

U.S. Grain and Soybean Exports to Mexico A Modal Share Transportation Analysis, 2007-2010

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April 2011

Summary

Prior to 2010, Mexico was the second most important U.S. agricultural export market after Canada. However, in fiscal year 2010 China surpassed Mexico, becoming the number two U.S. export market. The appreciation of the dollar against the Mexican peso and heavy Chinese purchases of U.S. agricultural products, such as soybeans, cotton, soybean oil, and red meats caused U.S. agricultural shipments to China to grow at a faster rate than shipments to Mexico.

The Mexican economy is highly dependent on trade with the United States. Trucks are the primary transportation mode by value in the U.S.–Mexico trade, followed by ocean vessels and railroads. Mexican truck access to the United States is one of the major trade disputes between the United States and Mexico; trucks carry 69 percent of the U.S.-Mexico trade. The Mexican government objects to the U.S. position of not allowing Mexican trucks to have full access to U.S. highways under the terms of the North American Free Trade Agreement (NAFTA). The majority of Mexico's agricultural exports to the United States consist of horticultural products and fresh and prepared fruit and vegetables, most of which are carried by truck.

In early March of 2009, the cross-border trucking demonstration program that allowed additional Mexican trucks to operate beyond the commercial zones along the international border was terminated. The Mexican government retaliated by imposing import tariffs on 89 U.S. agricultural and industrial products with an estimated export value of \$2.4 billion. The list of 36 agricultural products, valued at approximately \$864 million, did not include products that are important in the basic diet of Mexicans, such as corn, rice, beans, dairy, or meat. However, on August 18, 2010, Mexico increased the list of products affected by the import tariffs to 99 with an estimated value of \$2.03 billion. The new list increased the total number of U.S. agricultural products exported to Mexico to 54, valued at almost \$1.7 billion.

Laredo and El Paso, TX, are the main entry points of U.S. goods to Mexico. Goods are shipped mostly by truck, with the exception of Eagle Pass, TX, where railroads hauled more than half of total shipments. Since 2008, U.S. exports of the commodities included in this study (corn, sorghum, wheat, and soybeans) are spread throughout the year because of the elimination of the Tariff Rate Quotas (TRQs). Relative costs and rail service availability are some of the main factors determining modal share shipments to Mexico. Corn and soybeans are mostly shipped by rail, and wheat and sorghum by ocean. Ocean gained market share in all the commodities considered in the study at the expense of a decline in rail and truck shipments, except for soybeans. More than half of the soybean exports to Mexico were shipped by rail.

Acknowledgments

The author would like to acknowledge Keith Menzie and David Stallings (USDA, Office of the Chief Economist), Mark Ash, Edward W. Allen (ERS), and Heather Lutman (USDA, Economic Research Service), Adam Branson (USDA, Foreign Agricultural Service/Mexico City), and Byron Reilly (USDA, Grain Inspection, Packers, and Stockyards Administration) for reviewing the manuscript. The author would also like to thank Michael D. Smith, editor, and Jessica Ladd, graphic designer.

Introduction

Transportation costs comprise 17 to 35 percent of the landed cost of shipping U.S. grain and oilseeds to Mexico, making information on the transportation system and patterns of trade of vital interest to grain exporters. Due to its location, Mexico is a unique market that it is served by both overland—truck and rail—and maritime transportation. Overland transportation has several advantages over maritime shipping (Klindworth and Martinsen 1995):

- The grain does not require transfer upon entry into the country, so there is less damage than to grain shipped by vessel, which has to be off-loaded.
- Smaller lot sizes allow more specialized purchasing, with less variation in shipment quality.
- Inventory costs are lower because smaller lots are purchased more frequently.
- Supplies for some commodities are less costly because of improved access.
- Increased rail efficiencies¹ caused by larger trains and “Despacho Previo”. U.S. grain and soybean shipments to Mexico typically are hauled by unit trains (at least 52 cars) and shuttle trains (75-110 cars). “Despacho Previo” is a process in which railroads offer customers up to 72 hours of free time to pre-clear goods by Mexican customs while rail cargo is in route to the Mexican border (UP 2011). It reduces border crossing congestion and delays by allowing the interchange of run-through trains rather than individual cars. Following the expiration of the free time, railroads assess a document delay charge per day.

Analysis reveals changes in competitiveness and relative efficiencies among the modes (Marathon, VanWechel, and Vachal 2006). This report analyzes the current United States–Mexico grain and soybean trade patterns. It includes a description of the modal shares of corn, sorghum, wheat, and soybeans.

Overland Versus Maritime Shipping Time to Mexico

Shipping time² to Mexico takes longer by sea than by land. For example the transit time from Davenport, IA, to Port of New Orleans to Port of Veracruz, Mexico, is about 11–12 days. Barge transit time from Davenport to the Port of New Orleans is 9 days. Vessel voyage time from the U.S. Gulf to the Port of Veracruz is usually about 2.5 days. If cargo fumigation is required, the voyage time is 3 days (Reilly 2011). Transit time by rail from Davenport to Guadalajara, Mexico, averages 8 days, depending on the time spent crossing the U.S.-Mexico border (BNSF 2011).

¹ North American Railroads (Canada, United States, and Mexico) operate over 177,000 miles of track (AAR 2010 and RAC 2009) with a standard gauge size of 56.5 inches. Gauge uniformity facilitates railroad integration throughout North America, increasing transportation efficiency in the region (Salin 2008).

² Shipping time does not include vessel days at berth, loading, and discharges.

U.S.-Mexico Trade and Transportation

The Mexican economy depends on trade with the United States, making it vulnerable to weak U.S. economic conditions (IMF 2010). The United States buys about 80 percent of all Mexican exports (U.S. State Department 2011). Exports represent more than a quarter of Mexico's Gross Domestic Product (GDP). Trucks were the primary transportation mode used in the U.S.–Mexico trade by value, accounting for 68 percent (\$207 billion) of trade in 2009, followed by ocean vessels and railroads (table 1). Laredo and El Paso, Texas, are the main entry points of U.S. goods to Mexico. Goods are shipped mostly by truck, with the exception of Eagle Pass, TX, where railroads hauled about 70 percent of total shipments (table 2). Mexican truck access to the United States continues to be one of the major trade disputes between the United States and Mexico. The Mexican government objects to the U.S. policy of not fully allowing Mexican trucks to have access to U.S. highways under the terms of the North American Free Trade Agreement (NAFTA) (U.S. State Department 2002 and 2011). On March 3, 2011, the presidents of the U.S. and Mexico announced an agreement to solve the long-haul trucking dispute.

U.S. Mexico Cross-Border Long-Haul Trucking Dispute

Mexico agreed to suspend its retaliatory tariffs in stages, beginning with reducing tariffs, once the final agreement is reached (SE 2011). As part of the agreement, U.S. carriers wishing to transport cargo to Mexico must meet the same rules required for the Mexican carriers to enter to the United States.

The program consists of 3 phases (SE 2011):

- Phase I: is a pre-operation stage to certify the long-haul carriers. It consists in filing a certification application, reviewing of the carrier's vehicle, and accreditation of its operators. Once Mexican carriers are certified they will be granted a temporary entrance to the United States.
- Phase II: is an operational stage which begins with three months of inspection of the long-haul trucks while crossing the border. Inspections will be reduced significantly after the fourth month, and be completed when the company reaches 18 months of operation.
- Phase III: once the Mexican companies passed the compliance review and accumulated at least 18 months of operations, they will be notified of a final authorization of entrance to the United States. This final authorization is irrevocable, except for breaches of road safety regulations.

Mexican carriers with a history of recognized performance, improvements, and operational experience obtained in the previous program could obtain final authorization to enter to the United States before the 18 months required in Phase II. Mexico is committed to suspend the compensatory measures (tariffs) applied to U.S. exports upon fulfillment of the agreed program. Mexico reserves the right to fully reinstate these measures in case of any deviation or breach.

Mexican Truck Access to the United States

Prior to 1982, trucks from Mexico could drive anywhere in the United States. However, since 1982, trucks were not allowed to drive beyond the 20-25 mile commercial zone of U.S. border cities such as San Diego, El Paso, and Brownsville. There was an exception for Mexican trucking companies that were previously operating or grandfathered in (DOT 2007). Cargo destined beyond the commercial zone must be off-loaded and transferred to U.S. trucks (DOT 2007).

In 2008, there were 861 certified and grandfathered Mexican carriers with 1,749 trucks operating beyond the U.S.-Mexico border zone under separate permanent authority granted between 1982 and 1994 (Downey III, Kolbe, and Mead 2008; AMS 2009b). In 2010, there were 8,030 Mexican carriers³ with 30,480 trucks⁴, and 27,544 drivers operating within the U.S. commercial zone⁵ (DOT 2010).

In 2007, the United States created the Cross Border Trucking Demonstration Program. This was a year-long pilot program that allowed a select group of Mexican trucking companies to make deliveries beyond the 20-25 mile commercial zones along the Southwest border, which is consistent with the U.S. trade obligations under the North American Free Trade Agreement (NAFTA) (DOT 2007). This program was extended for 2 years on August 4, 2008.

On March 11, 2009, the United States terminated the Cross Border Trucking Demonstration Program. By mid-March, the Mexican government responded to the U.S. ban of Mexican trucks from U.S. roads by imposing 10–45 percent tariffs on 90 U.S. industrial and agricultural products,⁶ such as Christmas trees, onions, pet food, cherries, potatoes, fruit and vegetable juices, soy sauce, wine, mineral water, shampoos, and coffee makers, with an estimated export value of \$2.4 billion. Fresh grapes faced the highest tariff at 45 percent. The 36 agricultural commodities included in the list were valued at approximately \$864 million in 2008 (FAS 2009). These import duties excluded rice, corn, wheat, sorghum, meats, dairy, and seafood products (Mexico Official Gazette 2009). However, on August 18, 2010, Mexico revised the list of products affected by the import tariffs to 99, adding 26 products and dropping 16 from the original list, with an estimated value of \$2.03 billion (ITA 2010). According to Secretaría de Economía, the Mexican government made sure that none of the products impacted by the tariffs have a significant impact on the Mexican production system, but impact the U.S. States where exports to Mexico represent a significant proportion of their world trade (SE 2010). The revised list includes 54 agricultural products, valued nearly \$1.7 billion, such as pork products, cheeses, pistachios, oranges, grapefruits, apples, ketchup, rolled or

³ Carriers with OP-2 Authority (DOT 2010) refers to motor private carriers who are registered to transport property only in municipalities in the United States on the United States-Mexico international border or within the commercial zones of such municipalities.

⁴ Power units: identifies the number of trucks, tractors, hazardous material tank trucks, motor coaches, and school buses owned, term leased, or trip leased by the motor carrier.

⁵ The area around a port of entry at the U.S.-Mexico border in which motor carriers, domiciled in Mexico, with an approved Form OP-2 can operate.

⁶ In 2001 a ruling by a NAFTA dispute-settlement panel gave Mexico the right to retaliate against U.S. products entering Mexico, citing that the blanket exclusion of Mexican trucking firms violated U.S. obligations under the NAFTA (DOT 2007).

flaked oats, chewing gum, chocolate, and others. Tariffs range from 5–25 percent (FAS 2010).

Table 1. Value of U.S. Merchandise Shipments with Mexico by Mode of Transportation, 2007-2009, Millions of current U.S. dollars

Mode of Transport	Exports to Mexico			Imports from Mexico			Total Trade		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
Land modes:									
Truck	93,047	100,264	89,417	137,037	134,224	117,787	230,084	234,488	207,204
Truck % share	68.1	66.2	69.3	65.0	62.2	66.7	66.2	63.8	67.8
Rail	19,340	21,965	15,291	27,060	25,265	19,303	46,400	47,230	34,593
Rail % share	14.2	14.5	11.9	12.8	11.7	10.9	13.4	12.9	11.3
Pipeline	787	1,250	788	169	193	155	956	1,444	943
Other and unknown total¹	5,581	6,107	4,882	2,696	2,717	2,175	8,277	8,824	7,057
Foreign Trade Zones (FTZs)²	0	0	0	751	1,079	1,156	751	1,079	1,156
Mail	3	1	1	0	0	0	3	1	1
Total by land	118,758	129,587	110,378	167,713	163,478	140,576	286,472	293,065	250,954
Land % share	87.0	85.5	85.6	79.6	75.7	79.6	82.5	79.8	82.1
Air	6,824	7,030	7,183	4,684	5,952	7,704	11,508	12,982	14,888
Vessel	10,959	14,921	11,436	38,401	46,485	28,257	49,360	61,406	39,693
Vessel % share	8.0	9.8	8.9	18.2	21.5	16.0	14.2	16.7	13.0
Total by air and vessel	17,783	21,951	18,620	43,086	52,437	35,961	60,869	74,388	54,581
Air and vessel % share	13.0	14.5	14.4	20.4	24.3	20.4	17.5	20.2	17.9
Total, all modes	136,541	151,539	128,998	210,799	215,915	176,537	347,340	367,453	305,535

¹ "Other" includes other modes, for example: flyaway aircraft and vessels moving under their own power, where the conveyance itself is the shipment.

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data as of April 14, 2010

**Table 2. Top U.S. land ports by value of U.S.-Mexico land mode trade, 2009
(Millions of current U.S. dollars)**

Ranked by all land modes	Port	Total land modes	Truck	Rail	Other	Truck as a percent of total land modes	Rail as a percent of total land modes
1	Laredo , TX	95,096	79,781	14,990	325	83.9	15.8
2	El Paso, TX	42,261	37,457	4,328	477	88.6	10.2
3	Otay Mesa, CA	28,594	28,213	0	381	98.7	0
4	Hidalgo, TX	19,087	18,823	0	265	98.6	0
5	Nogales, AZ	16,224	11,121	5,097	6	68.5	31.4
6	Eagle Pass, TX	12,483	3,795	8,687	1	30.4	69.6
7	Brownsville, TX	9,738	8,254	1,152	332	84.8	11.8
8	Calexico-East, CA	8,402	8,212	131	58	97.7	1.6
9	Santa Teresa, NM	4,444	4,415	0	29	99.3	0
10	Del Rio, TX	2,284	2,283	0	2	99.9	0

Notes: NAFTA=North American Free Trade Agreement. "Other" includes pipeline and mail. Numbers may not add to totals due to rounding.

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Transborder Freight Data as of April 9, 2010

Methodology and Sources of Data

Modal Share

Modal share is the portion of grain tonnages moved by each mode of transport. Rail, truck, and ocean shares are presented as percentages (Marathon, VanWechel, and Vachal 2006). Transport modes are determined from major export terminals to Mexico. The reported modal shares are based on total quantities exported to Mexico.

Total Exports

Total grain and soybean export data were obtained from USDA's Global Agricultural Trade System (GATS) Foreign Trade Statistics, published by USDA's Foreign Agricultural Service (FAS). The data on the FAS website came from the U.S. Department of Commerce's *Foreign Trade Statistics*, a publication of the U.S. Census Bureau.

Ocean Exports

Ocean tonnages represent grain inspected for export by USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA).

Rail Exports

Rail totals were estimated by collecting primary data from Burlington Northern Santa Fe (BNSF) Railway, Union Pacific (UP) Railroad, and Kansas City Southern (KCS) Railway Company.

Methodology for Estimating Modal Tonnages and Share

(1) Total Exports in tons from Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics.

(2) Truck Exports = Total Exports - (Ocean Exports + Rail Exports).

United States–Mexico Agricultural Trade

Mexico was replaced by China as the second largest destination of U.S. agricultural exports after Canada, estimated in fiscal year (FY) 2010 at \$12.8 billion (ERS 2011; Flake 2010; FAS 2011). The appreciation of the dollar against the Mexican peso, Mexico's import duties on U.S. horticultural products, and heavy Chinese purchases of U.S. agricultural products such as soybeans, cotton, soybean oil, and red meats, caused U.S. agricultural shipments to China to grow at a faster rate than shipments to Mexico (FAS 2011; Flake 2010). China is forecast to surpass Mexico again in FY 2011 (ERS 2011).

Bulk commodities accounted for 65 percent of the total 28 million metric tons (mmt) of U.S. agricultural products exported to Mexico in 2010, and coarse grains 59 percent of the bulk agricultural shipments (FAS 2011). Soybeans and wheat accounted for 20 and 14 percent of the 17.9 mmt of bulk exports, respectively. Almost 70 percent of Mexico agricultural exports to the United States consist of fresh and prepared fruit and vegetables, and horticultural products (FAS 2011). Trucks are the primary transportation mode used in Mexico's agricultural trade, accounting for nearly 76 percent of Mexico total agricultural exports (SIAP 2011). However, 84 percent of Mexican agricultural imports enter the country by train or vessel (SIAP 2011).

The Caribbean Gulf ports are the main entry points of bulk grain and soybean shipments to Mexico. Most of these originate in the United States—76 percent in 2008 (SCT 2008 and Piers 2009). Veracruz is the top receiving port, followed by Progreso, Coatzacoalcos, Tuxpan, and Altamira. The Pacific Ocean ports received about 24 percent of shipments. They consisted of safflower imports from Argentina through the port of Guaymas, Sonora, followed by canola and wheat imports from Canada through the ports of Manzanillo, Colimas, and Lázaro Cardenas, respectively (SCT 2008). The port of Manzanillo is the top port for containers, followed by Lázaro Cardenas and Altamira (AMS 2010; and Piers 2009).

Corn Exports to Mexico

Mexico is the fifth largest world corn producer after the United States, China, the European Union (EU-27), and Brazil. In most years, Mexico is the world's second largest corn importer after Japan but, in the last two years, South Korea imported slightly more than Mexico. Mexico produces different varieties of corn, with white and yellow corn varieties being the most important and accounting for 92.9 and 6.9 percent of Mexican corn production in 2005 (SAGARPA/SIAP 2007). The largest white-corn producing States are Sinaloa, Jalisco, Michoacán, Chiapas, Guerrero, Estado de México, Guanajuato, Veracruz, and Puebla. Yellow corn production is concentrated in the States of Chihuahua, Jalisco, Tamaulipas, and Chiapas. Mexico processes much of its production of white corn into human food products, such as flour, traditional tortillas in rural areas, and other products.⁷ In 2006, about 83 percent of white corn was used for human consumption and 17 percent for animal feed. About 80 percent of yellow corn was used for animal feed and the remainder was made into corn starch, cereals, and snacks. Approximately 23 percent of Mexico's corn is imported, almost all of it from the United States. It consists of yellow corn for livestock feed to support increased meat production and a small amount of white corn for human consumption (SAGARPA/SIAP 2007). Lower feed demand, appreciation of the U.S. dollar against the Mexican peso, and higher domestic production kept the 2010 U.S. corn exports to Mexico below 2008 levels (FAS 2010 and WASDE 2010) despite the elimination of corn Tariff Rate Quotas (TRQs).

Corn Modal Share

Most corn shipped from major export facilities to Mexico is moved by rail (tables 3 and 4, and figure 1). From 2007 to 2010, rail hauled 59 percent of U.S. corn to Mexico, ocean vessels moved 36 percent, and trucks carried 5 percent. In 2010, rail corn shipments increased despite higher rail rates caused by increases in fuel surcharges and traffic demand compared to ocean rates (table 5) (AMS 2011). Over the last 2 years, rail has gained market share at the expense of ocean and truck carriers.

Texas is the major entry point for rail corn shipments to Mexico, via Brownsville, Laredo, El Paso, and Eagle Pass. The Port of Veracruz is the major entry point into Mexico for ocean vessels (figures 2 and 3, and table 6). All U.S. corn shipped by ocean originates from ports along the U.S. Gulf⁸ (table 4 and figure 4). About 42 percent of the corn shipped to Mexico by ocean moves down the Mississippi River; another 56 percent travels from North Texas. Figure 4 shows that since January 2008 the U.S. corn exports to Mexico spread throughout the year because of the elimination of corn TRQs. Mexico imported almost all of its corn from the United States, with a small amount coming from Argentina, Guatemala, and France.

⁷ Atoles, tamales, pozole, etc.

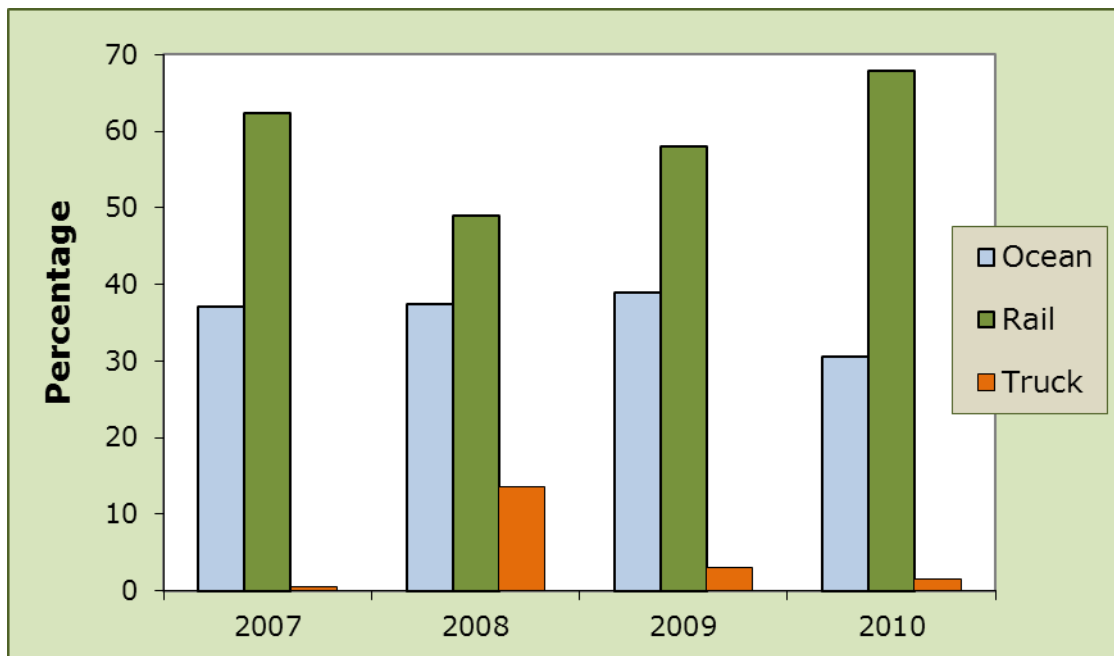
⁸ U.S. Gulf includes East Gulf, Mississippi River, North Texas, and South Texas.

Table 3. Tonnages (mt) and modal share for U.S. corn exports to Mexico

Year/type of movement	Mode of transport						Total U.S. exports to Mexico
	Ocean (U.S. Gulf)		Rail		Truck*		
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	
2007	3,041,478	37	5,112,052	62	50,162	1	8,203,692
2008	3,429,594	37	4,484,686	49	1,238,250	14	9,152,530
2009	2,789,423	39	4,145,593	58	224,778	3	7,159,794
2010	2,281,045	31	5,063,241	68	118,404	2	7,462,690
Average 07-10	2,885,385	36	4,701,393	59	407,898	5	7,994,677

Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Figure 1. U.S. corn exports to Mexico by mode



Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Table 4. U.S. corn exports to Mexico by route, 2007-2010 (mt)

Route	2007	2008	2009	2010
Maritime				
U.S. Gulf				
East Gulf	0	55,407	42,802	0
Mississippi River	2,101,086	2,376,181	1,576,470	951,447
North Texas	924,223	832,589	944,646	1,284,222
South Texas	16,169	165,417	225,505	45,376
Total	3,041,478	3,429,594	2,789,423	2,281,045
Maritime as % of total exports	37	37	39	29
Overland				
Overland as % of total exports	63	63	61	71
Total U.S. Exports	8,203,692	9,152,530	7,159,794	7,891,936

Source: Dept. of Commerce/U.S. Census Bureau/Foreign Trade Statistics and USDA/GIPSA

Table 5. Ocean and rail rates per metric ton (mt) from selected U.S. rail routes and the U.S. Gulf to Mexico, 2006–2010

Quarter	U.S. Gulf to Veracruz	Corn	Sorghum	Wheat	Soybeans
	Ocean bulk rates*	Rail rates (tariff + fuel surcharge)**			
	--US\$/mt--				
2006					
1st quarter	7.45	n.a.	n.a.	n.a.	n.a.
2nd quarter	8.98	n.a.	n.a.	n.a.	n.a.
3rd quarter	11.66	n.a.	n.a.	n.a.	n.a.
4th quarter	12.99	n.a.	n.a.	n.a.	n.a.
Average 2006	10.27	n.a.	n.a.	n.a.	n.a.
2007					
1st quarter	14.31	59.76	50.19	47.46	61.19
2nd quarter	18.81	60.74	51.51	48.75	62.09
3rd quarter	23.04	61.78	53.29	51.11	63.59
4th quarter	30.03	65.75	56.16	53.62	69.00
Average 2007	21.54	62.01	52.79	50.24	63.97
2008					
1st quarter	22.84	67.76	57.57	55.26	70.66
2nd quarter	27.41	70.10	59.34	56.86	72.98
3rd quarter	28.38	73.81	62.67	61.30	76.63
4th quarter	11.58	71.74	61.71	59.26	73.86
Average 2008	22.55	70.85	60.32	58.17	73.53
2009					
1st quarter	11.46	63.73	55.40	54.76	64.28
2nd quarter	15.46	61.54	54.04	53.66	61.91
3rd quarter	17.78	62.44	55.03	55.24	63.60
4th quarter	20.22	64.56	57.79	58.48	68.09
Average 2009	16.23	63.07	55.57	55.54	64.47
2010					
1st quarter	20.75	65.23	58.29	59.73	68.74
2nd quarter	22.34	65.81	58.77	60.80	70.06
3rd quarter	21.64	66.08	58.98	62.28	70.50
4th quarter	19.83	68.08	61.08	64.19	71.80
Average 2010	21.14	66.30	59.28	61.75	70.28

n.a.=not available

*Ocean rates from 2006 to March 2008 are estimated on the data obtained from the Baltic Exchange; from April-December 2008 are from O'Neil Commodity Consulting

**www.bnsf.com, www.uprr.com, www.kcsouthern.com; rail rates are based upon published tariff rates for high capacity shuttle trains: IA=Iowa, TX=Texas, KS=Kansas, JA=Jalisco, and GJ=Guanajuato

Table 6. U.S. grain and soybean exports to Mexico by port, 2010

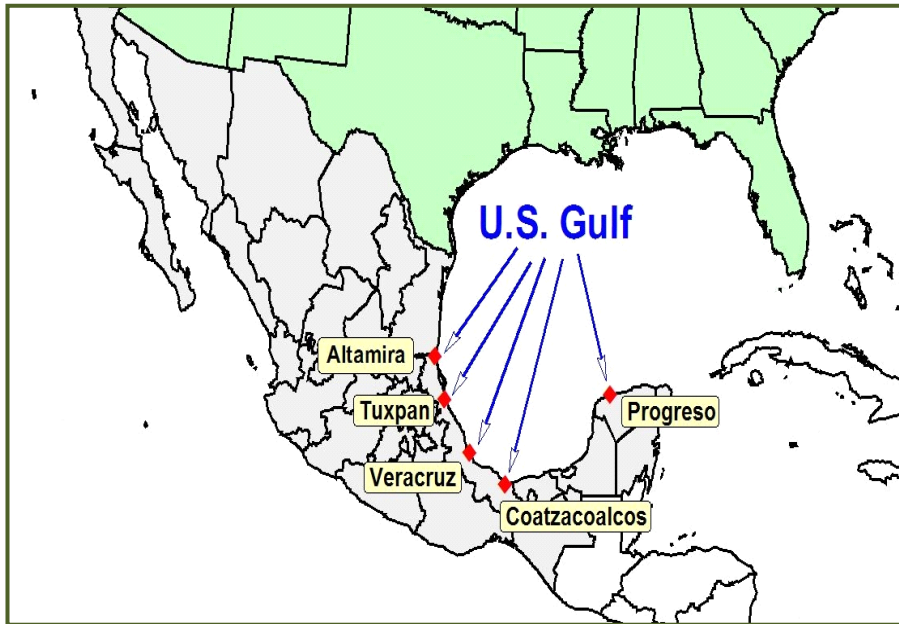
Port	Corn	Sorghum	Soybeans	Wheat
	Percentage share			
Veracruz	58	57	75	85
Progreso	14	31	25	5
Coatzacoalcos	19	8	-	2
Tuxpan	9	3	-	7
Manzanillo	0	-	-	0
Altamira	0	-	-	-
Mexico	-	-	-	-
Lazaro Cardenas	0	-	-	-
Merida	-	-	-	-
Total	100	100	100	100

Source: Port Import Export Reporting Service (PIERS), Journal of Commerce 2010

Figure 2. Major rail entry points to Mexico

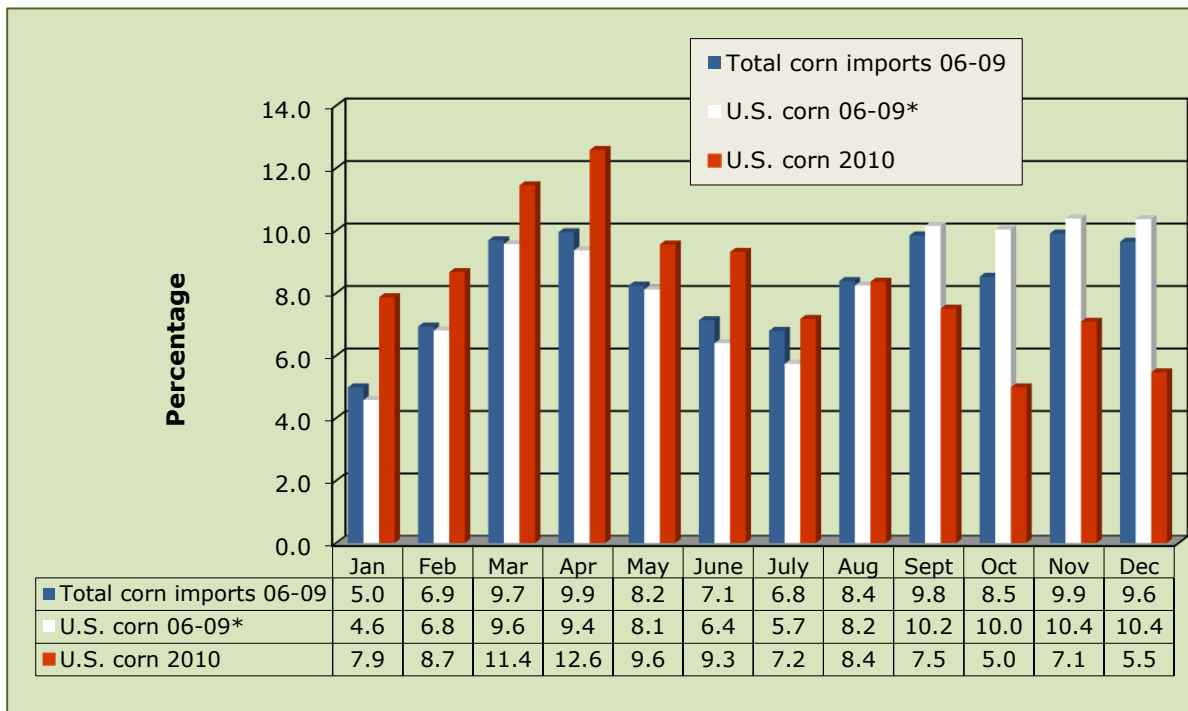


Figure 3. Major origin-destination shipments of U.S. grains to Mexico by ocean, 2010



Source: Secretaría de Comunicaciones y Transporte, Mexico and Port Import Export Reporting Service (PIERS), Journal of Commerce 2010

Figure 4. Mexico's average monthly corn imports



*The United States' share of total Mexican corn imports is almost 100 percent

Source: SIAP/SAGARPA

Sorghum Exports to Mexico

Mexico is the world's fourth largest sorghum producer after Nigeria, the United States, and India, and the second largest world consumer after Nigeria. Mexico sorghum production is not enough to satisfy its demand; Mexico imported more than 25 percent of its total sorghum consumption last year (FAS 2011). Mexico imports declined due to tight U.S. supplies, lower feed demand, and increased domestic production (FAS 2011; WASDE 2011). Sorghum is used exclusively for animal feed in Mexico (Adcock, Rosson, and Varela 2007). Mexican feeders were accustomed to feeding sorghum because corn imports were limited by Mexican government policies, TRQs, (Hoffman et al 2007). The top Mexican destinations for U.S. Sorghum in 2004 were Puebla, Yucatan, Jalisco, Veracruz, San Luis Potosi, and Nuevo Leon (Adcock, Rosson, and Varela 2007).

Sorghum Modal Share

The United States supplies almost all of the sorghum imported by Mexico. Over the last 2 years, ocean transportation gained market share over truck and rail sorghum shipments. On average, 49 percent of U.S. sorghum was exported to Mexico by ocean, 30 percent by rail, and 21 percent by truck. U.S. sorghum was exported to Mexico by ocean through the U.S. Gulf, mostly from North Texas, South Texas, and the Mississippi River (tables 7 and 8, and figure 5). The port of Veracruz is the major ocean point of entry. However, rail is losing market share to ocean due to the lack of rail service in the U.S.-Mexico border region, high rail tariff rates, and fuel surcharges (table 5), as well as the location of the major production areas along the border in the Rio Grande Valley of Texas. Trucks compete with rail for shipments between 300 and 600 miles (AMS 1998). However, according to the Association of American Railroads (AAR), since 2005 the Class I railroads' average length of grain haul is more than 1,000 miles with sorghum averaging 1,017 miles in 2008 (AAR 2010). There is a lack of rail service in the border region, especially in areas located within the rail average-haul length, forcing shippers to use trucks (Salin 2008). Trucks are the mode of choice when freight shipments both weigh less than 50,000 pounds and travel fewer than 500 miles (USDA and DOT 2010; AMS 1998). However, high fuel prices increase rail and barge relative distance cost advantage over trucks (USDA and DOT 2010).

The top rail destinations for U.S. sorghum exports to Mexico in 2005 were Nuevo Leon, Veracruz, Estado de Mexico, Jalisco, and Guanajuato (Adcock, Rosson, and Varela 2007). Texas (Laredo and El Paso) and Arizona (Santa Cruz) are the main rail entry points (figure 2). The ports of Veracruz and Progreso are the major entry points by vessel (table 6 and figure 3). Before the elimination of the corn TRQs, half of the year's sorghum exports to Mexico occurred between January and May, reaching a peak in April (figure 6). This trend has changed since 2008 and sorghum exports are now spread throughout the year, reaching their peak in April and August.

Table 7. Tonnages (mt) and modal share for U.S. sorghum exports to Mexico

Year/type of movement	Mode of Transport						Total U.S. exports to Mexico
	Ocean (U.S. Gulf)		Rail		Truck*		
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	
2007	694,599	39	723,074	41	356,949	20	1,774,622
2008	540,709	35	539,889	35	468,174	30	1,548,772
2009	1,407,959	57	529,840	22	512,923	21	2,450,722
2010	1,423,464	63	524,384	23	328,049	14	2,275,897
Average 07-10	1,016,683	49	579,297	30	416,524	21	2,012,503

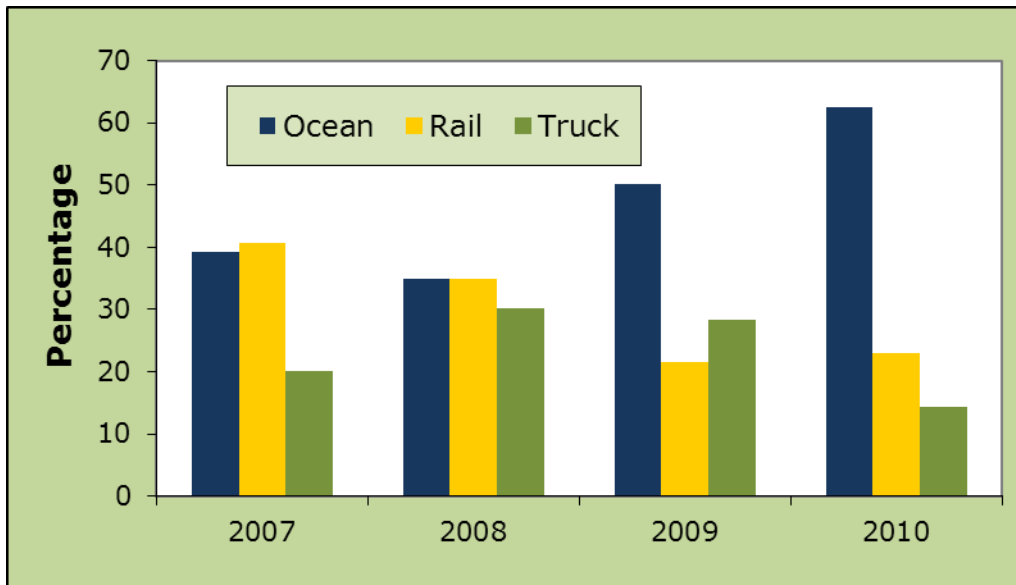
Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Table 8. U.S. sorghum exports to Mexico by route, 2007-2010 (mt)

Route	2007	2008	2009	2010
Maritime				
U.S. Gulf				
East Gulf	0	0	0	0
Mississippi River	47,973	168,738	136,066	29,281
North Texas	562,059	220,540	1,076,561	1,099,737
South Texas	84,567	151,431	195,332	294,446
Total	694,599	540,709	1,407,959	1,423,464
Maritime as % of total exports	39	35	57	63
Overland	1,080,023	1,008,063	1,042,763	852,433
Overland as % of total exports	61	65	43	37
Total U.S. Exports	1,774,622	1,548,772	2,450,722	2,275,897

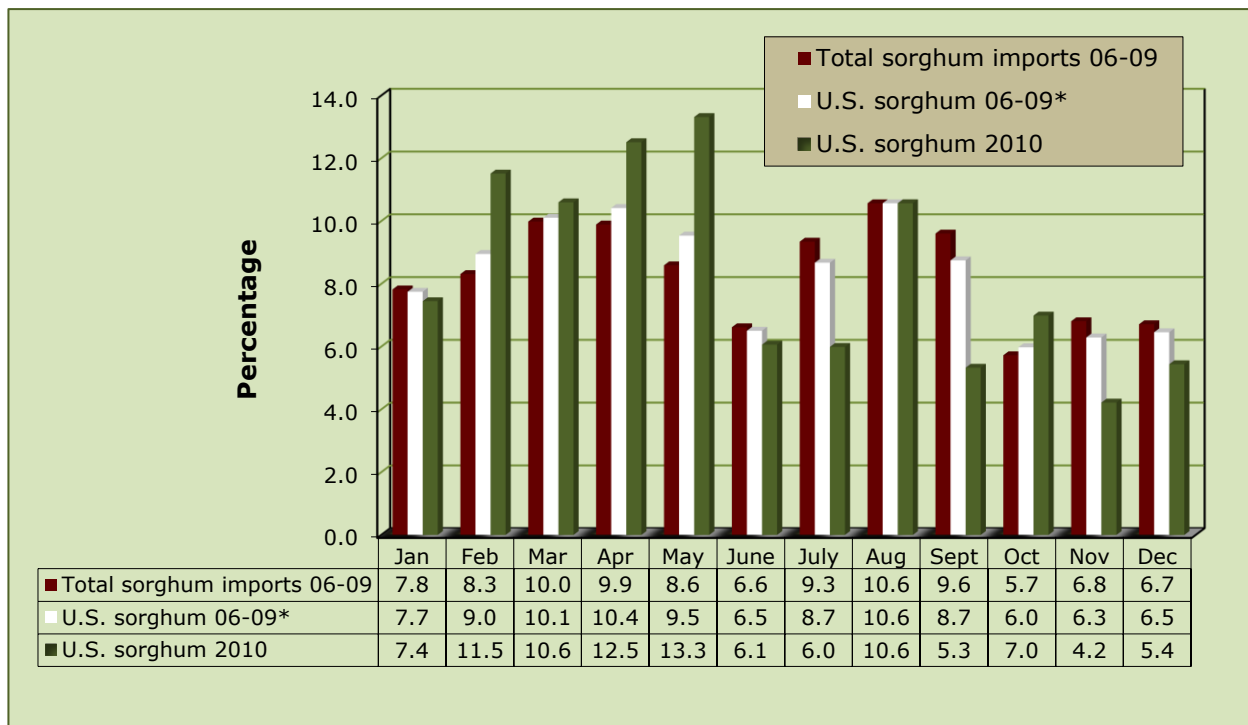
Source: Dept. of Commerce/U.S. Census Bureau/Foreign Trade Statistics and USDA/GIPSA

Figure 5. U.S. sorghum exports to Mexico by mode



Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Figure 6. Mexico's average monthly sorghum imports



*The United States' share of total sorghum imports was 100 percent in 2010

Source: SIAP/SAGARPA

Wheat Exports to Mexico

Although Mexico grows some wheat, it relies on imports to satisfy its demand. The United States and Canada are its major suppliers (figure 7). In 2010, the United States accounted for 70 percent of Mexican wheat imports (SAGARPA/SIAP 2010). The U.S. share of Mexico's wheat market varies annually because of Canadian competition (figures 7 and 8), which is based on quality and price. Wheat exports consist mostly of hard red winter (HRW) wheat due to the proximity of the HRW-wheat-growing areas in the Southern Plains to the Mexican border. Wheat is used almost entirely for human consumption (Adcock, Rosson, and Varela 2007). The wheat is milled to make bread, cookies, cakes, and prepared flours (Ag-Canada 2006). As a result of NAFTA, there are no tariffs on U.S. and Canadian wheat exports to Mexico. In 2010, U.S. wheat exports to Mexico increased but were below the 2008 levels (FAS 2011; WASDE 2011).

Wheat Modal Share

In 2010, marine transportation was the route of choice for shipping U.S. wheat to Mexico (tables 9 and 10). Ocean has gained a greater share because of a decline in truck shipments (figure 9). During this period, ocean vessels and rail transported more than 90 percent of U.S. wheat exports to Mexico. Railroads haul 66 percent of wheat to U.S. export markets (USDA and DOT 2010). Estado de Mexico was the major rail destination of U.S. wheat exports by rail, followed by the Distrito Federal (DF), Nuevo Leon, Jalisco, Puebla, Coahuila, Guanajuato, and Queretaro (Adcock, Rosson, and Varela 2007). Texas, via Laredo, El Paso, Eagle Pass, and Brownsville, and Santa Cruz, via Arizona, were the major entry points of wheat by rail (figure 2).

In 2010, almost of all of U.S. wheat shipped by ocean originated in the Gulf, mostly from North Texas regions and the Mississippi River (table 10). The ports of Veracruz, Tuxpan, and Progreso were the major points of entry into Mexico (figure 3 and table 6). Figure 7 shows that Mexico's wheat imports are spread throughout the year. The peak of Mexican wheat imports from the United States occurred in August; the Canadian peak was in October.

Figure 7. Mexico's average wheat and morcajo⁹ monthly imports

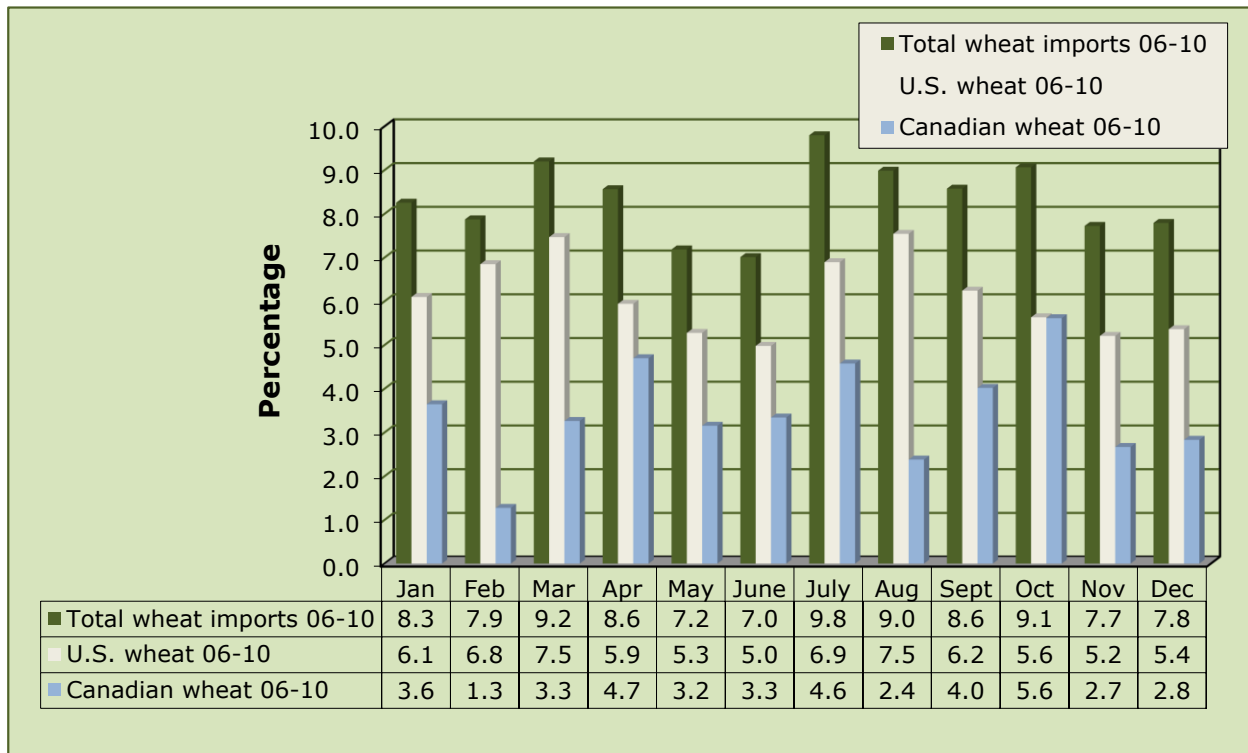
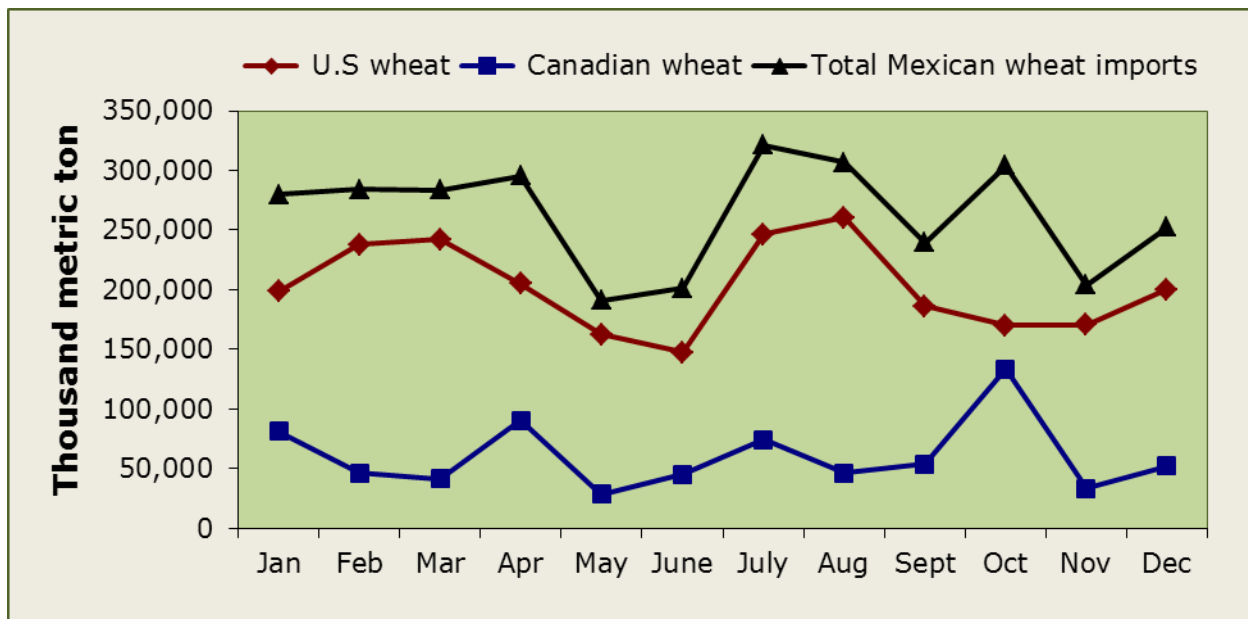


Figure 8. Mexico wheat and morcajo 3 year average* monthly imports



*Average: 2008-2010; morcajo is a mix of wheat and rye that produces grey and dark flour
 Source: SIAP/SAGARPA

⁹ Morcajo is a mix of wheat and rye that produces grey and dark flour. Source: SIAP/SAGARPA

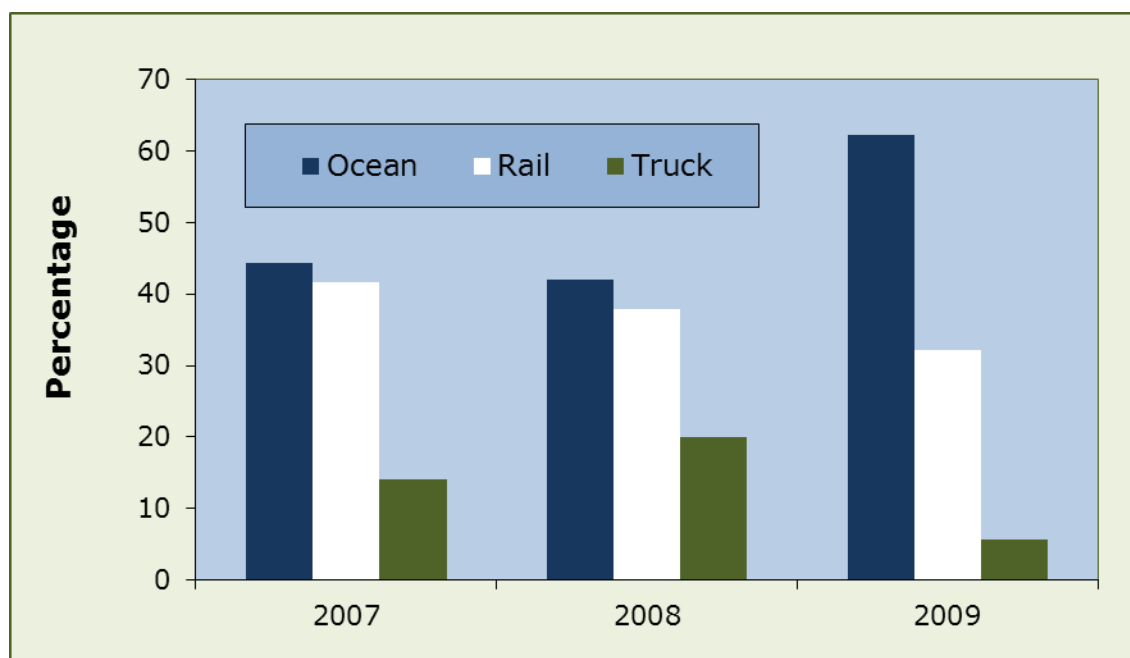
Table 9. Tonnages (mt) and modal share for U.S. wheat exports to Mexico

Year/type of movement	Mode of Transport						Total U.S. exports to Mexico
	Ocean (U.S. Gulf)		Rail		Truck*		
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	
2007	1,114,388	44	1,047,907	42	354,204	14	2,516,499
2008	1,180,247	42	1,063,986	38	560,132	20	2,804,365
2009	1,194,638	62	616,551	32	110,066	6	1,921,255
2010	1,697,784	70	n.a.		n.a.		2,433,924
Average 07-10	1,296,764	55	909,481	37	341,467	13	2,414,040

* Residual; n.a.: not available

Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Figure 9. U.S. wheat exports to Mexico by route



Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Table 10. U.S. wheat exports to Mexico by route, 2007-2010 (mt)

Route	2007	2008	2009	2010
Maritime				
U.S. Gulf				
East Gulf	0	25,844	0	0
Mississippi River	675,232	612,086	597,542	707,451
North Texas	438,913	465,839	559,547	839,115
South Texas	30,695	103,795	167,467	107,628
Subtotal	1,144,840	1,207,564	1,324,556	1,654,194
Lakes				
Toledo	0	0	0	0
Duluth-Sup	0	0	0	0
Chicago	20,243	51,853	19,156	10,593
Subtotal	20,243	51,853	19,156	10,593
Atlantic				
North Atlantic	0	0	0	0
South Atlantic	0	0	0	32,997
Subtotal	0	0	0	32,997
Total	1,165,083	1,259,417	1,343,712	1,697,784
Maritime as % of total exports	46	45	70	70
Overland	1,351,416	1,544,948	577,543	736,140
Overland as % of total exports	54	55	30	30
Total U.S. Exports	2,516,499	2,804,365	1,921,255	2,433,924

Source: Dept. of Commerce/U.S. Census Bureau/Foreign Trade Statistics and USDA/GIPSA

Soybean Exports to Mexico

Mexico is the world's third largest soybean importer, after China and the EU-27. Mexican domestic production has almost been displaced by U.S. imports because of reform in Mexico's domestic crop support program, the elimination of soybean tariffs due to NAFTA, and improvements in rail transportation links at the border (Ash, Livezey, and Dohlman 2006). In addition, strong income growth among Mexican consumers has boosted consumption of meat and vegetable oils, increasing the demand for soybeans as a feed ingredient. In 2008, however, U.S. soybean exports to Mexico dropped because of the slowdown in the Mexican economy and the international financial crisis (Banco de Mexico 2010; FAS 2008; 2009a); they increased again in 2010 (FAS 2011).

Soybeans are crushed into meal and oil in Mexico. Major soybean crushing facilities are located in Merida, Yucatan, Monterrey, Nuevo Leon, Guadalajara, Jalisco, northern Mexico City, Guanajuato, and near the ports of Veracruz and Coatzacoalcos (Adcock, Rosson, and Varela 2007). Soybean meal is an important protein feed for livestock, dairy, poultry, and aquaculture. Small portions are used as a baking ingredient and as meat substitutes (Ash, Livezey, and Dohlman 2006, and American Soybean Association 2000).

Soybean Modal Share

Railroads are the largest transport mode for shipping soybeans to Mexico (tables 11 and 12, and figure 10), especially to the North and Central regions (Gonzalez Diaz 2010). Rail is the preferred mode because of:

- Increased railroad efficiencies for high-capacity shuttle trains, 75–110 cars. Moreover, tariff rates for high-capacity shuttle trains are more stable than for smaller shipments. Users must unload and return the rail cars on the same day, creating incentives to build shuttle train terminals.
- Increased penalties for thefts from railcars reduced grain losses and quality damages caused by leaving railcars open.

From 2007 to 2010, rail hauled 57 percent of U.S. soybean exports to Mexico; ocean and truck moved 38 and 5 percent, respectively. In the last 2 years, ocean has gained market share at the expense of truck carriers. In 2010, ocean rates were lower than rail rates, averaging \$21.14/mt in 2010, (table 5). Truck is the preferred carrier at the border region. Importers and processors in the center such as Puebla, Chiapas, Jalisco, Guanajuato, Hidalgo, and Tamaulipas have the option to ship by rail or vessel depending of the rates, receiving time, and availability (Gonzalez Diaz 2010).

The ports of Veracruz, Tuxpan, and Progreso were the major ocean points of entry of soybeans into Mexico (figure 3 and table 6). Almost all soybean exports originated in the Gulf, having been shipped down the Mississippi River (table 12). Texas (Brownsville, Eagle Pass, El Paso, and Laredo) was the major entry point for

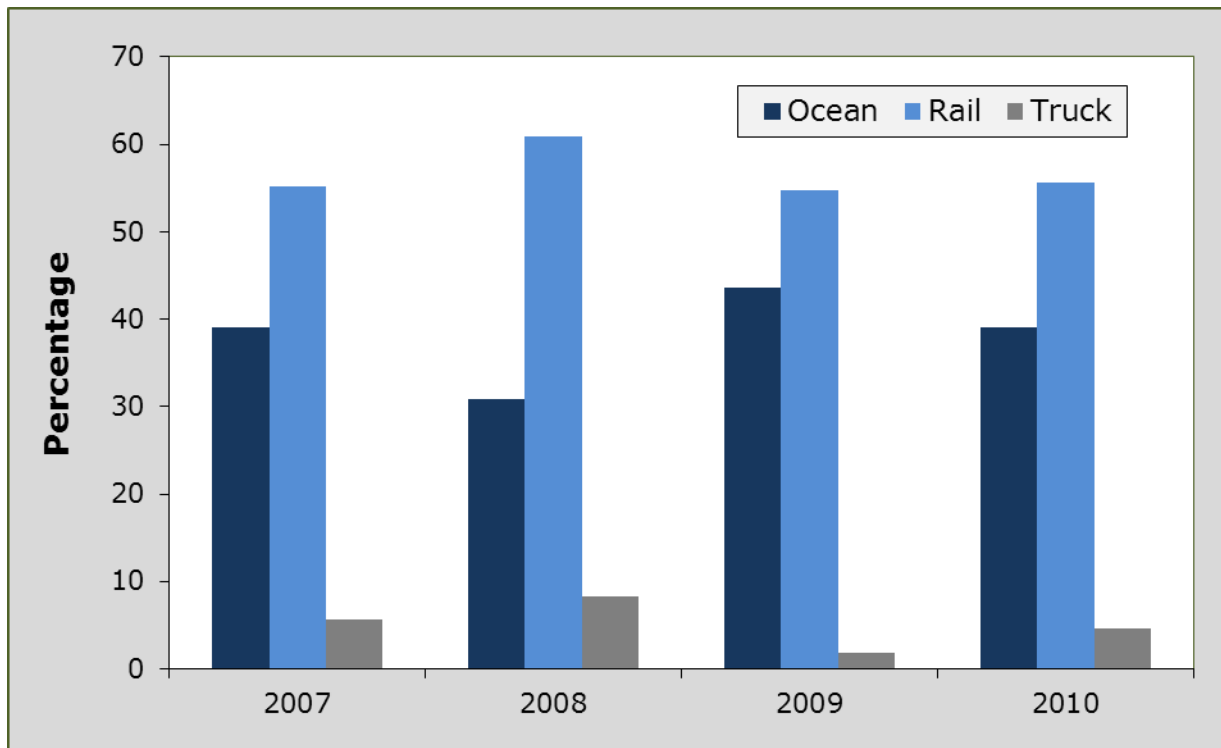
rail shipments (figure 2). The major rail destinations were Guanajuato, Nuevo Leon, Hidalgo, Tamaulipas, Jalisco, and San Luis Potosi (Adcock, Rosson, and Varela 2007). Figure 11 shows that U.S. soybean exports are spread throughout the year, reaching peaks in April and October.

Table 11. Tonnages (mt) and modal share for U.S. soybean exports to Mexico

Year/type of movement	Mode of Transport						Total U.S. exports to Mexico
	Ocean (U.S. Gulf)		Rail		Truck*		
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	
2007	1,433,189	39	2,021,928	55	208,017	6	3,663,134
2008	1,094,491	31	2,161,948	61	293,615	8	3,550,054
2009	1,428,594	44	1,794,334	55	58,336	2	3,281,264
2010	1,424,208	40	1,997,522	56	165,102	5	3,586,832
Average 07-10	1,345,121	38	1,993,933	57	181,267	5	3,520,321

Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Figure 10. U.S. soybean exports to Mexico by mode



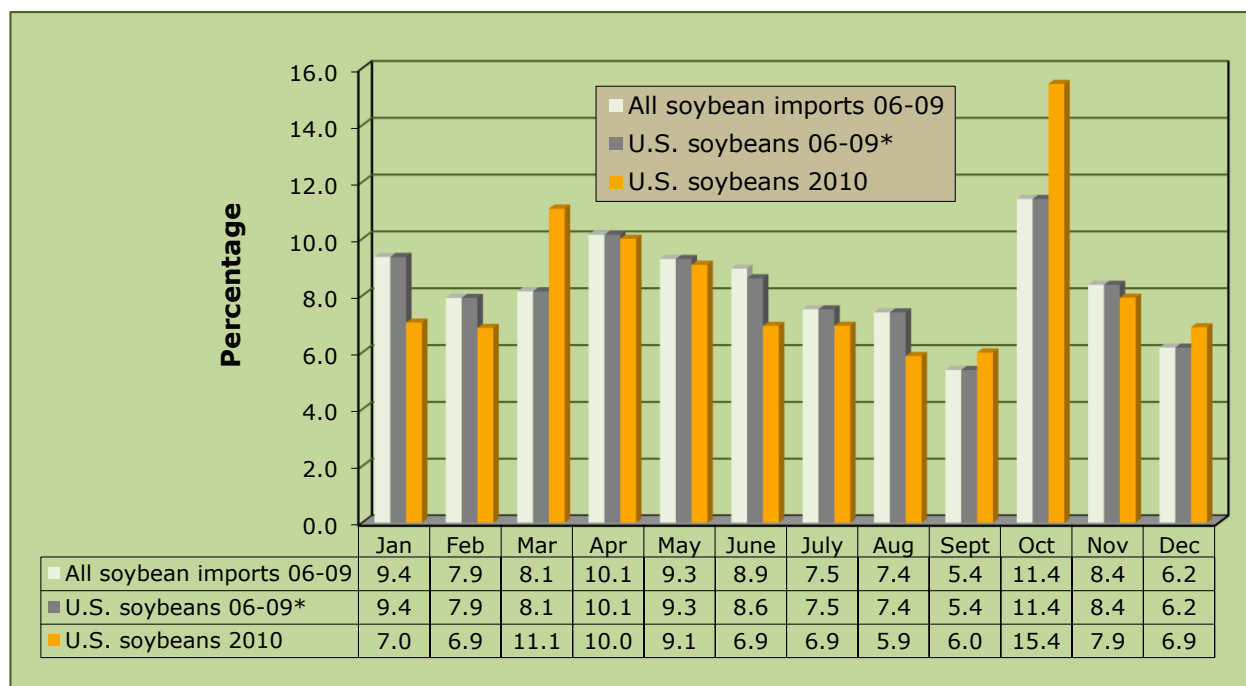
Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

Table 12. U.S. soybean exports to Mexico by route, 2007-2010 (mt)

Route	2007	2008	2009	2010
Maritime				
U.S. Gulf				
East Gulf	13,825	0	0	0
Mississippi River	1,343,835	1,007,779	1,351,639	1,341,596
North Texas	75,529	86,712	76,955	72,167
South Texas	0	0	0	10,445
Subtotal	1,433,189	1,094,491	1,428,594	1,424,208
Atlantic				
North Atlantic	0	0	0	0
South Atlantic	0	0	0	0
Subtotal	0	0	0	0
Total	1,433,189	1,094,491	1,428,594	1,424,208
Maritime as % of total exports	39	31	44	40
Overland	2,229,945	2,455,563	1,852,670	2,162,624
Overland as % of total exports	61	69	56	60
Total U.S. Exports	3,663,134	3,550,054	3,281,264	3,586,832

Source: Dept. of Commerce/U.S. Census Bureau/Foreign Trade Statistics and USDA/GIPSA

Figure 11. Mexico's average monthly soybean imports



Source: SIAP/SAGARPA

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