

# U.S. Grain and Soybean Exports to Mexico A Modal Share Transportation Analysis, 2007-2008

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## Summary

The Mexican economy is highly dependent on trade with the United States. Trucks are the primary transportation mode used in the U.S.–Mexico trade by value, 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. The Mexican government objects to the U.S. position of not fully allowing Mexican trucks to have access to U.S. highways under the terms of the North American Free Trade Agreement (NAFTA).

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 90 U.S. agricultural and industrial products with an estimated export value of \$2.4 billion. The list of agricultural products did not include products that are important in the basic diet of Mexicans, like corn, rice, beans, dairy, or meat. 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.

The commodities included in this study (corn, sorghum, wheat, and soybeans) are mostly shipped overland (rail and truck), with the exception of wheat. In 2008, more than half of the soybean exports to Mexico were shipped by rail. Trucks gained market share in all the commodities considered in the study at the expense of a decline in ocean and rail shipments. Trucks allow a greater flexibility in movements due to a more extensive road network. Corn, wheat, and sorghum rail shipments declined due to higher rates rail rates caused by increases in fuel surcharges, and slowed rail traffic throughout the country caused by two major hurricanes—Gustav and Ike—in the New Orleans port area. High ocean rates caused by a shortage of ocean vessels also contributed to the increase in truck cargo. Ocean rates from the U.S. Gulf to Veracruz doubled from 2006 to 2007, reached a peak in the fourth quarter of 2007, and remained slightly higher in 2008 than the previous year.

## 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 in 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.

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.

## U.S. - Mexico Trade and Transportation

The Mexican economy is highly dependent on trade with the United States. The United States bought about 82% of all Mexican exports in 2007 (U.S. State Department, 2009). 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 66 percent (\$230 billion) of trade in 2007, 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 60 percent of total shipments (table 2). Mexican truck access<sup>1</sup> to the United States

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<sup>1</sup>In 2007, the United States created the Cross Border Truck Safety Inspection 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). 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 but could make deliveries in U.S. 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

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). 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. 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,<sup>2</sup> 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 of 45 percent. The 36 agricultural commodities included in the list were valued at approximately \$864 million in 2008 (FAS 2009b). These import duties excluded rice, corn, wheat, sorghum, meats, dairy, and seafood products (Mexico Official Gazette 2009).

**Table 1 – Value of total U.S. merchandise shipments with Mexico by mode of transportation, 2007 (Millions of current U.S. dollars)**

Mode of Transport	Total		Exports to Mexico		Imports to Mexico	
	(US\$ Millions)	Percent share	(US\$ Millions)	Percent share	(US\$ Millions)	Percent share
Truck	230,084	66	93,047	68	137,037	65
Rail	46,400	13	19,340	14	27,060	13
Pipeline	956	0	787	1	169	0
Other and unknown total <sup>1</sup>	8,277	2	5,581	4	2,696	1
Foreign Trade Zones (FTZs) <sup>2</sup>	751	0	NA	NA	751	0
Mail	2.9	0	3	0	0	0
<b>Total by land</b>	<b>286,472</b>	<b>82</b>	<b>118,758</b>	<b>87</b>	<b>167,713</b>	<b>80</b>
Air	11,508	3	6,824	5	4,684	2
Vessel	49,360	14	10,959	8	38,401.4	18
<b>Total by air and vessel</b>	<b>60,869</b>	<b>18</b>	<b>17,783</b>	<b>13</b>	<b>43,086</b>	<b>20</b>
<b>Total, all modes</b>	<b>347,340</b>	<b>100</b>	<b>136,541</b>	<b>100</b>	<b>210,799</b>	<b>100</b>

NA = Not applicable

<sup>1</sup>“Other” includes other modes, for example flyaway aircraft and vessels moving under their own power, where the conveyance itself is the shipment.

<sup>2</sup>There are no exports from Foreign Trade Zones

Source: Beningo and Mohamed, U.S. Department of Transportation, 2009

2009b). By August 2009, there were 7,134 Mexican carriers with 29,681 trucks operating within the U.S. commercial zone (DOT 2009).

<sup>2</sup> 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).

**Table 2 – Top U.S. land ports by value of U.S.-Mexico land mode trade, 2007  
(Millions of current U.S. dollars)**

Ranked by all land modes	Port	Total land modes	Truck	Rail	Other	Truck as % of total land modes	Rail as % of total land modes
1	Laredo, TX	110,355	82,638	27,317	401	74.9	24.8
2	El Paso, TX	49,054	43,479	5,516	418	88.6	10.5
3	Otay Mesa, CA	30,707	30,697	0	10	100.0	0.0
4	Hidalgo, TX	21,859	21,688	1	170	99.2	0.0
5	Nogales, AZ	18,164	13,253	4,829	82	73.0	26.6
6	Brownsville, TX	13,208	11,551	1,353	304	87.4	10.2
7	Eagle Pass, TX	12,025	4,831	7,190	4	40.2	59.8
8	Calexico-East, CA	11,943	11,433	264	246	95.7	2.2
9	Del Rio, TX	3,220	3,220	0	<1	100.0	0.0
10	Santa Teresa, NM	1,390	1,390	0	<1	100.0	0.0

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

Source: Beningo and Mohamed, U.S. Department of Transportation, 2009

## Methodology and Sources of Data

### Modal Share

Modal share is the portion of tonnages of grain 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 come 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 the USDA Grain Inspection, Packers and Stockyards Administration (GIPSA).

## **Rail Exports**

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

## **Model for Estimating Modal Tonnages and Share**

(1) Total Exports 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 remains the second largest destination, after Canada, of U.S. agricultural exports, estimated in 2008 at \$15.6 billion due largely to increased prices and volumes for grains, soybeans, and soybean oil, and rising cotton, animal fat, red meat, and dairy products sales (ERS 2008). U.S. agricultural exports to Mexico are forecast to decrease to \$14.2 billion in 2009 (ERS 2009). Bulk commodities accounted for 67 percent of the total 27.8 million metric tons (mmt) of U.S. agricultural products exported to Mexico in 2008, and coarse grains about 39 percent of the bulk agricultural shipments (FAS 2009a). Soybeans and wheat accounted for 13 and 10 percent of the 17.9 mmt of bulk exports, respectively.

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). Veracruz is the top receiving port, 49 percent of the total, followed by Progreso, Coatzacoalcos, Tuxpan, and Altamira. The Pacific Ocean ports received 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, with 46 percent of the total, followed by Veracruz (21 percent), and Lázaro Cardenas (12 percent) (SCT 2008).

## **Corn Exports to Mexico**

Mexico is the fifth largest world corn producer, after the United States, China, the European Union (EU-27), and Brazil. However, it is the world's second largest corn importer, after Japan. 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 by-products<sup>3</sup>. 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). During 2008, United States corn exports to Mexico increased 12 percent from the previous year, totaling 9.1 mmt, due to the elimination of corn Tariffs Rates 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 2007–2008, rail hauled 56 percent, ocean vessels moved 37 percent of U.S. corn to Mexico, and trucks carried 7 percent. In 2008, rail corn shipments declined due to higher rail rates caused by increases in fuel surcharges (table 5) (AMS 2009). During September, railroads also dealt with the impact of two major hurricanes in the New Orleans port area, Gustav and Ike. Traffic was slowed throughout the country because the two hurricanes hit grain export destinations in the Gulf of Mexico region (AMS 2009). Over the last 2 years, trucks have gained market share at the expense of rail 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 for ocean vessels (figures 2 and 3, and table 6). All U.S. corn shipped by ocean originates from ports along the U.S. Gulf<sup>4</sup> (table 4 and figure 4). About 40 percent of the corn shipped to Mexico by ocean travels from North Texas; another 31 percent moves down the Mississippi River. Figure 4 shows that 43 percent of U.S. corn exports occurred during the last quarter of the year and reached a peak during December (about 19 percent). However, this trend changed in 2008 due to the elimination of corn TRQs. U.S. corn increased market share by 11 percent from a year earlier. Shipments were spread out throughout the year, reaching a peak in the 1<sup>st</sup> quarter (about 28 percent). Mexico imported almost all of its corn from the United States, with a small amount coming from Argentina and Brazil.

**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	Percent	Quantity	Percent	Quantity	Percent	
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
<b>Average 07-08</b>	<b>3,235,536</b>	<b>37</b>	<b>4,798,369</b>	<b>56</b>	<b>644,206</b>	<b>7</b>	<b>8,678,111</b>

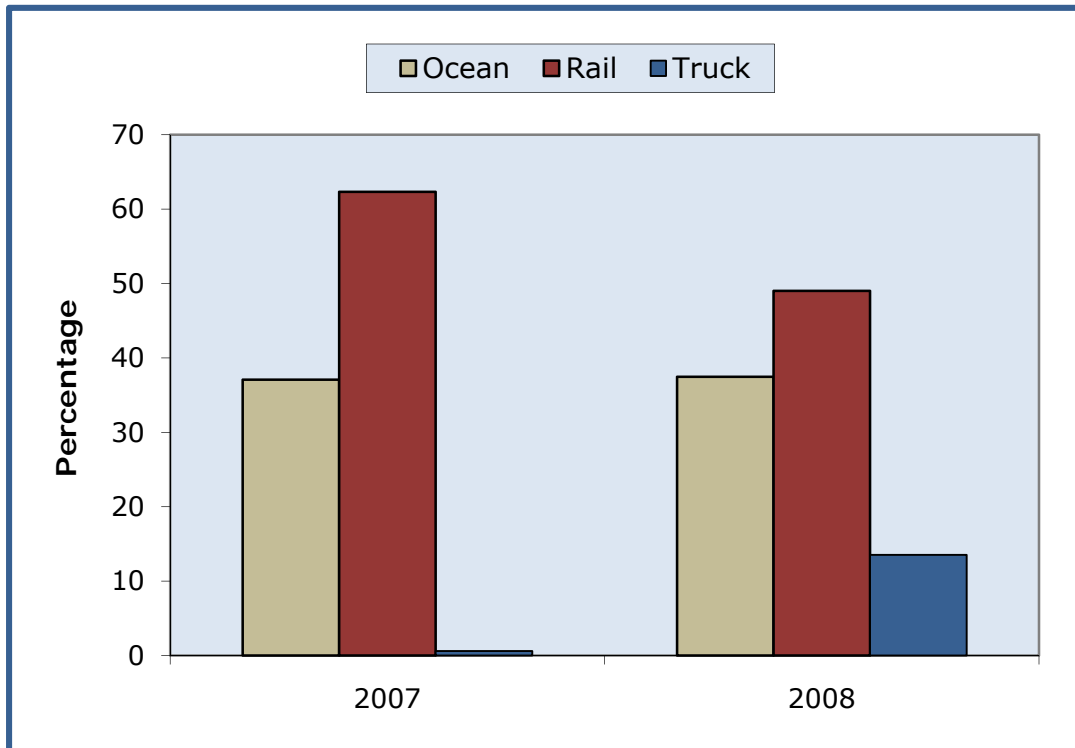
\*Residual

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

<sup>3</sup> Atoles, tamales, pozole, etc.

<sup>4</sup> U.S. Gulf includes East Gulf, Mississippi River, North Texas, and South Texas.

**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, 2007-2008 (MT)**

Route	2007	2008
<b>Maritime:</b>		
U.S. Gulf East Gulf	0	55,407
Mississippi River	2,101,086	2,376,181
North Texas	924,223	832,589
South Texas	16,169	165,417
<b>Total</b>	<b>3,041,478</b>	<b>3,429,594</b>
Maritime as % of total exports	37	37
<b>Overland</b>		
	5,162,214	63
Overland as % of total exports	63	63
<b>Total U.S. Exports</b>	<b>8,203,692</b>	<b>9,152,530</b>

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, 2006-2008**

Quarter	U.S. Gulf to Veracruz	Corn	Sorghum	Wheat	Soybeans
	Ocean bulk rates*	Rail rates (tariff + fuel surcharge)**			
	-- US\$/mt --				
<b>2006</b>					
1 <sup>st</sup> quarter	7.45	n.a.	n.a.	n.a.	n.a.
2 <sup>nd</sup> quarter	8.98	n.a.	n.a.	n.a.	n.a.
3 <sup>rd</sup> quarter	11.66	n.a.	n.a.	n.a.	n.a.
4 <sup>th</sup> quarter	12.99	n.a.	n.a.	n.a.	n.a.
<b>Average 2006</b>	<b>10.27</b>	n.a.	n.a.	n.a.	n.a.
<b>2007</b>					
1 <sup>st</sup> quarter	14.31	59.76	50.19	47.46	61.19
2 <sup>nd</sup> quarter	18.81	60.74	51.51	48.75	62.85
3 <sup>rd</sup> quarter	23.04	61.78	53.29	51.11	63.59
4 <sup>th</sup> quarter	30.03	65.75	56.16	53.62	69.00
<b>Average 2007</b>	<b>21.54</b>	<b>62.01</b>	<b>52.78</b>	<b>50.23</b>	<b>64.16</b>
<b>2008</b>					
1 <sup>st</sup> quarter	22.84	67.76	57.57	59.56	70.66
2 <sup>nd</sup> quarter	27.41	70.10	59.34	56.86	72.98
3 <sup>rd</sup> quarter	28.38	73.81	62.67	61.30	76.63
4 <sup>th</sup> quarter	11.58	71.74	61.71	59.26	73.86
<b>Average 2008</b>	<b>22.55</b>	<b>70.85</b>	<b>60.32</b>	<b>59.24</b>	<b>73.53</b>

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](http://www.bnsf.com), [www.uprr.com](http://www.uprr.com), [www.kcsouthern.com](http://www.kcsouthern.com)



**Table 6 – U.S. grain and soybean exports to Mexico by port, 2008**

Port	Corn	Sorghum	Soybean	Wheat
	Percentage share			
Veracruz	57.98	68.29	67.99	72.95
Tuxpan	8.72	0.86	-	9.94
Progreso	21.52	21.43	30.42	9.63
Altamira	1.09	-	-	-
Coatzacoalcos	10.70	9.42	1.60	7.48
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Secretaría de Comunicaciones y Transporte, Mexico

**Figure 2 – Major rail entry points to Mexico**

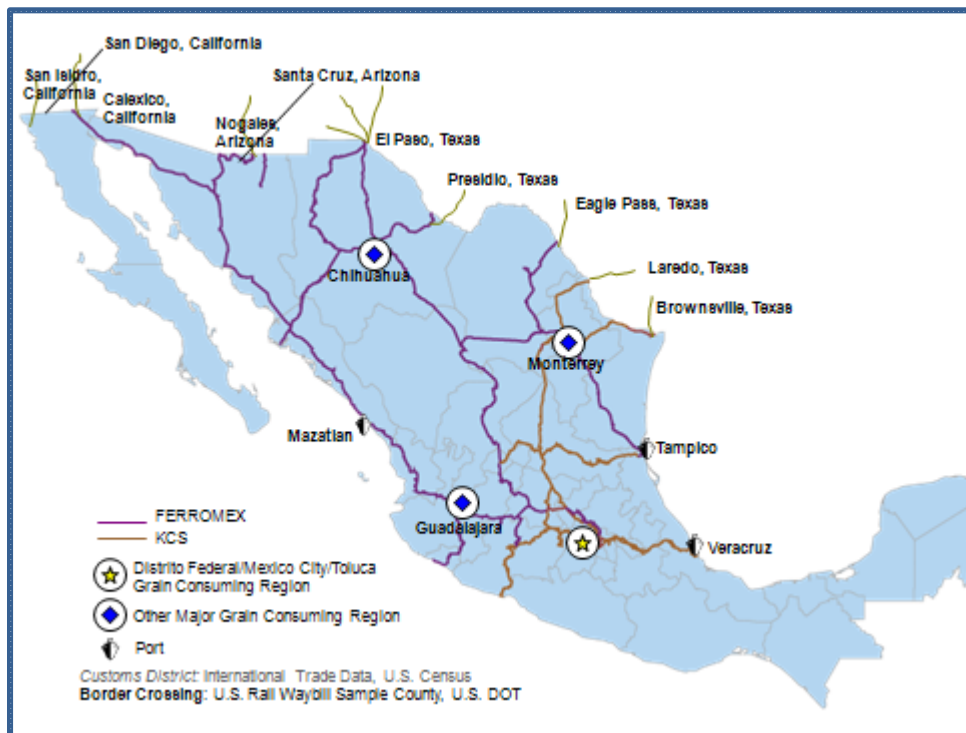


Figure 3 – Major origin-destination shipments of U.S. grains to Mexico by ocean, 2008

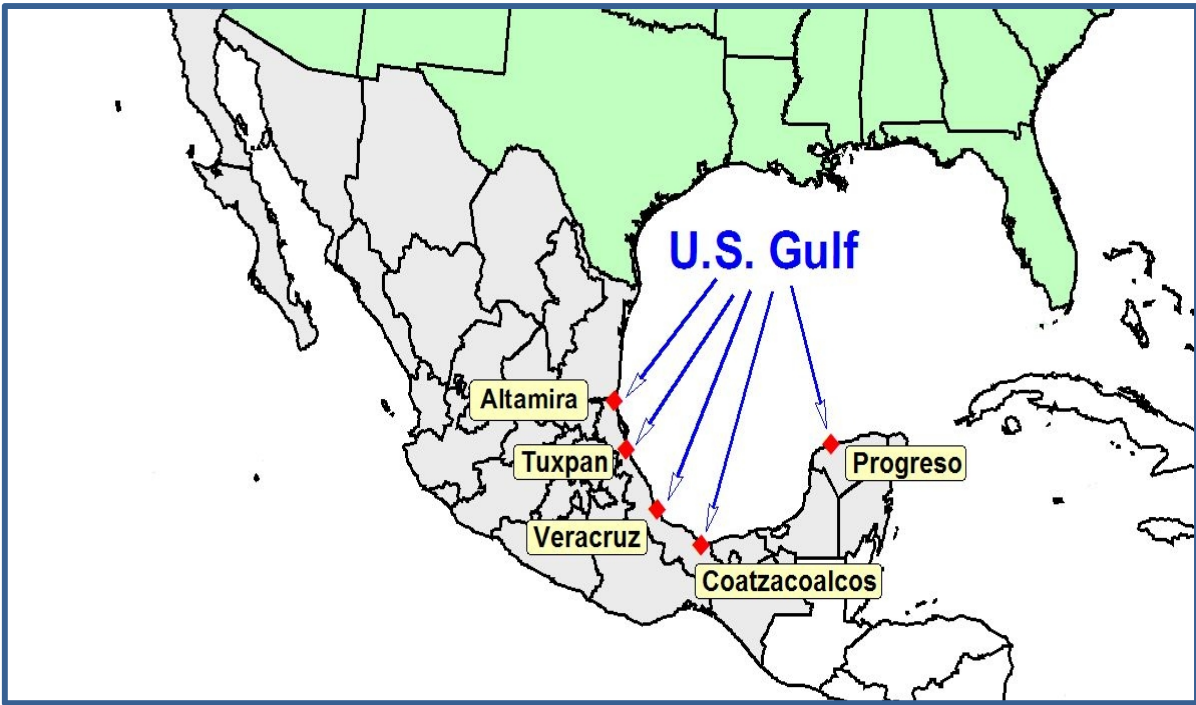
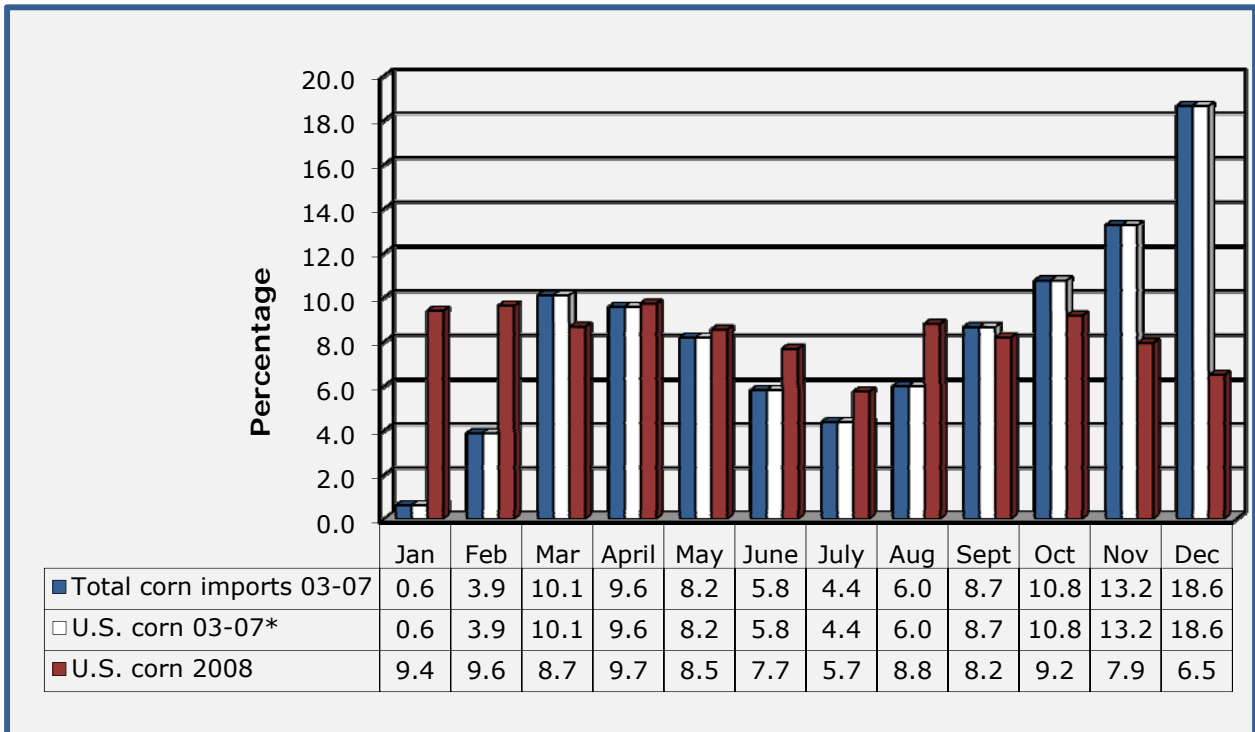


Figure 4 – Mexico's average monthly corn imports



\*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 the United States, Nigeria, and India, and the third largest world consumer after Nigeria and India. Mexico sorghum production is not enough to satisfy its demand; consequently Mexico imported about 27 percent of its total sorghum consumption last year. Mexico imported 1.5 mmt of sorghum from the United States during 2008, almost a 13 percent decline compared with 2007 (FAS 2009a). Mexico sorghum imports dropped because EU-27 purchases of U.S. sorghum pushed prices higher relative to corn (Allen 2008). 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 (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 sorghum to Mexico. Over the last 2 years, truck transportation gained market share over ocean and rail sorghum shipments. On average, 38 percent of U.S. sorghum was exported to Mexico by rail, 37 percent by ocean, and 35 percent by truck. U.S. Sorghum was exported to Mexico by ocean through the U.S. Gulf, mostly from North Texas, the Mississippi River, and South Texas (tables 7 and 8, and figure 5). The port of Veracruz is the major ocean point of entry. However, ocean and rail are losing market share to trucks due 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 2003 Class I railroads' average length of grain haul is more than 900 miles; sorghum averages 820 miles (AMS 2007). There is a lack of rail service in the border region, especially in areas located below the rail average-haul, length forcing shippers to use trucks (Salin 2008). Trucks are the mode of choice when freight shipments weigh less than 50,000 pounds and travel fewer than 300 miles (AMS 1998).

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 changed in 2008, when more than half of U.S. sorghum exports occurred during the second half of the year, reaching its peak in October (20 percent).

**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	Percent	Quantity	Percent	Quantity	Percent	
2007	694,599	39	723,074	41	356,949	20	1,774,622
2008	540,709	35	539,889	35	468,174	20	7,548,772
<b>Average 07-08</b>	<b>617,654</b>	<b>37</b>	<b>631,482</b>	<b>38</b>	<b>412,562</b>	<b>25</b>	<b>1,661,697</b>

\*Residual

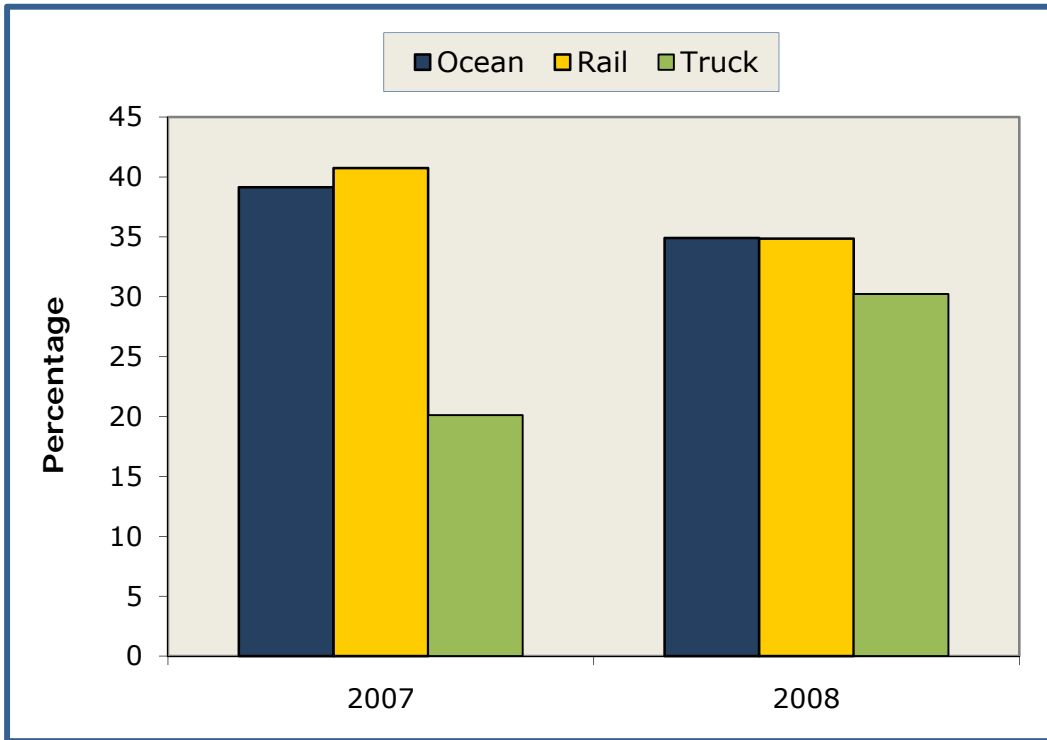
Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

**Table 8 – U.S. sorghum exports to Mexico by route, 2007-2008 (MT)**

Route	2007	2008
<b>Maritime:</b>		
U.S. Gulf	0	0
East Gulf		
Mississippi River	47,973	168,738
North Texas	562,059	220,540
South Texas	84,567	151,431
<b>Total</b>	<b>694,599</b>	<b>540,709</b>
Maritime as % of total exports	39	35
<b>Overland</b>		
Overland as % of total exports	61	65
<b>Total U.S. Exports</b>	<b>1,774,622</b>	<b>1,548,772</b>

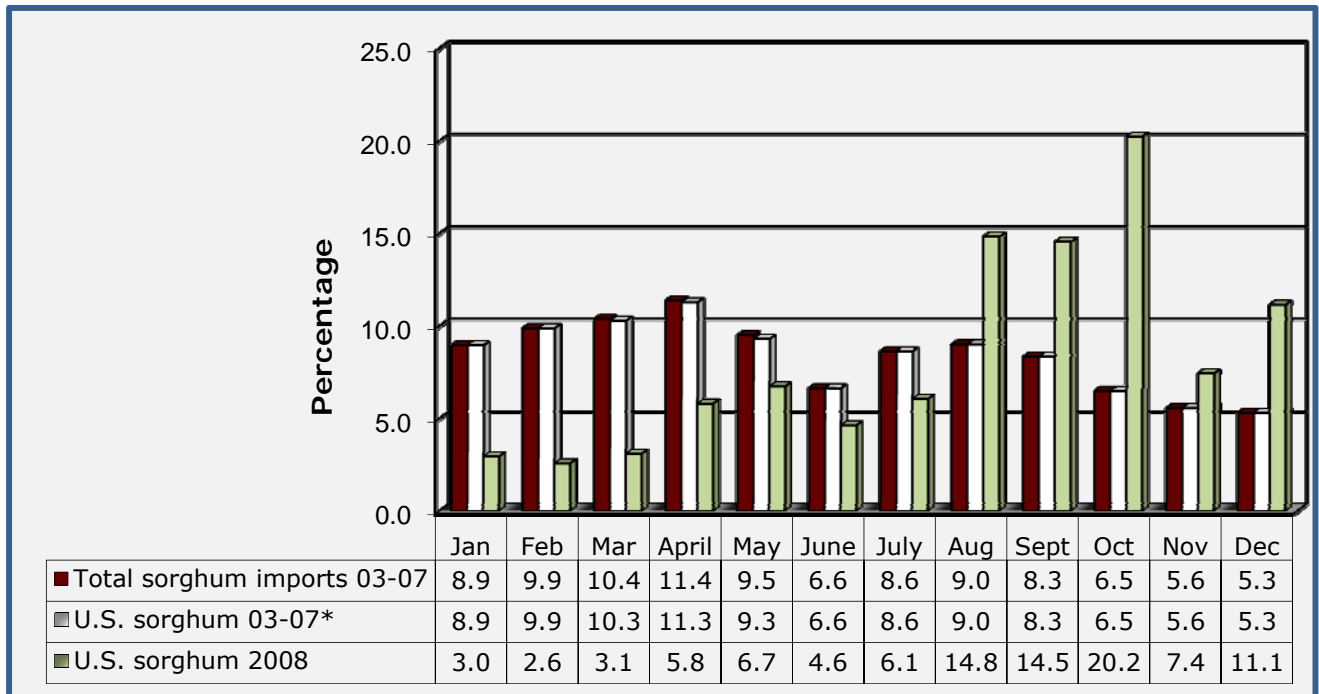
Source: Dept. of Commerce/U.S. Census Bureau/Foreign Trade Statistics and USDA/GIPSA

**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 Mexican sorghum imports is almost 100 percent

Source: SIAP/SAGARPA

## Wheat Exports to Mexico

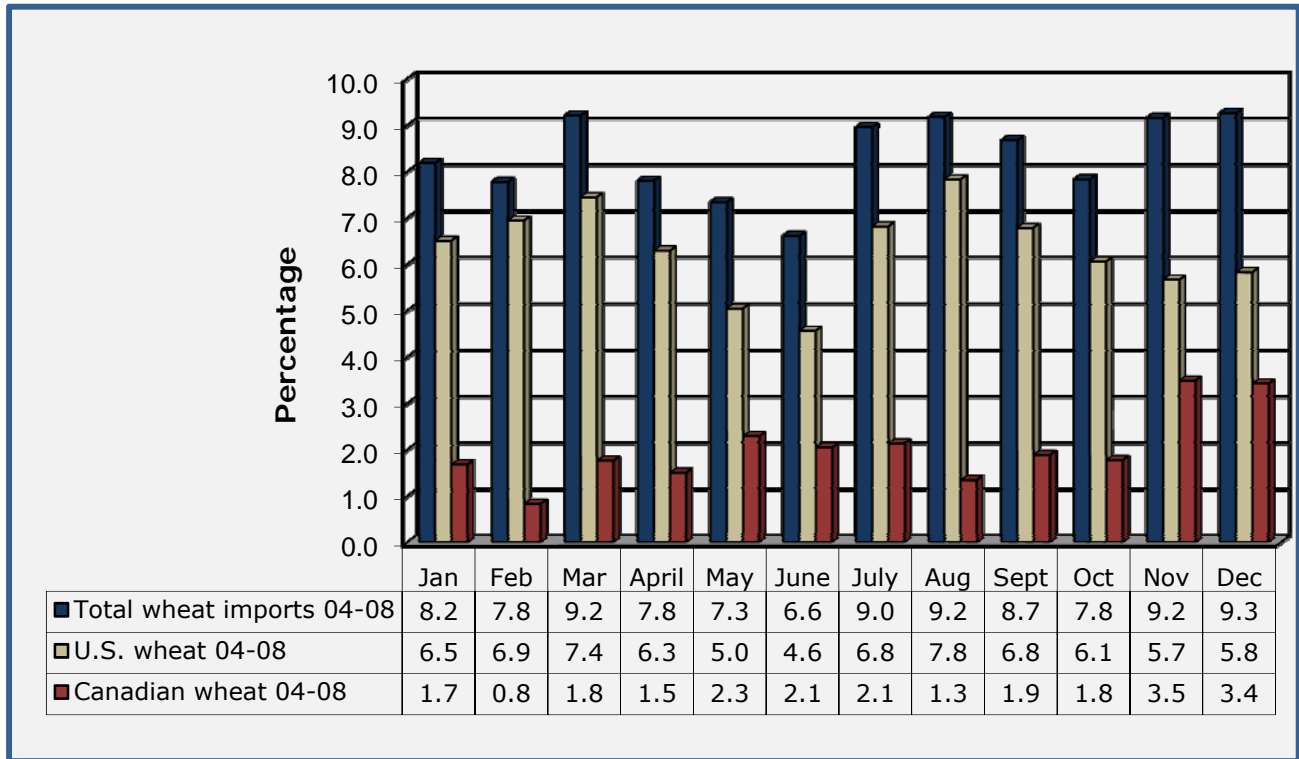
Mexico grows some wheat, but it relies on imports to satisfy its demand. The United States and Canada are its major suppliers (figure 7). In 2008, the United States accounted for 75 percent of Mexican wheat imports (SAGARPA/SIAP 2009). The U.S. share of Mexico's wheat market varies from year to year 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. 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. Wheat exports to Mexico increased 11 percent in 2008 to 2.8 mmt from 2.5 mmt in 2007. They are used almost entirely for human consumption (Adcock, Rosson, and Varela 2007).

### Wheat Modal Share

Since 2007, overland transportation was the major route for shipping U.S. wheat to Mexico (tables 9 and 10). Truck has gained a greater share of the market, mostly due to a decline in rail shipments (figure 9). During this period, ocean vessels transported 46 percent, rail hauled 40 percent and truck moved 15 percent of U.S. wheat exports to Mexico. Rail wheat shipments to Mexico declined due to high rail rates and the two hurricanes that hit grain export destinations in the Gulf of Mexico (AMS 2009). Railroads haul 60 percent of U.S. wheat to export markets (Marathon, VanWechel, and Vachal 2006). Estado de Mexico was the major rail destination of U.S. wheat exports by rail, followed by the D.F., Nuevo Leon, Jalisco, Puebla, Coahuila, Guanajuato, and Queretaro (Adcock, Rosson, and Varela 2007). Texas (Laredo, El Paso, Eagle Pass, and Brownsville) and Santa Cruz, Arizona, were the major entry points of wheat by rail (figure 2).

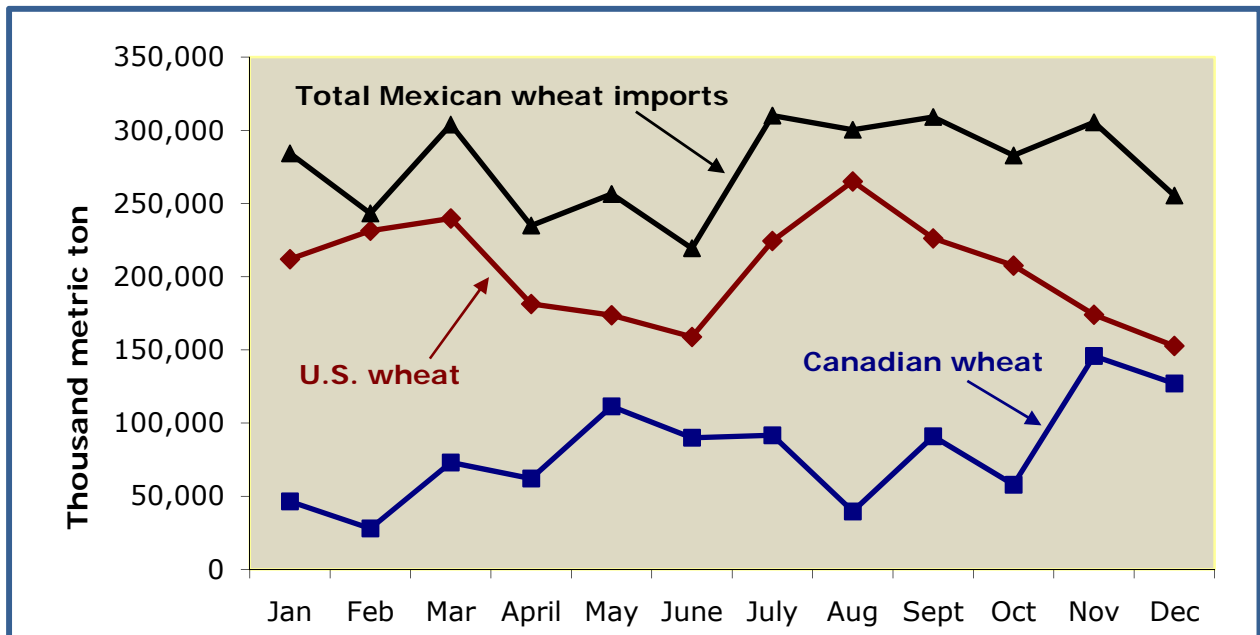
In 2008, about 96 percent of U.S. wheat shipped by ocean originated in the Gulf, mostly from the Mississippi River and North Texas regions (table 10). The ports of Veracruz, Tuxpan, and Progreso were the major points of entry into Mexico (figure 3 and table 6). Figure 7 shows that 53 percent of Mexico's wheat imports occurred during the second half of the year, reaching a peak from November through December. In 2008, the majority of U.S. wheat exports to Mexico occurred during the third quarter of the year, reaching a peak in August (11 percent).

**Figure 7 – Mexico’s average monthly wheat and “morcajo” imports**



“morcajo”: Mix of cereals (wheat and rye) to produce grey and dark flour  
 Source: SIAP/SAGARPA

**Figure 8 – Mexico wheat and “morcajo” 3 year average\* monthly imports**



\*Average: 2006-2008; “morcajo”: Mix of cereals (wheat and rye) to produce grey and dark flour  
 Source: SIAP/SAGARPA

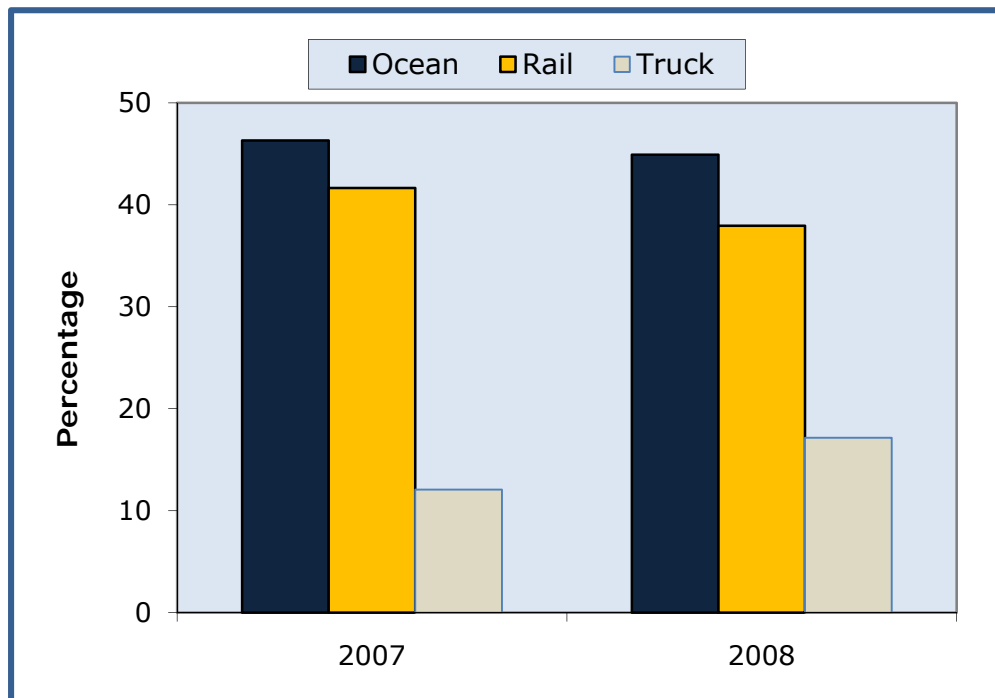
**Table 9 – Tonnages (MT) and modal share for U.S. wheat exports to Mexico**

Year/type of movement	Mode of Transport						Total U.S. exports to Mexico
	Ocean (U.S. Gulf)		Rail		Truck*		
	Quantity	Percent	Quantity	Percent	Quantity	Percent	
2007	1,165,083	46	1,047,907	42	303,509	12	2,516,499
2008	1,259,417	45	1,063,986	38	480,962	17	2,804,365
<b>Average 07-08</b>	<b>1,212,250</b>	<b>46</b>	<b>1,055,947</b>	<b>40</b>	<b>392,235</b>	<b>15</b>	<b>2,660,432</b>

\*Residual

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 mode**



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, 2007-2008 (MT)**

Route		2007	2008
<b>Maritime:</b>			
U.S. Gulf	East Gulf	0	25,844
	Mississippi River	675,232	612,086
	North Texas	438,913	465,839
	South Texas	30,695	103,795
	Subtotal	1,144,840	1,207,564
Lakes	Toledo	0	0
	Duluth-Sup	0	0
	Chicago	20,243	51,853
	Subtotal	20,243	51,853
Atlantic	North Atlantic	0	0
	South Atlantic	0	0
	Subtotal	0	0
Total		1,165,083	1,259,417
Maritime as % of total exports		46	45
<b>Overland</b>		1,351,416	1,544,948
Overland as % of total exports		54	55
<b>Total U.S. Exports</b>		<b>2,516,499</b>	<b>2,804,365</b>

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

## Soybean Exports to Mexico

Mexico is the world's fourth largest soybean importer, after China, the EU-27, and Japan. Mexican domestic production has almost been displaced by U.S. imports because of reform in Mexico's domestic crop support program and the elimination of soybean tariffs due to NAFTA, and because of 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 and has increased the demand for soybeans as a feed ingredient. However, U.S. soybean exports to Mexico decreased 3 percent from 2007 to 2008, to 3.5 mmt, due to the slowdown in the Mexican economy and the international financial crisis (FAS 2008; 2009a).

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 2009). From 2007 to 2008, rail hauled 61 percent of U.S. soybean exports to Mexico; ocean and truck moved 31 and 8 percent, respectively. In the last 2 years, railroad and trucks have gained market share at the expense of ocean carriers. Ocean rates increased from \$10.27/mt in 2006 to \$21.54 in 2007, and to \$22.55 in 2008, reaching a peak of \$30.03/mt in the fourth quarter of 2007 due to a shortage of vessels (table 5) (AMS 2007 and O'Neil Commodity Consulting 2008). Increased global demand for bulk shipments and congestion off the ports of Australia increased vessel waiting times, resulting in a reduction of vessel availability to move bulk commodities in the rest of the world (AMS 2007 and O'Neil Commodity Consulting 2008). Rates began to drop during the last quarter of 2008 (table 5). The Texas soybean crop was transported by truck to the northern states of Tamaulipas and Nuevo Leon (Gonzalez Diaz 2009). 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). 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.

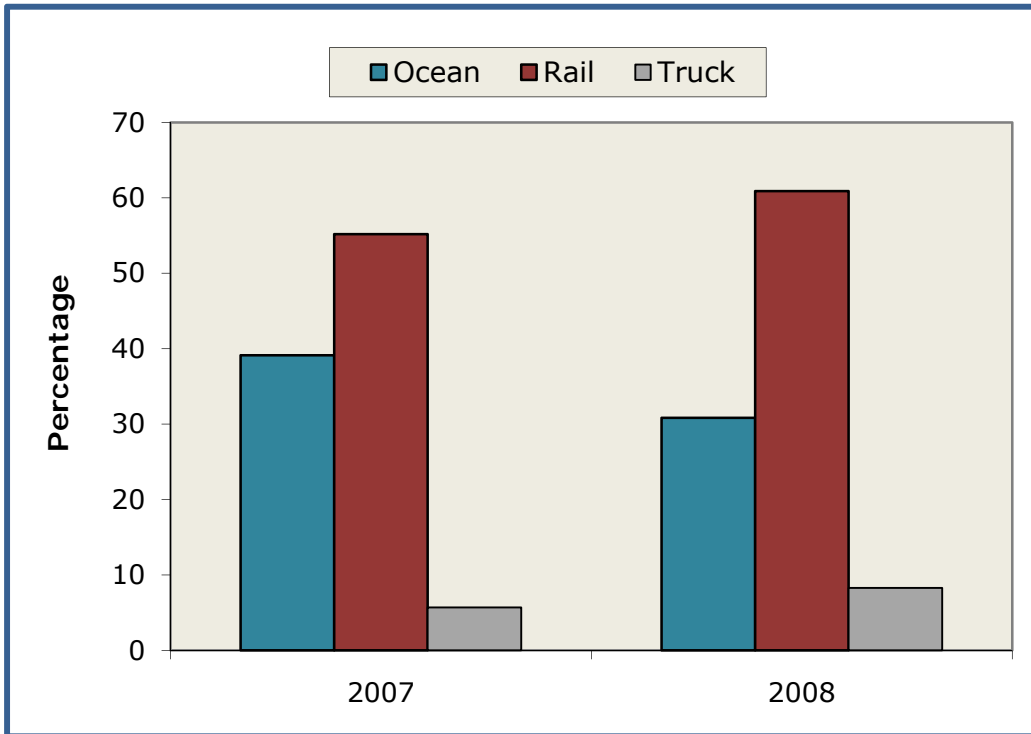
**Table 11 – Tonnages (MT) and modal share for U.S. soybean exports to Mexico**

Year/type of movement	Mode of Transport						Total U.S. exports to Mexico
	Ocean (U.S. Gulf)		Rail		Truck*		
	Quantity	Percent	Quantity	Percent	Quantity	Percent	
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
<b>Average 07-08</b>	<b>1,263,840</b>	<b>35</b>	<b>2,091,938</b>	<b>58</b>	<b>250,816</b>	<b>7</b>	<b>3,606,594</b>

\*Residual

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**



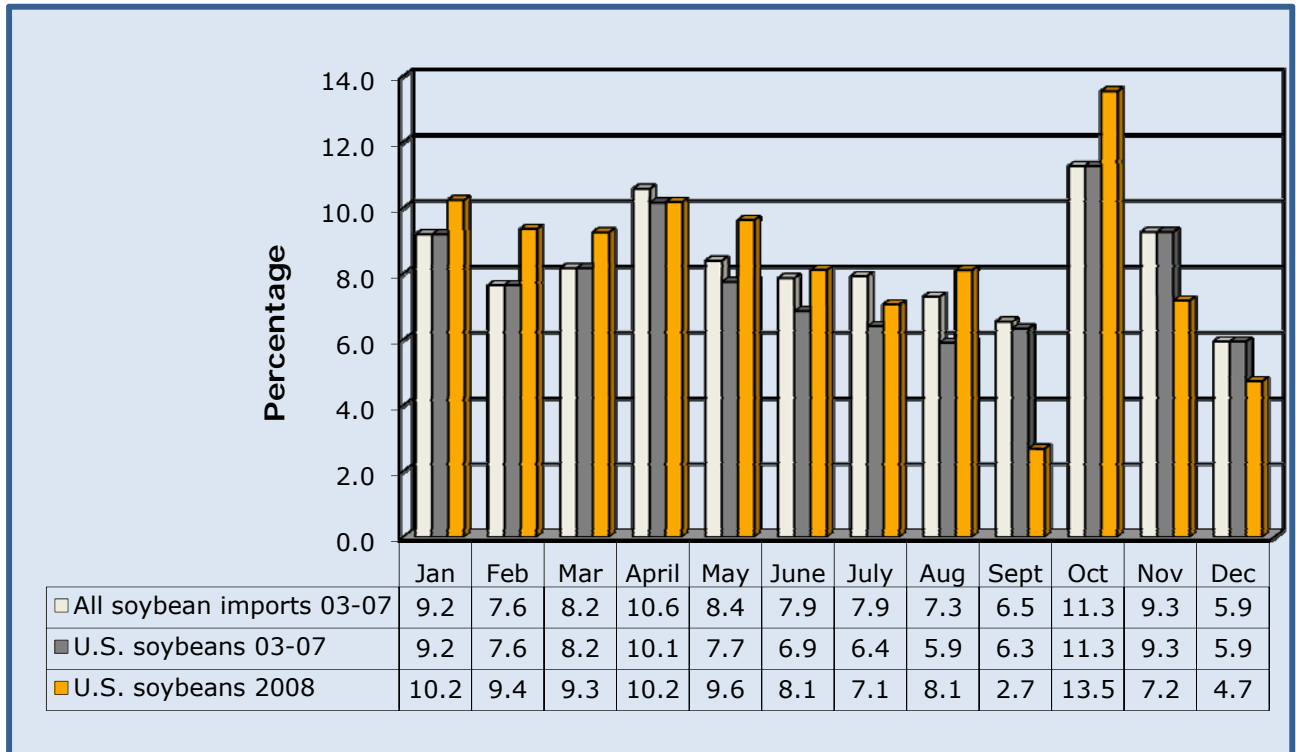
Source: USDA/GIPSA, Union Pacific Railroad, BNSF Railway, Kansas City Southern Railway, and Dept. of Commerce/U.S. Census Bureau

**Table 12 – U.S. soybean exports to Mexico by route, 2007-2008 (MT)**

Route		2007	2008
<b>Maritime:</b>			
U.S. Gulf	East Gulf	13,825	0
	Mississippi River	1,343,835	1,007,779
	North Texas	75,529	86,712
	South Texas	0	0
	Subtotal	1,433,189	1,094,491
Total		1,433,189	1,094,491
Maritime as % of total exports		39	31
<b>Overland</b>		2,229,945	2,455,563
Overland as % of total exports		61	69
<b>Total U.S. Exports</b>		<b>3,663,134</b>	<b>3,550,054</b>

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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