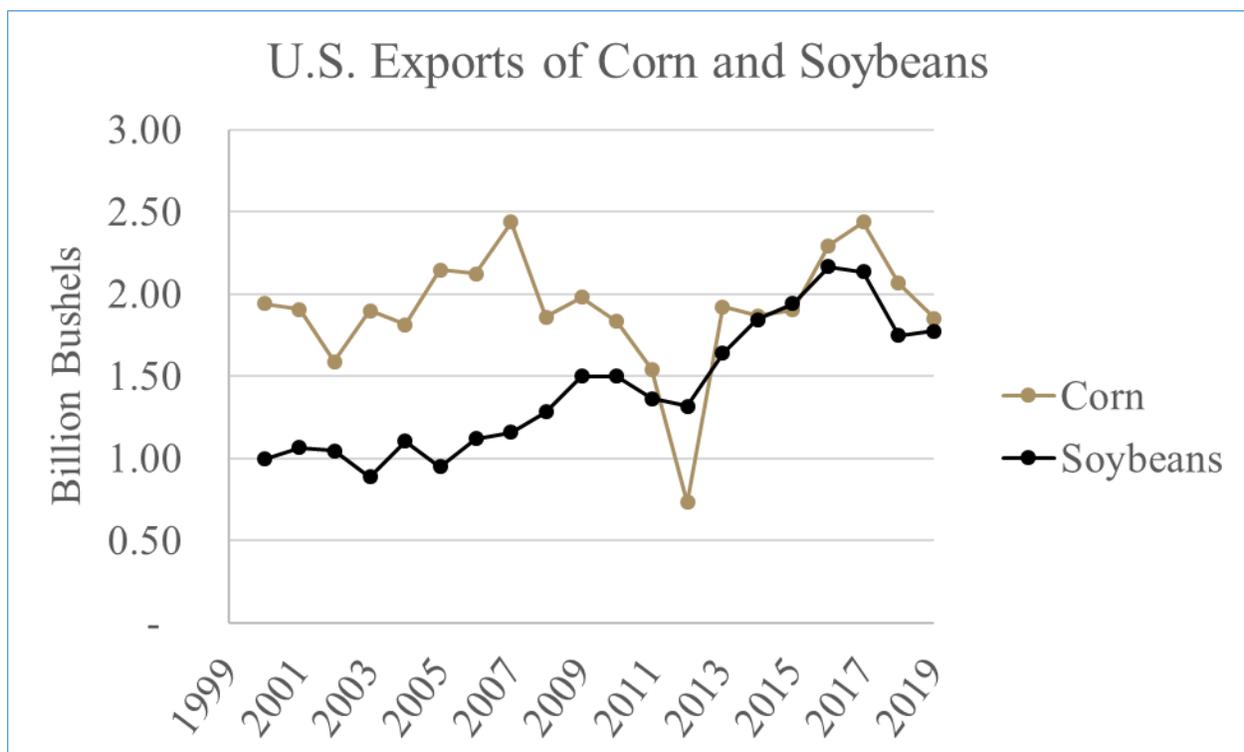


Figure 1. U.S. Exports of Soybeans and Corn in Billions of Bushels (2000-2019)

ment of the trade dispute soon with China could provide a boost to U.S. soybean exports. However, historically the bulk of U.S. soybean exports to China have been in the fall and early winter before South American supplies are available. So, to provide a significant boost to exports from the U.S. to China in the current marketing year, it's important to settle the trade dispute sooner rather than later.

There are also concerns about how much impact African Swine Fever (ASF) has had on demand for soybeans and soybean meal in China. USDA estimates that hog slaughter and pork production are falling sharply in China as ASF continues to ravage the Chinese pork industry. To help put the impact of ASF in perspective, it's important to realize just how large the Chinese pork industry is. China is the largest pork producer in the world and as recently as 2017 slaughtered just over 700 million pigs. In comparison, U.S. hog slaughter is expected to set a new record in 2019 at just over 134 million head. But in 2019, as the impacts of ASF became widespread, USDA estimates China's hog slaughter declined about 15% to 600 million head. Looking ahead to 2020, USDA anticipates a further decline of 27% to just 438 million head. If that turns out to be correct, it would constitute a 38% reduction in hog slaughter since 2017 and a significant decline in demand for soybean meal by the Chinese pork industry.

Even with the uncertainty on the trade front, the large reduction in 2019 soybean production is expected to tighten soybean carryover stocks significantly. Record soybean production in 2018 combined with weak exports produced a soybean carryover into the 2019/2020 marketing year of over 900 million bushels, equivalent to about 23% of total usage. But the combination of a sharp acreage reduction and lower yields this past season is forecast to reduce the soybean carryover into the 2020/2021 marketing year to less than 500 million bushels, equivalent to about 12% of usage.

Based in part upon that ending stocks estimate, USDA forecasts the 2019/2020 marketing year average price to improve by about 37 cents compared

to last year, which would yield a \$8.85 U.S. average price. But there are a lot of moving parts to watch out for in the forecast. Although the administration announced a large Phase One trade deal with China in mid-December, very few details were made available making it difficult to speculate on the deal's possible impact. Continued delays on the trade front could weigh on prices this winter. Although soybean stocks are expected to be much tighter at the end of the 2019/2020 marketing year than a year earlier, they are still not down into the range that led to significantly higher price levels in recent years. For example, ending stocks beginning with the 2007/2008 marketing year through the 2016/2017 marketing year averaged just 5% of usage. In comparison, even with this year's sharp stocks draw-down, U.S. soybean ending stocks are projected to total 12% of usage. As a result, it would likely take a big weather event in South America this winter to produce a sharp rally in soybean prices.

Looking ahead to 2020, look for a large increase in acreage compared to 2019, assuming a return to more typical weather. A return to a trend line national average yield of about 48 bushels per acre combined with a planted acreage of 85 million acres would boost 2020 production by approximately 500 million bushels compared to this year. If usage is held constant near this year's level, that implies a carryover into the 2021/2022 marketing year of just over 13%, just slightly larger than the projected carryover into the 2020/2021 marketing year, which would likely yield an average price near \$9.00 per bushel.





Take part in one of the most successful and longest-running management programs geared specifically for farmers — the Purdue Top Farmer Conference, featuring faculty and staff experts from Purdue's Center for Commercial Agriculture. Surrounded by farm management, farm policy, agricultural finance and marketing experts, and a group of your peers, the conference will stimulate your thinking about agriculture's future and how you can position your farm to be successful in the years ahead.

The 2020 Purdue Top Farmer Conference will feature some of the nation's top experts on marketing, risk management and crop production, and will take place on Friday, January 10, 2020 at the Beck Agricultural Center located at 4540 U.S. 52 West, West Lafayette, IN 47906. A pre-conference session focused entirely on risk management strategies will take place in the afternoon on Thursday, January 9, 2020.

**"Uncertain economic conditions plagued the 2019 agricultural economy leaving farmers with tough decisions ahead of next year's planting season" said James Mintert, Purdue agricultural economics professor and director of the Center for Commercial Agriculture. "The 2020 Top Farmer Conference was developed to address concerns producers and agribusiness professionals may face in the coming year and help them identify strategies to position their operations for future success."**

This year's half-day pre-conference is entitled Ag Survivor, which provides farmers with hands-on experience developing strategies for managing risks in

their operation. This pre-conference workshop, which has been used by thousands of farmers nationwide, will be conducted by a faculty team from the University of Wyoming and the University of Nebraska. The main conference includes sessions on: long- and short-term agricultural outlook; recent trends and prospects for farmland markets across the Corn Belt; insights into the use of and impacts of using cover crops; and a comparison of the ARC and PLC programs as farmers prepare to make their Farm Bill decisions by mid-March.

Purdue professors Nathan DeLay, Nathan Thompson, and James Mintert will share survey data from crop farmers regarding their usage of digital ag technology on their farms. Purdue's crop production specialists, Robert Nielsen and Shaun Casteel from Purdue Agronomy and Bill Johnson from Purdue Weed Science, will discuss lessons from 2019 that can be applied to farmer's 2020 production plans. The conference will conclude with a session featuring well known crop climatologist, Eric Snodgrass, from Nutrien Ag Solutions and the University of Illinois, on weather and climate impacts on crop production and managing weather risk in production agriculture.

Registration for the Conference (January 10, only) is \$150 or \$50 for the Pre-Conference (January 9, only). For those wanting to attend both days, the center is offering a bundled discount of \$175.

The conference is sponsored by Purdue University's Center for Commercial Agriculture and Farm Credit Mid-America. For more information, contact Sarah Zahn at [smithse@purdue.edu](mailto:smithse@purdue.edu), 765-494-7004, or visit [purdue.ag/topfarmer20](http://purdue.ag/topfarmer20).

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