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**KING CORN VERSUS THE SAFRINHA: AN UPDATED COMPETITIVE ANALYSIS OF
THE CORN INDUSTRIES IN THE UNITED STATES AND BRAZIL IN LIGHT OF THE
2012 U.S. DROUGHT**

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ABSTRACT

The United States has long been the world's largest corn exporter. However, the drought experienced in the Midwestern United States during the summer of 2012 greatly reduced corn production and limited the availability of supplies to the export market. Brazil has been expanding its corn production and exports over the past decade, mostly due to the increased production from its second-crop corn harvest in the Center-West region of the country. A strong Brazilian harvest in 2012 allowed Brazil to increase its market share in the global corn market, including several of the United States' largest importing countries. This paper briefly chronicles the post-drought events in the U.S. and Brazilian corn markets and evaluates the short-, medium-, and long- term competitiveness of the two industries in light of the drought. The authors argue that the United States will likely regain its standing as the world's largest global corn exporter. However, the post-drought opportunity is likely to accelerate some of the progress that Brazilian corn suppliers made in international markets prior to 2012.

¹ This paper represents solely the views of the authors and is not meant to represent the views of the U.S. International Trade Commission or any of its commissioners. Please direct all correspondence to Brendan Lynch, Office of Industries, U.S. International Trade Commission, 500 E Street, SW, Washington, DC 20436, telephone: 202-205-3313, fax: 202-205-2384, email: brendan.lynch@usitc.gov.

Introduction

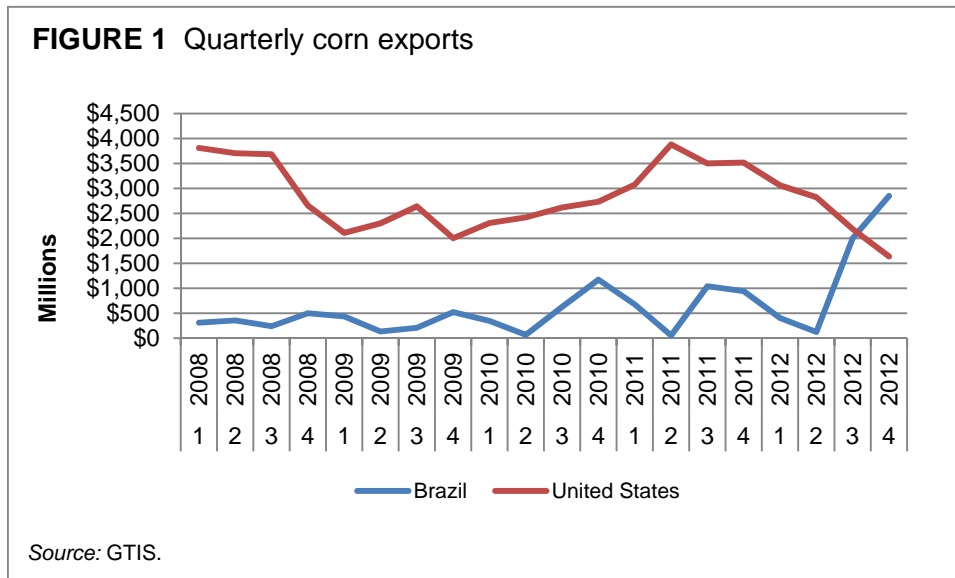
For decades the United States has been the world's leading corn exporter. The United States has taken advantage of its expansive acreage, high productivity, and efficient transportation and marketing systems to drive down delivered costs to customers around the globe. Several factors, both domestic and global, in recent years have opened the door to increased competition in the corn market, particularly from Brazil. These factors were highlighted in the findings of *Brazil: Competitive Factors in Brazil Affecting U.S. and Brazilian Agricultural Sales in Third Country Markets*, which was published by the U.S. International Trade Commission (USITC) in April 2012.¹

Following the report's publication, however, a drought in the United States significantly changed the competitive outlook for the two countries. During the 2012/13 marketing year² an historic drought in the Midwestern United States significantly lowered U.S. production. Brazilian producers responded with strong export growth. In the fourth quarter of 2012, Brazilian corn exports actually exceeded those of the United States, and for the first time U.S. Department of Agriculture (USDA) forecasted that Brazil would be the world's largest exporter of corn in the upcoming trade year (figure 1).³ In addition, Brazil is increasing its market share in several of the United States' most important markets, particularly Japan and South Korea.

¹ USITC, *Brazil: Competitive Factors in Brazil Affecting U.S. and Brazilian Sales in Selected Third Country Markets*, April 2012.

² Marketing years for agricultural products run approximately from when a crop is harvested to when product from the subsequent harvest begins to come to market. In the United States, the corn marketing year runs from September 1 to August 31.

³ The USDA defines a trade year as running from October to September. This time definition is used to harmonize different marketing years for different countries and crops. Capehart, Allen, and Bond, *Feed Outlook*, February 12, 2013, 5-6; USDA, FAS, *Grain: World Markets and Trade*, February 2013, 1, 19.



Many of the findings in the 2012 USITC report regarding U.S.-Brazil competition in the grains market are still applicable, but these new developments call for further analysis. While the current market situation may ultimately be a short-term phenomenon, it does provide an opportunity to reexamine the two countries competitive standing in the corn industry. One key question moving forward is whether Brazil will keep any of its gains in market share once U.S. production levels recover. This paper argues that the United States will likely regain its standing as the world’s largest global corn exporter. However, the post-drought opportunity is likely to accelerate some of the progress that Brazilian corn suppliers have already made in international markets, even before 2012.

Competitive Factors Between U.S. and Brazilian Corn

Several factors shape competition between the U.S. and Brazilian corn industries. Each country has unique agricultural economies, different cost structures, complementary production cycles, and fast growing domestic markets—the livestock sector for Brazil and the energy sector for the United States—that compete with foreign markets for supplies.⁴ Additionally, there are non-farm factors that differ for each country’s corn industry, such as transportation costs and exchange rates, which significantly affect delivered costs for producers.

⁴ USITC, *Brazil: Competitive Factors*, April 2012, 7-8 to 7-15.

One of the biggest distinctions between the United States and Brazil is the role of corn in each country's agricultural economy. Corn is arguably the most prominent agriculture commodity in the United States, accounting for the largest amount of acreage and the most production value.⁵ In Brazil, corn's role in many production regions was oriented toward agronomic management, improving returns on land primarily devoted to soybeans, as a second crop planted immediately after the soybean harvest. This second crop is known as the "safrinha"—or little harvest. As a result, producers placed less emphasis on optimizing inputs for corn production. As it is during the region's dry season, the timing of the second-crop harvesting cycle increases yield risks and, thus, uncertainty on the financial returns for additional investments in better seeds or more fertilizer use. However, beginning in 2006, corn's role began to shift. Many Brazilian producers responded to higher global prices by improving seed use and the application of fertilizer, increasing yields and production.⁶ This shift made corn a more prominent cash crop for producers.

Cost structures for the two countries are different as well. Brazil's expansive land availability, lower fertilizer use, and use of lower-quality seeds result in lesser production costs at the farm gate.⁷ Some of the differences in yields between the two countries are accounted for by Brazil's lower fertilizer use and less advanced seed varieties. However, even if farms chose to increase the expenditures on fertilizer and seed, Brazil's land costs still provide a significant competitive advantage.

The United States has a distinct advantage in transportation costs.⁸ Brazil has many well-documented challenges in its transportation and logistics infrastructure. This is particularly true for the Center-West region, where much of the increased corn production has taken place. The United States currently has superior storage, rail, road, and river transportation networks that reduce the cost of bringing product to ports—on both the Atlantic and Pacific coasts—allowing the United States to take full advantage of its scale and productivity to supply global markets.

⁵ USDA, NASS, QuickStats, (accessed February 13, 2013).

⁶ USITC, *Brazil: Competitive Factors*, April 2012, 7-4.

⁷ *Ibid.*, 7-10.

⁸ *Ibid.*

Both countries have faced changing demand structures over the past 10 years. Macroeconomic growth in Brazil has increased domestic consumption of meat and animal products, boosting domestic demand for corn from Brazil's livestock and poultry sectors.⁹ In the United States, meanwhile, federal ethanol policies have encouraged corn-based ethanol production since 2006. In the 2005 marketing year (September 2005 to August 2006), 14 percent of U.S. corn production was converted to ethanol. In recent years, that ethanol production has increased to over 40 percent of production.¹⁰ As a result, less of the U.S. corn crop has been available for export.¹¹

Exchange rates also affect the delivered cost of each country's exports. The Brazilian *real* has appreciated against the dollar since 2005, placing downward pressure on Brazilian exports. However, there have been brief periods of sharp depreciation over that time, such as the global financial crisis in 2008-09, which provided substantial, but temporary, opportunities for Brazilian exports. More recently, from July 2011 to December 2012, the *real* depreciated 32 percent against the dollar, making Brazilian corn more affordable for foreign consumers.¹²

U.S. Corn Prices and the Effects of the Drought

After many years of relative stability, global corn prices began to increase dramatically beginning in 2006, along with the increasing volatility in many agricultural commodity markets.¹³ U.S. corn prices have fluctuated several times since 2000 (figure 2). Higher corn prices were transmitted to world prices, stimulating an increase in global corn production over that period (figure 3).

Several factors contributed to fluctuations in agricultural markets, from increasing demand due to global economic development, to weather-related supply disruptions in some major producing countries, to government policies that affected the underlying supply and demand factors or that disrupted global

⁹ *Ibid.*, 2-12.

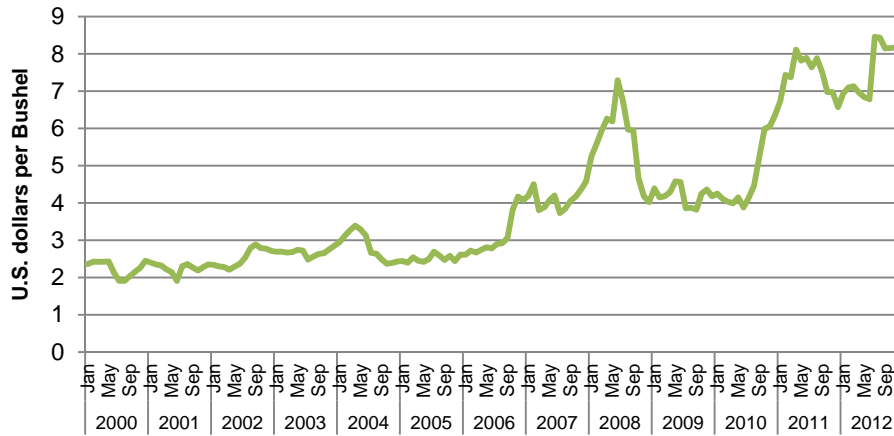
¹⁰ USDA, ERS, Feedgrains Database (accessed March 11, 2013).

¹¹ USDA, FAS, PSD Online (accessed February 12, 2013).

¹² USDA, ERS, Agricultural Exchange Rates Database (accessed February 13, 2013).

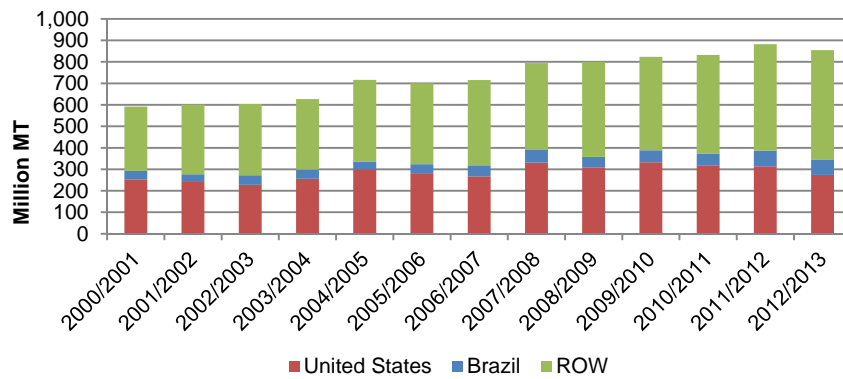
¹³ USDA, ERS, Feed Grains Database (accessed February 14, 2013); Trostle, *Global Agricultural Supply and Demand: Factors Contributing to the Recent Increases in Food Commodity Prices*, May 2008.

FIGURE 2 U.S. corn prices for export



Source: USDA/ERS.

FIGURE 3 World corn production



Source: USDA/FAS.

Note: ROW = Rest of World.

markets with trade barriers.¹⁴ In 2008, a combination of the global economic downturn and global production increases brought some relief from high prices, although they remained well above pre-2006 levels. Prices then jumped again beginning in 2010, as the global economy recovered and additional

¹⁴ Trostle, *Global Agricultural Supply and Demand: Factors Contributing to the Recent Increases in Food Commodity Prices*, May 2008.

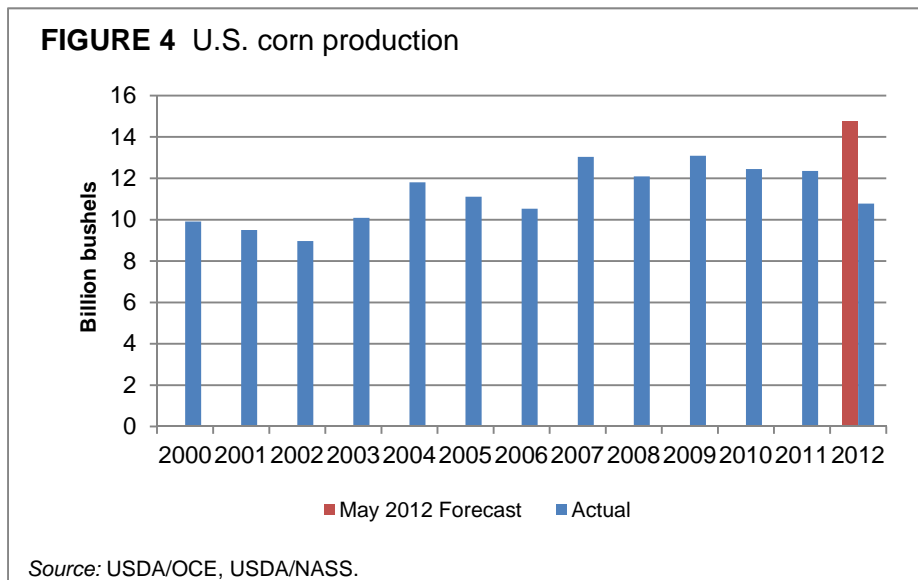
weather-related supply disruptions in Russia and Eastern Europe reverberated through grain markets.¹⁵ While all of these events impacted U.S. corn producers, until 2012, none of the supply disruptions had been internal. Instead, U.S. corn producers continued to have very strong harvests relative to historical production.

The expectation for a large corn harvest from the United States continued into 2012. In its initial forecast for the 2012/13 marketing year, USDA forecast record corn production based on very large amounts of planted area and strong yield expectations.¹⁶ After several years of tight domestic and global inventories, the historically high crop production was expected to result in increased exports and replenished stocks, all while keeping corn prices relatively stable. However, warm, dry conditions, which facilitated plantings and crop development early in the growing cycle, eventually developed into one of the most severe droughts in the Midwestern United States' history. For example, by August 30, 2012, 58 percent of the state of Iowa was classified as being in "extreme drought," the second most extreme level, and nearly the entire state was in at least a "severe drought." By comparison, only 9 percent of the state had been in "severe drought" conditions the same week a year earlier. U.S. corn production in 2012 was ultimately 10.8 billion bushels, 27 percent lower than the pre-drought forecast and 13 percent lower than the previous year's production (figure 4).¹⁷ U.S. corn prices—and as a result global corn prices—increased sharply starting in July 2012, as the impacts of the potential drought were taken into account by the market. These price levels moderated somewhat over the fall, but remained high for the remainder of 2012.

¹⁵ Trostle et al., *Why Have Food Commodity Prices Risen Again?* June 2011, 9.

¹⁶ USDA, WAOB, *World Agricultural Supply and Demand Estimates*, May 2012; Capehart and Allen, *Feed Outlook*, May 14, 2012.

¹⁷ USDA, NASS, *Crop Production*, February 2013, 7; USDA, WAOB, *World Agricultural Supply and Demand Estimates*, May 2012.



Changes in MY 2011 and 2012 Export Flows

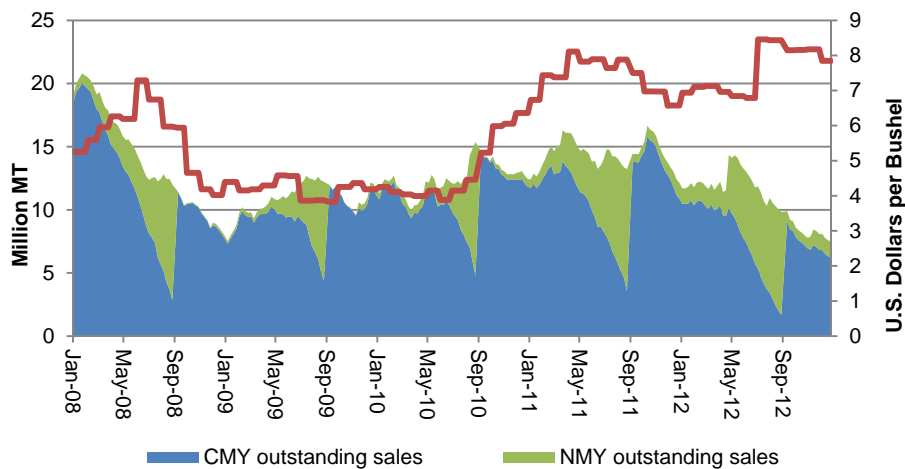
The drought impacted trade levels and flows significantly. Even though the affected product would not be marketed until the fall and winter of 2012 and 2013, consumers started rationing and reallocating their supplies while drought-stricken crops were still in the fields. Once prices increased, exporters reported declining sales to many foreign customers, both for the current marketing year and sales for the next crop year.¹⁸ Total outstanding foreign corn sales were 31 percent lower the week of September 13, 2012 (the first full week of the 2012/13 marketing year), compared with the year earlier; this drop likely indicated that firms were planning on purchasing their corn from other suppliers or lowering overall corn purchases due to corn’s limited availability and higher prices (figure 5).

As U.S. corn export commitments declined, Brazilian corn exports increased substantially. Brazilian corn exports usually skew toward the second half of the year, as second-crop corn comes to market and soybean export volumes typically fall, opening up transportation capacity (figure 6).¹⁹ Although data on outstanding export commitments are not available for Brazil, the shift is evident in Brazil’s official monthly trade data. In 2012, exports jumped substantially compared with recent years,

¹⁸ USDA, FAS, Export Sales Reporting (accessed February 1, 2013).

¹⁹ USITC, *Brazil: Competitive Factors*, April 2012, 7-14.

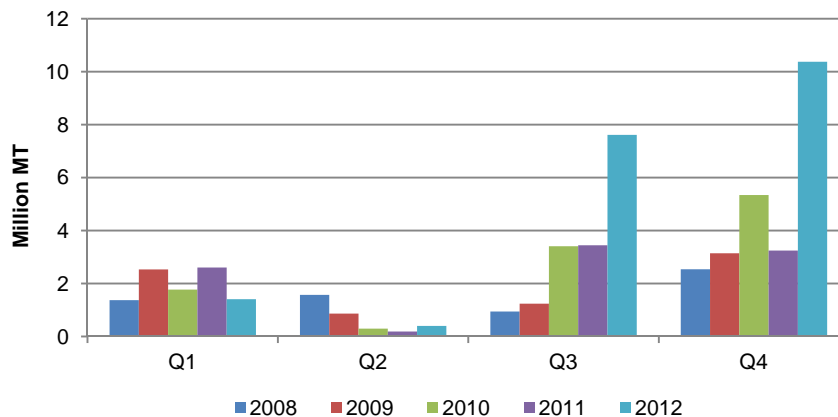
FIGURE 5 U.S. corn outstanding export commitments



Source: USDA/ERS, USDA/FAS.

Note: CMY = Current Marketing Year, NMY = Next Marketing Year.

FIGURE 6 Brazil quarterly corn exports



Source: GTIS.

with tonnage for 2012 more than double the average for 2008-2011. Must of this increase was made possible by expanding Brazilian production, which grew 27 percent for its 2011/12 marketing year.²⁰ Growth in production from the second crop was primarily responsible for the increase, as low global corn inventories pushed Brazilian farmers to plant 23 percent more corn area, and earlier plantings and

²⁰ CONAB, *Acompanhamento da Safra: Grãos* [Brazilian Crop Assessment: Grain], September 2012, 19-21; CONAB, *Acompanhamento da Safra: Graos* [Brazilian Crop Assessment: Grain], July 2012, 18.

favorable weather conditions resulted in yields that were 40 percent higher than the previous year.²¹ For the first time, Brazil's second-crop harvest accounted for the majority of the country's corn production. With record supplies, Brazil was able to market its corn on the international market and fill the gap created by less available U.S. corn.

In addition to increasing total exports, Brazil was able to increase its share in the United States' largest foreign markets. Previously, Brazil was primarily building its export markets by increasing market share in countries that sought lower-priced corn or wanted to diversify their suppliers as the United States production was increasingly kept in the domestic market.²² However, through 2011 Brazil still had relatively small market shares in the largest foreign markets for U.S. corn, in particular Japan and South Korea. In response to the drought, though, both Japan and Korea began reducing their purchases of U.S. corn (figures 7 and 8). This process started at the beginning of 2012, but accelerated in July when prices jumped and the effects of the drought truly took hold.²³ As a result, Japan and South Korea turned to the Brazilian market to satisfy their demand. Brazil began capturing significantly higher market shares starting in the summer of 2012 (figures 9 and 10). With relatively low outstanding sales reported to Japan and Korea, relatively large supplies remaining in Brazil, and a depreciating Brazilian *real*, Brazil is expected to remain the primary corn supplier for the global market— at least until a new U.S. crop is harvested.²⁴

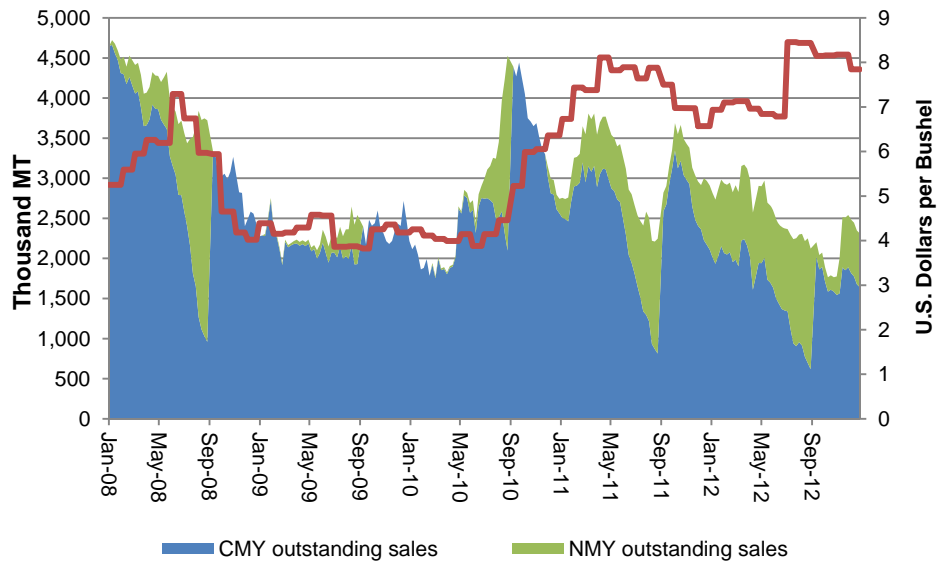
²¹ CONAB, *Acompanhamento da Safra: Grãos* [Brazilian Crop Assessment: Grain],” September, 2012, 19-21.

²² USITC, *Brazil: Competitive Factors*, April 2012, 7-6, 7-16–7-21.

²³ USDA, FAS, Export Sales Reporting (accessed February 1, 2013).

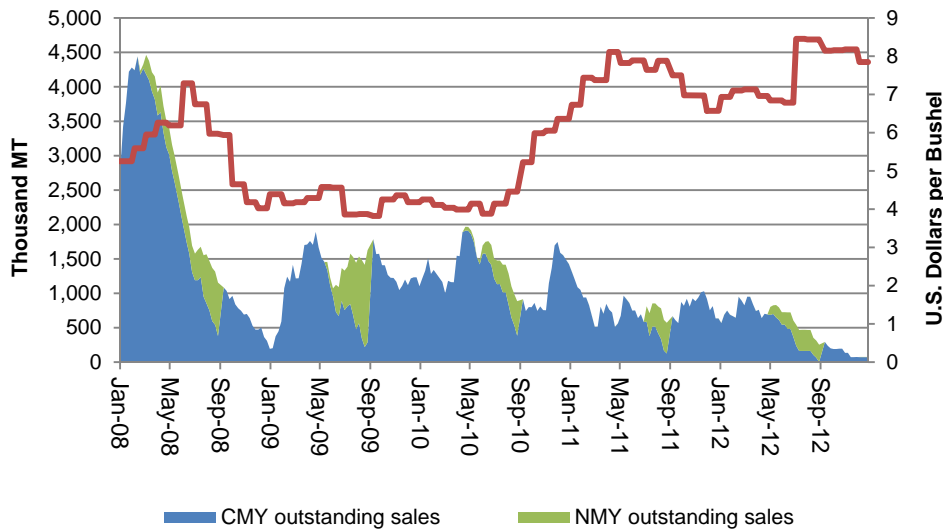
²⁴ Capehart, Allen, and Bond, *Feed Outlook*, February 12, 2013, 5-6.

FIGURE 7 U.S. outstanding corn export commitments to Japan

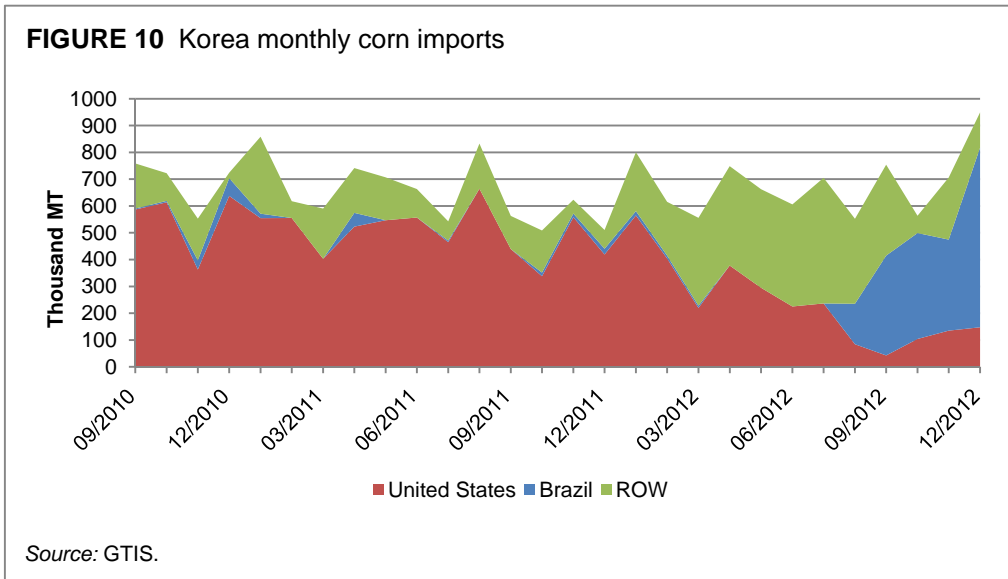
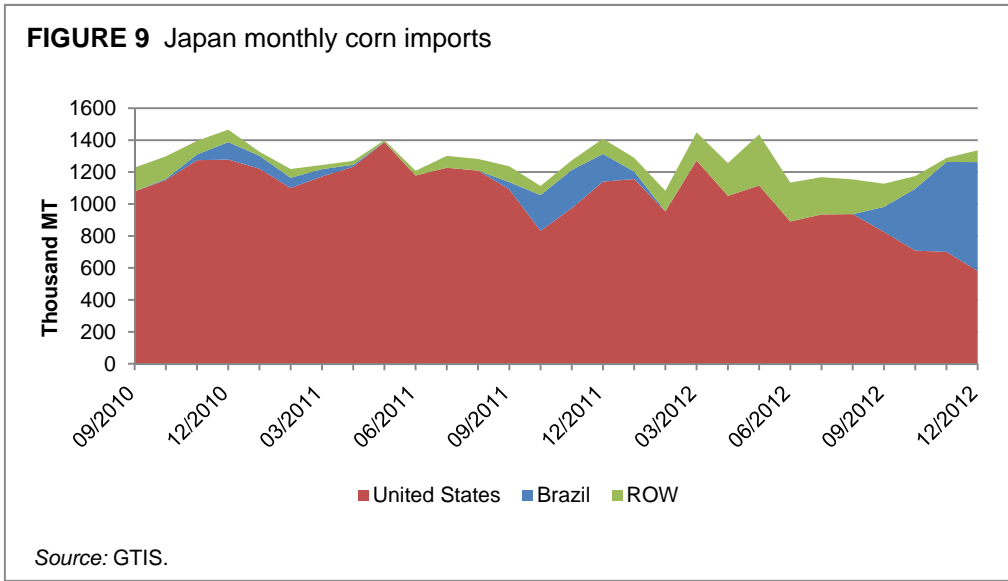


Source: USDA/FAS, USDA/ERS.

FIGURE 8 U.S. outstanding corn export commitments to Korea



Source: USDA/FAS, USDA/ERS.



Competitive Standing of the Industries Moving Forward

A key question going forward is whether this is a temporary market condition that will be resolved when U.S. production levels normalize, or if Brazil will be able to keep market share that it has taken in the current marketing year. This will impact countries that import corn, as well as U.S. producers as they develop their marketing strategies. Another key question is whether U.S. producers should focus

on the international market or rely on domestic customers instead. The issue is best viewed by examining factors of competitiveness over three time frames: the short, medium, and long term.²⁵

In the short-term, the most important factor will be production levels. USDA long-term projections show a substantial rebound in U.S. corn production from very large harvested areas and strong yields.²⁶ While this is not a forecast, it does indicate that there is an expectation for a substantial rebound in U.S. supplies. Weather will once again pose a significant risk. While drought conditions have improved throughout much of the Corn Belt, there are still areas that remain in moderate or extreme drought, and much of the region would be vulnerable if there was another year of poor weather conditions.²⁷ Nearly one-third of Iowa was still under “extreme drought” conditions as of the second week in February, with planting decisions still looming.²⁸ Meanwhile, Brazil’s next crop is forecasted to be even larger, as second-crop corn is likely to continue to use additional area in the Center-West region and yields are expected to remain high relative to historical levels.²⁹ However, weather is a risk factor for Brazil as well. Brazil’s second-crop corn is susceptible to the dry season in the Center-West and producers will have to decide how much to invest in inputs and potential yields under uncertain conditions.³⁰

If both the United States and Brazil have harvests that meet current expectations, world prices would likely drop dramatically, leaving both producers to compete on the basis of delivered cost. In such a case, the United States is likely to have competitive advantage, as Brazil will once again have to cope with its high transportation costs. However, Brazil would also marginally benefit if the *real* continues to depreciate against the dollar.

In the medium term, relationships with trading partners and domestic demand are likely to be the key factors in competitiveness over the next several marketing years. The United States has always had

²⁵ For this analysis, the short term refers to factors affecting the current and next immediate marketing year; the medium term, factors that will affect multiple marketing years, approximately 2-5 years into the future; and long term, to factors over a 3- to 10-year horizon, that require actions and investments in one time period with benefits that won’t be realized until a future time.

²⁶ USDA, ERS, Agricultural Baseline Database, (accessed on February 14, 2013).

²⁷ University of Nebraska, Drought Monitor Archives (accessed February 14, 2013).

²⁸ Ibid.

²⁹ CONAB, *Acompanhamento da Safra: Grãos* [Brazilian Crop Assessment: Grain], February 2013, 19-21.

³⁰ USITC, *Brazil: Competitive Factors*, April 2012, 7-9.

strong relationships with its foreign customers and a strong “brand” abroad. Brazil is still developing its trading relationships and improving its reputation for quality, but is making progress.³¹ Even if U.S. production rebounds, it is likely that Brazil’s market share will remain larger than pre-drought levels, as importers gain familiarity with Brazilian product and develop relationships with Brazilian suppliers.

Additionally, the growing demand in each country’s domestic market will continue to undercut the availability of corn supplies for export. It will also affect foreign customers’ purchasing decisions as they diversify and allocate their purchases to ensure adequate supplies. The rise of corn-based ethanol production in the United States resulted in several importing countries turning to Brazilian product even before the drought.³² U.S. ethanol production is largely dependent upon government policies, as ethanol production mandates and gasoline blending limits impact both the supply and demand in the U.S. ethanol market.³³ However, USDA baseline projections estimate that the share of corn that is used for ethanol and ethanol co-products will stabilize at about 35 percent over the long run, slightly less than recent pre-drought levels.³⁴ USDA also projects that the exported share of corn production will fall in the next few years, but will increase over a 10-year horizon to about 15 to 16 percent of the corn crop— a level slightly above recent, pre-drought levels.³⁵

In Brazil, it is the growing domestic livestock and poultry sector that will be competing with foreign demand for the country’s corn supplies. In its most recent international baseline projections, the USDA shows the share of Brazilian corn production dedicated for feed use to rise from 74 to 77 percent by 2014 as the livestock and poultry sectors grow, before falling back to about 73 percent by 2021.³⁶ While there are many stochastic factors to these projections, especially as they look further into the future,

³¹ USITC, *Brazil: Competitive Factors*, April 2012, 7-5.

³² *Ibid.*, 7-6.

³³ The impacts of U.S. ethanol policy have been thoroughly discussed in the literature. With the recent expiration of the blenders’ tax credit and the removal of tariffs on imported ethanol, production mandates remain an underlying factor driving production.

³⁴ USDA long-term projections assume a continuation of ethanol policy that is currently in place. USDA, ERS, Agricultural Baseline Database, (accessed on February 19, 2013).

³⁵ USDA, ERS, Agricultural Baseline Database, (accessed on February 19, 2013).

³⁶ This most recent projection was done before to the drought and strong Brazilian harvest. However, it does provide a benchmark for future trends. USDA, ERS, International Baseline Database (accessed on February 19, 2013).

these are likely to be the significant market factors that impact competitiveness and the market outlook over the next several crop cycles.

Finally, investment in infrastructure will remain one of the most crucial factors affecting long-term competitiveness. Brazil continues to invest in port capacity, rail, highways, river ways, and storage facilities, but investments are still catching up to needs of the current market.³⁷ In contrast, the United States' transportation and logistics network is showing signs of significant degradation.³⁸ Most notably, the Mississippi River's system of locks has several points which have become antiquated and are significant bottlenecks in moving product along the river. Without significant reinvestment, agricultural products will likely experience delays getting to markets, or will have to rely on more expensive rail and trucking routes. Additionally, many ports in the United States need to be updated to accommodate larger ships and more traffic. While the United States still has an advantage in transportation costs, this advantage will dissipate if current deficiencies are not addressed.

Conclusion

The drought in the United States was an unforeseen weather phenomenon that had dramatic effects on corn production and repercussions on its ability to supply global customers. Brazil's corn industry was well positioned to take advantage of the supply shortage, increasing its presence in the global market even with some of the United States' strongest trading partners. The United States still retains many competitive advantages over the Brazilian industry, and will likely recapture its place as the world's largest corn exporter once production levels recover. However, the drought revealed Brazil as a strong competitor with the capacity to serve markets the United States is not able to reach, whether due to supply shocks, availability of product for export, or delivered costs for price-sensitive consumers.

³⁷ USITC, *Brazil: Competitive Factors*, April 2012, 3-1-3-22.

³⁸ *Economist*, "Underinvestment in Ports and Inland Waterways," February 2, 2013.

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