



Export Markets for Distillers Grains



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Executive Summary

Spurred by the introduction of renewable fuel standards and the elimination of MTBE as a gasoline additive, U.S. production of fuel ethanol expanded from about 1.6 billion gallons in 2000, to 9 billion gallons in 2008. This increase has led to questions about whether markets could absorb the concomitant increase in production of distillers grains (DG). To date most DG has been used in the domestic cattle and hog sectors, but DG exports have been growing. This fact sheet examines recent trends in DG exports from the U.S. The analysis indicates:

- Exports have grown rapidly over the past three years and now account for over 20 percent of DG production.
- Exports of 4.5 million metric tons in 2008 were valued at close to \$1 billion.
- The top two foreign markets for DG are Mexico and Canada, accounting for 43 percent of exports.
- Turkey emerged in 2007 as the 3rd largest export market for DG, and cemented that position for 2008 as its imports tripled to 465,000 metric tons.
- Rapid growth in exports to Mexico, South East Asia, Central and South America and the Middle East/North Africa region have compensated for markets lost in Europe due to new EU labeling laws.
- Five of the top seven DG importers in 2008 were also among the top seven importers of US corn. However, because DG can also be fed as a protein source, the overall pattern of DG exports is correlated with both corn and soybean meal exports.

Background

Since 2002, U.S. ethanol production has increased by an average of about 26 percent per year reaching 9 billion gallons in 2008. As a by-product of dry-mill ethanol production, distillers grains (DG) production also increased rapidly, reaching approximately 20 million metric tons (mmt) in 2008. Under the terms of the Energy Independence and Security Act of 2007 the U.S. renewable fuel standard sets a target of 36

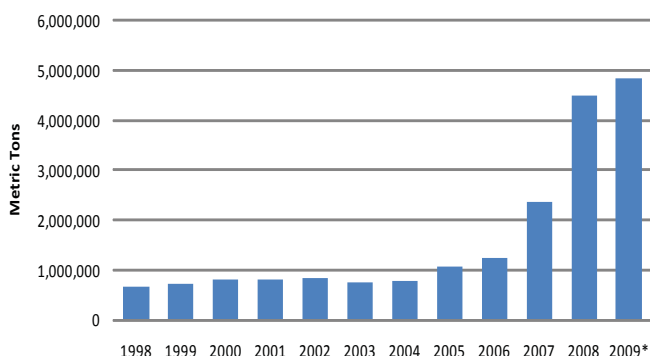
billion gallons of fuel ethanol by 2022, of which 15 billion gallons can be derived from grain. Because the expansion in ethanol production is from new dry-mill facilities, it follows that if grain-based ethanol production reaches 15 billion gallons (uncertain given the current downturn in ethanol profitability) there will be significant additional production of DG in the upcoming years. Applying some conversion factors – i.e., 2.8 gallons of ethanol and 18 lbs of DG per bushel of corn, 2204 lbs/metric ton – indicates that 15 billion gallons of ethanol would use 5.3 billion bushels of corn (over 40 percent of the record crop harvested in 2007), and result in the production of over 44 mmt of DG. Domestic use of DG in animal feed rations has increased as supplies have become more reliably available and as producers become familiar with the product. The dairy and beef cattle sectors account for over 80 percent of domestic consumption, and the domestic market still accounts for the bulk of DG use – over 85 percent in 2007. Various studies have estimated potential DG consumption in the U.S. using livestock inventories and assumptions about usage and inclusion rates. Those studies generally estimate maximum usage between 38 and 60 mmt, indicating that, under optimistic assumptions, the domestic market may have the capacity to absorb almost all of the likely increase in DG production. Using less favorable assumptions however, the numbers suggest that export markets will be vital to maintain competitive prices for DG.

Distillers Grain Exports

From 1995 to 2004, DG exports averaged 740,000 mt, ranging from 526,000 mt in 1996 to 842,000 mt in 2002 (figure 1). Exports exceeded 1 mmt for the first time in 2005, and increased by 18% to 1.25 mmt in 2006. In 2007, exports almost doubled to 2.35 mmt, and almost doubled again in 2008 to reach 4.5 mmt, representing over 20 percent of production. Data for the first five months of 2009 suggests that exports are continuing to increase but at a much slower pace. Exports during the first 5 months of 2009 were only 7 percent higher than in the same period in 2008, despite significantly lower bulk shipping rates.

Table 1 contains data on export quantities to the top

Figure 1. US Exports of Distillers Grains, 1995-2009



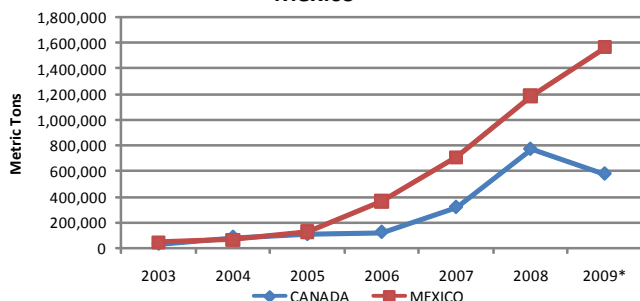
*Projected based on Jan-May
 Source: USDA-FAS <http://www.fas.usda.gov/ustrade/USTExHS10.asp?QI=>

25 export markets during 2008. Mexico has been the top export market for the past three years, accounting for between 25 and 30 percent of exports. Canada and Turkey were the 2nd and 3rd largest markets in 2007 and 2008, followed by several South East Asian countries. The table documents the decline in exports to Ireland and Spain, the only EU member countries on the list.

North America

Mexico and Canada accounted for approximately 43 percent of DG exports in 2007 and in 2008. Exports to both countries grew rapidly in recent years facilitated by the option to ship by rail and the absence of tariffs (figure 2). Exports to Canada tripled between 2005 and 2007, while exports to Mexico increased over five times in the same period. In 2006, Mexico surpassed Ireland to become the largest export market for DG. Exports

Figure 2. US Exports of DG to Canada and Mexico



*Projected
 Source: USDA-FAS <http://www.fas.usda.gov/ustrade/USTExHS10.asp?QI=>

continued to grow in 2008 increasing by 68 percent to Mexico, and by 143 percent to Canada.

During the first five month of 2009, exports to Mexico increased by 32 percent over the same period in 2008, projecting total imports of over 1.5 mmt for the year. The continued growth is associated with steady expansion in Mexican livestock and poultry production. Between 2007 and 2009, both the calf crop and broiler production are estimated to increase by more than 4 percent compared to 2007. While production systems are less reliant on compound feeds compared to the U.S., animal inventory numbers suggest a potential market for DG of around 3 mmt (Fox, 2008). Exports to Canada during the first part of 2009 fell by 25% compared to 2008, despite a slight increase in cattle on feed numbers. The reduction is attributed to increased availability of competing feeds including barley and feed wheat.

South East Asia

In 2008, seven South East Asian countries were among the top eleven DG importers, accounting for 25% of U.S. exports, up from 4% in 2004. Taiwan, Japan, South Korea, and Thailand each imported between 180 and 200,000 metric tons in 2008 (figure 3). Exports to these four countries are projected to rise by about 25 percent in 2009, with increased quantities to Japan and Thailand offset by reductions to Korea.

Exports to Japan increased by almost 40% in the first five months of 2009, and are on target to exceed 275,000 metric tons for the year. Japan is the number one export market for U.S. corn and has significant potential to increase its DG imports. Fox (2008) estimated the potential DG market at around 2.4 mmt, or over 8 times the projected 2009 level. Japan also imports DG from China and Canada but the U.S. is the dominant supplier with over 90 percent of the market.

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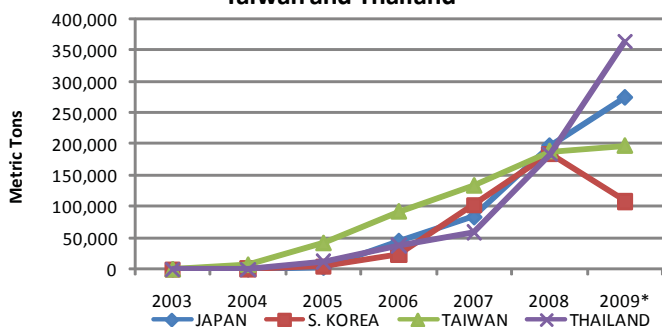
Table 1. Top 25 Export Markets for DG in 2008 (metric tons)

Country/Region	2004	2005	2006	2007	2008
Mexico	66,894	128,271	367,386	708,216	1,188,766
Canada	83,984	105,929	123,022	318,864	771,797
Turkey	0	216	416	136,519	465,212
Japan	0	2,824	45,248	83,586	198,014
Israel	6,366	47,935	17,668	62,315	195,045
Taiwan	7,431	42,249	92,824	134,404	189,451
Korea	625	4,843	24,587	102,529	184,723
Thailand	10	12,802	38,140	59,346	183,611
Indonesia	11,516	46,523	43,764	69,099	118,183
Vietnam	633	19,869	17,979	58,260	117,248
Philippines	958	11,758	62,465	79,153	113,017
Cuba	0	10,043	0	84,646	106,080
Costa Rica	6,600	0	10,432	15,149	93,527
Ireland	185,007	206,222	145,225	75,711	86,926
Morocco	0	5,499	27,858	46,246	80,936
Chile	0	3,607	3,011	37,488	78,866
Malaysia	12,475	34,410	29,970	39,576	57,659
Colombia	3,849	2,565	4,945	12,440	44,188
Egypt	0	0	0	0	42,901
Guatemala	3,998	0	4,970	3,500	39,609
Honduras	8,024	5,039	7,141	5,433	28,537
El Salvador	129	0	2,451	2,143	26,185
Spain	77,176	110,052	23,458	65,497	25,467
Panama	1,184	0	2,648	5,247	24,527
Jamaica	1,490	774	1,199	9,078	11,742
Rest of World	309,357	267,781	156,846	143,803	38,166
TOTAL	787,706	1,069,211	1,253,653	2,358,248	4,510,383

Source: USDA-FAS (<http://www.fas.usda.gov/ustrade/USTExHS10.asp?QI=>)

The beef sector in Korea has expanded in recent years, partly a consequence of restrictions on imports following the discovery of mad cow disease in the U.S. in 2003. From 2003 to 2009, beef cow inventories grew by over 65 percent from 532,000 to 882,000. Slower exports to Korea in early 2009 are attributed in part to credit constraints following the maxing out of U.S. export credit guarantees. With livestock inventories around two thirds those of Japan, and corn imports approximately half as large, the maximum potential market for DG in Korea is estimated at around 1.6 mmt. In Taiwan, while the hog sector is comparable in size to that of Korea or Japan, the dairy and beef cattle sectors

Figure 3. US Exports of DG to Japan, Korea, Taiwan and Thailand



*Projected

Source: USDA-FAS <http://www.fas.usda.gov/ustrade/USTExHS10.asp?QI=>

are much smaller. Total cow inventory as of January 2008 was estimated at about 150,000 hd., compared to about 1 million in Korea and 1.5 million in Japan. Thus the market potential for DG in Taiwan is more limited. Exports to Thailand more than tripled between 2007 and 2008, and are on track to double between 2008 and 2009 to over 350,000 metric tons. At that level Thailand could become the third largest market for U.S. distillers grains behind Mexico and Canada. The rapid increase in exports to markets such as Thailand is due in part to education and marketing efforts by the U.S. Grains Council which conducts seminars, feeding trials and training programs for feed mills on the use of DG's in several countries, and also to lower bulk shipping rates.

The other major export markets in South East Asia are Indonesia, Vietnam and the Philippines. Their combined DG imports totaled around 350,000 metric

tons in 2008, spread equally among the three. Exports are projected to increase for all three in 2009 – by 35 percent in Vietnam, 70 percent in the Philippines, and by 110 percent in Indonesia.

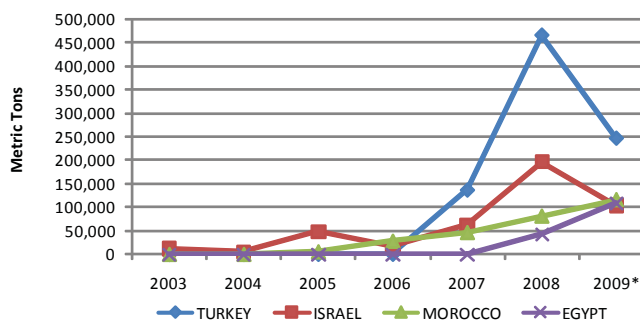
Until recently most DG moved to Pacific Rim markets by container shipment, taking advantage of backshipments of otherwise of empty containers. Container shipment presents some logistical problems because in Japan, for example, most container traffic goes to major ports that do not routinely handle animal feed. However, following a dramatic collapse in dry bulk shipping rates in the latter half of 2008 from what had been record high levels in May, bulk shipments of DG have been increasing. Cheaper bulk shipping rates compared to early 2008 are contributing to the growth in exports and should facilitate continued growth in Asian markets.

Middle East

Turkey emerged in 2007 as a major market for DG exports taking 136,000 metric tons, up from only 400 tons the previous year (figure 4). Quantities more than tripled in 2008 to 465,000 mt, ranking Turkey as the 3rd largest export market. Similarly, Israel tripled its imports between 2006 and 2007, and again between 2007 and 2008 to reach 195,000 mt. Exports to both countries have been lower in the first part of 2009 due to a larger than expected corn crop in Turkey and increased imports of cheap feed wheat by Israel from the Black Sea region.

Following promotions by the U.S. Grains Council, a

Figure 4. US Exports of DG to Turkey, Israel, Morocco and Egypt



*Projected

Source: USDA-FAS <http://www.fas.usda.gov/ustrade/USTExHS10.asp?QI=>

When new labeling and traceability requirements for animal feed were introduced in 2004, DG exports to the EU declined. Between 2005 and 2008, shipments fell from over 560,000 mt to about 260,000 mt, and from 72 percent of total exports to only 2 percent.

number of other Middle Eastern countries have begun to import DG. Exports to Morocco began in 2005 on a limited scale and have grown steadily, while Egypt began to import DG in 2007. Both are on track to import around 100,000 mt in 2009. A number of other Middle Eastern countries imported limited quantities, some for feeding trials, during 2008, including Syria, Tunisia, Libya and Oman.

European Union

During the 1990's the EU was the dominant export market for both DG and corn gluten, another by-product of corn milling. Each year between 1995 and 2000, more than 90 percent of U.S. exports of DG went to EU countries, as did over 80 percent of corn gluten exports. Following the introduction of labeling requirements for genetically modified plants, and a 1998 moratorium on approval of new GM crop varieties, the EU effectively ended its imports of US corn. But because the labeling requirements did not initially apply to by-products, the EU continued, until 2005, as the largest market for DG and corn gluten. Within Europe, the largest market was Ireland, which, between 1995 and 2005, was consistently the largest individual export market for DG, taking in some years, as much as 35 percent of U.S. exports. Irish agriculture is dominated by grass-based beef and dairy production, but those sectors rely heavily on imported grain for feed supplementation during winter months. Other important EU markets were the UK, Spain, and Portugal.

When new labeling and traceability requirements for animal feed were introduced in 2004, DG exports to the EU declined. Between 2005 and 2008, shipments fell from over 560,000 mt to about 260,000 mt, and from 72

percent of total exports to only 2 percent. The primary reason for the loss of this market is the fact that, due to the length and complexity of the EU approval process, many of the GM corn varieties grown in North America have not yet been approved by the EU. Furthermore, the fact that the U.S. grain systems does not facilitate effective segregation of varieties, coupled with the EU's zero tolerance for non-approved GMs creates a risk that shipments may be returned if any trace of non approved GM material is found. This risk creates a significant disincentive for trade. Additionally, under what are termed "safeguard clauses," individual EU countries have the ability to continue to ban GM varieties that may have been approved by the EU commission.

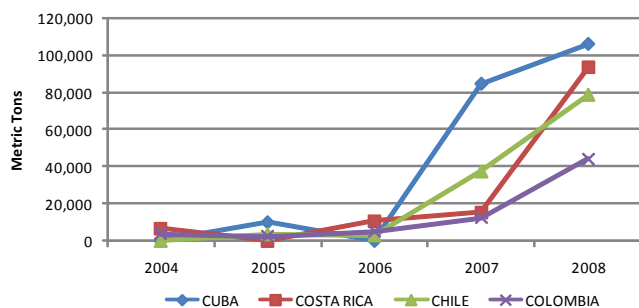
Some European countries, notably, Ireland and Spain, continue to import limited quantities of DG from the US, with pre-load testing used to verify that shipments contain only EU approved varieties. Shipments are subject to additional testing on arrival in Europe. But because new GM corn varieties continue to be developed and adopted in the US, it appears unlikely that the EU will be a significant market for DG in the immediate future.

Central and South America

Central and South America countries have been importing DG from the U.S. since 2000 when Columbia imported 40,000 mt, with smaller quantities going to Guatemala, Honduras, Jamaica and Venezuela in the same year. Since then, DG have also been exported in varying quantities and at varying times to Belize, Chile, Costa Rica, Cuba, Dominican Republic, El Salvador, Nicaragua, and Panama. From 2006 to 2008, exports to the region increased from 36,000 mt to 467,000 mt, with the bulk of the increase attributable to purchases by Cuba's state trading entity, Alimport, which imported over 100,000 mt in 2008. Chile and Columbia are the main markets for DG in South America, importing a combined 120,000 mt in 2008, while exports to Costa Rica in 2008 approached 100,000 mt.

Argentina and Brazil, South America's largest livestock producers, are net exporters of both feed grains and thus unlikely to import DG. Using livestock inventory

Figure 5. US Exports of DG to Cuba, Costa Rica, Chile and Columbia



Source: USDA-FAS <http://www.fas.usda.gov/ustrade/USTEXHS10.asp?QI=>

numbers, and excluding Brazil and Argentina, Paulson (2008) estimated the potential DG market in South America at around 1.5 mmt, and in Central America/ Caribbean at around 3.0 mmt.

Outlook for DG Exports

Early indications are that the rapid growth in export markets seen in 2007 and 2008 will not be sustained in 2009, as exports for the first five months of the year were only 7 percent higher than in 2008. As new markets are developed the distribution of DG exports has become more diverse. While the top three markets continue to account for more than half of exports, the share for the top three is down from 69 percent in 2003 to 54 percent in 2008. Similarly, in 2003 seven countries accounted for over 90 percent of exports, while in 2008 it took fifteen countries to account for the same total share. Growing diversity in the market is also evidenced by the increasing number of countries importing DG. In 2008, the U.S. exported DG to a total of 46 countries, twice as many as in 2003. Fifteen percent of total exports in 2008 went to countries that imported either no DG or only limited trial quantities (less than 500 mt) in 2006.

In economics, Say's law refers to the idea that income generated from the production of one good provides the means to purchase other goods. It is often summarized in the phrase "supply creates its own demand." In a different, and more direct, sense the same idea applies to distillers grains given that production of 1lb of DG is a consequence of removing approximately 3 lbs of corn from the market. Thus, if permissible DG

inclusion rates in animal feed are sufficiently high, there will be a ready-made demand for that 1lb of DG. With recommended inclusion rates as high as 30 to 40 percent for beef cattle, and up to 25 percent for dairy cattle, that demand will exist, and so it follows that as long as sellers of DG have access to the same markets as sellers of corn there should be no more concern about oversupply of DG than about oversupply of corn.

The correlation between corn and DG prices documented by Schroeder (2009) suggests that DGs are indeed being used to replace corn in livestock rations. It follows that the most likely potential export markets for DG will be in countries that import U.S. corn. The pattern of exports for DG appears to bear this out, and in 2008 for example, five of the top seven export markets for DG

were also in the top seven export markets for corn. Those five countries – Mexico, Canada, Japan, Taiwan, and Korea – accounted for 56 percent of DG exports and 71 percent of corn exports. But because distillers grains have much higher protein content than corn (approx 30 percent versus 10 percent), DG can also be used as a substitute for soybean meal (44 percent protein) in certain situations. Given this potential use as a protein source, the distribution of DG exports may also correlate with exports of soybean meal and so should not be expected to exactly reflect those of corn. Figures 6a and 6b show the distribution of DG exports to different countries/regions and the distribution of (equally weighted) average corn and soybean meal exports to the same markets. With some exceptions (more DG to Mexico and Other South East Asia) the pattern of exports in the two figures are broadly similar. As export markets for DG mature we would expect exports to continue to be correlated with both corn and soybean meal exports.

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Figure 6a. Distribution of DG Exports, 2008

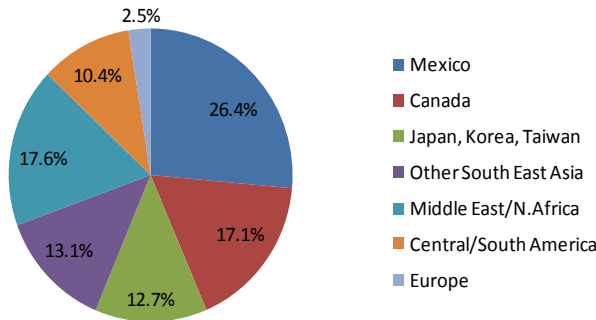
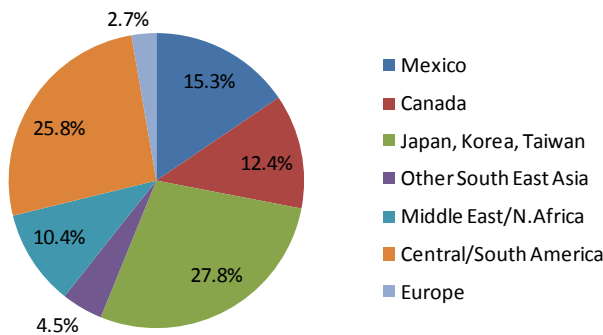


Figure 6b. Average Distribution of Corn & Soybean Meal Exports, 2008



For More Information

Fox, John. A. “The Value of Distiller’s Dry Grains in Large International Markets,” and Paulson, Nicholas D. “International Demand for U.S. Distillers Dried Grains with Solubles in Small Markets.” Chapters 6 and 7 in Using Distillers Grains in the U.S. and International Livestock and Poultry Industries, edited by B.A. Babcock, D.J. Hayes, and J.D. Lawrence. Midwest Agribusiness Trade Research and Information Center (MATRIC) Iowa State University. November 2008. Available at <http://www.matric.iastate.edu/DGbook>

Schroeder, Ted C. “Distillers Grain Prices: Spatial Relationships, Arbitrage Opportunities & Risk Management.” North American Institute for Beef Economic Research. May 2009.