Marketing Winter Vegetables from Mexico

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The North American winter-vegetable industry is highly integrated, with Mexican production supplying a large part of U.S. winter consumption needs. Imports from Mexico undergo a rigorous inspection procedure before entering the United States. In addition to Mexican firms, many U.S. firms are also involved in sourcing winter vegetables from Mexico. To compete well, both U.S. and Mexican firms must adapt to the changing market pressures, which reward firms that can source from many locations to provide a year-round supply and vertically integrated or coordinated firms that can control quality and pursue aggressive marketing.

Introduction

The winter-vegetable export industry of western Mexico, centered in Sinaloa, is an important component of a highly integrated North American produce market. The industry is driven by U.S. consumer demand for fresh vegetables during the winter months, and Mexican growers produce to meet U.S. import requirements. Both Florida and Mexico grow and compete for the U.S. winter market when there is no other domestic source due to cold weather and very few imports from other sources. During the October–June season, Mexican winter vegetables (tomatoes, bell peppers, cucumbers, summer-type squash, snap beans, and eggplant) account for a large portion of the available U.S. supply. From 1992–93 to 1996–97, Mexican winter vegetables ranged from an average of 23 percent of the snap bean supply during the October–June season to 76 percent of cherry tomatoes (Table 1). During the same period, Florida and Mexico together averaged at least 95 percent of the U.S. market for all of the winter vegetables.

This article discusses how winter vegetables from Mexico are marketed to the United States. Understanding the structure of Mexican marketing in an integrated industry is important because change can affect all the players, Mexican or U.S. This study relies mainly on interviews with a limited number of distributors in Nogales, Arizona, several producers in Culiacán, Sinaloa, and industry organizations. The paper begins with an overview of structural changes in the North American produce industry that affect both American and Mexican producers and marketers. After a brief account of production in Mexico, we review how produce is shipped to Nogales, Arizona—the main distribution center—and describe the border-crossing process. Finally, we discuss the role of distributors in Nogales, the methods used for sourcing production in Mexico, and sales.

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Structural Changes in the North American Produce Industry

The produce industry has been changing rapidly in response to market forces. In an integrated industry, both Mexican and U.S. producers must adapt to the changes or lose market share. In the United States, there has been a consolidation of the major buyers in the food industry and, in response, an increased concentration of suppliers to maintain marketing strength. Many shippers must invest in order to develop the marketing skills required by these powerful firms, which are often looking for special packing, product differentiation, and promotional support (Wilson, Thompson, and Cook, 1997). Large customers often prefer to deal with a few key suppliers throughout the year. This has led to increased pressure for extended season or year-round sourcing. With changes in communications and transportation, it is possible to source commodities from many areas. Producers must find locations with good production potential to fill many marketing windows. Many U.S. firms source from Mexico to fill this need and to consolidate their position in the U.S. market. Mexican firms can produce winter vegetables in Sinaloa and in Baja California during the summer. The competition for supplies has increased, and there is a range of methods used to fill that demand, including contracting for production and joint ventures with other growers.

Table 1. Market Share of Florida, Mexico and Others in the U.S. Winter Vegetable Market, October–June.

	Area	1992–93	1993–94	1994–95	1995–96	1996–97	Average
		percent					
Snap beans	Florida	80.7	83.6	76.1	67.9	75.6	76.8
	Mexico	19.3	16.1	23.5	32.0	24.1	23.0
	Others	0.1	0.3	0.4	0.1	0.3	0.2
Cucumbers	Florida	46.8	38.7	40.3	32.3	32.7	38.2
	Mexico	47.3	56.4	54.5	64.1	64.2	57.3
	Others	5.9	5.0	5.1	3.6	3.2	4.5
Eggplant	Florida	47.3	45.1	36.2	25.6	44.2	39.7
	Mexico	52.1	54.2	62.5	72.1	54.2	59.0
	Others	0.6	0.7	1.3	2.3	1.6	1.3
Bell peppers	Florida	58.7	57.8	50.8	46.8	57.0	54.2
	Mexico	37.5	38.1	44.1	48.7	39.3	41.6
	Others	3.8	4.1	5.1	4.5	3.7	4.2
Squash	Florida	31.9	27.7	22.8	18.3	16.5	23.4
	Mexico	64.8	69.8	74.7	80.4	81.4	74.2
	Others	3.3	2.5	2.5	1.3	2.1	2.3
Tomatoes	Florida	71.7	69.7	56.2	51.1	52.4	60.2
	Mexico	27.3	29.2	42.4	46.5	44.3	37.9
	Others	1.0	1.1	1.3	2.3	3.3	1.8
Cherry tomatoes	Florida	23.6	22.9	16.8	18.9	33.3	23.1
	Mexico	76.4	77.1	82.3	80.4	65.1	76.3
	Others	0.0	0.0	0.9	0.7	1.5	0.6

Source: Agricultural Marketing Service, USDA.

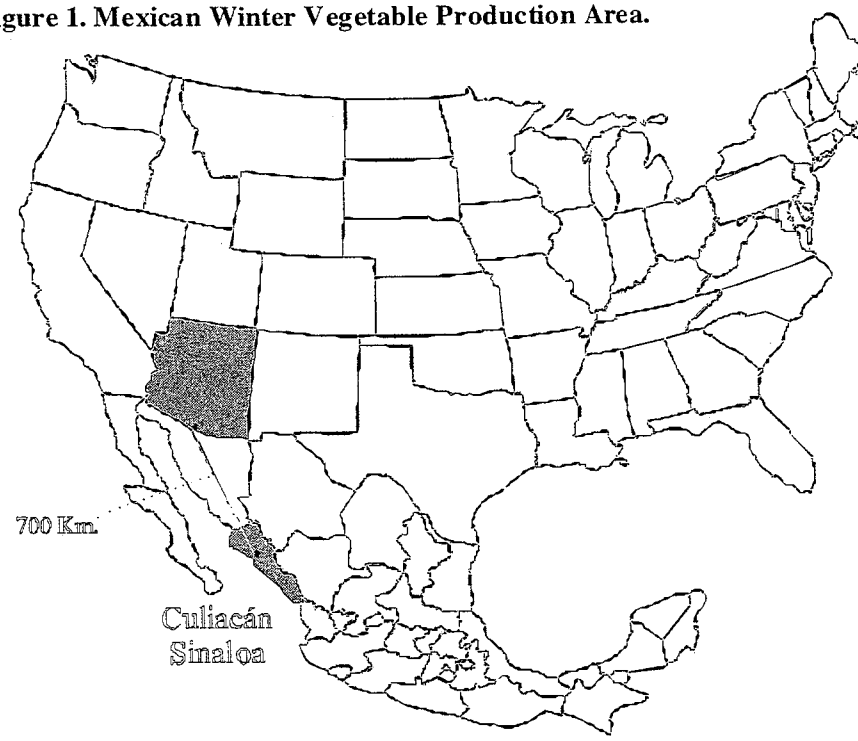
The pressures to coordinate year-round production, often in far-flung locations, are forcing more firms to become vertically integrated or coordinated. Also, large retail buyers with exacting standards require quality and consistency, which are easier to achieve in a vertically integrated or coordinated operation. In the United States, grower-shippers have become more important in the produce industry. These large firms control growing, packing, and cooling facilities; transportation; sales; and production promotion (Carman, Cook, and Sexton, 1997). Similarly, a few large Mexican growers have forward-integrated into sales of their products at the distributing center in Nogales, Arizona. Mexican grower-owned distributors in Nogales are similar to the U.S. grower-shipper but with sales separated from production by 700 kilometers. Mexican firms have evolved from merely growing for the U.S. market to being major players in a multinational business.

The success of the extended shelf life (ESL) tomato has also provided additional impetus for Mexican firms to provide this popular product year-round and to compete with U.S. firms that offer year-round supplies. Thompson and Wilson (1997)—in their 1995–96 survey of fresh tomato grower-shippers in California, Florida, and Mexico—found that 10 of 31 firms shipped at least eight months of the year, and seven of those shipped 11–12 months. Of this last group, three were from California, and two each were from Florida and Mexico. Firms achieve this goal by producing on their own land and/or through contracting or joint ventures with producers in different geographic areas. Not all firms are likely to achieve year-round supplies because it is difficult to compete with low-cost U.S. production scattered throughout many states during the summer months. Typically, Florida expanded to California and East Coast states for summer production; California expanded to Sinaloa for winter production; and California and Mexico expanded to Baja California for summer production. Now the patterns are even more diverse as several Florida firms have joint ventures with Mexican firms. The ability to source from both Florida and Mexico during the winter reduces the risk of not having adequate supplies in the case of bad weather in one location.

Winter Vegetable Production in Mexico

Winter vegetables for the U.S. market are produced mainly in Sinaloa (Figure 1). Growers produce to U.S. market standards and use sophisticated technology that is not universal in other parts of Mexico. Tomatoes and other winter vegetables are important Mexican exports, with tomatoes accounting for 17 percent of the value of agricultural exports from 1988 through 1997.

Figure 1. Mexican Winter Vegetable Production Area.



U.S. imports of Mexican winter vegetables are shown in Table 2. Imports of tomatoes averaged an annual increase of 19 percent from 1990 through 1997. Other winter vegetables showed average annual increases of 8–9 percent. Increases in exports have been driven by many factors, including increased consumer demand in the United States for fresh vegetables; technological advances in Mexico, such as the ESL tomato; decreased tariffs under the North American Free Trade Agreement (NAFTA); and the peso devaluation in December 1994, which made the export market relatively more attractive to Mexican producers.

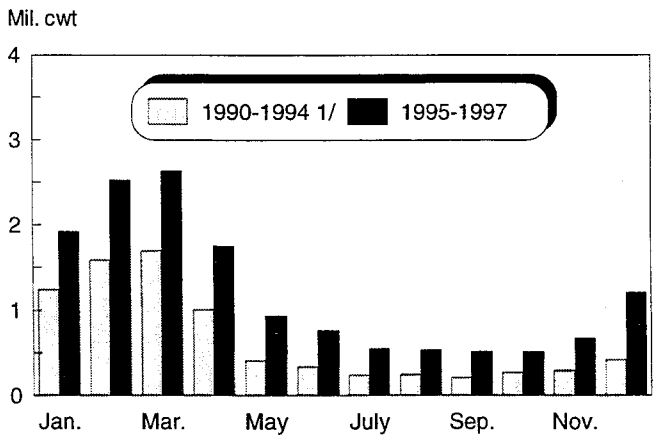
Over time, Mexican producers have sought to extend their season by locating other producing areas in Mexico that can produce for potentially profitable market windows just before and after the main Sinaloa season. Tomato production in Baja California also provides firms with a summer supply so that tomatoes can be shipped year-round from Mexico. The lengthening of the season is shown in Figure 2.

Table 2. U.S. Winter Vegetable Imports from Mexico, 1990–1997.

Item	1990	1991	1992	1993	1994	1995	1996	1997
	----------	----------	----------	metric tons	----------	----------	----------	----------
Tomatoes	352,312	353,577	183,116	400,494	376,032	593,063	685,678	660,609
Bell peppers	91,022	87,334	76,277	101,234	96,713	116,173	143,734	146,194
Cucumbers	166,256	159,962	171,368	204,421	228,228	238,988	293,752	286,082
Squash	74,681	77,534	81,376	89,285	99,257	113,219	135,439	135,118
Eggplant	16,248	19,735	16,710	17,942	21,020	24,104	29,780	28,680
Snap beans	13,076	10,533	10,032	10,746	9,623	15,524	17,124	19,013

Source: U.S. Department of Commerce.

Figure 2. Fresh-Market Tomatoes: Seasonality of Mexican Shipments to the United States



1/ Excludes 1992.
Source: Agricultural Marketing Service, USDA.

The winter vegetables have always accounted for the bulk of the agricultural trade through Nogales during the October–June season. The top 25 imports of fresh fruits and vegetables through Nogales from the 1994–95 through 1996–97 seasons are shown in Table 3. The winter vegetables rank in the top 14 products in terms of volume. Many nontraditional crops are becoming increasingly important in Nogales trade. Some of these products—mangoes and grapes, for example—are shipped in the spring or summer, allowing firms to extend their selling season and to spread fixed business costs over more sales. While only a few firms can source and market a particular product 12 months of the year, others can extend their market season by selling other crops.

Table 3. Top 25 Fresh Fruit and Vegetable Imports from Mexico through Nogales.

Item	1994–95[a]	1995–96[a]	1996–97[a]
	----------metric tons----------		
Tomatoes	417,645	461,430	511,419
Cucumbers	169,616	224,782	257,762
Squash	106,762	140,904	184,139
Watermelons	102,184	138,371	159,486
Bell peppers	126,553	134,642	142,234
Cantaloupes	57,418	71,305	85,051
Mangoes	61,530	69,472	70,289
Grapes	89,862	50,752	62,675
Honeydew	33,564	42,558	49,126
Chile peppers	38,388	37,292	39,133
Eggplant	29,656	30,735	30,547
Corn	21,562	24,955	26,119
Cherry tomatoes	20,974	21,736	20,024
Snap beans	14,200	16,474	17,723
Oranges	4,029	6,712	9,110
Dry onions	9,217	5,979	8,513
Tomatillos	3,757	3,293	4,750
Papaya	1,322	2,979	4,459
Kale	–	1,104	2,926
Mixed melons	888	1,324	1,832
Peas, green	1,022	1,895	1,785
Chayote	1,873	1,734	1,670
Celery	185	141	1,292
Broccoli	167	30	735
Green onions	209	1,086	602

[a] July 1 through June 30. – = not available.
Source: Agricultural Marketing Service, USDA.

The winter vegetable industry in Sinaloa is driven by the export market. Growers produce to U.S. standards so that they can export, but they sell to both the U.S. and Mexican markets, depending on where profit is highest. Vegetables for export are produced under contract with distributors in Nogales, Arizona. Producers grow, harvest, and pack the vegetables and then deliver them to the distributors in Nogales. Growers generally export their highest-quality product and sell lower-quality production to the domestic market. Some of the winter vegetables—such as cherry tomatoes, eggplant, and bell peppers—however, have limited Mexican demand, which reduces marketing options. Domestic sales are generally cash sales at the packinghouse, which is a useful means of improving cash flow during the harvest season.

Transportation to Nogales, Arizona, and the Border-Crossing Process

Horticultural products destined for the U.S. market are sent to Nogales, Arizona—700 kilometers from Culiacán, Sinaloa. Nogales, Mexico, and Nogales, Arizona, effectively form one city divided by an international border. Most of the production is transported by temperature-controlled trucks although a small portion is transported by rail. Trucks are loaded at the packinghouses and arrive in Nogales, Mexico, the next morning after the 12–18 hour trip. As soon as the truck leaves the packinghouse, information is sent electronically to Nogales to the customs brokers and the distributor who begins selling the product, often even before it has actually arrived. After clearing Mexican and U.S. customs, the trucks deliver their loads to Nogales, Arizona, distributors, and then most of them return to Mexico.

The Mexican growers' organization for the state of Sinaloa—Confederación de Asociaciones Agrícolas del Estado de Sinaloa (CAADES)—has a section dedicated to supporting the vegetable export industry—the Commission for the Investigation and Defense of Vegetables—which is active in facilitating the export process. In the past, all Mexican produce went to the CAADES inspection compound upon arrival in Nogales, Mexico. For a fee, CAADES:

- weighs each truck to ensure it meets U.S. weight standards;

- prepares paperwork for the truck (documents of compliance with U.S. safety standards, insurance, and license plates), which is required for driving in the United States;
- provides a place for Agricultural Marketing Service (AMS) inspections;
- provides information on CAADES recommendations regarding minimum quality standards or shipping quantities; and
- records the shipment and notifies distributors.[1]

There are now six private competing centers in Nogales, Mexico, which also provide these services. This stop is the last chance to resolve any problems with the product and vehicle before it crosses the border. After producing for the U.S. market, and incurring transportation expenses to Nogales, growers try to ensure that the product will cross the border with no problem. Some centers provide additional services, such as unloading products that would exceed the U.S. weight limits, providing a new cab or truck repairs to ensure safety compliance, repacking of products that do not meet the grade, and packing or palletizing.

AMS Inspection

Florida tomato marketing during the winter season is governed by Federal Marketing Order Number 966, which mandates minimum size and grade standards. Section 8(e), an amendment to the Agricultural Marketing Agreement Act of 1937, provides that—if a commodity is listed in the section and is regulated by a federal marketing order that imposes regulations regarding grade, size, quality, or maturity—the same or comparable requirements can be imposed on imports of that commodity. Winter tomatoes from Mexico—not roma, cherry, or greenhouse tomatoes—are inspected at the border for quality, condition, and size by representatives of the Agricultural Marketing Service (AMS).[2] All loads of tomatoes are inspected. Tomatoes are partially unloaded, giving inspectors the option to select samples from any location in the truck. On average, about 1 percent of the containers are sampled. Less than one-half percent of total shipments inspected fail to meet the standards. If a load does not meet the minimum quality requirements, it will often be repacked and then reinspected or sold in Mexico. AMS inspects tomatoes at the CAADES center or one of the other six inspection centers in Nogales, Mexico. AMS will also inspect tomatoes at warehouses in Nogales, Arizona, if there are adequate facilities. About 60–70 percent of the inspections take place in Mexico. Inspection for a full load of tomatoes costs about US$70–$80 and is based on a flat fee per package. There is no comparable inspection failure rate for Florida because the AMS inspectors go directly to the packinghouse, and only tomatoes that meet the grade are shipped. Packers in Florida also pay for AMS inspections. In Nogales, AMS will also inspect a load of any fruits and vegetables, for a fee, if requested. A grower or distributor may request this impartial inspection in cases in which the grade is uncertain and must be established before sale or when the condition of a load is under dispute.

Mexican and U.S. Customs

Customs brokers clear merchandise through customs. Each truck uses both a Mexican and a U.S. customs broker to clear customs. First, a truck must clear Mexican customs, present the export document of record, and pay a user's fee. Mexican customs brokers charge a maximum rate of 0.18 percent of the value of the shipment. Next, a truck must clear U.S. Customs. All the paperwork has been sent in advance to the U.S. customs broker and been electronically transmitted to U.S. Customs, the Food and Drug Administration (FDA), the USDA, and the Arizona Department of Motor Vehicles. When the truck arrives at the border, the paperwork has been

[1] In periods of low prices, CAADES recommends actions to alleviate the problem, such as shipping only higher-quality products or reducing shipments for a period of time.

[2] Other imported fruits and vegetables that must be inspected at the border to comply with U.S. marketing orders include onions, citrus, and grapes during the Coachella, California marketing season. Citrus is always inspected in the United States since it also requires an Animal and Plant Health Inspection Service (APHIS) inspection. APHIS inspects citrus in Mexico, and the seal on the load must not be broken before it reaches the U.S. side of the border.

filed, and the decision on whether to require further inspections has been made.

U.S. Customs is in charge of collecting tariffs, dealing with tariff-rate quotas, and currently, with monitoring the tomato suspension agreement. With NAFTA, all U.S. tariffs on horticultural products will be eliminated over a period of 15 years. The tariffs on winter vegetables, however, were quite low before NAFTA (Table 4). The winter vegetable tariffs are specific tariffs, and the ad valorem value of the tariffs has eroded over time. Tariffs were eliminated immediately for some less sensitive crops and time periods. For more sensitive crops and time periods, the tariff is phased out over a 15-year period. Other crops have phaseout periods of 5 and 10 years. The tariffs on winter vegetables vary by season.

To further protect sensitive commodities under NAFTA, tariff-rate quotas were introduced. A specified amount of a commodity is allowed to enter the country during a certain time period at the reduced-tariff rate, but any amount over the quota is charged the pre-NAFTA tariff rate or Most Favored Nation tariff rate, whichever is lower at the time of over-quota trade. The United States has two tariff-rate quotas for tomatoes (quotas differ by season) and one each for eggplant and squash (Table 5). The tariff-rate quota increases by a compounded 3 percent annual rate until the tariff is phased out. With the exception of tomatoes in the first year of NAFTA and squash in 1995, the tariff-rate quotas have always been filled.

Table 4. U.S. Tariffs on Imports of Fresh Vegetables from Mexico.

	1993	1994	1995	1996	1997	1998	Phase-out period
	cents per kilogram						years
Tomatoes, fresh							
3/1–7/14 [a]	4.60	4.14	3.68	3.22	2.76	2.30	10
7/15–8/31	3.30	2.64	1.98	1.32	0.66	0.00	5
9/1–11/14	4.60	3.68	2.76	1.84	2.76	2.30	10
11/15–end of February	3.30	2.97	2.64	2.31	0.66	0.00	5
Tomatoes, cherry							
5/1–11/30	3.30	2.64	1.98	1.32	0.66	0.00	5
12/1–4/30	3.30	0.00	0.00	0.00	0.00	0.00	Immediate
Bell peppers							
6/1–10/31	5.50	4.40	3.30	2.20	1.10	0.00	5
11/1–5/31	5.50	4.95	4.40	3.85	3.30	2.75	10
Cucumbers							
3/1–5/31	6.60	6.16	5.72	5.28	4.84	4.40	15
6/1–6/30	6.60	5.28	3.96	2.64	1.32	0.00	5
7/1–8/31	3.30	0.00	0.00	0.00	0.00	0.00	Immediate
9/1–9/30	6.60	5.28	3.96	2.64	1.32	0.00	5
10/1–11/30	6.60	6.16	5.72	5.28	4.84	4.40	15
12/1–end of February	4.90	0.00	0.00	0.00	0.00	0.00	Immediate
Squash							
7/1–9/30	2.40	1.92	1.44	0.96	0.48	0.00	5
10/1–6/30 [a]	2.40	2.16	1.92	1.68	1.44	1.20	10
Eggplant							
4/1–6/30 [a]	3.30	2.97	2.64	2.31	1.98	1.65	10
7/1–9/30	3.30	0.00	0.00	0.00	0.00	0.00	Immediate
10/1–11/30	3.30	2.97	2.64	2.31	1.98	1.65	10
12/1–3/31	2.40	0.00	0.00	0.00	0.00	0.00	Immediate
Snap beans							
6/1–10/31	7.70	6.16	4.62	3.08	1.54	0.00	5
11/1–5/30	7.70	6.93	6.16	5.39	4.62	3.85	10

[a] Tariff-rate quota in effect.

Source: Foreign Agricultural Service, USDA.

Table 5. U.S. Tariff-Rate Quotas for Fresh Vegetables from Mexico.

Crop and Quota Period	1994	1995	1996	1997	1998
	Tariff-rate quota volume in metric tons [a] (Actual trade if quota is not filled or date quota filled)				
Tomatoes	165,500	170,465	175,579	180,846	
3/1–7/14	(141,883)	(filled 5/16)	(filled 4/25)	(filled 4/14)	
Tomatoes [b]		172,300	177,469	182,793	188,277
11/15–end of February		(filled 2/27)	(filled 2/27)	(filled 2/10)	(filled 2/12)
Eggplant	3,700	3,811	3,925	4,043	
4/1–6/30	(filled 5/23)	(filled 6/5)	(filled 5/3)	(filled 5/20)	
Squash [b]		120,800	124,424	128,157	
10/1–6/30		(104,940)	(filled 5/6)	(filled 5/12)	

[a] The tariff-rate quota increases at a compounded 3-percent annual rate over the life of the tariff.
[b] Tariff-rate quotas were not in effect in 1994 because part of the relevant period was in 1993 before NAFTA began.

Source: U.S. Customs Service.

Tomato trade is further regulated by a dumping case brought against Mexican producers by Florida tomato producers. On October 28, 1996, the U.S. Department of Commerce announced a five-year agreement with principal Mexican producers/exporters that suspended the anti-dumping duty investigation. The suspension agreement established a reference price, or minimum price, for all signatories that covers most Mexican fresh-market tomatoes exported to the United States. The net price—after rebates, discounts, etc.—of Mexican tomatoes cannot fall below the reference price of US$5.17 per 25-pound box, or 20.68 cents per pound.

Food and Drug Administration

Imports must meet domestic pesticide residue standards, and the FDA tests that residue levels are within acceptable tolerances and that no unauthorized chemical residues are present. FDA reviews the paperwork for a random sample of 30 percent of the shipments for possible inspection. The decision to inspect is not completely random and depends also on other factors, such as the grower and the past history of residue violations. Of the 3 percent of total shipments tested in Nogales, about 3 percent of them fail. In 1997, there were 22 entries for raw agricultural products that failed the tests, and no shipments of bell peppers, cucumbers, tomatoes, summer-type squash, or eggplant failed. Information on shipments that fail is posted on the Internet, and the Mexican government is notified of the problem. (See Zepp, Kuchler, and Lucier (1998) for a discussion of the comparison between the pesticide residue levels of domestic and imported produce.) When a load is selected randomly for inspection, FDA pays for the testing. Once a load from a particular grower has failed, all shipments are tested, and that grower must have five consecutive problem-free shipments (the grower must pay for these inspections at a private facility) before s/he is eligible again for the regular sampling regime. All shipments that fail the test are destroyed to prevent them from entering the United States.

In October 1997, President Clinton proposed legislation to permit FDA inspection of foreign food-safety practices and to halt the imports of fruits and vegetables from countries that do not meet U.S. standards. The federal government, with input from the domestic and international agricultural community, intends to issue guidance on sound agricultural and manufacturing practices for fruits and vegetables within one year.

Animal and Plant Health Inspection Service (APHIS)

The APHIS inspection ensures that a product is allowed entry into the United States and that no observable pests enter. APHIS has identified 23 agricultural commodities that have no problematic pests associated with them, and if these products cross the border in a closed vehicle, as opposed to an open truck, they are eligible for the border cargo release program and are sampled at the reduced rate of 5 percent of the loads. Shippers can prefile commodities in the border cargo release program, and if they are not going to be inspected, APHIS releases these loads. All of the winter vegetable commodities, except snap beans, are in the border cargo release program.[3] All other commodities that are not in the program are inspected at a higher rate. Commodities entering the United States under an APHIS phytosanitary work plan are subject to special inspection procedures.[4]

Nogales Distributors

Once a load of produce clears customs, it is delivered to a distributor where the product will be warehoused until sold. There are about 60 distributors in Nogales, Arizona (with approximately 120 dealers and brokers). Distributors in Nogales are U.S. companies although they may be owned by Mexican growers. They receive product from Mexico and sell to U.S., Canadian, and other buyers. Distributors of winter vegetables generally source in similar ways. They mainly source from Mexico via contracts with growers although there are other options which are discussed below. A grower sells through, not to, a distributor. The distributor does not take title to the product and represents the grower's product for a selling commission.

Over time, the ownership of Nogales distributorships has changed. While the industry was once dominated by U.S. distributors, U.S. firms play a less critical role now and are largely indistinguishable from their Mexican-owned counterparts. While numerous U.S. distributors are very strong, there is obviously a strong incentive for Mexican firms to own or control their own distributorship. In the United States, large grower-shippers sell directly from their packinghouses. Mexican growers do not have that option since their product must still be shipped to Nogales and must clear all of the inspection hurdles before it is ready to sell. Distributors in Nogales are a critical step in the marketing chain for Mexican products, and many of them are merely the marketing arms of large Mexican growers. Instead of just sending their product off to be marketed by someone else in another country, growers with distributorships control their product through the final sale. The distributorship can be owned by the grower or a family member so that the operation is vertically integrated or coordinated.

All distributors can sell, but sophisticated marketing requires more time and investment. The bigger U.S. and Mexican firms can market well and can acquire the more desirable sales. Despite the obvious advantage of controlling final sales, growers must consider whether they are willing to make the investment in marketing that is required to make a distributorship profitable. The issue of marketing may explain the joint ventures in marketing between large Mexican and U.S. firms. The Fresh Produce Association of the Americas is an organization of distributors in Nogales. The numbers and characteristics of winter vegetable distributors that are members of this organization are indicated in Table 6. The association represents most of the distributors in Nogales, but the statistics cannot be taken as representative of the entire industry. The number of distributors ranges from 15 for eggplants to 40 for tomatoes. Most distributors handle more than one product. The top 10 distributors for each commodity control from 68 percent of the total shipments for tomatoes to 95 percent for eggplants. This concentration of distributors (which would usually be called ship-

[3] The crops eligible for the border cargo release program include asparagus, bananas (excluding flowers), bitter melon, Chinese beans (not green, garden, or snap beans), cactus fruit, cactus pads, cantaloupes, chayotes, coconuts, cucumbers, eggplants, grapes, tomatillos, jicama, limes, melons, onions, peas, peppers, squash, strawberries, tomatoes, and watermelons.

[4] Oranges and mangoes both enter the United States under a phytosanitary work plan that specifies the inspection procedure. Orange imports come from a fruit fly-free zone in Sonora where the trailer is sealed after loading. At the border, 10 boxes are selected out of the load, and five pieces of fruit are cut to inspect for evidence of the fruit fly. For mangoes, the trailer is also sealed in Mexico after the fruit has been treated with a hot-water bath. Originally, 100 percent of the loads were inspected. Since there have been no problems, inspections have been reduced to only 5 percent of the loads, but they are more rigorous with inspectors off-loading the truck to select boxes instead of merely pulling some fruit off the back of the truck.

Table 6. Characteristics of Members of the Fresh Produce Association of the Americas.

Item	Number of Distributors Selling Each Commodity	Percent of Member Imports Per Commodity by the Top 10 Distributors	Number of Growers Selling Through Member Distributors	Percent of Member Imports Produced by the Top 10 Growers	Average Number of Growers Per Distributor, Per Commodity	Average Percent of a Distributor's Imports From Largest Grower	Percent of Distributors Per Commodity With Just One Grower
Tomatoes	40	68	126	52	3.6	83	30
Cucumbers	36	75	107	64	3.3	83	42
Peppers	39	70	145	57	4.4	76	26
Squash	34	71	320	36	10.7	59	18
Eggplant	15	95	35	79	2.6	83	33
Snap beans	25	90	59	73	2.6	89	48

Source: Fresh Produce Association of the Americas.

pers in other places) is common for U.S. production, too. Thompson and Wilson (1997) found that 15 grower-shippers in California shipped about 80 percent of tomatoes in that state, and nine grower-shippers in Florida accounted for about 75 percent of shipments there.

Most distributors represent very few growers per crop, and a large number represent just one grower. However, a distributor may sell a number of commodities and, therefore, represent a larger group of growers. With the exception of squash, the average number of growers represented by a distributor for a particular crop ranges from 2.6 to 4.4 each. For tomatoes, cucumbers, eggplant, and snap beans, the largest grower for each distributorship represents at least 83 percent of the total product represented. Squash distributors, on average, represent 10.7 growers, and the largest grower averages just 59 percent of a distributor's total supplies. There are many squash growers because it is a very easy crop to grow, matures in 35 days, and can be grown early in the season and followed with another crop. For other crops, production is much more concentrated.

Distributors can be broken down into three broad categories: distributors importing to complement their domestic production; distributors with no production in Mexico or the United States; and Nogales-based Mexican grower-owned distributors. The types of firms are shown by commodity in Table 7.[5] At least 60 percent of all imports, except squash, pass through Mexican grower-owned distributors. These firms import more than 70 percent of the peppers, cucumbers, and eggplants. Mexican grower-owned distributors are very important for winter vegetables but do not play such a dominant role for all commodities imported from Mexico. Firms with no production in either country import from 14 percent to 36 percent of the winter vegetables, with the highest market share for squash and snap beans. Distributors who import to augment domestic U.S. production import from 1 percent to 23 percent of the winter vegetables, with the largest market share being tomatoes.

Sourcing

There are many ways for Nogales firms to source winter vegetables. Some Mexican grower-owned distributors only sell production from their own farms in Mexico, but even these firms use marketing contracts to procure the commodities. The percent of distributors—ranging from an average of 18 percent for squash to 48 percent for snap bean growers—that sell only their own production is shown in Table 6. Mexican-owned

[5] These figures must only be taken as a general indication since it is sometimes difficult to categorize firms accurately.

Table 7. Types of Nogales Distributors.

Crop	Item	Distributor with U.S. Production	Distributor With No U.S. or Mexican Production	Nogales-Based Mexican Grower-Owned Distributor
Tomatoes	Percent of distributors	10	30	60
	Percent of volume	23	14	63
Peppers	Percent of distributors	10	28	62
	Percent of volume	9	20	71
Cucumbers	Percent of distributors	11	31	58
	Percent of volume	14	14	72
Squash	Percent of distributors	15	41	44
	Percent of volume	21	36	43
Eggplant	Percent of distributors	7	40	53
	Percent of volume	1	21	78
Snap beans	Percent of distributors	16	40	44
	Percent of volume	4	36	60

Source: Fresh Produce Association of the Americas.

distributors that sell more than their own product and other firms that source from Mexico also use marketing contracts to acquire product from growers. Joint ventures are also used. Purchasing on the spot market is relatively rare. Although there are no available statistics that would show how common the various types of sourcing are, contracting is regarded as the most common. A distributor may use only one method, several methods simultaneously, or different methods in different years. With a range of methods, firms can choose business activities that match their risk preferences. It also allows firms to take advantage of a variety of business opportunities.

A marketing contract is typically set up before a farmer plants a crop and is usually required for a Mexican grower seeking credit from a Mexican bank. The exact arrangements vary between the grower and distributor. Distributors want good-quality product to sell since they sell on commission—generally, 10 percent to 12 percent of the f.o.b. Nogales, Arizona, price although grower-owned distributors may charge their own growers a rate as low as 8 percent. Very few commission rates exceed 12 percent. The commission rate depends on many factors, including the volume of product sold, crop type, credit extended to the grower, and inputs and technical assistance provided. The importance of these services has varied over time and continues to vary by type of grower and crop. Fixed elements in most contracts include the provision that the distributor receives money from the sale of the product and that the distributor can sell any way that s/he sees fit—direct sales, consignment, etc. (although the suspension agreement for tomatoes has made consignment sales more difficult).[6] At the end of the season, the distributor subtracts money already advanced to the grower from sales and returns the rest to the grower. Contracts are generally for one year for an entire crop, and the grower is responsible for any losses.

Before the Mexican winter vegetable industry was as developed as it is now, U.S. distributors played a more critical role. U.S. distributors searched for growers and provided them with infrastructure—credit, technology, and marketing knowledge. Credit has always been an important element of a contract, but as the Mexican credit

[6] For a fresh product, like pickling cucumbers, that goes to a processor, the contract is quite different. The price is specified as well as the quantity. The processor, distributor, and grower all sign the contract.

market has matured, the credit role of the distributor has declined somewhat. Growers can get credit through their distributor, can self-finance, or can get credit through Mexican banks, including preferential credit through Bancomext. Smaller farmers are perhaps more likely to depend on their distributor for financing. The amount of credit provided by distributors varies from year to year, depending on other conditions. Distributors would like to provide as little cash as possible, and growers would like as much as possible.

Technical assistance has also become less important as the winter vegetable industry in Sinaloa has become increasingly sophisticated. Growers in Sinaloa are well-educated and have access to the best technology available from many sources around the world. In the case of the ESL tomato, Mexican growers are leading the way with a new technology. Large Mexican firms are also investing heavily in greenhouse production. Most companies that sell agricultural inputs or services have offices in Sinaloa to sell their product. For some other crops, the technological assistance is still important.

Joint ventures are also an important method of sourcing from Mexico. There are joint ventures in marketing and joint ventures in growing. Joint ventures in marketing allow Mexican firms to benefit from well-known U.S. brand names. Joint ventures in growing seem to be particularly common for crops grown in areas along the border where U.S. firms can have a more direct impact on production. The importance of joint ventures appears to fluctuate with the changing perceptions of growers and distributors about risk, profitability, and recent business experiences.

Although it is not very common for distributors to buy winter vegetables on the spot market, it occasionally occurs. When the Florida or Mexico season begins late or ends early, there are potential opportunities to buy products in other parts of Mexico to fill the gap and make a profitable trade. However, since the produce market is very volatile, it is unusual when a firm can spot an opportunity for such a trade and can arrange to have the product packed in acceptable containers and transported to Nogales before the opportunity has passed. The produce industry began this way with U.S. firms going to Mexico to buy what was available. This method of sourcing is still used for some watermelon trade.[7]

U.S. firms can buy land in Mexico, but such transactions appear to be quite rare. Laws prohibit buying large tracts of land, which limits the interest of many potential investors. Since 1992, corporations—both Mexican and U.S.—have been allowed to buy land for up to eight partners. No foreigner can own land within 50 kilometers of the coast or 100 kilometers of a land border. Outside of these areas, an individual may own up to 100 hectares of land for row crops and up to 300 hectares of land for orchards (Cook and Schedel, 1992). Some U.S. firms also lease land in Mexico, but this seems to be more common for crops grown closer to the U.S.-Mexico border.

Sales

Produce from Mexico and the United States has the same potential markets, retail and food service, and once winter vegetables leave Nogales and enter the U.S. supply, they are largely indistinguishable from other produce. A distributor may sell directly to the final buyers or via wholesalers, with or without the use of brokers. Brokers negotiate the purchase of produce for a buyer or seller. They may additionally inspect, consolidate the load, and arrange shipping for a purchase. Brokers call various distributors to find the product that best fits the customer's needs. Many buyers have established relationships with brokers and trust them to find the best deal. With many distributors in Nogales, shopping for the best deal is a specialized business. Estimates of how much of the produce passing through Nogales is sold through a broker, as opposed to direct sales through the distributor, range from about 30 percent to more than 50 percent. In periods of excess supply, distributors rely more heavily on brokers to find buyers.

Ideally, a distributor would like to have sales to all types of markets to best cope with the variety of products produced in any season. Factors affecting the types of market channels that a distributor uses include length of marketing season, quality, consistency, handling issues, product

[7] While distributors will generally have contracts with melon producers, they also buy from a lot of very small melon growers. Distributors have employees in Mexico to buy melons on the spot market. In some cases, growers bring loads of unpacked melons to the border where firms bid for the product.

variety, and merchandising ability.[8] Firms with a larger season have more flexibility about selling at a low price at certain times if they can recoup their losses at some other point in the season (Thompson and Wilson, 1997). Larger firms that have the resources for marketing well instead of just selling have an advantage. More sophisticated marketing may require the provision of retail promotional materials and differentiated products, which may include new varieties or presentations of products, brands, or products with special food safety attributes, such as private testing for residues.

Summary

The North American winter vegetable market is a highly integrated market driven by U.S. consumer demand for fresh vegetables in the winter and by Mexican growers who can augment the U.S. supply. A large portion of the U.S. winter vegetable supply comes from Mexico, and growers there produce to the specifications required by the U.S. market. Over time, the role of Mexican growers has expanded. Instead of merely growing for the U.S. market, many Mexican growers now operate integrated firms that market their product through their own distributorships in Nogales, Arizona.

Structural change in the North American produce industry will continue to place competitive pressure on all firms to adapt to new and rapidly changing business environments. Sourcing from many locations is becoming increasingly important for both large U.S. and Mexican firms to assure the year-round availability demanded by many buyers. Growers and distributors on both sides of the border will continue to search out profitable opportunities in this highly integrated market.

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[8] For tomatoes, distribution handling is important. For fresh green tomatoes, repackers are an important market. Repackers buy green tomatoes, ripen them with ethylene gas, and sort and repack the tomatoes for retail and food-service buyers. Vine-ripe tomatoes are also occasionally repacked.