2022

ANNUAL REPORT

PURDUE UNIVERSITY | Center for Commercial Agriculture

DIRECTOR'S LETTER

This past year was an exciting one for the Center for Commercial Agriculture. The year started with the 2022 *Purdue Top Farmer Conference* on January 7th. Purdue was still operating under COVID restrictions at the start of the year so, for the second year in a row, the conference was held virtually by broadcasting from Purdue's Stewart Center. Over 260 people registered for the conference which featured sessions on storing carbon in agricultural soils, farmland values, strategies to deal with the rise in crop production costs and a keynote presentation by the University of California's Frank Mitloehner on animal ag's path to climate neutrality.

The way the Center delivers information continues to evolve with more information being delivered online. The Center's outlook programming is delivered primarily by a combination of webinars and podcasts with 10 webinars and related podcasts delivered throughout 2022. The Center's *Purdue Commercial AgCast* podcast is becoming increasing popular with a total of 40 episodes published during 2022. The Center's webinars during 2022 had nearly 13,000 registrants and *Purdue Commercial AgCast* podcasts had nearly 16,000 downloads.

The 2022 *Purdue Farm Management Tour* was held in Tipton and Clinton Counties, Indiana in mid-July with over 200 producers and agribusiness personnel attending the Tour and early evening Master Farmer reception held at Beck's Hybrids in Atlanta, Indiana. Thanks to the Henderson, Orr and Stafford families for their willingness to open up their farming operations to visitors and to share their expertise on crop production, farm management strategies, succession planning and facility designs.

The Center's monthly newsletter *Commercial AGNews* continues to be a great way to stay up-to-date regarding upcoming programming as well as what's new on the Center's website with nearly 11,000 subscribers. Social media is also an important way to get information out to users and during 2022 the Center provided over 550 social media posts available on Twitter and Facebook.

As the nation's only monthly survey of commercial ag producers, the *Purdue University-CME Group Ag Economy Barometer* provides insights into producer sentiment while also providing opportunities to learn more about producers' reactions to contemporaneous events affecting the agricultural sector. Each month during 2022 the Center published an *Ag Economy Barometer* report summarizing survey results, posted a short YouTube summary video and an in-depth podcast interpretation of the current month's barometer survey, all accessible via the Center's website and by subscription. The barometer is widely reported in both the ag and business press and is the subject of a large number of media interviews each month.

Thank you for your interest in and support of the Purdue Center for Commercial Agriculture. As always, if you have suggestions for future programs or research, or you just want to chat, we'd love to hear from you.

Sincerely,

James Mintert

Director

MONTHLY OUTLOOK

CORN & SOYBEAN UPDATE FOLLOWING USDA REPORTS

Each month in 2022, the Center hosted a free webinar and/or released a podcast episode providing an in-depth update on the corn and soybean outlook following release of USDA's monthly *Crop Production* and *World Agricultural Supply and Demand Estimates* (WASDE) reports. Purdue ag economists Michael Langemeier, Nathanael Thompson and James Mintert reviewed information from the updated supply/demand estimates along with other key information on exports, industrial and feed usage. A farm risk management discussion is included in each webinar featuring a review of estimated corn and soybean production costs, crop basis and marketing opportunities along with net farm income projections.

The webinar recordings were uploaded to the Center's YouTube channel while the audio recordings were released as *Purdue Commercial AgCast* podcast episodes. Both the video and audio programs were subsequently posted, along with the slides used during the webinar presentation, on the Center's website. The participant list has grown to include over 1200 individuals who receive a monthly email reminder with the webinar date, time and login information and a follow-up email after the webinar to view the video recording and/or podcast and download the slides used during the webinar.

	DATE	YOUTUBE VIEWS*	PODCAST DOWNLOADS*	WEB PAGEVIEWS*	LIVE VIEWS	REGISTRATIONS
December Corn & Soybean Outlook Update	12/19/22	188	239	294	71	1,213
November Corn & Soybean Outlook Update	11/11/22	303	338	516	58	1,241
October Corn & Soybean Outlook Update**	10/14/22		517	387		1,204
September Corn & Soybean Outlook Update	9/16/22	398	359	388	85	1,040
August Corn & Soybean Outlook Update**	8/12/22		477	368		947
July Corn & Soybean Outlook Update**	7/13/22		524	464		923
June Corn & Soybean Outlook Update	6/13/22	485	326	530	88	862
May Corn & Soybean Outlook Update	5/16/22	353	478	349	129	1,117
April Corn & Soybean Outlook Update	4/12/22	442	412	520	129	1,059
Corn & Soybean Prospective Plantings Report Update**	4/4/22		345	142		
March Corn & Soybean Outlook Update**	3/11/22		519	318		955
February Corn & Soybean Outlook Update	2/10/22	563	418	392	158	1,011
January Corn & Soybean Outlook Update	1/14/22	642	413	425	95	861

**all time views since publication, data pulled on January 12, 2023*

***released as podcast ONLY*

FINANCIAL MANAGEMENT

STATEMENTS, ANALYSIS & STRATEGY

	DATE	PODCAST DOWNLOADS*	WEB PAGEVIEWS*
U.S. Farm Sector Capital Expenditures	12/6/22		312
Tax Planning & Working Capital In A Strong Income Year	11/23/22	344	143
Feed Cost Indices For Laying Hens In 2023	11/1/22		61
Prospects For Swine Feed Costs In 2023	11/1/22		34
U.S. Farm Sector Financial Performance	11/1/22		63
Crop Budget Spreadsheet	10/25/22		6,039
Tax Planning For High-Income Years	10/13/22		192
U.S. Farm Sector Balance Sheet	10/6/22		227
What Is Your Breakeven Price For Corn And Soybeans?	10/4/22		329
2023 Crop Cost And Return Guide	9/30/22		1,220
Farm Impact From Rising Inflation And Interest Rates: September Update	9/29/22	321	76
Comparing Net Returns For Alternative Leasing Agreements	9/2/22		211
Conventional And Organic Enterprise Net Returns	8/3/22		410
Rising Interest Rates...Implications For Farmers	7/22/22	343	408
Trends In Working Capital	7/1/22		141
Nontraditional Lenders And Their Impact On The Agricultural Credit Markets	6/1/22	373	173
Impact Of Higher Corn Prices On Feeding Cost Of Gain And Net Returns For Cattle Finishing	4/28/22		138
Inflation, Interest Rates & The Cost Of Farm Inputs	4/20/22	518	718
Trends In General Inflation And Farm Input Prices	4/19/22		603
2022 Crop Cost And Return Guide	3/22/22		8,640
Cattle Finishing Net Returns Prospects For 2022	1/7/22		384

**all time views since publication, data pulled on January 12, 2023*

The Center's farm financial management information provides an introduction to financial statements and analysis, but also serves as a refresher for those that may have studied this topic in college. The first topic addresses why someone on the farm needs to be responsible for putting together financial statements and analyzing the information contained in these statements. Most farms put together a balance sheet and have cash income and expense information that can be used for taxes. Producers are encouraged to leverage this balance sheet and cash flow data to develop an accrual income statement, sources and uses of funds statement, and statement of owner's equity. A case farm is used to develop an example of each financial statement. Articles pertaining to working capital, how much debt a farm can carry, and the relationship between Schedule F net farm profit and accrual net farm income are also available.

Using the financial statements for the case farm, key financial performance benchmarks are illustrated and discussed. Specifically, financial ratios that measure farm profitability, the efficiency of farm asset utilization, and repayment capacity are illustrated and discussed in separate articles. Particular emphasis is given to the operating profit margin ratio, the asset turnover ratio, return on assets, and return on equity. Benchmarks that are not commonly included in discussions of financial ratios; such as machinery investment and cost per acre, and labor productivity and efficiency; are also illustrated and discussed using the case farm data.

Publications that describe the U.S. farm balance sheet, net farm income, capital expenditures, and financial performance are also provided. These publications contain current U.S. estimates, but also discuss trends in U.S. farm financial data.

The articles on the Center's web site are used for the farm financial signature program that is delivered by Center staff and county educators. The signature program entails six to seven hours of training on financial statements and financial analysis, with emphasis on hands-on activities involving spreadsheets related to financial ratios, enterprise budgeting, and partial budgeting.

FARM MANAGEMENT

PRODUCTION & MARKETING STRATEGY

Throughout the year, the Center provides information on a variety of different farm management topics. Outputs range from articles posted on the Center's website to webinars and podcasts. Subscribers to the Center's webinars and podcasts receive updates via email or their podcast provider. Topics covered in 2022 ranged from annual updates on Indiana farmland values and cash rental rates and benchmarking of production costs to more contemporaneous topics including the impact of the war in Ukraine on the corn market.

The Center also provides several farm management tools in spreadsheet form on the Center's website via the Decision Tools link on the Center's main menu bar. Several new tools were posted in 2022 which included the Crop Budget, Comparison of Conventional & Organic Crop Rotations, Comparison of Conventional with an Organic Forage Based Crop Rotation and Cover Crop tools.

	DATE	YOUTUBE VIEWS*	PODCAST DOWNLOADS*	WEB PAGEVIEWS*	LIVE VIEWS	REGISTRATIONS
U.S. Corn Exports Off to a Weak Start	11/23/22			56		
River Levels and Barge Rates Impacting Corn and Soybean Basis	11/23/22			164		
Indiana Farmland Values & Cash Rental Rates 2022 Update	8/24/22	900	539	3,456	179	335
Indiana Farmland Prices Grow At Record Pace In 2022	8/10/22			4,885		
Explaining Fluctuations In DDG Prices	5/31/22			668		
Farm Management Strategies to Navigate a Volatile Market, Commodity Classic 2022	5/11/22	159		263	400	
Agricultural Job Market & The Purdue Ag Jobs Dashboard**	5/9/22		346	128		
International Benchmarks For Wheat Production	5/5/22			2,302		
International Benchmarks For Soybean Production	3/29/22			2,062		
Crop Insurance Choices For 2022**	3/4/22		417	212		
International Benchmarks For Corn Production	3/4/22			468		
Understanding The Corn Market's Response To War In Ukraine	3/3/22			1,696		
Exports Continue To Be A Bright Spot For U.S. Pork Sector	2/22/22			176		
Benchmarking Labor Efficiency And Productivity	2/4/22			603		

all time views since publication, data pulled on January 12, 2023

***released as podcast ONLY*

FARM SUCCESSION & CONTINGENCY PLANNING

PARTNERSHIP WITH PURDUE INSTITUTE FOR FAMILY BUSINESS & EXTENSION

The Center, in partnership with the Purdue Institute for Family Business and Purdue Extension, covered several succession planning topics on the *Purdue Commercial AgCast* podcast in 2022. Started as a series in 2021 with 11 episodes, and built upon with six additional episodes this year, Brady Brewer hosted Maria Marshall, Renee Wiatt, Michael Langemeier, Heather Caldwell, Ed Farris, Kelly Heckaman, Jenna Nees, and Kyle Weaver as guests on the podcast to discuss key components to farm transition planning.

The two December episodes were also part of a new contingency planning series based on the *Six Pillars of Farm Risk Management* Extension course, funded by the North Central Extension Risk Management Education Center. The series encompasses a process to mitigate, transfer, and avoid risks in production, marketing, financial, legal, human resource, and social media. Contingency plans help businesses efficiently recover from disruptions or disasters. This series will conclude with three additional episodes in the new year.

	DATE	PODCAST DOWNLOADS*	WEB PAGEVIEWS*
Production Risk Management & Contingency Planning	12/28/22	155	4
Human Resource Risk Management & Contingency Planning	12/14/22	175	20
10 Tips For Communication In Your Farm Business	9/26/22	275	48
Farm Succession: Roadmapping Your Farm Transition	7/15/22	303	64
Farm Succession: Financial Readiness For Succession	7/6/22	301	87
Farm Succession: Exiting The Business In A Timely Manner	6/4/22	284	107

**all time views since publication, data pulled on January 12, 2023*

Maria Marshall, Renee Wiatt and Brady Brewer recording a podcast episode.

FIND MORE

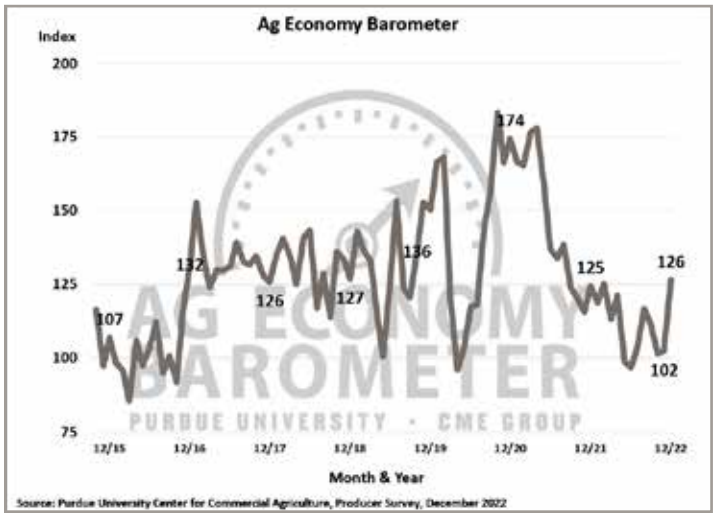
A Production Risk checklist and other contingency planning resources can be found on the Purdue Institute for Family Business' website at https://purdue.ag/fambiz.

AG ECONOMY BAROMETER

MONTHLY FARMER SENTIMENT SURVEY ON THE AG ECONOMY

The *Purdue University/CME Group Ag Economy Barometer* is a nationwide measure of U.S. agricultural producers' sentiment regarding both their farms and the U.S. agricultural economy's health. Each month the Center surveys 400 commercial scale agricultural producers from across the U.S. Respondents each month are drawn from a large database of commercial agricultural producers and each month's survey pool is stratified to mirror the percentage contribution to the value of U.S. farm production for principal crop (corn, soybeans, wheat and cotton) and livestock (beef, pork, and dairy) enterprises as estimated by the U.S. Census of Agriculture. Results are reported on the first Tuesday of each month and include not only the barometer but also the *Index of Current Conditions*, the *Index of Future Expectations*, the *Farm Capital Investment Index*, and both the *Short and Long-Term Farmland Value Expectations Indices*.

The Center for Commercial Agriculture, in partnership with the CME Group, reaches over 16,500 subscribers each month with a monthly email update highlighting the results from that month's *Ag Economy Barometer* survey in addition to providing links to a short video that provides an overview of the survey's results. Purdue ag economists James Mintert and Michael Langemeier also share insights into the *Ag Economy Barometer* survey results each month in an episode of the *Purdue Commercial AgCast* podcast in addition to interviews with a variety of ag media outlets.



Purdue/CME Group Ag Economy Barometer, Oct. 2015-Dec. 2022.

	DATE	YOUTUBE VIEWS*	PODCAST DOWNLOADS*	WEB PAGEVIEWS*
High Input Costs And Rising Interest Rates Top Concerns As Farmer Sentiment Remains Unchanged	12/6/22	179	307	2,907
Ag Economy Barometer Declines Again, Producers Express Concern About Interest Rate Policy	11/1/22	238	314	3,435
Farmer Sentiment Drifts Lower, Rising Interest Rates Contribute To Uneasiness	10/4/22	96	339	3,982
Farmer Sentiment Improves But Producers Still Concerned About Rising Costs And Inflation	9/6/22	122	297	3,743
Slight Increase In Producer Sentiment Despite Rising Costs And Lower Crop Prices	8/2/22	126	338	4,967
Farmer Sentiment Remains Weak, Crop Producers Contemplating Acreage Shifts In 2023	7/5/22	151	311	6,115
Farmer Sentiment Plummets As Production Costs Skyrocket	6/7/22	166	371	6,078
Producer Sentiment Improves With Strengthened Commodity Prices; But High Cost Inflation Worries Farmers	5/3/22	140	377	4,156
g Economy Barometer Slides Lower, Producers Concerned About War's Impact On Input Prices	4/5/22	134	337	3,639
Farmer Sentiment Rises During Commodity Price Rally; Concern Over Production Costs Remains	3/1/22	149	320	3,256
Ag Economy Barometer Declines, Producers Concerned About Rising Costs And Supply Chain Disruptions	2/1/22	175	336	3,546
armer Sentiment Rises On Strengthening Current Financial Position	1/4/22	170	390	4,033
What We've Learned From The Ag Economy Barometer**	1/25/22		307	32

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ASSOCIATION OF AGRICULTURAL PRODUCTION EXECUTIVES

FORT WORTH, TEXAS

The membership of the Association of Agricultural Production Executives (AAPEX), an organization that is now more than two decades old, is composed of many of the nation's leading agricultural producers. AAPEX is devoted to ongoing executive education for its members. The Center for Commercial Agriculture delivered the 2022 AAPEX Annual Meeting in Ft. Worth, Texas, February 1 – 4, 2022. Over 160 AAPEX members attended the 2022 meeting representing 27 states and two countries. There were several great speakers and topics covered, including keynote sessions from Peter Zeihan, Dr. Gustavo Grodnitzky and Dr. David Kohl. In 2022 the program continued the pre-meeting field tour that included a visit to an AAPEX member farm business and local winery. Working with this group of producers provides the Purdue faculty and staff with insights into the research and educational needs of America's leading farmers and provides opportunities for further collaboration. 2022 was the sixth year for Purdue University to be involved in the AAPEX meeting.

AAPEX
ASSOCIATION OF AGRICULTURAL PRODUCTION EXECUTIVES

PURDUE TOP FARMER CONFERENCE

1-DAY VIRTUAL CONFERENCE

The Purdue Top Farmer Conference is one of the most successful and longest running management programs geared specifically for farmers. On January 7, 2022, the Center hosted the Purdue Top Farmer Conference virtually again due to the on-going pandemic. Over 260 registered for this year's conference, with keynote speaker Dr. Frank Mitloehner, professor of Animal Science & Air Quality Extension Specialist and director of University of California-Davis' CLEAR Center, who discussed animal agriculture and the path to climate neutrality. Purdue's Nathan Thompson, Carson Reeling, and Shalamar Armstrong discussed opportunities and challenges of storing carbon in agricultural soils. Purdue's Todd Kuethe, Schrader Real Estate and Auction Co.'s RD Schrader, and Halderman Real Estate & Farm Management's Howard Halderman discussed new record high farmland prices and the drivers behind the sharp increase in farmland values. Purdue's Dan Quinn, Shaun Casteel, Bill Johnson, and Michael Langemeier examined the impact of the dramatic rise in crop input prices and gave strategies to deal with the rise in crop production costs. The 2022 virtual conference allowed the Center to reach participants in 33 states and several more internationally.

PURDUE FARM MANAGEMENT TOUR & INDIANA MASTER FARMER RECEPTION

TIPTON & CLINTON COUNTIES

The 89th annual Purdue Farm Management Tour was held July 19-20, 2022, in Tipton and Clinton counties. The Department of Agricultural Economics at Purdue University has organized an annual Indiana farm management tour every year since the early 1930s. One of the tour's primary goals is to encourage Hoosier farmers to develop high-level management knowledge and skills. M&K Henderson Family Farm, Henderson Ag Advantage, Orr Farms, and Stafford Farms hosted and provided tour attendees with insights about innovative ways to approach the challenges facing today's farming operations. In addition to touring three progressive and diverse operations, the 2022 tour also included the Master Farmer Reception & Panel Discussion at Beck's

Hybrid's headquarters near Atlanta, Indiana.

On this year's Tour, we had a chance to learn how the Henderson's have combined farming with their pursuit of entrepreneurial opportunities to help ensure a successful farm transition. The M&K Henderson Family Farm operation emphasized improving soil health using a combination of no-till, strip-till, and cover crops. Over the years, the Henderson family has also focused on improving drainage, moving beyond solving wet spots to improving yields by pattern tiling. Tour attendees got to see first-hand the Orr's new stand-alone grain facility with a GrainHandler Continuous Mix-Flow dryer which provides the Orr's with capacity to store 100% of the seed beans, waxy corn and white corn their farm produces. Staying up-to-date on new technology is important on Orr Farms and their new 2022 model corn and soybean planters were both on display at this tour stop. The Stafford's new state of the art farm shop was highlighted during the final stop of the tour. In addition to their hog enterprise, Stafford's raise seed

corn and have been installing pattern tile using their own equipment. To prepare their farming operation for transition to the next generation, Stafford's have implemented a plan to move major assets from father to sons over time.

The Master Farmer program is a long-standing tradition in Indiana and honors individuals who have contributed heavily to Indiana agriculture and demonstrated success in farming efficiency, stewardship of natural resources and community service. A reception with a panel discussion was held in conjunction with the tour to honor the 2022 Indiana Master Farmers on July 19, 2022.

A special thanks to the Henderson, Orr, and Stafford families for sharing details about their farm operations, and to the Tour's local coordinator, Adam Shanks, Purdue Extension's Clinton County Educator as well as this year's Tour sponsors, Indiana Farm Bureau Insurance and Farm Credit Mid-America. See more insights and photos from the Tour on Twitter #PFMT22.

COMMODITY CLASSIC

NEW ORLEANS, LOUISIANA

Commodity Classic welcomed the ag industry back together in New Orleans, March 10-12, 2022. The Center and the CME Group presented a Learning Center Session on Friday, March 11 entitled Farm Management Strategies to Navigate a Volatile Market. In the session, Jason Henderson, Associate Dean, College of Agriculture and Director of Purdue Extension, Michael Langemeier, Professor, Department of Agricultural Economics and Associate Director, Center for Commercial Agriculture, Nathan Delay, Assistant Professor, Department of Agricultural Economics, Purdue University, and James Mintert, Professor, Department of Agricultural Economics, and Director, Center for Commercial Agriculture shared what U.S. ag producers are saying about economic conditions on their farms and the U.S. ag economy featuring the latest data from the Purdue/CME Group Ag Economy Barometer. The session also included an update on current production costs and profitability estimates for corn and soybeans in 2022, insight into Federal Reserve policy, inflation, and interest rates along with a discussion about the impact of precision ag technology on production costs and how users are getting the most out of precision ag. To better manage risk, the panel suggested producers use scenario analysis to see how different scenarios will impact their farm's finances. The session concluded with panelists responding to questions posed by producers attending the session. The Center's faculty and staff were also available during the Commodity Class trade show welcoming visitors at the Purdue University booth.

17K

DOWNLOADS IN 2022

In 2022, the Center delivered 40 new podcast episodes and had over 16,000 total downloads, an increase of 38% over 2021. All time AgCast downloads neared 33.5k with Apple Podcast as the favorite platform with 59% of the downloads, followed by about 13% listening from a web browser via our website.

PODCAST

The Center launched the Purdue Commercial AgCast podcast in April 2020, as the COVID-19 pandemic created a need for improved remote access to information and a broader reach in a more convenient way. Since launching the podcast, the Center has delivered 113 episodes with over 33.5k downloads. Purdue ag economists Brady Brewer and James Mintert serve as the weekly hosts of the podcast, geared towards covering farm management news and advice for top agricultural producers and agribusinesses, and cover a variety of topics from ag outlooks, farm succession-transition planning, farm finances and farm management, as well as insights from the Purdue/CME Group Ag Economy Barometer. The podcast can be accessed directly from the Center's website or all major podcast apps including Apple Podcasts, iTunes, Stitcher, Spotify and Podbean.

YOUTUBE

Webinars and informational videos from the Center are shared with a broad audience from the Center's YouTube channel. The Center works with the Purdue Video & Multimedia Production studio to broadcast webinars live and produce high-quality recordings that are shared on the Center's YouTube channel for participants to watch at their convience. Since the channel's launch in May 2016, the Center has delivered 197 total webinars and recorded videos on farm and financial management, ag outlooks, and strategic topics, as well as breakdowns on the Purdue/CME Group Ag Economy Barometer. The Center's channel has over 55.9k lifetime views, 10.6k watch time hours, and over 800 subscribers.

NEWSLETTER

Making producers and agribusiness personnel aware of the information available from the Center is a challenge. The Center's monthly newsletter Commercial AgNews has proven to be a good way to provide an update regarding upcoming programming as well as what's new on the Center's website to nearly 11,000 subscribers.

WEBSITE/ARTICLES

The department's Purdue Agricultural Economics Report (PAER) is hosted on the Center's website as well as many well written articles and publications, upcoming events and programs, recorded videos, presentations, tools and podcasts. In 2022, the Center's home website averaged over 11,000 visitors per month with over 241.7k pageviews, 16.3k pdf and tool downloads, and 13.5k video views.

The Center also hosts an additional website for the Purdue University/CME Group Ag Economy Barometer. The site is updated monthly with survey results in a written report and press release, as well as updated charts, tables and media files. With an average of 1,800 visitors per month, the Center's Ag Economy Barometer website averaged 40k pageviews and 1,600 downloads in 2022.

789

YOUTUBE SUBSCRIBERS

During 2022, 22 new videos were added to the Center's YouTube channel with over 9,000 views and 1500 watch time hours.

CROP BASIS TOOL

Developed by Nathan Thompson, the Center's Crop Basis Tool allows users to examine weekly nearby and deferred basis for corn and soybeans in Illinois, Indiana, Michigan, and Ohio. Daily cash price data from individual grain elevators and processors are averaged within each crop reporting district to create a regional average cash price series. The regional average cash price data is used to compute weekly basis (cash price minus futures price) for corn and soybeans, using Wednesday cash and futures prices to generate weekly basis data for each crop and crop reporting region. The number of buyers vary by crop reporting district and by week, depending on how many buyers choose to report their cash prices. Cash price data are provided by DTN and represent approximately 2,000 buyers across the four states.

SOCIAL MEDIA

From sharing barometer reports and monthly outlook highlights to promoting upcoming programs and recently released resources, social media is an important way to reach a wider audience and get information into new hands. The Center is active on both Twitter and Facebook with over 2100 followers. In 2022, the Center provided nearly 550 social media posts with over 163k views and a 3% engagement rate.

RESOURCE HIGHLIGHT

COMPARING NET RETURNS FOR ALTERNATIVE LEASING ARRANGEMENTS

Michael Langemeier

Obtaining control of land through leasing has a long history in the United States. Leases on agricultural land are strongly influenced by local custom and tradition. However, in most areas, landowners and operators can choose from several types of lease arrangements. With crop share arrangements, crop production and often government payments and crop insurance indemnity payments are shared between the landowner and operator. These arrangements also involve the sharing of at least a portion of crop expenses. Fixed cash rent arrangements, as the name implies, provide landowners with a fixed payment per year. Flexible cash lease arrangements provide a base cash rent plus a bonus which typically represents a share of gross revenue in excess of a certain base value. Each leasing arrangement has advantages and disadvantages. These advantages and disadvantages are discussed on the Ag Lease 101 web

site (here). Rather than focusing on the advantages and disadvantages of various lease arrangements, this article uses a case farm in west central Indiana to illustrate net returns to land derived from crop share, fixed cash rent, and flexible cash lease arrangements. This article updates an article written by Langemeier (2021).

LEASING ARRANGEMENTS

Net return to land from 2007 to 2022 from a landowner perspective were computed for a case farm in west central Indiana. Information for 2022 was projected using income and cost projections in early September. The case farm had 3000 crop acres and utilized a corn/soybean rotation. Lease arrangements examined included a crop share lease, a fixed cash rent lease, and a flexible cash lease.

With the crop share lease the landlord received 50 percent of all revenue (crop revenue, government payments, and crop insurance indemnity payments). In addition to providing the land, the landowner paid 50 percent of seed, fertilizer, and chemical (herbicides, insecticides, and fungicides) expenses as well as 50 percent of crop insurance premiums. The case farm participated in government programs (e.g., ARC-CO and PLC programs), and purchased 80 percent revenue protection coverage.

Fixed cash rents were obtained from the annual Purdue Farmland Value Survey. Specifically, cash rents for average productivity land in west central Indiana were used. The flexible cash lease arrangement used a base cash rent that was 90 percent of fixed cash rent. In addition to the base case rent, the landowner received a bonus of 50 percent of the revenue above non-land cost plus base cash rent if revenue exceeded non-land cost plus base cash rent. Revenue included crop revenue, government payments, and crop insurance indemnity payments. All cash and opportunity costs, except those for land, were included in the computation of non-land cost. More discussion regarding possible parameters that can be used for flexible cash leases can be found in Langemeier (2018).

COMPARISONS OF NET RETURN TO LAND AMONG LEASING ARRANGEMENTS

Before making comparisons between leases, we will briefly discuss bonus payments for the flexible cash lease. Per acre bonus payments for the flex cash lease arrangement are illustrated in figure 1. During the 2007 to 2022 period, bonus payments were incurred in 10 years. Bonus payments ranged from $0 to $137 per acre, and averaged $42 over the 2007 to 2022 period. From 2007 to 2013, the average bonus payment was $59 per acre. The annual bonus payment from 2014 to 2019 was zero. The bonus payment from 2020 to 2022 averaged approximately $85 per acre. The largest bonus payment, $137 per acre, occurred in 2021.

Pairwise comparisons were used to compare the three leasing arrangements. Figure 2 compares the crop share lease to the fixed cash rent lease. The landowner net return for the crop share lease was more variable. As would be expected, net return for the crop share

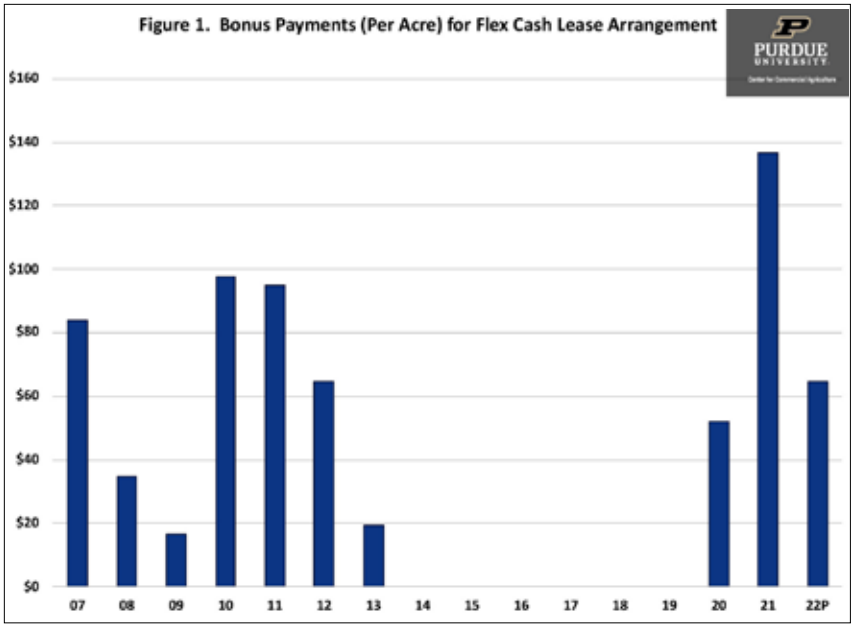


Figure 1. Bonus Payments (Per Acre) for Flex Cash Lease Arrangement

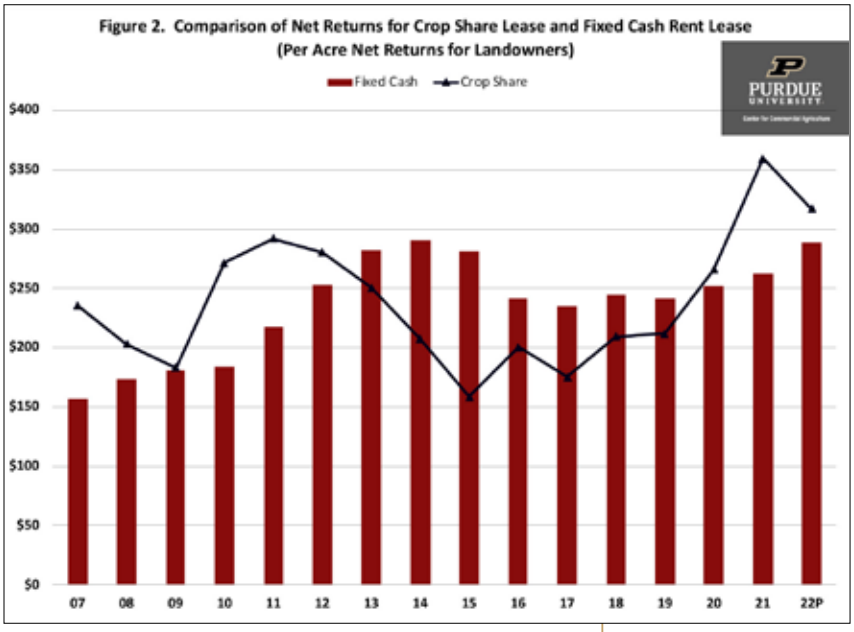


Figure 2. Comparison of Net Returns for Crop Share Lease and Fixed Cash Rent Lease (Per Acre Net Returns for Landowners)

lease increased faster when revenue was increasing, but also decreased more rapidly when revenue was declining. The net return for the crop share lease was higher than the net return for the fixed cash rent lease from 2007 to 2012. From 2013 to 2019, the net return for the crop share lease was from $29 per acre (in 2019) to $122 per acre (in 2015) below the net return for the fixed cash rent lease. On average, from 2013 to 2019, the net return for the crop share lease was $57 per acre below the net return for the fixed cash rent lease. From 2020 to 2022, the net return for the crop share lease was from $14 to $97 higher than the net return for the fixed cash rent lease. The average difference during the 2020 to 2022 period was $46 per acre.

Figure 3 compares the net return for the flexible cash lease to the net return for the fixed cash rent lease. This graph looks remarkably similar to figure 2. Net returns for the flexible cash lease were more volatile than the net returns for the fixed cash rent lease. The net return for the flexible cash lease was relatively higher in 2007-2008, 2010-2012, and 2020-2022. During the 2007 to 2013 period, the average net return for the flexible cash lease was similar to the average net return for the share rent lease, and $38 per acre higher than the average net return for the fixed cash rent lease. From 2014 to 2019, the annual net return for the flexible cash rent lease was on average $26 per acre below the net return for the fixed cash rent lease. However, it is important to note that during this same

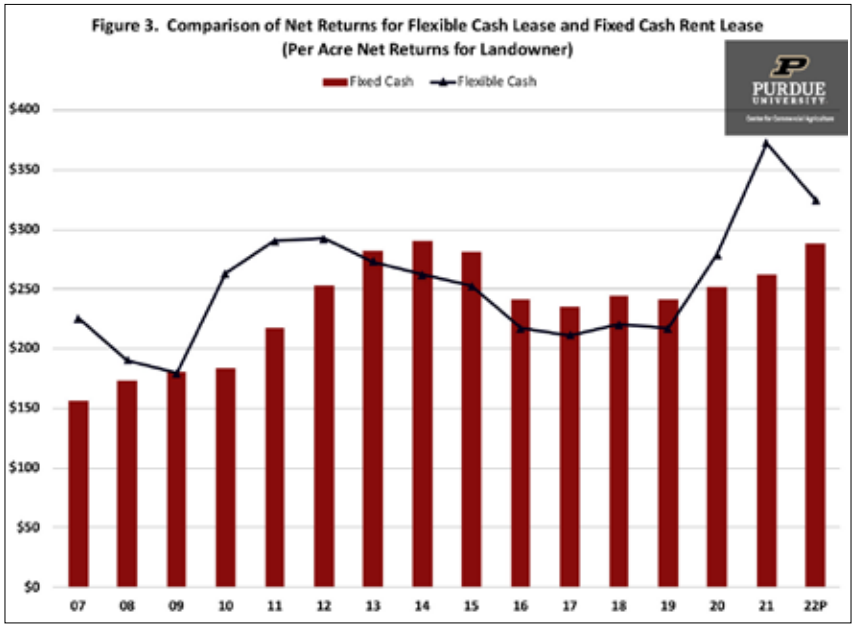


Figure 3. Comparison of Net Returns for Flexible Cash Lease and Fixed Cash Rent Lease (Per Acre Net Returns for Landowner)

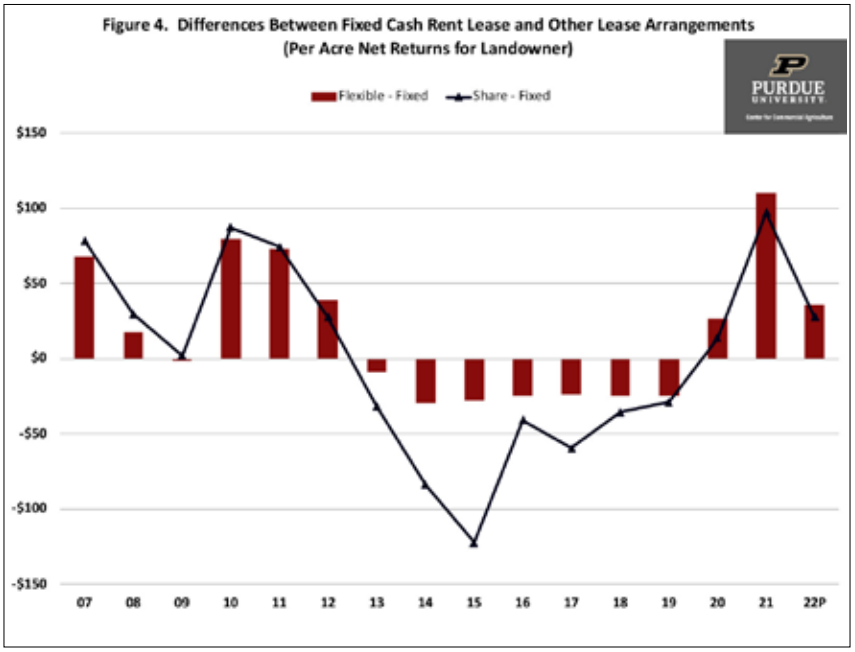


Figure 4. Differences Between Fixed Cash Rent Lease and Other Lease Arrangements (Per Acre Net Returns for Landowner)

period the net return for the flexible cash lease was $36 per acre higher than the net return for the crop share lease. From 2020 to 2022, the net return for the flexible cash lease was $58 per acre higher than the net return for the fixed cash rent lease and $12 per acre higher than the net return for the crop share lease.

Differences between the fixed cash rent lease and the other two leasing arrangements are illustrated in figure 4. This chart was created by subtracting fixed cash rent payments per acre from the net return for the flexible cash lease and the net return for the crop share lease. As noted above, the net returns for the flexible cash lease mimic those for the crop share lease. However, there are a few differences in the trends for these two leases. The flexible cash lease did not increase as much as the crop share lease in 2007, 2008, and 2010. More importantly, from a downside risk perspective, the flexible cash lease did not decrease as rapidly as the crop share lease from 2013 to 2015, and was relatively higher from 2016 through 2022.

What about differences in the potential net returns for the three crop leases in 2023? Early projections for 2023 show a potential bonus for the flexible cash rent lease of approximately $35. The crop share lease on the other hand is projected to have lower net returns than both the fixed cash rent lease and the flexible cash rent lease. Continued high fertilizer prices are adversely impacting potential net returns for crop share leases. Of course, the projections for 2023 are sensitive to income and cost budget assumptions.

SUMMARY AND CONCLUSIONS

This article used a case farm in west central Indiana to compare the net return to land for crop share, fixed cash rent, and flexible cash leases. The average net returns to land from a landowner perspective were similar among the three lease arrangements. The flexible cash lease mimicked the ups and downs of the crop share lease. However, the upward and downward spikes for the flexible cash lease were less pronounced than those for the crop share lease. Choosing among the leases depends on a landowner's desire to capture improvements in crop share revenue and ability to withstand downside risk. The crop share and flexible cash leases allow landowners to more fully capture annual improvements in crop revenue, but also increase the probability of significant downward movements in annual net returns.

RESOURCE HIGHLIGHT

INTERNATIONAL BENCHMARKS FOR CORN PRODUCTION

Michael Langemeier & Leying Zhou

Examining the competitiveness of corn production in different regions of the world is often difficult due to lack of comparable data and agreement regarding what needs to be measured. To be useful, international data needs to be expressed in common production units and converted to a common currency. Also, production and cost measures need to be consistently defined across production regions or farms.

This paper examines the competitiveness of corn production for important international corn regions using 2016 to 2020 data from the agri benchmark network. An earlier paper examined international benchmarks for the 2015 to 2019 period (Langemeier, 2021). The agri benchmark network collects data on beef, cash crops, dairy, pigs and poultry, horticulture, and organic products. There were 16 countries with corn data for 2020 represented in the cash crop network. The agri benchmark concept of typical farms was developed to understand and compare current farm production systems around the world. Participant countries follow a standard procedure to create typical farms that are representative of national farm output shares, and categorized by production system or combination of enterprises and structural features. Costs and revenues are converted to U.S. dollars so that comparisons can be readily made. Data from six typical farms with corn enterprise data from Argentina, Brazil, Russia, Ukraine, and United States were used in this paper. It is important to note that corn enterprise data is collected from other countries. These five countries were selected to simplify the illustration and discussion.

The farm and country abbreviations used in this paper are listed in table 1. While the farms may produce a variety of crops, this paper only considers corn production. Typical farms used in the agri benchmark network are defined using country initials and hectares on the farm. To fully understand the relative importance of the corn enterprise on each typical farm, it is useful to note all of the crops produced. The typical farm in Argentina produced corn, soybeans, sunflowers, and winter wheat in 2020. Corn was produced on approximately 11 percent of the typical farm's acreage during the five-year period. The typical farm in Brazil produced corn and soybeans in 2020. Corn was a second crop following soybeans and was produced on approximately 78 percent of the typical farm's acreage during the five-year period. The farm in Russia produced alfalfa, chickpeas, corn, corn silage, fodder grass, soybeans, summer barley, sugar beets, sunflowers, winter rye, and winter wheat in 2020. Corn was produced on approximately 12 percent of the typical farm's acreage during the five-year period. Crops produced on the farm in the Ukraine in 2020 included corn, soybeans, sunflowers, winter rapeseed, and winter wheat. Corn was produced on approximately 26 percent of the typical farm's acreage during the five-year period. There are five U.S. farms with corn in the network. The two farms used to illustrate corn production in this paper are the Iowa typical farm (US700) and the west central Indiana typical farm (US1215). Both of these farms utilize a corn/soybean rotation.

Table 1. Abbreviations of Typical Farms.

Farm	Country	Hectares	Region
AR700	Argentina	700	South East of Buenos Aires
BR1300	Brazil	1,300	Mato Grosso
RU20000	Russia	20,000	Chernozem/Black Soil Region
UA7100	Ukraine	7,100	Poltava region, Central part of Ukraine
US700	United States (Iowa)	700	Iowa
US1215	United States (west central Indiana)	1,215	Central Indiana

CORN YIELDS

Although yield is only a partial gauge of performance, it reflects the available production technology across farms. Average corn yield for the farms in 2016 to 2020 was 8.66 metric tons per hectare (137.9 bushels per acre). Average farm yields ranged from approximately 5.98 metric tons per hectare for the Russian farm (95.3 bushels per acre) to 12.63 metric tons per hectare for the Iowa farm (201.2 bushels per acre). Figure 1 illustrates average corn yield for each typical farm. Both of the U.S. farms had average corn yields above 11.5 metric tons per hectare (183 bushels per acre).

INPUT COST SHARES

Due to differences in technology adoption, input prices, fertility levels, efficiency of farm operators, trade policy restrictions, exchange rate effects, and labor and capital market constraints, input use varies across corn farms. Figure 2 presents the average input cost shares for each farm. Cost shares were broken down into three major categories: direct costs, operating costs, and overhead costs. Direct costs included seed, fertilizer, crop protection, crop insurance, and interest on these cost items. Operating cost included labor, machinery depreciation and interest, fuel, and repairs. Overhead cost included land, building depreciation and interest, property taxes, general insurance, and miscellaneous cost.

The average input cost shares were 41.2 percent for direct cost, 32.2 percent for operating cost, and 26.6 percent for overhead cost. The typical farms in Russia, Ukraine, and Iowa had below average cost shares for direct cost. All of the farms except the typical farm in Russia and the typical farm in Ukraine had below average cost shares for operating cost. Labor costs as a proportion of total costs were relatively higher for the typical farms in Russia and the Ukraine. Overhead costs as a proportion of total costs were relatively higher in Argentina and the United States. The relatively large cost share for overhead cost in the

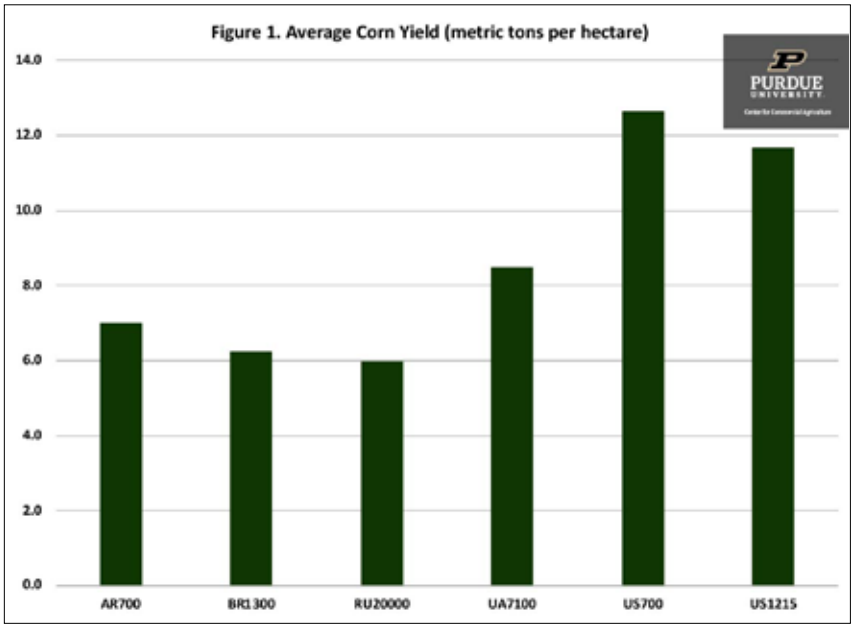


Figure 1. Average Corn Yield (metric tons per hectare)

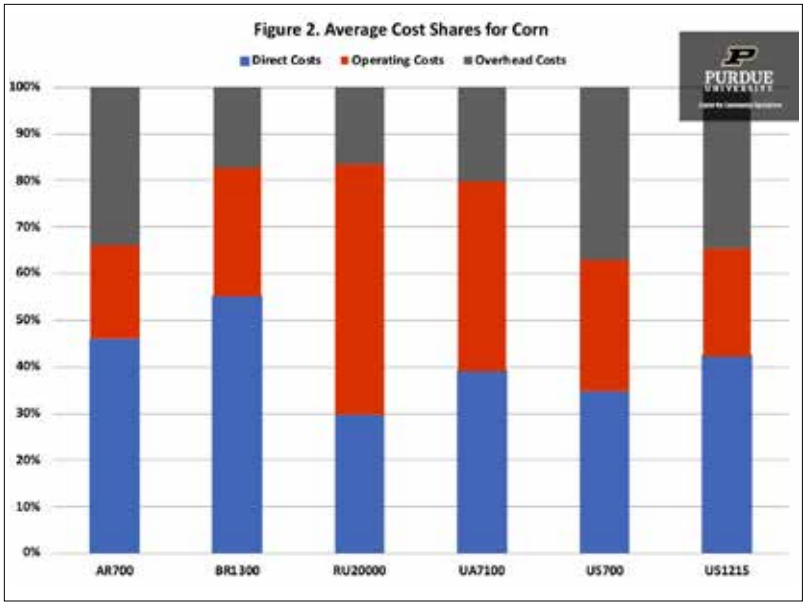


Figure 2. Average Cost Shares for Corn

U.S. reflects our relatively high land cost. Land cost accounted for approximately 32 percent of total cost for the two U.S. typical farms.

REVENUE AND COST

Figure 3 presents average gross revenue and cost for each typical farm. Gross revenue and cost are reported as U.S. dollars per hectare. It is obvious from figure 3 that gross revenue per hectare is substantially higher for the two U.S. farms. However, cost is also substantially higher for these two farms. The typical farms from Argentina and Ukraine exhibited economic profit during the five-year period. Average losses during the five-year period for the typical farms from Brazil and Russia were $46 and $10, respectively. The typical farm in Iowa and the typical farm in west central Indiana exhibited averages losses of $178 and $147 per hectare, respectively, during the five-year period. The lowest economic profit during the five-year period for the typical farms was 2017 with an average loss of $141 per hectare, while the highest average economic profit ($120 per hectare) occurred in 2016. The lowest economic profit for each typical farm was as follows: 2016 for the Iowa farm; 2017 for the typical farms in Brazil, Russia, Ukraine, and western Indiana; and 2020 for the typical farm in Argentina.

Figure 4 presents average gross revenue and cost for corn on a per ton basis. Gross revenue per ton was

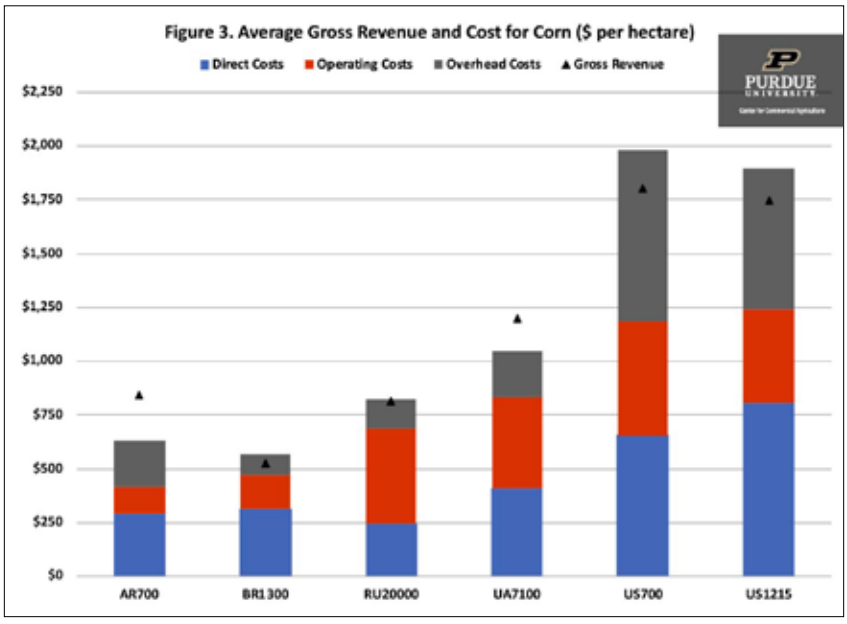


Figure 3. Average Gross Revenue and Cost for Corn ($ per hectare)

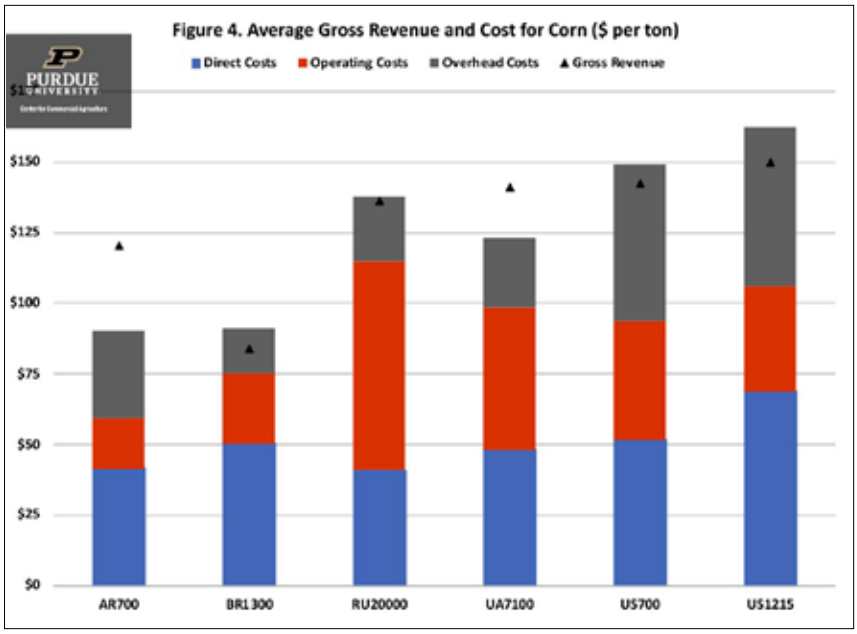


Figure 4. Average Gross Revenue and Cost for Corn ($ per ton)

relatively higher for the typical farm in the Ukraine and the two typical U.S. farms. However, the two U.S. typical farms also had relatively higher costs per ton. Economic profit for the five-year period was positive for the typical farms in Argentina and Ukraine.

CONCLUSIONS

This paper examined yield, gross revenue, and cost for farms in the agri benchmark network from Argentina, Brazil, Russia, the Ukraine, and the United States with corn enterprise data. Yield, gross revenue, and cost were substantially higher for the U.S. farms. The typical farms in Argentina and Ukraine exhibited a positive average economic profit during the 2016 to 2020 period. The data for 2021 will be available early this fall. Once the 2021 data is added to the five-year averages, economic profit will increase for the two U.S. farms. Whether this will change relative competitiveness is an open question at this point.

RESOURCE HIGHLIGHT

UNDERSTANDING THE CORN MARKET'S RESPONSE TO WAR IN UKRAINE

James Mintert & Nathanael Thompson

Russia's invasion of Ukraine in late February disrupted world supplies of several key agricultural commodities, including corn. Some readers were likely surprised to learn that Ukraine is an important supplier of corn to the world. A bit of background is in order since it's only in recent years that corn production in Ukraine increased to the point where shifts in Ukrainian production and exports began to impact corn prices.

In the early 2000's corn acreage in Ukraine was quite small, ranging from about 3 million to just over 4 million acres. That started to change as the first decade of the 21st century came to a close and by 2010 corn Ukrainian corn producers were harvesting over 6 million acres of corn. Corn acreage continued to climb in recent years, approaching 8 million acres in 2021, more than doubling in two decades.

At the same time that corn acreage was increasing, Ukrainian corn yields began to increase. National average yields that ranged from a little less than 50 bushels per acre to the high 60's in the early 2000's first eclipsed the 100 bushels per acre barrier in 2011. USDA's Foreign Agricultural Service estimated 2021's average yield at 126 bushels per acre, 2.6 times the average yield in 2000, setting a new record. The combination of larger acreage and higher yields pushed Ukrainian corn production up from just 151 million bushels in 2000 to an estimated 1.653 billion bushels in 2021.

As corn production increased, Ukraine's exportable surplus increased rapidly, and the percentage of Ukraine's production exported rose from 10% in 2000 to over 80% in recent years. As a result, Ukraine changed from providing less than 1% of the world's corn exports in 2000 to nearly 17% in recent years. Losing access to Ukraine's corn exports significantly altered the world supply/demand balance. Not only has it tightened world corn supplies at a time when concerns have been arising regarding South American corn production because of adverse weather in Argentina and Brazil, but it also shifted the pattern of the world's corn trade.

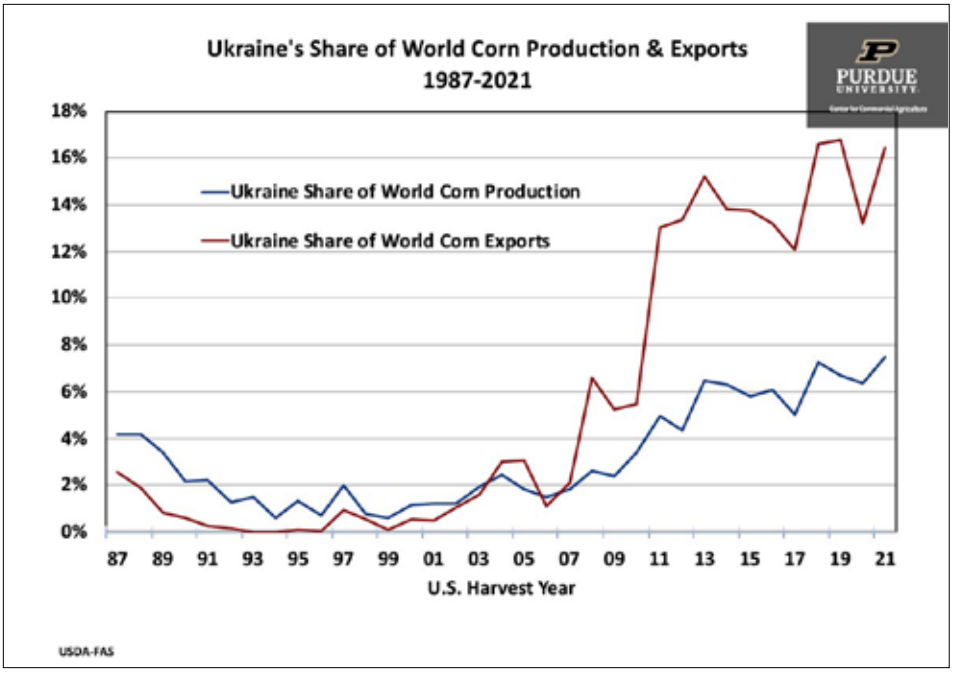
With Ukraine's Black Sea ports closed for the foreseeable future, some export sales that were expected to originate from Black Sea ports needed to be filled from other sources. Exporters looking for corn to fill prior sales commitments have been shifting the origination from Black Sea ports to the U.S., resulting in exporters scrambling to fill barges on U.S. waterways. The result has been a shift in U.S. corn basis patterns as well as a strong inversion in Chicago Board of Trade corn futures prices.

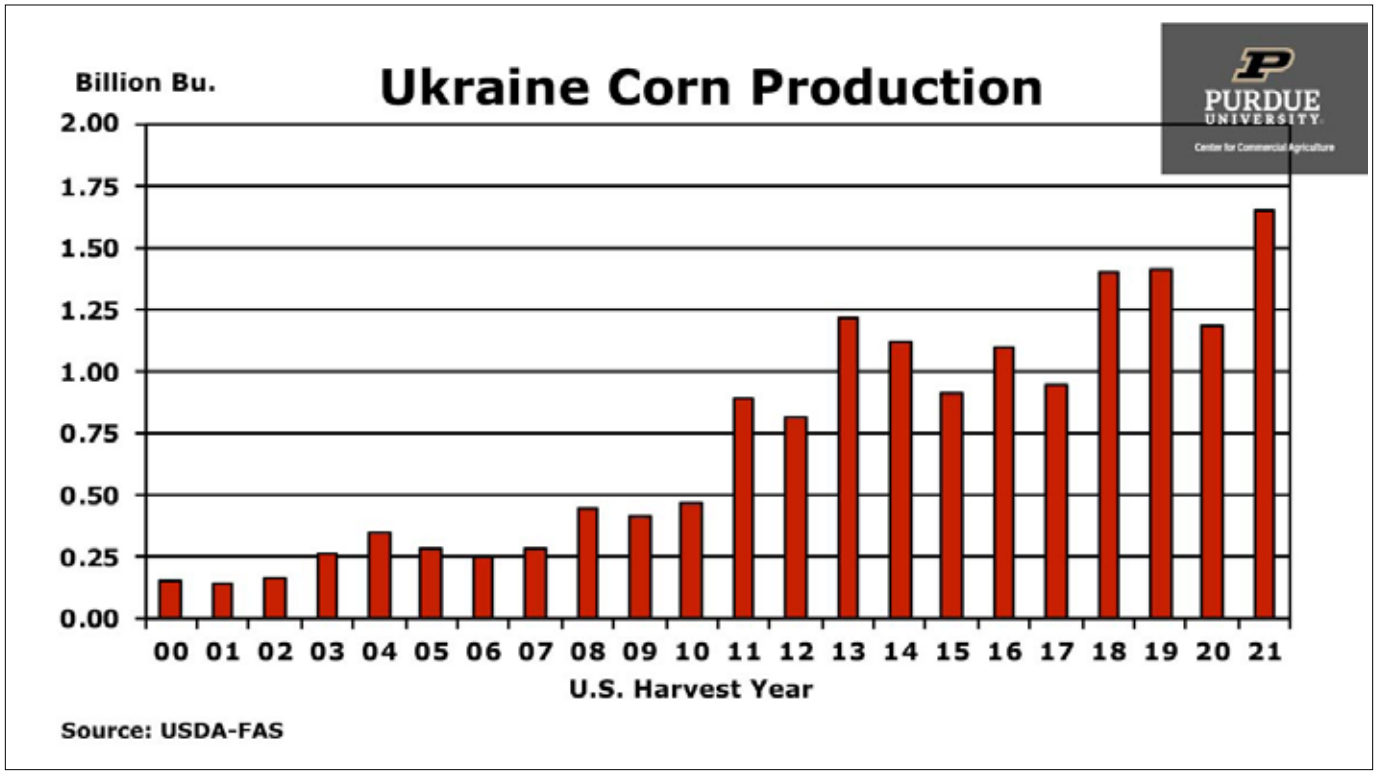
Corn basis levels at river terminals rose sharply in recent days in response to exporters' needs. For example, nearby corn basis on the Mississippi at St. Louis, Missouri ranged from +$0.20 to +$0.24/bushel during January. Nearby basis started to strengthen in February ranging from +$0.32 to +$0.35/bushel before jumping to +$0.48/bushel the first week of March. Nearby corn basis at Evansville, Indiana on the Ohio river was relatively flat during January and the first half of February, ranging from +$0.02 to +$0.08/bushel before climbing to +$0.30/bushel in early March. The strengthening corn basis at river terminals stands in sharp contrast to what's been taking place at inland terminals not well suited to help fill short-term export needs. For example, nearby corn basis at Beech Grove, Indiana near Indianapolis weakened, dipping $0.08 to -$0.15 in early March compared to -$0.07/bushel the last week of February.

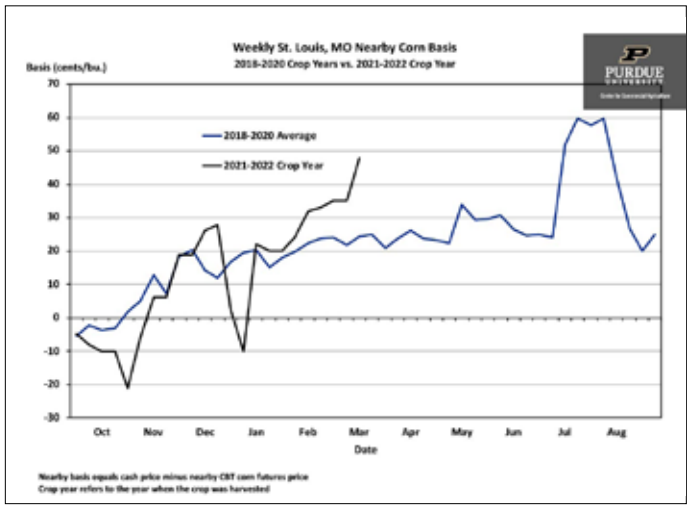
In addition to shifting basis patterns, evolving trade disruptions have altered corn futures price spreads. Typically, deferred futures contract prices within a crop year trade at a premium to nearby futures contract prices to provide an incentive for some inventory holders to continue storing a portion of the crop until the next harvest. The premium of the deferred contract over nearby futures prices is referred to as the carry since it provides an incentive to carry forward some inventories. However, in years when crop supplies are tight, or there is a production shortfall, futures prices sometimes become inverted with nearby futures prices trading at a premium to deferred prices. The inversion provides a market signal that supplies are more highly valued now than in the future. And that is exactly what has happened in the corn futures market.

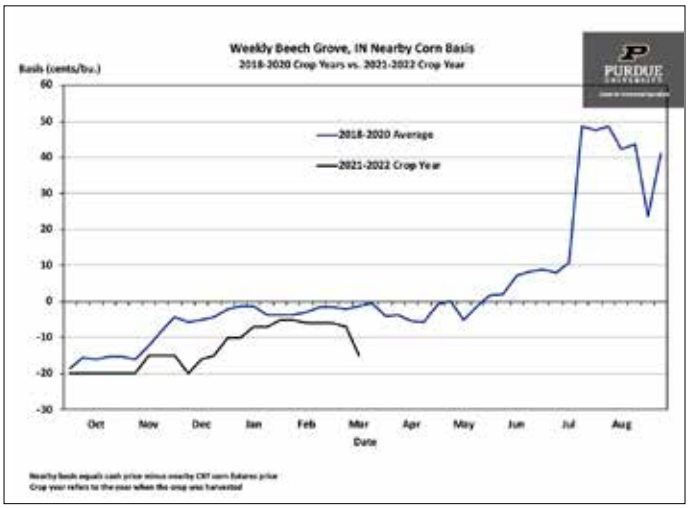
Looking at how the spread between July and May CBT corn futures (July futures price minus May future price) has shifted makes clear that the corn futures market is signaling that corn is needed sooner rather than later in the crop year. The July Minus May CBT Corn Futures Prices chart illustrates the average relationship between these two futures contracts prices for contracts that expired in 2019, 2020 and 2021 vs. what's been taking place for the contracts that will expire in 2022. July usually trades at a premium to the May contract as indicated by the three-year average. Going back to the beginning of the 2021 crop year in September, the premium of July over May was unusually small and actually inverted in December. The inversion widened modestly in February as crop production problems in South America unfolded and then jumped by $0.25/bushel following Russia's invasion of Ukraine.

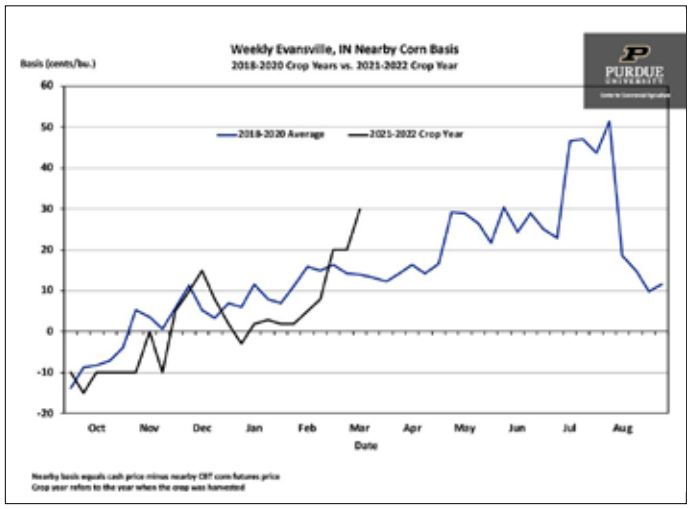
How should corn producers respond to the current market situation? Producers in locales where corn basis is unusually strong should consider moving corn at these favorable basis levels. Basis levels can be secured using either basis contracts or cash sales. Basis contracts leave producers open to changes in futures prices whereas cash sales effectively lock in both the basis and futures price simultaneously. Recognize that futures prices will be very volatile for the remainder of this crop year as the market continues to absorb the implications of shifting world trade patterns, possible production shortfalls in South America and spring planting decisions and progress in the U.S.

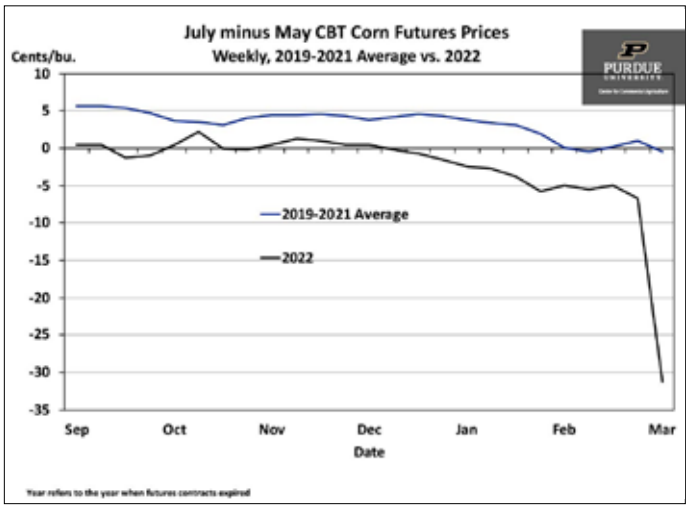



Billion Bu.
Ukraine Corn Production
PURDUE UNIVERSITY
Center for Commercial Agriculture
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21
U.S. Harvest Year
Source: USDA-FAS


Weekly St. Louis, MO Nearby Corn Basis
2018-2020 Crop Years vs. 2021-2022 Crop Year
Basis (cents/bu.)
2018-2020 Average
2021-2022 Crop Year
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug
Date
Nearby basis equals cash price minus nearby CBT corn futures price
Crop year refers to the year when the crop was harvested


Weekly Beech Grove, IN Nearby Corn Basis
2018-2020 Crop Years vs. 2021-2022 Crop Year
Basis (cents/bu.)
2018-2020 Average
2021-2022 Crop Year
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug
Date


Weekly Evansville, IN Nearby Corn Basis
2018-2020 Crop Years vs. 2021-2022 Crop Year
Basis (cents/bu.)
2018-2020 Average
2021-2022 Crop Year
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug
Date
Nearby basis equals cash price minus nearby CBT corn futures price
Crop year refers to the year when the crop was harvested


July minus May CBT Corn Futures Prices
Weekly, 2019-2021 Average vs. 2022
Cents/bu.
2019-2021 Average
2022
Sep Oct Nov Dec Jan Feb Mar
Date
Year refers to the year when futures contracts expired

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