



United States
Department
of Agriculture

AES-93
June 2016



A Report from the Economic Research Service

www.ers.usda.gov

Brazil's Corn Industry and the Effect on the Seasonal Pattern of U.S. Corn Exports

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Abstract

The extraordinary increase in Brazil's corn production over the past decade—driven by rising global demand and the combined influence of changes in price, technology, crop management practices, and area harvested—has made the country the third largest global corn producer and the second largest corn exporter. Brazil has emerged as the largest U.S. competitor in the global corn market with second-crop corn, harvested late in the local marketing year, boosting exports from September to January, months traditionally dominated by Northern Hemisphere exporters. Continued competition from Brazilian corn might permanently alter the seasonal pattern of U.S. corn exports, highlighting the need to reassess export forecasting methods. A change in export seasonality could alter the seasonality of U.S. corn prices, further weakening corn prices at harvest and eroding U.S. export market share.

Keywords: United States, Brazil, corn, production, prices, shipments, seasonality of exports

Acknowledgments

The authors thank Mark Jekanowski, Suzanne Thornsbury, Andrew Muhammad, Mark Ash, Rip Landes, and Linwood Hoffman of USDA, Economic Research Service, Richard O'Meara, Andrew Sowell, and Renee Schwartz of USDA, Foreign Agricultural Service, Jerry Norton and Michael Jewison of USDA, Office of the Chief Economist, and Darrel Good of University of Illinois for their peer reviews, and Chris Dicken of ERS for cartographic output, and Dale Simms of ERS for editorial assistance, and Lori Fields of ERS for design.

Approved by USDA's
World Agricultural
Outlook Board

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Introduction

Brazil has been the world's third largest global corn producer for decades and the second largest exporter of corn for 2 years (USDA/FASa). Following soybeans, corn is the second largest crop in the country, with a 20-percent share of planted area, on 15.8 million hectares. Corn accounted for 31 percent of Brazil's non-perennial crop production, or 85 million metric tons (hereafter, "tons") in 2014/15 (USDA/FASc, IBGE, 2015). With production expanding faster than domestic food and feed demand, attractive export prices moved most of the increased production into larger exports.

Over the past decade (2005/06 to 2014/15), Brazil's corn export growth averaged 21 percent annually, representing a nearly seven-fold increase in exports since 2005. As a consequence, Brazil became the world's largest corn exporter in 2012/13 (October-September)¹ when severe drought damaged U.S. production (USDA/FASa). In USDA's Agricultural Projections to 2025, Brazil is expected to be the world's second largest corn exporter over the next 10 years—behind the United States and ahead of Argentina and Ukraine (USDA/OCE/WAOB, 2016).

Double-cropping in Brazil is extensive. In the country's frontier region in Mato Grosso, first-crop soybeans are typically followed by second-crop corn, both partly for export. In the traditional growing region of São Paulo, common crop rotations are soybeans-corn and soybeans-cotton (Nassar et al., 2008). U.S. corn producers are wary of larger corn exports from Brazil and the implications for seasonal corn export patterns. Historically, Brazil's corn export shipments were small and occurred early in the trade year; since 2009, Brazil's corn exports have grown and shifted increasingly into September-January after its second-crop corn is harvested. In addition, export shipments of Brazilian soybeans occupy most of the available port capacity from March through June, crowding out corn (USDA/FASb).

This report describes the evolution of the Brazilian corn sector, the structural changes that have occurred in the last decade, and the factors behind Brazil's expanding corn production including attractive prices, changes in technology and farm management practices, and locational shifts in production. Corn area in Brazil has shifted from the traditional South-Southeast regions to the frontier Center-West, where second-crop corn production has grown rapidly.

Second-crop corn (also known as the *safrinha*, or "little harvest" in Portuguese) was a fitting name in years past but the *safrinha* corn crop is now larger than the full-season corn crop in Brazil. As a result, corn exports from Brazil are now greater in September-January than in the prior May-July period, and this pattern is expected to persist. This new seasonal pattern in Brazil means more formidable competition in the U.S. corn export market. U.S. corn prices are normally lowest after harvest and the increased export price competition could exacerbate the harvest-time low.

¹International corn trade year.

Brazil's Corn Industry

Corn is Brazil's most important cereal, followed by rice and wheat. Since 2000/01, Brazil's corn production has doubled, reaching a record 85 million tons in 2014/15, equivalent to 8.4 percent of global corn production (USDA/FASa). Brazil has several advantages in corn production, including ample land and a favorable climate with a long growing season in much of the country that enables two harvests per year. Technological advances in soil management and improvements in hybrid corn varieties have also spurred expansion.

Area harvested to corn in Brazil has risen from an average of less than 9 million hectares in the 1960s to over 15.8 million hectares in 2015/16, growing an average of 1 percent per year over the past 5 decades (USDA/FASc). Brazil's vast land area encompasses many climates. Consequently, corn—mostly yellow dent grain type—is cultivated in all regions, though the timing of planting and harvesting differs between States and across regions (table 1).

Table 1
Brazil's 1st and 2nd corn crop calendar by region and State

Region/State ¹	1 st crop planting	2 nd crop planting	1 st crop harvesting	2 nd crop harvesting
Center-West				
<i>Mato Grosso</i>	October-December	January-February	February-May	May-July
<i>Mato Grosso Sul</i>	October-December	January-February	January-April	May-July
<i>Goiás</i>	October-December	January-February	January-April	May-July
South				
<i>Parana</i>	September-November	January-March	January-May	May-September
<i>Rio Grande do Sul</i>	August-November		February-May	
Southeast				
<i>Minas Gerais</i>	October-December	February-March	February-May	June-September
<i>Sao Paulo</i>	October-December	January-March	January-May	May-September
Northeast				
<i>Bahia</i>	October-January	May-July	February-June	August-November
<i>Maranhao</i>	November-February	February-March	May-September	June-July
<i>Ceara</i>	January-April		June-August	
North				
<i>Rondonia</i>	August-October	January-March	January-April	June-July
<i>Para</i>	October-December		January-May	

¹Brazil's five regions are defined by State boundaries and similar characteristics for climate, topography, soil, and land use.
Source: *Companhia Nacional de Abastecimento*, CONAB, 2015 (CONABa).

Corn in Brazil is produced in both tropical and subtropical environments; only 3 percent of the national corn area is irrigated and drought stress is frequent on half of the total corn area (IBGE, 2014). The structure of Brazilian agriculture began to change rapidly in the 1970s, prompted by industrialization and economic policies focusing on import substitution. Within this framework, self-sufficiency and the development of agriculture were seen as necessary to ensure an ample food supply for a growing population (Brandão et al., 2006). Brazil also sought in the 1970s to expand intensive agriculture systems into the country's Center-West *Cerrados*.² This frontier was a vast area of savannahs and grasslands occupying 197 million hectares suitable for corn, soybean, and cotton production (USDA/FASb, figure 1). Once regarded as an unproductive region, the adaptation of technologies for acidic and low-fertility soils supported the agricultural development of the *Cerrados*. Moreover, the soybean-corn rotation promotes higher phosphorus use efficiency, boosting yields.

Figure 1
Brazilian States and regions



Source: Brazilian Institute of Geography and Statistics, 2006.

²The *Cerrados* ecological zone, concentrated in the Center-West region, is characterized by soil, temperature, and rainfall patterns that, with the appropriate technology, are ideally suited to high-yielding second-crop corn production since 2011/12.

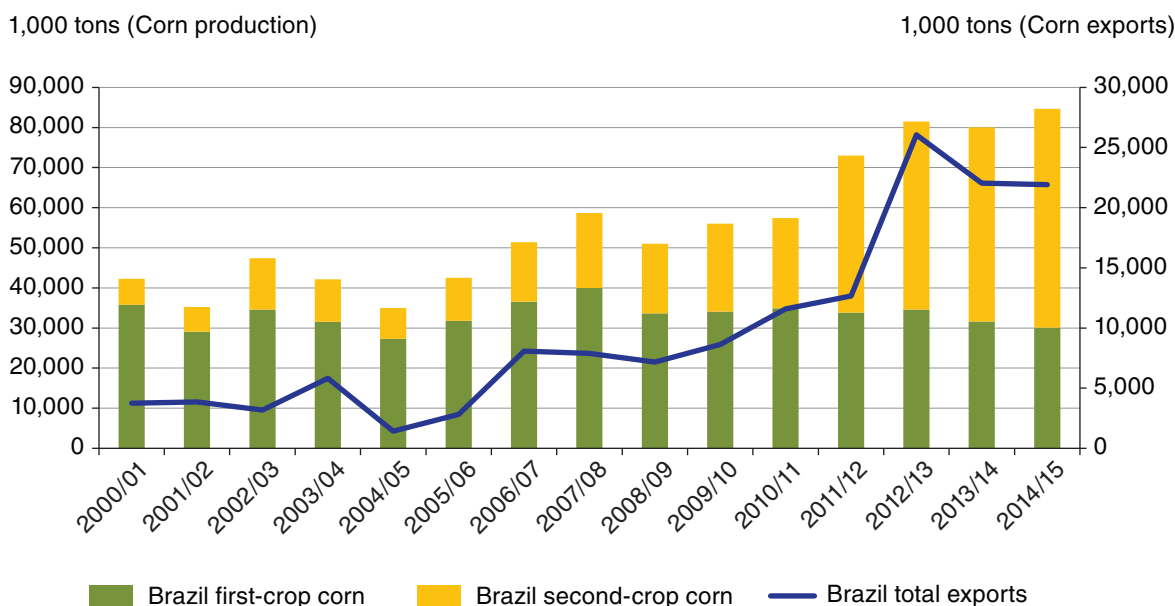
Brazil contains two distinct areas for the production of corn: the traditional Southern and Southeastern agricultural producing regions, principally the States of Minas Gerais and Paraná; and the Center-West agricultural frontier, principally the State of Mato Grosso where land is abundant and less expensive (USDA/FASb). In the Southern and Southeastern regions, the bulk of the first crop is planted in September and harvested in March and corn yields are typically higher, reflecting better seed varieties and highly capitalized farmers (USDA/FASb). First-crop corn is mostly destined for the nearby domestic animal feed market, so planting flexibility is limited by local demand for feed from swine and poultry producers (USDA/FASb).

In Mato Grosso, second-crop corn is planted beginning in January after the first-season soybean harvest (USDA/FASb). Mato Grosso is now the largest producer of second crop-corn and planted area has increased greatly as a result of technological improvements, including the use of lime to reduce acidity levels in the soil and the adoption of no-tillage systems. While the onset of the dry season in the later stages of growth limits second-crop yield potential somewhat, double cropping spreads fixed costs over two crops, enhancing profitability.

However, the most significant driver of corn cultivation in the Center-West region of Brazil, since the 1960s, has been EMBRAPA's (Brazil's Ministry of Agriculture Research Company) development of cultivars better suited to a tropical climate—high yielding corn hybrids and soybean varieties that have complemented the correction of nutrient deficiencies in low-fertility *Cerrados* soils (USDA/FASb). These technological advances made it possible to cultivate marginally suitable soils, resulting in a large expansion of Brazil's agricultural frontier since the 1970s (Brandão et al., 2006). Regulations constrain planting soybeans after soybeans in order to control diseases. Some other crops, including cotton, compete with corn to be double-cropped after soybeans, but corn is predominant.

In Mato Grosso, the area planted to second-crop corn following soybeans quadrupled between 2005 and 2015, and this *safrinha* crop increased from 22 percent of total corn production in 2004/05 to more than 64 percent of production in 2014/15 (figure 2). Mato Grosso in 2014/15 accounted for nearly 25 percent of Brazil's corn production (table 2). The second-crop corn harvest largely serves the export market (USDA/FASb); corn production has outpaced domestic use each year since 2005/06.

Figure 2

Brazil's corn production and exports, 2000/01-2014/15

Note: Exports are on the October-September trade year.

Source: USDA, Foreign Agricultural Service, PS&D Database (USDA/FASc), and *Companhia Nacional de Abastecimento* (CONAB), 2015.

Table 2

Corn area, yields, and production by region and State, 2010/11-2014/15

Major corn regions/States	Area planted to corn					Average annual growth, 2010/11-2014/15	5-year average yields, 2010-15	Production, 2014/15
	2010/11	2011/12	2012/13	2013/14	2014/15			
	Hectares (1,000)					%	Tons/ha	(1,000 tons)
Brazil total	13,806	15,178	15,829	15,829	15,693	3.0%	4.9	84,672
Traditional region¹								
Paraná	2,486	3,003	3,047	2,566	2,457	-1.8%	5.8	15,863
Minas Gerais	1,205	1,313	1,269	1,326	1,278	1.3%	5.6	6,865
São Paulo	899	892	904	754	763	-4.9%	5.3	4,166
Bahia	790	606	628	813	764	2.3%	3.4	2,773
Santa Catarina	548	537	489	472	412	-6.8%	6.8	3,189
Frontier region²								
Mato Grosso	1,898	2,740	3,425	3,298	3,417	14.6%	5.4	20,763
Mato Grosso do Sul	993	1,268	1,509	1,575	1,636	12.9%	4.9	9,283
Goias	934	1,242	1,216	1,241	1,263	7.8%	6.5	8,934

¹Paraná, Rio Grande do Sul, Santa Catarina, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, Alagoas, Bahia Ceará, Paraíba, Pernambuco, Rio Grande do Norte, and Sergipe.

²Goias, Mato Grosso do Sul, Mato Grosso, Maranhão, Piauí, Acre, Amazonas, Amapá, Pará, Rondônia, Roraima, and Tocantins.

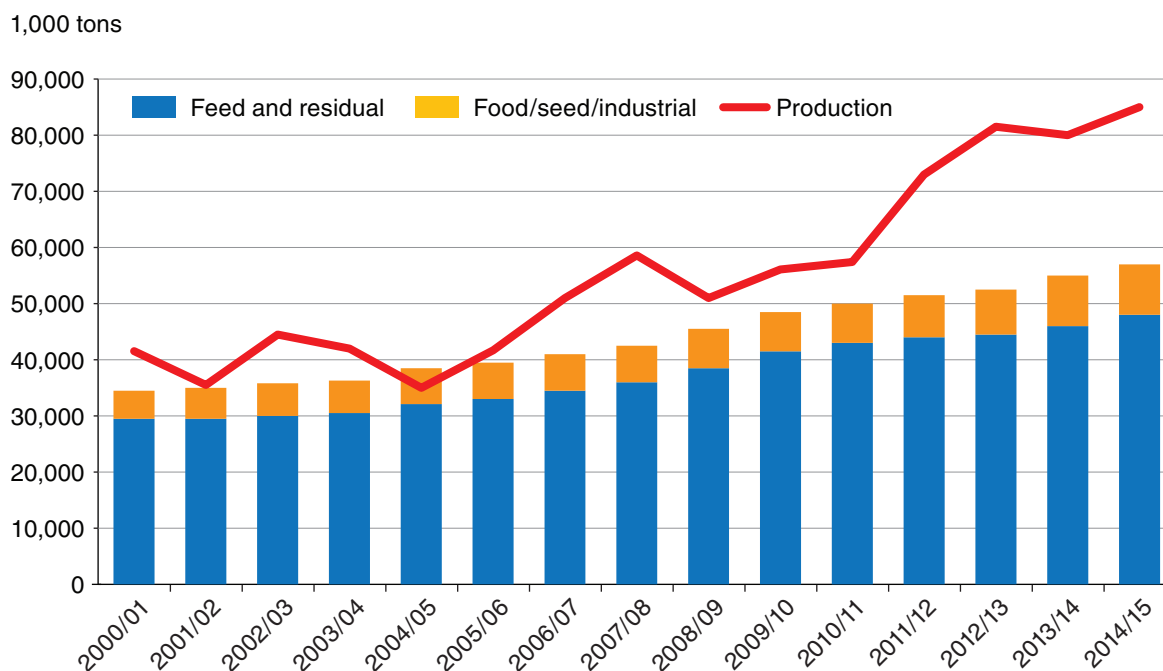
Source: *Companhia Nacional de Abastecimento*, 2015 (CONABa).

Brazil's Corn Consumption

Brazil is also one of the world's largest consumers of corn, ranking fourth in 2013/14 and accounting for 6 percent of world use. Use of corn has grown substantially over the last 15 years (2000/01-2014/15), supported mostly by feed use. Brazil is the world's leading meat exporter and, with a large population and rising incomes, also has growing domestic demand for meat. Broiler meat production in 2015 was an estimated 13.1 million tons and swine meat 3.5 million tons (USDA/FASc). Aquaculture use of corn as feed, though smaller, is a rapid growth market (USDA/FASb).

Brazil's feed and residual use of corn grew 5.3 percent per year from 2006/07 to 2010/11. Since then, growth has been slower due to high corn prices and a slowdown in meat exports. Residual use (including losses) has likely expanded with larger crops. Food, seed, and industrial (FSI) use of corn is much smaller than the feed/residual component, and grew an estimated 3.7 percent annually from 2000 to 2015 (figure 3). Industrial use includes a wide variety of corn processing, with corn starch a significant input for industrial manufacturing and food processing. Food use is significant, as corn is the traditional grain consumed in much of Brazil, but per capita consumption is declining as higher incomes lead to substitution with protein-based and other preferred foods. Seed use increases with corn area, but is very small compared to other uses.

Figure 3
Brazil's corn production and use, 2000-15



Source: USDA, Foreign Agricultural Service, PS&D Database (USDA/FASc).

Government Support Policies

Brazil's support for the corn sector has been similar to most other agricultural commodities, consisting of two major components: subsidized credit and price support (minimum guaranteed prices). Policies to provide subsidized credit for production and marketing, implemented in the 1960s through the early 1990s, facilitated the development of commercial agriculture and expansion into the *Cerrados* frontier. With economic reforms in the early 1990s, the Government decreased subsidized credit but created new programs linked to the support of guaranteed minimum prices for corn (Brandão et al., 2006).

Brazil's system of minimum guaranteed prices for corn revolves around auctions of premiums, which are the difference between minimum guaranteed prices and market prices. The minimum guaranteed prices for the various regions of Brazil, and the portion of the crop that will be eligible for these programs, are announced annually in the Brazilian agricultural economic plan (MAPA, 2015). The leading price support program for corn in Brazil is the Premium Equalizer Paid to the Producer program (PEPRO-*Prêmio Equalizador Pago ao Produtor*), which pays farmers directly when commodity prices fall below a predetermined price (CONAB, 2015b). Under PEPRO, all eligible crops must be either exported or shipped to designated regions in order to receive the premiums.

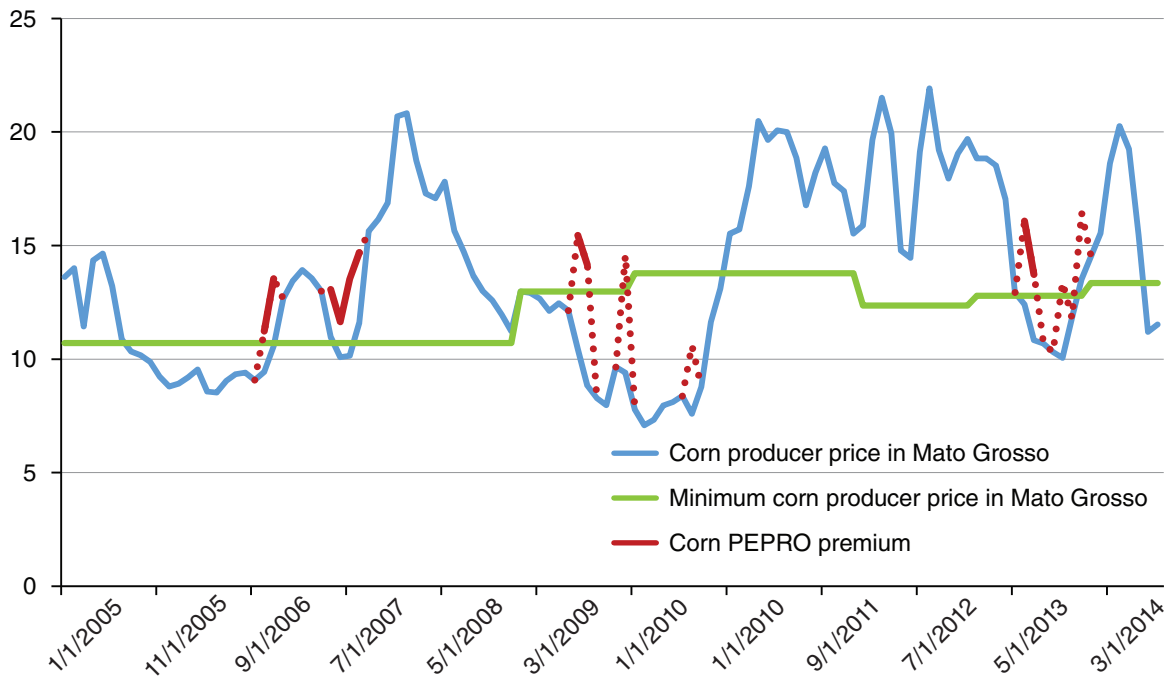
Under the PEPRO program, public auctions are organized by the national food supply agency—CONAB—to establish an auction price based on a minimum price and a premium for commercial buyers. The PEPRO program subsidizes transactions by paying a premium to commercial buyers, which is the difference between the minimum price (received by producers) and the market price (USDA/FASb). This mechanism allows the Government to manage the supply of corn in deficit regions and for export, but without buying the product directly (USDA/FASb). The system of minimum prices and government tenders to commercial buyers encourages corn farmers to continue producing despite falling domestic market prices (figure 4). This program is registered with the WTO as an “amber box” measure and total notified amber box outlays remain within permitted levels.

Under the PEPRO program, the Government of Brazil held auctions to sell more than 21 million tons of corn—produced in Mato Grosso, Bahia, Goiás, Mato Grosso do Sul, Minas Gerais, Paraná, and Tocantins—from 2006 to 2014. Most PEPRO payments have gone to second-crop corn producers in Mato Grosso, with total payments costing more than \$500 million (table 3).

Figure 4

Brazil's corn minimum price, market price, and PEPRO support, 2005-2014

Real per 60 kg



Note: PEPRO = *Prêmio Equalizador Pago ao Produtor*.

Source: USDA, Economic Research Service using data from *Companhia Nacional de Abastecimento*, CONAB, 2015 (CONABb).

Table 3

Brazil's PEPRO Government support program for corn, 2006-2014

	Volume of corn auctions (tons)	Government spending on PEPRO program (\$ million)	Premium (\$ per ton)
2006			
October	50,000	0.7	13
November	50,000	1.1	22
2007			
May	448,699	10.3	23
June	901,764	12.9	14
July	1,667,586	48.5	29
August	735,198	18.8	26
2009			
March	89,116	1.3	14
April	19,100	0.5	24
May	95,000	2.8	29
June	25,000	1.1	44
July	451,020	10.3	23
August	616,292	17.0	28
December	517,430	18.9	37
2010			
June	224,110	12.9	57
July	615,917	27.8	45
November	35,070	2.3	64
2013			
July	1,936,962	51.5	27
August	4,372,707	90.2	21
September	453,084	8.4	19
October	1,052,340	23.9	23
November	1,046,580	22.8	22
2014			
August	2,536,545	43.1	17
September	3,233,833	72.8	29
October	32,200	0.8	25
Total	21,205,553	500.7	Average premium, \$28/ton

Note: PEPRO = *Prêmio Equalizador Pago ao Produtor*. The PEPRO program was not used in 2008, 2011, 2012, and 2015.

Source: USDA, Economic Research Service using data from *Companhia Nacional de Abastecimento*, CONAB, 2015(CONABb).

Brazil's Corn Exports

Brazil's corn exports were small prior to 2000/01, when they jumped to 6.3 million tons. The seasonal pattern of Brazil's corn exports has shifted and grown more pronounced over the last 5 years (figure 5), with a larger portion exported from August to January, months when harvesting begins and supplies peak in the Northern Hemisphere.

Soybean trade patterns influence corn trade. Because soybeans are more valuable per ton and denser than corn, they are cheaper to transport. Their higher value also makes them more expensive to store, whether due to financing costs or opportunity costs associated with holding the commodity. These factors tend to give soybeans priority access to logistical infrastructure; when transportation and handling bottlenecks occur, most notably port congestion in Brazil, soybeans get priority. While bottlenecks are less binding in the United States, soybeans are still likely to get priority access to handling/transportation capacity during peak harvest, which occurs almost simultaneously for both crops.

Brazil tends to use most of the *first-crop* corn (harvested primarily during February-April) domestically because it is grown near the poultry and pork enterprises in the South. Since transport costs for *second-crop* corn are about the same between the interior/poultry areas in the South and the ocean ports, second-crop corn has been more heavily exported than first-crop corn. The second-crop corn is also harvested primarily during June-August, just as the peak soybean export period ends, freeing up port capacity.

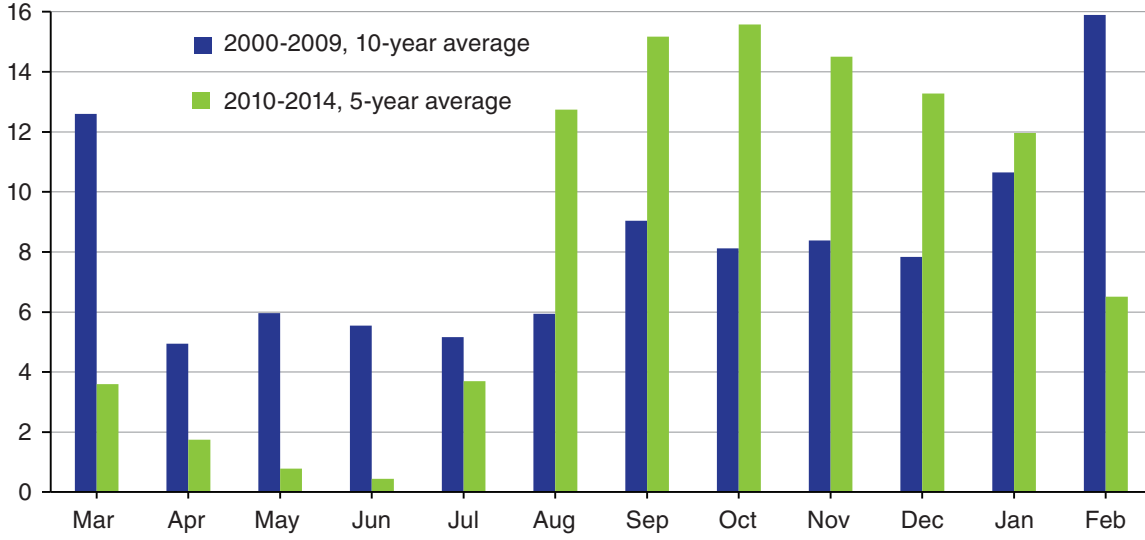
Brazil exported 24.3 million tons and 24.9 million tons of corn during the 2011/12 and 2012/13 (local March-February) marketing years, more than double any previous year as the drought-reduced 2012 U.S. harvest reduced world supplies and drove corn prices to record levels. As second-crop corn production expanded to meet this demand, the seasonal pattern of Brazilian corn exports also changed.

Over the last 5 years, the seasonality of corn exports has grown more pronounced, with March-July shipments relatively low (less than 5 percent of annual exports per month) and August-January exports brisk (with over 12 percent per month for August through January). For the latest 5 years, March-July corn exports have been a smaller share of annual exports than in the previous 10 years (figure 5).

Figure 5

Brazil's corn export seasonality, 2000/01-2013/14

Monthly share of annual total (%)



Source: USDA, Economic Research Service using data from Global Trade Information Services, GTIS, 2015.

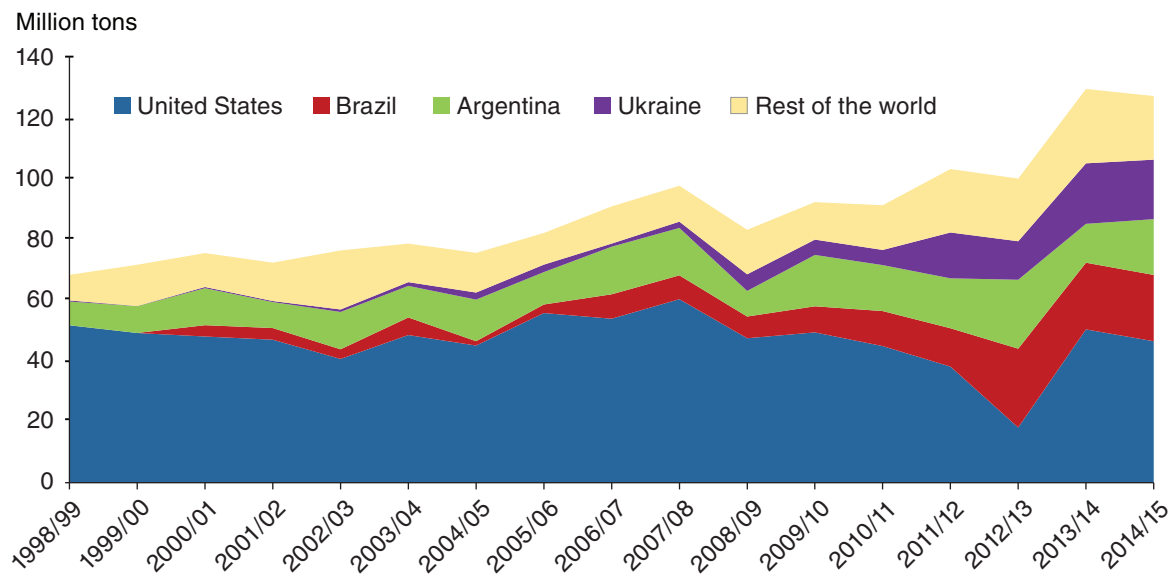
U.S. and Brazilian Corn Export Competition

Brazil’s share of world corn trade jumped from 12.2 percent in 2011/12 to 25.9 percent the following year. Brazil’s increased share may represent a permanent shift in the structure of the world corn market, and not just a short-term response to the U.S. drought in 2012. For the 2015/16 October-September trade year, Brazil is projected to have record corn exports, exceeding the 2012/13 share. The 2015/16 situation is being driven largely by Brazil’s sharp currency depreciation, especially relative to the U.S. dollar. USDA’s Agricultural Projections to 2025 assume that Brazil will remain the second largest corn exporter through the next decade, with a small increase in export market share from 2016/17 to 2024/25, though Brazil’s share of trade is expected below recent highs.

Before 2011/12, Argentina was a much larger corn exporter than any other foreign competitor, but in 2011/12, responding to strong global demand and high prices, both Brazil and Ukraine expanded corn exports. For the decade before December 2015, Argentina’s Government policy—especially export quotas on corn—severely limited the growth in Argentina’s corn production and exports, allowing Brazil’s corn exports to overtake Argentina (figure 6).

Argentina’s corn and soybean exports are traditionally strongest and prices most competitive shortly after harvest, which spans several months after February and, unlike Brazil, is counterseasonal to U.S. corn exports. The seasonality of Argentina’s corn exports has been influenced by the portion of the corn crop that is late-planted, the exchange rate and other economic incentives to move or hold corn, and the timing of export quotas. The recent elimination of Argentina’s corn export quotas and export taxes is expected to heighten competition in the global corn market at a time when Brazil, Argentina, and Ukraine all have weak currencies relative to the U.S. dollar. This further supports their ability to compete with U.S. corn on price. Modest growth in global corn trade is expected to focus attention on shifting export market shares.

Figure 6
World corn exports, 1998/99-2014/15



Source: USDA, Foreign Agricultural Service, PS&D Database (USDA/FASc).

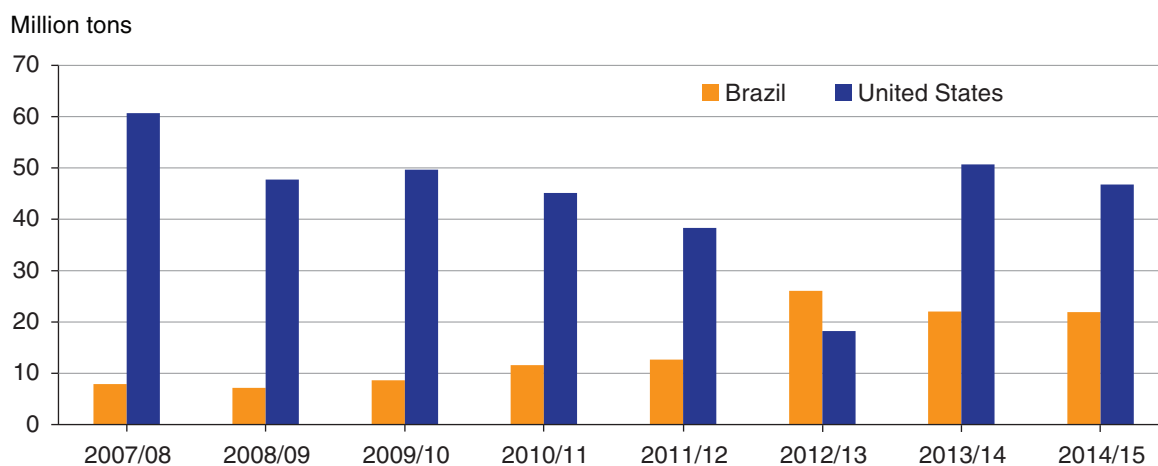
U.S. Corn and Soybean Export History and Seasonality

U.S. corn exports may be affected in the longer term by the emergence of Brazil as a major competitor (figure 7). In addition to taking some market share from the United States, the expansion of Brazil's production and exportable surplus of corn appears to have changed the seasonal pattern of U.S. monthly corn exports. The seasonal pattern of Brazil's corn exports in recent years has begun to mirror the export pattern for Brazil's soybeans.

As competition from Brazil's corn exports has become more intense, the seasonality of U.S. corn trade has also begun to mirror the seasonal pattern of U.S. soybean trade. Brazil's soybean exports have historically been concentrated in post-harvest months, especially April, May, June, and July (figure 8). Meanwhile, U.S. soybean exports have grown more pronounced in October, November, December, and January (figure 9). As the volume of South American exports has increased and the U.S. share of world soybean trade has declined, U.S. shipments have become more concentrated in the early months of the U.S. marketing year. The trade patterns reflect a market-based response to price by importers, caused by differing harvest-time lows in the Northern and Southern Hemispheres. A modest price difference is enough to get key buyers such as China to switch origins. With most exports occurring in the first half of the local marketing year, fewer soybean stocks need to be held into the second half, both in Brazil and the United States.

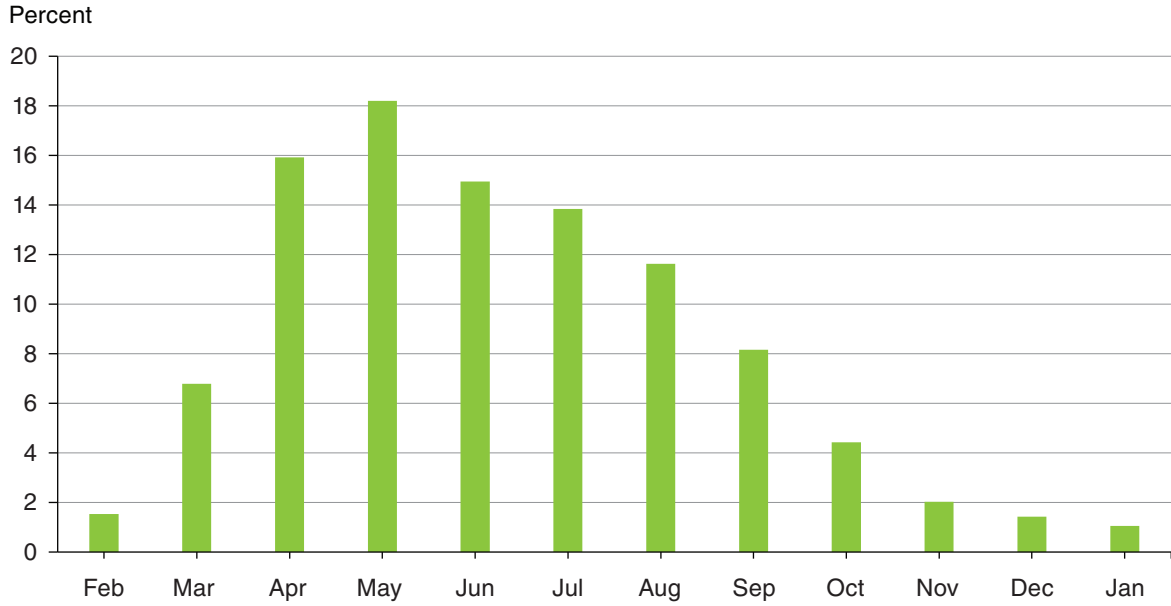
As Brazil's soybean harvest reaches ports beginning in February, port capacity is devoted more to soybeans and less to corn, promoting larger March-June U.S. corn exports. At the end of February, March, and April 2014, U.S. outstanding sales of corn reached record levels for each month. March, April, and May 2014 corn exports exceeded 5 million tons each month, with June exports nearly as strong. U.S. corn exports in 2013/14 were mostly backloaded into the second half, with strong March-June shipments complementing slow Brazilian shipments.

Figure 7
U.S. and Brazil corn exports, 2007/08-2014/15



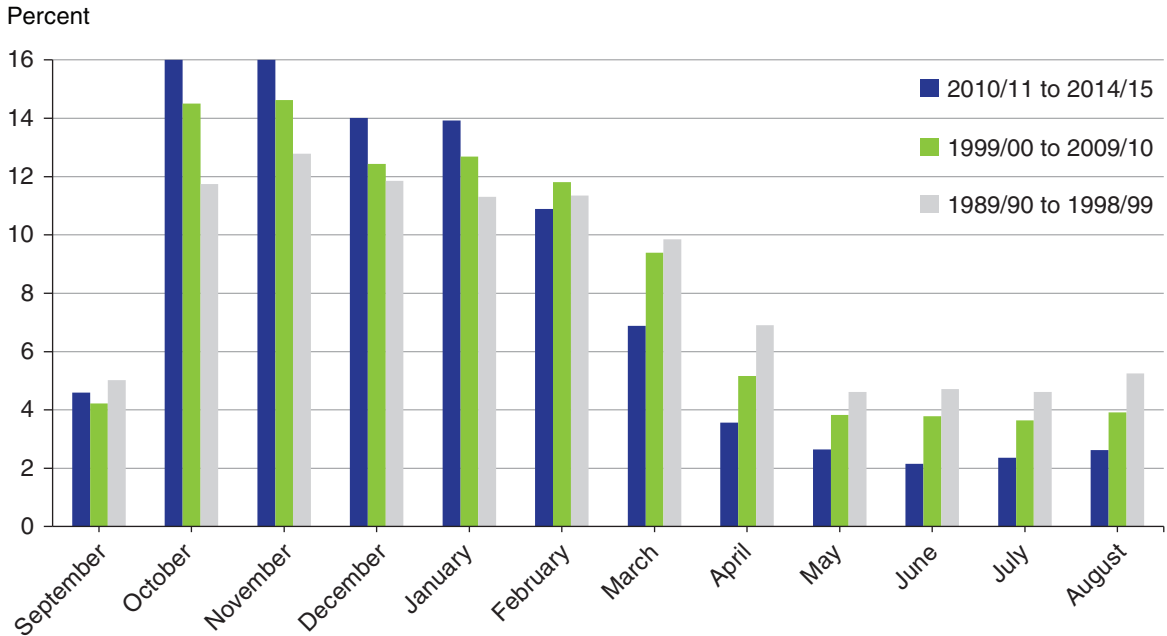
Source: USDA, Foreign Agricultural Service, PS&D Database (USDA/FASc).

Figure 8
Brazil's soybean exports show strong seasonality—average monthly share since 1990



Source: USDA, Economic Research Service using data from Global Trade Information Services, GTIS, 2015.

Figure 9
U.S. soybean exports are shifting to earlier months in the marketing year

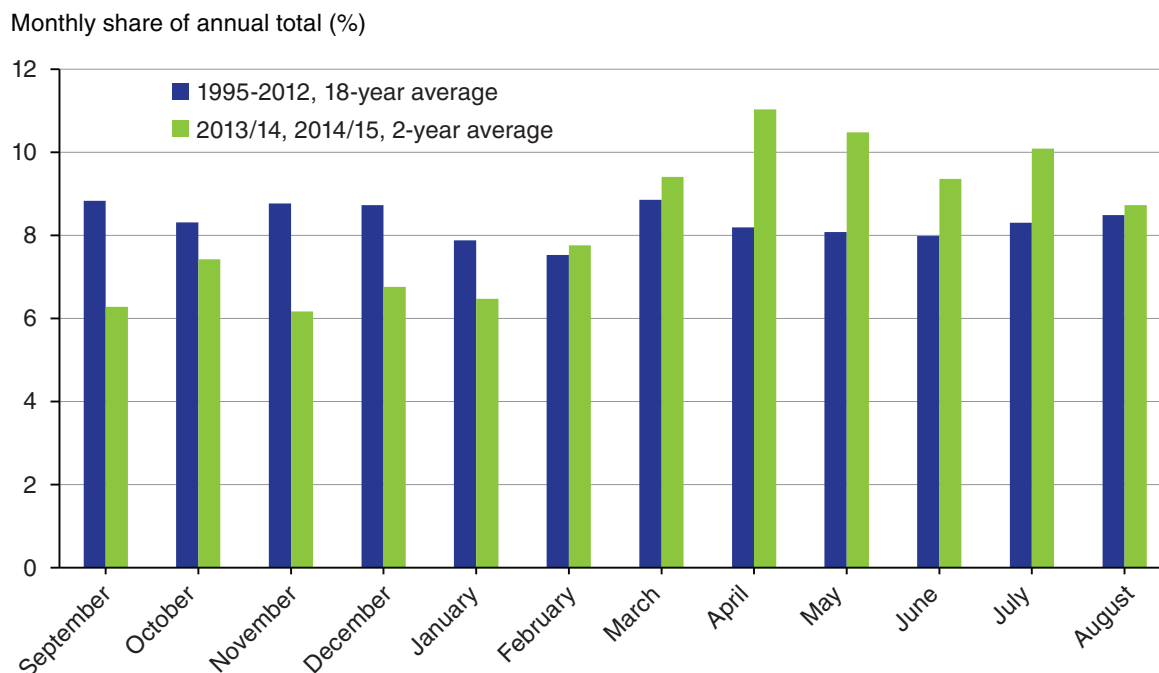


Source: USDA, Economic Research Service using data from Global Trade Information Services, GTIS, 2015.

However, in future years, other competitive factors could curb the increase in U.S. March-June corn exports. Investments in port capacity in Brazil and larger stock holding could prevent backlogs and even out the seasonal patterns of Brazil's exports. Also, importers may increase shipments of corn during those months that Brazil exports, muting the impact of Brazil on the seasonality of U.S. exports. The size and timing of corn exports by Argentina or other competitors could also influence U.S. seasonality. Some of these factors contributed to smaller U.S. corn exports in 2014/15 than in the previous year. However, in 2014/15, U.S. corn shipments were backloaded again, with shipments and sales accelerating in April and staying strong through August.

In contrast to 2013/14 and 2014/15, U.S. corn exports during 1995/96-2012/13 showed relatively little seasonality, with each month accounting for 7.5 to 8.9 percent of total September-August marketing year exports (figure 10). This relative stability of U.S. monthly corn exports is not surprising, as U.S. exporters often supplied more than half of world corn and many importers have little domestic corn production.

Figure 10
The seasonality of U.S. corn exports has shifted for the last 2 years



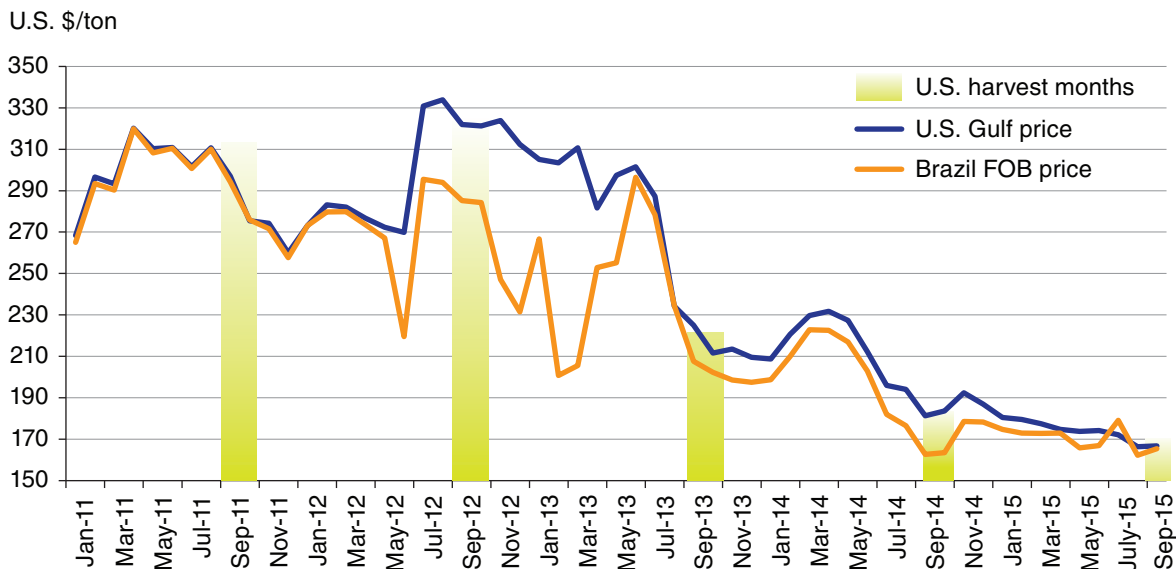
Source: USDA, Economic Research Service using data from Global Trade Information Services, GTIS, 2015.

The pattern of U.S. corn exports may have changed permanently since the 2012/13 drought. In 2013/14 and 2014/15, Brazil's export price has been at a notable discount to the U.S. Gulf price during the U.S. harvest (figure 11). Some of the shift in U.S. exports to later months (away from the historical pattern of about 9 percent of exports occurring each month) is the result of short-term factors such as a late U.S. harvest, railcar shortages, and tight beginning stocks. However, increased competition with Brazil may persist in the longer term.

U.S. corn prices were high enough before the 2012 drought to encourage competitors' corn production. The drop in U.S. corn production resulting from the 2012 drought had a large short-term impact on U.S. corn exports that complicates assessment of the significant increase in Brazilian competition. At the start of 2012/13, corn importers had made normal forward purchases for delivery in September and October and, with prices relatively high and old-crop stocks still available, the importers took a good share of those shipments during that period. However, U.S. corn supplies quickly tightened and could not maintain that brisk early export pace. Importers subsequently turned to other suppliers and U.S. total marketing year corn exports fell to only 38 percent of their 5-year average in 2012/13.

Several short-term events, including the 2012 drought, combined to make September 2013 the slowest corn export shipment pace since 1995/96, at 4.2 percent of 2013/14 exports. Carryover stocks from 2012/13 were extremely tight because of the drought, the U.S. 2013/14 corn harvest was delayed, and competitors' shipments—especially from South America—were in full swing. Most of this appears to be an agile marketplace adjusting to relatively ephemeral events.

Figure 11
Brazil and U.S. FOB corn price, 2011-2015

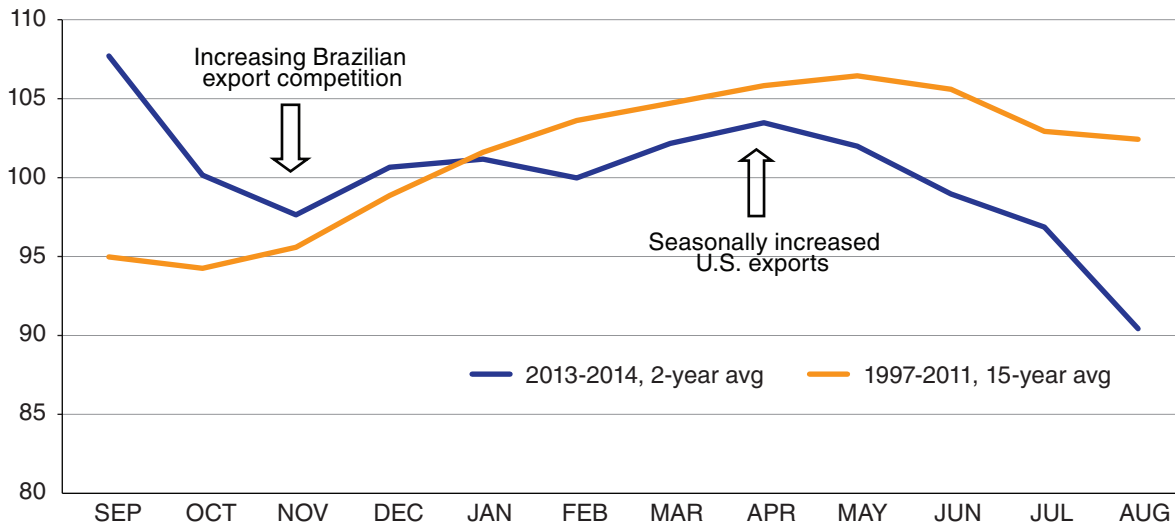


FOB = Free on board.
 Source: USDA, Economic Research Service using data from USDA, Foreign Agricultural Service (USDA/FASc) and The World Bank.

However, as 2013/14 unfolded, with the short-term effects of the 2012 drought passed, the export pattern that emerged may become the “new normal,” different than the patterns of U.S. corn exports from 1995/96 to 2011/12. Figure 12 illustrates the direction and timing of price pressure exerted by changing corn export seasonality. Brazil’s export competition is most intense during and immediately following the U.S. harvest, when U.S. prices are often at seasonal lows. This could intensify the harvest lows for U.S. corn prices and increase incentives for storing corn. Large Brazilian corn supplies could also limit price rallies associated with U.S. production problems.

Figure 12
Changing export seasonality could influence U.S. corn prices

U.S. corn price seasonality indexed with each year's season average = 100



Source: USDA, Economic Research Service using data from USDA's National Agricultural Statistics Service.

Conclusion

Corn is Brazil's second leading crop in terms of area harvested after soybeans (USDA/FASc). Brazil's corn production has risen in response to higher international prices, new higher yielding varieties (including input saving GMO corn), a shift of corn production to frontier regions (particularly Mato Grosso), geographic shifts in livestock feeding, the ability to produce two crops in the same year, and targeted government support. In recent years, Brazil's exchange rate has favored exports. While Brazil has always been one of the world's leading corn producers, in recent years it has emerged as the second largest exporter and a major competitor for the United States.

USDA's Agricultural Projections to 2025 indicate that Brazil is poised to continue as a major force in corn export markets. The size and seasonality of Brazil's corn exports are likely to affect the seasonality of U.S. corn exports. Given current seasonal patterns of Brazil's corn exports, U.S. corn export sales are likely to strengthen in months when Brazil reduces corn export competition. This will amplify the importance of U.S. corn export sales reported in February, March, and April, as was the case in 2013/14, compared to earlier years. Conversely, U.S. corn exports can expect strong competition from Brazil from September through January.

Stronger competition from Brazil corn exports at the start of the U.S. September-August marketing year is expected to have price implications for U.S. corn and soybean producers. Deeper U.S. harvest-time lows for corn prices would be significant to U.S. producers who over the last 5 years marketed an average 48.1 percent of their corn during October-January. On the other hand, U.S. *soybean* prices during October-January should find support from stronger seasonal export demand for U.S. supplies. U.S. producers marketed an average 62.0 percent of their soybeans during October-January over the past 5 years. Shifts in producer returns resulting from these relative price changes would contribute to further adjustments in U.S. acreage from corn to soybeans.

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