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# **Evolving Vegetable Trading Relationships: The Case of Mexico and California**

by

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## **Introduction**

The U.S. fruit and vegetable industry has been experiencing an increase in import competition in the 1980s. Many regions of the world, particularly Mexico, Chile, and the Caribbean Basin Initiative (CBI) countries, are expanding fruit and vegetable exports to the United States. Fresh fruit and vegetable import volume increased 55 percent between 1980 and 1988. The import share of the growing U.S. fresh fruit and vegetable market was 18.5 percent in 1988, up from 15 percent in 1980 (Table 1).

The objectives of this paper are to discuss: 1) the reasons behind and the policy implications of the rapid growth in fruit and vegetable imports; and 2) the case of the emerging relationship between California and Mexico in the production and marketing of vegetables.

## **Growth in Vegetable Imports and the Lack of a Policy Consensus on Imports**

Standard assumptions regarding the effect of imports on U.S. agricultural producers must be modified when discussing the vegetable industry. It is generally assumed that U.S. agricultural producers do not operate in other countries, indeed, that most operate in only one region of one state. Hence, it is presumed that they will advocate protectionist policies when faced with significant imports.

In contrast, California vegetable grower-shippers are frequently multi-regional and obtain products internationally, often through joint ven-

tures with producers in other countries. Thus, they can extend shipping seasons and sell products produced in several locations via one marketing organization. The rapid growth in multi-location firms has contributed to a high degree of integration of the Mexico-California-Arizona vegetable industries. Since most vegetable crops are not perennials, the location of production can shift readily, based on relative production and marketing costs and growing season. Trends in the production and marketing arrangements of California vegetable grower-shippers are important, because California alone accounts for half of total U.S. production of the 15 major vegetables.

Another important factor contributing to the policy debate on fresh vegetable imports is the position of food retailers. Since storage is possible for most foods, seasonality of production does not affect monthly supply. In contrast, if imports of perishable foods are not permitted during periods of low U.S. supply, then retailers experience a loss in sales. In the past, retailers dealt with low winter supplies of produce by committing a limited amount of floor space to the produce department. However, in the 1980s retailers have responded to the growth in consumer interest in produce by significantly expanding the space allocated to produce departments. In 1988 selling space devoted to produce averaged 12 percent of supermarket floor space, up from 3 to 4 percent in the smaller stores of the 1970s. The average number of items handled in a produce department has gone from 65 in 1975 to over 250 in 1988 (Pierson and Allen). In fact, many chains have repositioned their entire marketing strategy around the produce department. Consequently, it is vital that this space be

**Table 1. ORIGIN OF FRESH FRUITS AND VEGETABLES IN U.S. MARKETS (Billion Pounds)**

	U.S.	MEXICO	CANADA	SA/CBI <sup>a,b</sup>	OTHER <sup>a</sup>	TOTAL
1980	45.67	2.31	0.54	5.38	0.08	53.98
1981	48.31	1.88	0.69	5.68	0.08	56.64
1982	48.74	2.26	0.79	6.05	0.12	57.96
1983	50.88	2.54	0.73	5.83	0.12	60.10
1984	50.63	2.91	0.55	6.24	0.19	60.52
1985	50.73	2.94	0.87	7.34	0.28	62.16
1986	53.86	3.30	0.73	7.26	0.25	65.40
1987	55.16	3.77	0.90	7.45	0.24	67.52
1988	57.27	3.88	0.93	7.85	0.26	70.19

<sup>a</sup> Countries included change from year to year.

<sup>b</sup> SA/CBI = South America and Caribbean Basin Initiative countries.

Source: Fresh Fruit and Vegetable Shipments by Commodities, States, and Months, Calendar Years 1980-1988, USDA, Agricultural Marketing Service, Fruit and Vegetable Division, various issues.

full all year, making the retail demand for year-round produce a compelling force in favor of imports.

Given the overwhelming demand for produce imports, and the integration of many California and Arizona producers with foreign production operations, the possibility of achieving significant protectionist measures is greatly lessened. To achieve protectionist policies, producers in the affected industries must present a united front. Given the disparity of interests prevailing at the shipping point level in the vegetable industry between those that are operating internationally and those that are not, this consensus is difficult to achieve. Witness the failure of the California legislature to pass a country-of-origin labeling bill, due to dissension within agri-industry and opposition from retailers. Country-of-origin labeling legislation has also been defeated at the national level.

The number of California firms operating overseas, especially in Mexico, continues to grow. The change in relative labor costs and the need to extend shipping seasons to meet buyer demand are not the only factors underlying this shift in the location of production. Supply driven factors like urban encroachment and high water costs in southern California coastal production regions, and increasing regulatory constraints in California, have also played a critical role in this transition (Cook and Amon).

Other forces behind the growth in import competition in frozen and fresh vegetables include: 1) the accelerating rate of technological development and its international dissemination; 2) the electronic communication revolution which allows for ready identification and analysis of economic opportunities; and 3) the global deregulation of financial flows that facilitates timely foreign investment in identified opportunities (Moulton and Runsten).

Hence, the attempt of debt-ridden countries to expand vegetable exports as a means of generating foreign exchange is only one of many forces driving the growth in U.S. fruit and vegetable imports. Because many of these forces are beyond the scope of national public policy, firms must respond with adaptive strategies, rather than simply rely on policy interventions.

Another issue influencing the U.S. response to fruit and vegetable imports is the timing of imports. For example, imports from Chile of asparagus, grapes and other fruits, and kiwis and asparagus from New Zealand are contra-seasonal. Consequently, not only are domestic producers

presumably not harmed by these imports, but they may benefit as well. The argument is that contra-seasonal imports cause consumers to become accustomed to consuming commodities such as asparagus, grapes and soft fruits during the off-season, thereby increasing the overall demand throughout the entire year.

However, the effect of contra-seasonal imports on annual demand appears to vary by commodity. For example, while per capita consumption of grapes has increased during the 1980s, peach per capita consumption has actually declined slightly. Certainly many other variables beyond seasonal availability enter into consumer purchase decisions, including perceptions of quality, relative prices, nutritional and health concerns and perceptions of the price/value relationship offered by any given product.

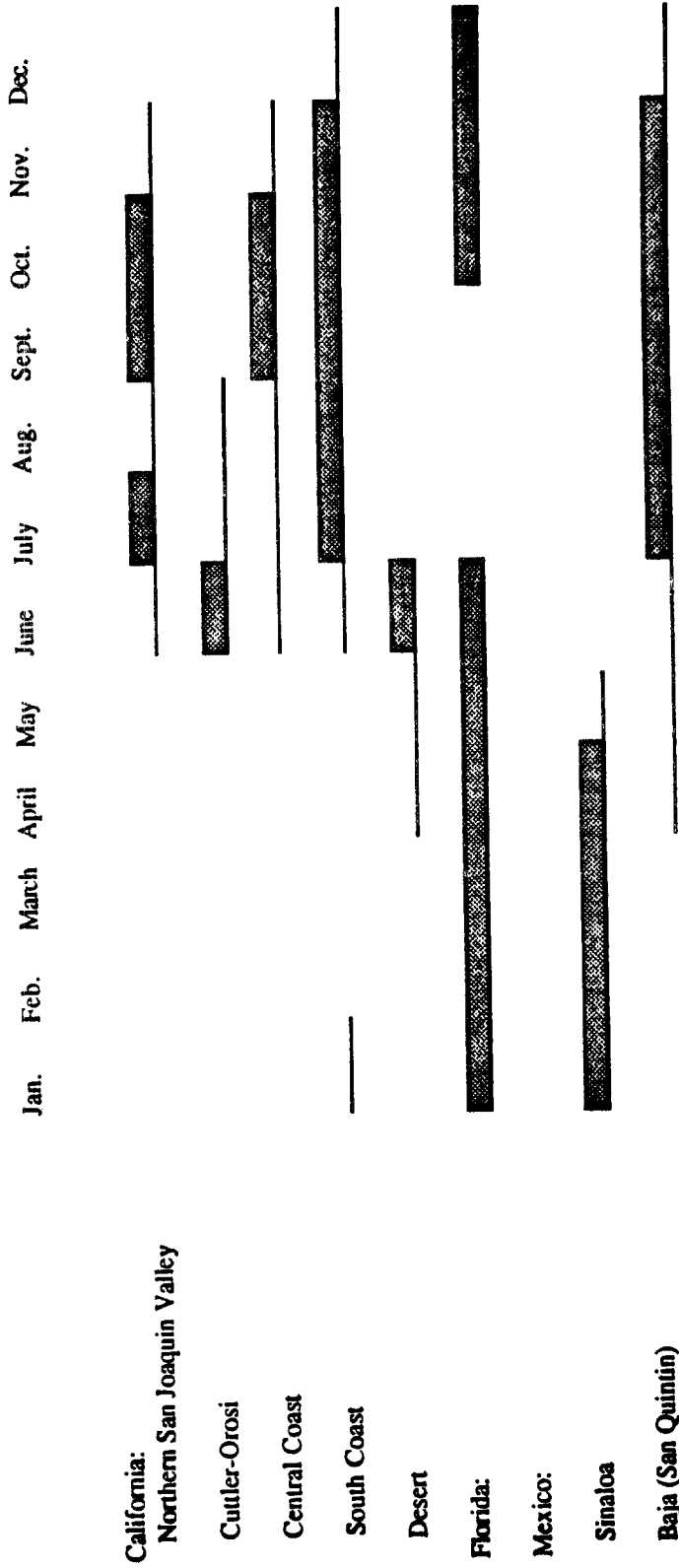
Furthermore, some of these commodities are storeable and hence may have overlapping shipping seasons and compete with California product. Also affected are early and late season varieties and regions that ship while foreign shipping seasons get started or wind down.

In addition, since many produce items may have a high degree of substitutability, the expanded number of non-traditional items now available during the winter may adversely affect consumption of the traditional fresh winter fruits and vegetables. Furthermore, while per capita fresh produce consumption has indeed expanded, by 14 percent between 1980 and 1988, part of this growth has simply been a shift from canned fruits and vegetables to fresh. Hence, wider availability of fresh fruits and vegetables during the winter months may have a further adverse affect on the demand for canned fruits and vegetables produced domestically.

### **New Mexican Production Regions**

The case study approach can be useful in examining emerging international relationships in the vegetable industry. One of the most dynamic relationships is the evolving California-Mexico connection. Traditionally, Mexico has produced primarily winter vegetables and has competed most directly with Florida. For example, in the case of tomatoes California does not ship during the January to April period when Mexico and Florida jointly supply the winter market (see Figure 1). However, during the 1980s new vegetable production regions have begun to emerge in northwestern Mexico, and their shipping seasons overlap with southern California. This changes the competitive relationships between the two countries. On the

Figure 1. Shipping Seasons for Fresh Tomatoes  
 (Heavy lines indicate relatively larger volumes for the respective districts.)



Sources: U.S. Department of Agriculture, Marketing California Tomatoes, 1985, July 1986;  
 Union Nacional de Organismos de Productores de Hortalizas y Frutas, Boletín Anual Temporada, 1985-1986, Nov. de 1986.

other hand, part of the production developing in these new Mexican regions has been set up and financed by California and Arizona growers. In essence, a coordinated relationship is evolving to meet the demand of U.S. buyers for a year-round supply of produce.

Several commodities are instructive of the new relationship between Mexico and the United States. They are frozen broccoli and cauliflower, and fresh market tomatoes. The new production regions that will be emphasized are the Baja Peninsula of Mexico and the Mexicali-San Luis valleys which are located directly below the Imperial Valley of California and the Yuma production area of Arizona.

#### *Agriculture in the Coastal Region of Baja*

The coastal production region of Baja includes Ensenada and San Quintin and covers 60,000 hectares of farmland, about 18 percent of which is in vegetable production. Tomato production is concentrated in the San Quintin area, about 150 miles south of the U.S.-Mexican border.

Irrigation in this area is from ground water sources whose quality has been declining. The aquifer interfaces with sea water and a lack of replenishing rain has caused salinity levels to increase markedly. Of the 700 wells located in the San Quintin Valley, 50 percent exhibit salinity levels of 2000 to 3000 parts per million (SARH, 1987). Due to the scarcity and salinity of water in the San Quintin area, local authorities prohibit drilling new wells. Furthermore, because suitable water is often not available at the production sites, it has to be pumped several miles, increasing the cost of farming in this area (Cook and Amon).

Despite the severe water and land constraints, tomato production in Baja increased dramatically in the 1980s. The production increase is due to the adoption of drip irrigation and improved yields, since acreage remained stable as shown in Table 2. Despite the fixed land base, tomato shipments from Baja grew from 24,310,000 pounds in 1981 to 270,639,000 in 1988. This was equivalent to 33 percent of California shipments in 1988, up from 3 percent in 1981 (see Table 3).

U.S. investment played a role in this expansion, attracted by lower labor, water and land costs. Regional shifts are occurring within California as well, as urbanization pressures in coastal areas and high water costs (\$500/acre foot in San Diego County) contribute to an expansion

in vegetable acreage in the central valley of California. Table 4 shows the regional shifts in fresh market tomato acreage in California.

Clearly San Diego experienced a significant decline in acreage in the 1980s, and the development of the vine-ripe tomato deal in Baja has particular significance for San Diego because the shipping seasons are almost completely overlapping. Since shipments from Baja are heaviest from September through November (Figure 1), the development of the tomato industry has severely encroached on the fall market window formerly relied on by San Diego county. Yet because many of the San Diego growers are now operating in Baja, in essence there has just been a shift in the location of production.

The interdependency of the Baja and California vine-ripe tomato markets is demonstrated by the incorporation of Mexican tomatoes into the California state marketing order for tomatoes. Any tomatoes handled in California (regardless of origin) are subject to a handler assessment. In this manner, out-of-state beneficiaries of California tomato research who desire to market in California must contribute to the development of improved technology. By reducing the free rider issue of Baja grown tomatoes, dissension over the expansion of this industry has been ameliorated.

The rapid growth in Baja vine-ripened tomato exports is partly the result of a significant cost advantage relative to Southern California. As shown in Table 5, in 1987 the estimated production and packaging costs of San Quintin tomatoes c.i.f. Chula Vista was \$3.89 per carton (grower interviews) vs. \$5.10/carton for San Diego, according to Schrader (1987).

While land rent and water costs (\$60/acre foot) are substantially lower in San Quintin than San Diego, lower labor costs accounted for most of the cost differential. In 1987 wage rates for tomato workers in Baja averaged \$3 per day vs. \$40 in San Diego. However, wage rates have increased to \$5 per day in Baja and c.i.f. Chula Vista tomato production and packaging costs in 1989 were in the \$4-\$4.50/carton range. Transportation costs are expected to increase in the near future, further eroding the cost advantage.

Lack of rain in the coastal region in the last two years is also seriously jeopardizing vegetable production. New agricultural investment has come to a halt and further expansion in tomato shipments is considered highly unlikely. Total vegetable crop acreage has likely peaked and growth in vegetables new to the

**Table 2. Fresh Market Tomato Area Harvested, Yield and Production in Baja California, 1970 - 1986**

	Area		Yield			Production			
	Mexicali	Coast	Total	Mexicali	Coast	Total	Mexicali	Coast	Total
	<i>hectares<sup>a/</sup></i>		<i>tons per hectare</i>			<i>tons</i>			
1970	0	756	756	0	12.32	12.32	0	9,313	9,313
1980	138	3,890	4,028	27	30	29	3,736	116,700	120,436
1981	177	3,622	3,799	21	27	26	3,713	96,462	100,175
1982	63	3,651	3,714	20	32	32	1,248	116,884	118,132
1983	28	3,027	3,055	20	34	34	560	104,226	104,786
1984	42	4,169	4,211	24	31	31	1,000	129,643	130,643
1985	66	4,269	4,335	20	36	36	1,328	156,145	157,473
1986	33	4,162	4,195	43	37	37	1,424	156,426	157,850

a/ To convert to acres, multiply by 2.47.

Source: Secretaria de Agricultura y Recursos Hidraulicos, Direccion de Economia Agricola. Oficina Regional de Mexicali.

**Table 3. Total Shipments of Fresh Tomatoes from California and Baja, 1981-1988**

	1981	1982	1983	1984	1985	1986	1987	1988
	-----10,000 pound units -----							
California	78,499	74,821	67,300	60,794	66,867	70,261	80,957	83,535
Baja	2,431	7,097	13,584	17,026	18,985	25,057	19,834	27,639

Source: U.S. Department of Agriculture, Agricultural Marketing Service, Marketing California Tomatoes, various issues.

**Table 4. California Fresh Market Tomato Harvested Acreage by Production Region, 1981-1986**

<b>Production Area</b>	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>
	----- <i>acres</i> <sup>a/</sup> -----						
No. San Joaquin Valley	9,300	8,260	10,300	11,420	11,600	12,100	11,650
Cuttler-Orosi	5,160	5,010	3,700	4,520	5,800	7,500	7,450
Central Coast	5,000	5,060	4,400	3,400	3,200	3,200	3,400
South Coast	7,840	8,960	7,500	7,120	4,340	3,450	3,030
Imperial Valley	1,200	1,250	1,360	1,450	1,500	1,300	1,000
Other	2,000	1,560	1,440	1,390	1,460	1,050	2,070
<b>State Total</b>	<b>30,500</b>	<b>30,100</b>	<b>28,700</b>	<b>29,300</b>	<b>27,900</b>	<b>28,600</b>	<b>28,600</b>

a/ One acre equals 0.40 hectare.

Sources: California Crop and Livestock Reporting Service, California Vegetable Crops, various issues, 1980-1985; California Agricultural Statistics Service, California Vegetable Crops 1985-1986, July 1987.

**Table 5. Tomato Production and Marketing Costs in San Quintin, Mexico, 1987**

<b>Vine-Ripened Tomatoes</b>	<b>Cost/Carton</b>
	<i>U.S. dollars</i>
Pre-harvest <sup>a/</sup>	\$1.20
Picking	.30
Packing	.70
Carton	.85
Transportation to Border	.35
UNPH Tax	.01
Duties	.48
<b>Total Cost</b>	<b>\$3.89</b>

a/ Yield of 2,500 cartons/acre.

Source: Grower interviews, Cook and Amon.



region (e.g., celery and lettuce) can only be expected at the expense of other vegetables.

The uncertain future of San Quintin is causing producers to seek new land, particularly in the state of Baja Sur or Southern Baja. Since no other region in the Peninsula is suitable for year-round vegetable production, several new vegetable production regions are expected to evolve to (partially) replace San Quintin. Vegetable production is beginning to develop in the Vizcaino area (500 miles south of the U.S.-Mexican border), in the Ciudad Constitucion area (800 miles from the border), and in the La Paz area (900 miles from the border).

Not surprisingly, transportation costs to the border are significantly higher than from San Quintin. For example, transportation costs for a carton of tomatoes shipped from La Paz are \$1.13 vs. \$.35 from San Quintin. These higher transportation costs eliminate most of the labor cost advantage. In addition, labor availability is a problem in Southern Baja and worker housing is frequently unavailable in the areas where new production is emerging. Growers must make major investments in housing (\$500,000 plus) before attempting large scale production. While water costs are low in these new areas (about \$10/acre foot), purchased input costs are similar to U.S. levels. Clearly, these Southern Baja regions can only be competitive during periods of low U.S. supply. In other words, these new regions are expected to be more of a factor during the late winter and early spring, rather than competing directly with Southern California growers during the spring through fall.

One of the crops experiencing growth is asparagus in the Cd. Constitucion area. Asparagus can be shipped from this region during the fall, before the Imperial Valley and the Mexicali-San Luis valleys begin. Tomatoes, melons, and peppers can be shipped from La Paz during the winter, with heaviest volume in the March to May period.

Yet the future of these areas as winter vegetable suppliers to the U.S. market, is clouded by the severely limited water supply. Rainfall ranges from 100 ml./year in Vizcaino to 300 in La Paz. Access to water is strictly controlled by the Department of Agriculture (SARH). The government of the state of Southern Baja has determined that the economic return per acre foot of water is significantly higher from tourism than from agriculture. Consequently, the rapid development of the tourism industry in Southern Baja

will compete vigorously with agriculture for the State's limited water resources.

### *Vegetable Production In the Mexicali-San Luis Valleys*

While the Mexicali and San Luis valleys overlap the state lines of Baja California and Sonora, they can essentially be considered as one production region. The climate and soil conditions are similar to desert growing areas across the border and are suitable for most vegetables during the winter season, except tomatoes. The valleys together have 325,000 hectares of agricultural land, of which 207,000 hectares are irrigated (SARH, 1987). In 1989 horticultural production took place on 7 percent of the available irrigated land, up from 5 percent in 1987. To date the principal vegetable crops produced in the Mexicali Valley are green onions (2201 has), asparagus (2867 has), 504 hectares of radishes, and 2387 hectares of melons and watermelons (SARH, 1988).

Research done at CIANO (Center for Agricultural Research in the Northwest) in Sonora indicates that the net return per cubic feet of water is three times higher for most vegetable and fruit crops than for field crops. Consequently, there are incentives to change the crop mix and increase vegetable production. The proximity of the Mexicali-San Luis valleys to the border puts this area in a better position to exploit the growing demand for fresh vegetables than some of the new production regions emerging in Southern Baja. On the other hand, this region has the disadvantage of directly overlapping with production in the U.S. desert, rather than extending shipping seasons.

Furthermore, despite the large size of the Mexicali-San Luis valleys, high quality ground suitable for growing vegetables is in limited supply, and water availability is increasingly becoming a problem. Besides Colorado River water there are some 700 deep wells, but access to those wells is becoming difficult. This constraint is reportedly causing some Imperial Valley growers to diminish their presence there. Another threat to the development of the vegetable industry in the Mexicali-San Luis valley is a canal project proposed by the U.S. Department of the Interior. This project would realign a 66 mile section of the All-American Canal, potentially reducing Mexico's indirect access to Colorado River water by 32.6 billion gallons per year. Hence, the extent to which vegetable production can continue to expand in this area is unclear.

## **U.S. Imports of Frozen Vegetables From Mexico**

A major vegetable freezing industry has developed in the Bajío area of central Mexico. This industry was established and financed in the early sixties by U.S. processing firms (Heinz, Del Monte, Campbells, etc.). The firms adapted technology to the region and trained growers to produce to specifications on a contract basis. Today there is a large pool of growers in central Mexico experienced in broccoli and cauliflower production and several Mexican firms have become significant suppliers of the U.S. market. Many of these also have access to sufficient capital to consider alternative marketing strategies, such as production for the fresh market (Moulton and Runsten).

Since broccoli is a dual usage crop, the phenomenal growth in Mexican frozen broccoli exports to the United States as shown in Table 6 (from 27,747,000 lbs. in 1983 to 164,416,000 lbs. in 1987) has adversely affected the U.S. fresh broccoli market as well. Specifically, Mexico has captured a 32.4 percent share of the U.S. market for frozen broccoli, thereby limiting the extent to which producers can divert production to the processing market when low prices prevail in the fresh market. A similar situation exists for cauliflower, with Mexico's share of the U.S. market increasing from 14.4 percent in 1983 to 41.0 percent in 1987, larger than the California share.

Frozen asparagus imports from Mexico have also experienced major growth. While imports are still minor relative to total U.S. consumption, they have increased fourfold from 1,044,302 lbs. in 1980 to 4,575,493 in 1987 (Pradhan and Moulton).

Although U.S. imports of frozen broccoli and asparagus from Mexico stabilized in 1988, Mexico's competitive position appears strong. Moulton and Runsten indicate that the robust nature of competition from Mexico is derived from low labor costs, good capitalization, current technology and good access to the U.S. market. As indicated in Table 7, total broccoli production costs in Mexico are less than pre-harvest costs in the U.S.

While fuel, fertilizer and other energy sources are subsidized, their elimination would be unlikely to reduce Mexico's cost advantage resulting from lower labor costs. And Moulton and Runsten conclude that exchange rate fluctuations are unlikely to significantly affect Mexico's competitive position, given the continuing expansion in exports in the face of a

decline in the undervaluation of the peso. Certainly the development of efficient export marketing channels by the multi-national firms greatly facilitates the movement of Mexican product into the U.S. market.

The growth in frozen broccoli and cauliflower imports from Mexico has had an adverse effect on independent processors operating only in California, reducing profits and employment. Yet the fragmented structure of the broccoli industry and the lack of industry-wide organization via a marketing order or commission has inhibited the ability of the California industry to develop effective competitive responses.

## **The Importance of Industry Structure And Organization**

Industry structure and organization appear to have an important effect on the competitive position of California agri-industries. It is instructive to compare and contrast the frozen vegetable industry with the frozen strawberry industry.

When the Bracero program ended in the 1960s, California feared a loss of the strawberry industry to Mexico due to the highly labor-intensive nature of strawberry production. In reality, California has continued to gain market share relative to both Mexico and other regions of the United States (Runsten). California has a state strawberry marketing order and has consistently invested in the varietal development and other research areas necessary to retain a technological advantage (the 1988-89 research budget of the Strawberry Advisory Board was \$642,000). Figure 2 shows the gap in strawberry yields which has developed since the 1950s between California and Mexico and the Pacific Northwest.

California also has a generic promotion and advertising program for strawberries with a 1988-89 budget of \$2.5 million. Neither Mexico nor any other state has an organized industry-wide research and promotional program of any significance.

Another relevant factor is the structure of the California strawberry industry. The California industry is composed of many medium size firms and grower cooperatives and is not dominated by a single firm capable of transferring technology to Mexico on a significant scale.

In contrast, the frozen vegetable industry is comprised of several large multi-national firms with sufficient resources to affect the overall

**Table 6. Frozen Broccoli and Cauliflower: Shares of the U.S. Market<sup>a</sup>**

**Broccoli**

Year	California Pack	Market Share	Other U.S.	Market Share	Imports from Mexico	Market Share	Imports from Guatemala	Market Share	Other Imports	Total
	1,000 lb	Percent	1,000 lb	Percent	1,000 lb	Percent	1,000 lb	Percent	1,000 lb	1,000 lb
1978	265,088	90.8	11,431	3.9	13,930	4.8	1,475	0.5	57	291,981
1979	298,618	95.1	-0-	0	12,213	4.2	2,149	0.7	88	314,069
1980	290,657	92.4	-0-	0	19,110	6.1	4,607	1.5	181	314,555
1981	288,700	86.3	18,055	5.4	22,542	6.7	5,161	1.5	120	334,578
1982	303,850	82.7	31,666	8.6	26,759	7.3	4,675	1.3	436	367,386
1983	260,359	81.6	24,999	7.8	27,747	8.7	3,238	1.0	2,566	318,909
1984	327,535	76.0	38,229	8.9	55,318	12.8	10,023	2.3	63	431,168
1985	309,836	71.4	46,970	10.8	63,376	14.6	12,666	2.9	1,105	433,953
1986	275,159	62.3	49,360	11.2	96,837	21.9	18,124	4.1	2,189	441,669
1987	261,903	51.6	50,557	10.0	164,416	32.4	27,844	5.5	2,559	507,279

**Cauliflower**

Year	California Pack	Market Share	Other U.S.	Market Share	Imports from Mexico	Market Share	Imports from Guatemala	Market Share	Other Imports	Total
	1,000 lb	Percent	1,000 lb	Percent	1,000 lb	Percent	1,000 lb	Percent	1,000 lb	1,000 lb
1978	96,771	68.1	30,742	21.7	11,808	8.3	1,914	1.4	448	141,683
1979	76,957	69.2	24,173	21.8	5,887	5.3	3,969	3.6	153	111,139
1980	66,369	70.2	18,397	19.5	6,060	6.4	3,642	3.9	19	94,487
1981	85,370	71.9	19,791	16.7	10,412	8.8	3,090	2.6	72	118,735
1982	85,339	64.5	26,305	19.9	13,306	10.1	7,083	5.4	181	132,214
1983	71,779	59.0	28,762	23.6	17,571	14.4	3,238	2.7	276	121,626
1984	72,062	54.2	30,044	22.6	27,559	20.7	3,069	2.3	206	132,940
1985	67,074	51.0	27,543	21.0	32,869	25.0	2,835	2.2	1,119	131,940
1986	64,631	50.9	24,489	19.8	24,347	27.1	2,159	1.7	1,337	126,963
1987	51,244	37.6	26,514	19.5	55,878	41.0	1,614	1.2	1,023	136,273

<sup>a</sup>Before U.S. exports, which are mainly to Canada; ignores carry-over stocks.

SOURCES: American Frozen Food Institute, *Frozen Food Pack Statistics*, various years; U.S. Department of Commerce, Bureau of the Census, *U.S. Imports for Consumption*, Schedule E.

**Table 7. Estimating Costs to Produce Broccoli in Mexico and California, 1986 a/**

	Mexico b/	California c/
	-----U.S. dollars per acre-----	
Pre-harvest	\$268.77	\$799.09
Overhead	91.00	161.00
Harvest & Transport	64.62	450.00
Fixed Costs	54.00	95.50
<b>Total Costs</b>	<b>\$478.39</b>	<b>\$1,505.59</b>
<b>Cost per pound</b>	<b>6.5 cents</b>	<b>15.1 cents</b>

a/ Mexican costs are for Guanajuato, calculated in June 1986; California costs are 1986 University of California sample costs with wages and land rents adjusted downward to reflect actual practice.

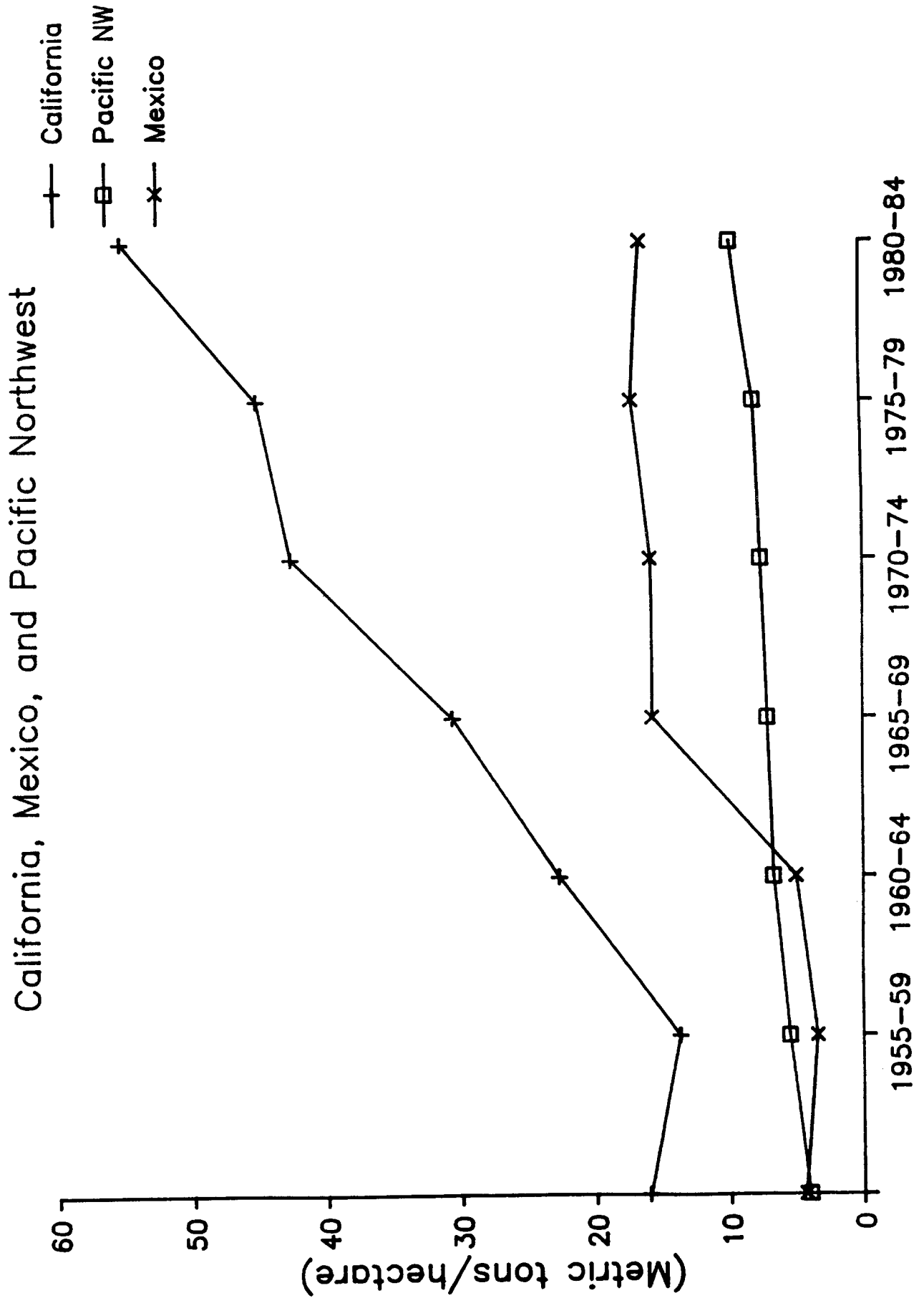
b/ Based on an average payable yield of 7,316 pounds/acre (8.2 metric tons/hectare) from 1983 survey; yields may be higher now, although the same varieties are being grown.

c/ Based on the California 1986 average broccoli yield of 10,000 pounds/acre (11.2 metric tons/hectare).

Sources: For Mexico, Kirby Moulton and David Runsten, The Mexican Frozen Vegetable Industry, University of California Cooperative Extension, Berkeley, December 1986; for California, various Cooperative Extension sample cost studies and interviews with growers.

Figure 2.

# Strawberry Yields



market. Secondly, the frozen vegetable industry does not benefit from an organized program supporting research and/or promotion such as through a marketing order.

### **Maquiladoras for Vegetables**

Another example of the emerging relationship between California and Mexico in the vegetable industry is the recent decision of the California Department of Food and Agriculture (CDFA) to approve the establishment of a "maquiladora" in Mexico to package carrots grown in the Imperial Valley and destined for the U.S. market. The maquiladora concept has been heavily used by U.S. manufacturing firms. Maquiladoras import inputs into Mexico duty-free, assemble the products there to take advantage of low labor costs, and then pay duty only on the value-added in Mexico when "exporting" to the U.S. market.

The application of the maquiladora concept to agriculture is new and has interesting implications. For vegetable crops which are not highly labor-intensive at the production and harvesting levels, Mexico may not have a significant cost advantage. For these crops the greatest potential for cost savings may be in the packaging stage. Hence, it could be considered advantageous by California and Arizona growers to produce in the less risky U.S. environment and merely package in Mexico (for crops that aren't highly perishable). Indeed, the marketing and infrastructure advantages of producing in California may make this a common scenario for those operating close to the border.

### **Marketing Strategies for California And Mexican Vegetable Growers**

Traditionally, California has pursued a marketing strategy of operating as a high volume, least cost producer. Yet California can no longer be described as the least cost producer for many vegetable crops. An alternative strategy pursued by a growing number of California grower-shippers is that of targeting the product attribute market for differentiated products.

The entrance of new players into the fresh vegetable industry is also affecting the marketing environment in California. Due to the decline in consumption of canned fruits and vegetables, many processors (e.g. Dole, Campbell's, Pillsbury-Green Giant, Kraft, Del Monte) have entered the fresh market during the 1980s and have brought with them their branded marketing mentalities. Successful branding of produce is difficult because of the following requirements: 1) year-round

availability of product; 2) a consistent, high quality supply; 3) a differentiated product; and 4) proper handling throughout the cold chain.

Without these conditions a consumer brand (as opposed to a trade label) is not economically viable, since the development of a "consumer franchise" for a product requires costly consumer advertising. This kind of investment would not be profitable for a product available only seasonally, for example. The growth of contra-seasonal imports is reducing this constraint, but because of the perishability of fresh produce, the industry is still grappling with the other requirements. Yet clearly, as the large firms invest in consumer brands and tackle the obstacles, they will depend on foreign imports to fill the gaps when U.S. supplies are low. This is a powerful force in favor of imports.

Because of the difficulty of clearly differentiating produce, given the variable intra- and inter-seasonal quality, brands may have a higher success rate if they are associated with value-added products such as pre-cut and microwaveable products. Hence, consumer interest in convenience oriented products and industry interest in branded marketing may offer an advantage to the larger firms with past brand marketing experience and large resource pools. As a result, the introduction of brands is expected to affect industry structure at the shipping point level. Smaller firms with insufficient capital to invest in consumer brands or without sophisticated quality control programs in their foreign operations may be at a disadvantage in a branded environment.

Yet the success of brands in produce remains to be seen. It has not been demonstrated that the majority of retailers will support brands and pay a price premium. Survey data from the Food Marketing Institute/Produce Marketing Association show a lack of consensus on the part of retailers on the benefits of brands. Retailers do respond favorably to branded products as an informational merchandising technique, where the physical brand label or package includes recipes, ripening or nutritional information.

Although the ability of shippers to develop successful consumer franchises is uncertain, branding will bring both an advertising and informational/merchandising jolt to produce. This may be an important competitive factor for exporting countries attempting to penetrate the U.S. market and raises an interesting question with regard to marketing strategies. Will countries such as Mexico continue to pursue a least

cost, high volume strategy or will they attempt to forward integrate into the U.S. market and develop branded, value-added products?

Mexico's ability to move into value-added, convenience oriented products may be limited by the costly market research and sophisticated packaging and postharvest technology required. If Mexico is to pursue these strategies it may be merely as part of the supplier network for large U.S. firms who set the specifications and transfer the technology.

### Conclusions

The internationalization of the fruit and vegetable industry and changing consumer demand is ushering in a new marketing era. While imports are expanding rapidly, much of this production has been set up and financed by sectors of California agriculture itself. The propensity of many California firms to shift operations out-of-state and out-of-country makes it difficult for the state's agricultural industry to speak with one voice.

Compelling demand and supply side factors favor a continuation of the transfer of some of California's production capacity to other areas. Yet in the case of Mexico, many constraints limit the extent to which production can be transferred. California's natural advantages of diverse climates and long growing seasons, combined with highly developed production, postharvest and distribution technology, insure California agriculture's importance in the fruit and vegetable industry. Although the location of the production may change, California firms are bound to continue to play a major role in the financing and marketing of production from new regions. Yet in order to maintain a leadership role, California must continually invest in the research and development necessary for a competitive advantage, and must look to innovative marketing strategies emphasizing high quality, differentiated products.

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