

Chapter 4

Crop Sector

4.1 Overview of Arizona and Sonora's Crop Industries

Importance of Sector for Arizona and Sonora

As indicated in Chapter 3, the crop industry is the largest component of production agriculture for both Sonora and Arizona. In Arizona, cash receipts from crops have exceeded livestock in all of the last fifteen years. During the 90s, crops contributed an average of 58 percent of agricultural cash receipts for Arizona. The share of crops relative to livestock has increased recently for Arizona even though crop acreage has declined at an average annual rate of 1.6 percent from 1980 to 1995. This share increase is attributed to the growing fresh vegetable industry and a downward trend in the real value of cattle and calves sold. In 1980 vegetables contributed only 10 percent of crop receipts, whereas in 1995, favorable prices for vegetables resulted in sales that amounted to 30 percent of total crop revenues.

On average, crops accounted for 56 percent of Sonora's production agriculture revenues from 1980 to 1989 and increased slightly to an average of almost 58 percent for the years from 1990 to 1995. Sonora's crop revenues increased slightly by an annual rate of 0.13 percent from 1980 to 1995. In contrast, Arizona's real crop receipts declined by an annual rate of -0.89 percent. Alfalfa and grapes have led the way for Sonora's increase in crop value. Alfalfa made up only 3 percent of Sonora's crop value in 1980 but increased to 18 percent by 1995. Over this same period grapes have increased from 8 to 17 percent of Sonora's crop sales.

National Perspective

Both Arizona and Sonora demonstrate areas of strength within their respective national economies. Table 4.1a summarizes production information as a percentage of national production for crops that are ranked in the top three in either national economy. In field crops, Sonora shows definite strength ranking number one nationally in upland cotton, wheat, and sunflowers and number two in soybeans. In contrast, Arizona shows a greater national presence in the relatively small markets for pima cotton and durum

Table 4.1a. National Importance of Arizona and Sonora Crops, 1995.

Crop	Arizona Production	% of US Production	AZ's Rank	Sonora Production	Mexican Production	% of SO's Rank
Field Crops:						
Pima Cotton (1,000 bales)	72	19.6	2			
Upland Cotton (1,000 bales)	793	4.5	8	347	90.6	1
All Wheat (1,000 tons)	311	0.6	35	1,274	33.4	1
Durum Wheat (1,000 tons)	255	8.3	2			
Garbanzo (1,000 tons)				12	9.1	3
Sunflower (1,000 tons)				66	52.3	1
Soybeans (1,000 tons)				178	31.0	2
Principal Vegetables (mil. US \$)	657	8.9	3	56		
Head Lettuce (100 cwt)	17,661	44.4	2			
Leaf Lettuce (100 cwt)	1,440	19.6	2			
Romaine Lettuce (100 cwt)	1,482	16.4	2			
Cantaloupes (100 cwt)	3,040	14.4	2			
Cauliflower (100 cwt)	765	11.7	2			
Broccoli (100 cwt)	946	7.8	2			
Honeydews (100 cwt)	576	10.2	3	270	2.4	7
Spring Onions (100 cwt)	672	6.7	4			
Watermelons (100 cwt)	1,802	4.4	5	2,093	20.1	1
Green Onions (100 cwt)				344	4.6	8
Asparagus (100 cwt) ¹				321	41.0	1
Fruits & Nuts (mil. US \$)	108	1.0	9			
Lemons (1,000 ctns)	7,200	14.9	2			
Tangerines (1,000 ctns)	1,300	10.2	3			
Grapefruit (1,000 ctns)	2,800	2.0	4			
Oranges (1,000 ctns)	2,100	0.4	4	9,492	4.1	5
Grapes (1,000 tons)	26	0.5	6	396	63.0	1
¹ Figures are for 1994.						

Source: Arizona (AZ): 1995 Arizona Agricultural Statistics. Sonora (SO): SAGAR, 1995-96, El Sector Alimentario en Mexico, 1995. INEGI, CONAL Revista Claridades Agropecuarias. ASERCA, Revisa Productores de Hortalizas.

wheat, where Arizona is ranked second. It should be remembered that the relative size of crop production in each country varies dramatically. For example, Arizona produces more than twice as much upland cotton as Sonora but this only puts Arizona in eighth place in US production.

In vegetables, Arizona places second only to California in the production of lettuces, cauliflower, broccoli and cantaloupe. Sonora shows its strengths in watermelon and asparagus. With asparagus, in particular, Sonora has the potential to exploit their comparative advantage (see section 4.3).

In fruits, Arizona shows some strength in citrus, particularly in lemons. In orange production, Sonora produces more than four times the amount of Arizona but ranks only fifth in Mexican production. In grape production, Sonora is number one in Mexico.

Government Programs and Regulations

The US Federal Agriculture Improvement and Reform Act of 1996, signed into law in April, 1996 fundamentally redesigned farm income support and supply management programs for major program crops - wheat, corn, grain sorghum, barley, oats, rice, and upland cotton. The new law expanded market-oriented provisions started in the two previous farm bills, which had generally reduced the influence of government commodity programs in the agricultural sector.

The 1996 Act replaced deficiency payments with fixed payments (i.e., production flexibility contract payments) that are no longer linked to current plantings or current prices. Acreage reduction programs were eliminated so that program participants have total planting flexibility, except for planting some fruit and vegetable crops. Although producers have planting flexibility, elimination of target prices will make it more difficult for some producers to obtain credit. The Act makes US agricultural exports more price competitive in the long run but somewhat less price competitive in the short run (Young and Westcott).

Mexico's agricultural policy has also changed dramatically in recent years. Producer price supports formerly covering about 20 commodities are gone, along with most consumer price controls and direct input and processing subsidies. Aside from the PROCAMPO cash payments, government intervention in the farm economy is now limited to technical assistance and infrastructure support.

Thus, the emphasis of recent changes in farm programs in both countries has been on reducing economic distortions in the production, distribution, and consumption of food and agricultural products. With all three NAFTA countries now focused more on supporting producer income and letting markets operate with only limited government intervention, there is more similarity in policy approaches than ever before.

4.2 Structure of Crop Production and Regional Competitiveness

Land Tenure and Land Ownership in Sonora

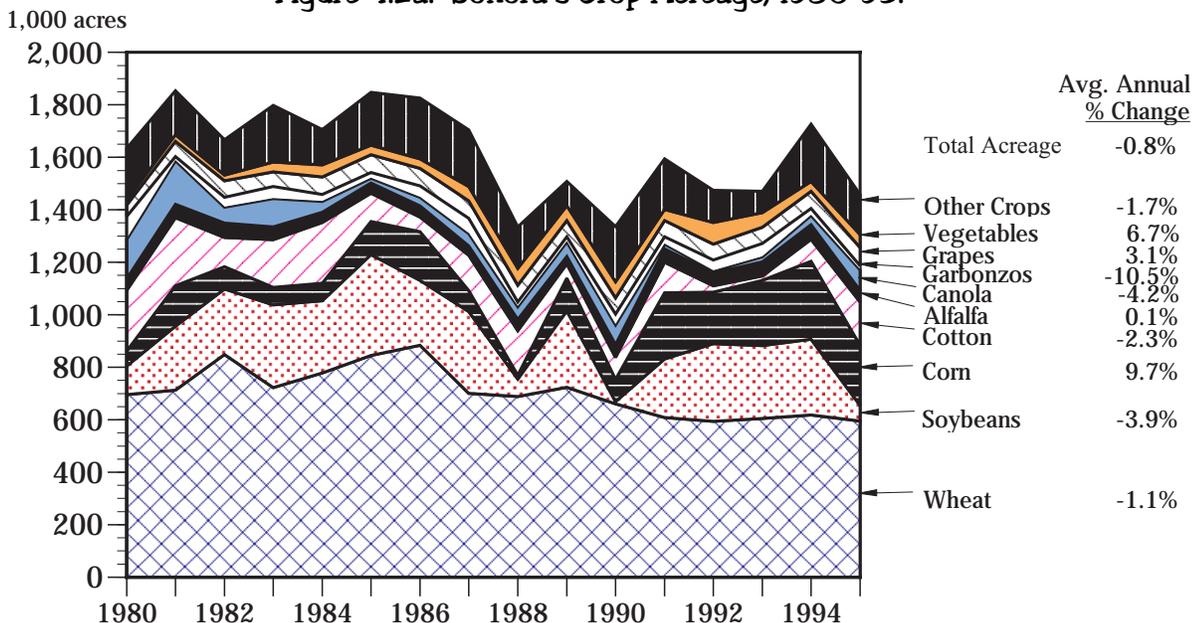
Ejididos represent a widespread form of land tenure in Mexico. They are rural lands managed by communal groups, primarily in common (Thompson and Wilson). They account for just under fifty percent of the farmland acreage in Mexico as a whole and over thirty percent of the land in Sonora. While there is great diversity among ejidos with regards to infrastructure development and natural endowment, Sonoran ejidos, on average, place well relative to the rest of Mexico. Almost 75 percent of Sonora ejido land is irrigated, and all other infrastructure measures are on par with or above national averages. This indicates that ejidos in Sonora might be in a good position to take advantage of trade linkages with Arizona.

The ejido reforms announced in 1992 were designed to address low productivity. Ejidos on average are 30 to 50 percent less productive than comparable private farms (Yates). While critics considered these policies an abandonment of the ideals of land reform, from an agribusiness perspective they were a positive step. Property rights are more secure as expropriation is now prohibited, foreign and corporate ownership is allowed, and it is possible to lease and even buy ejido land in some instances. The goal of the new policies is the modernization of ejidos through investment of private capital. The opportunities created by these reforms could play an important role in the agribusiness linkages between Arizona and Sonora.

Regional Crop Patterns

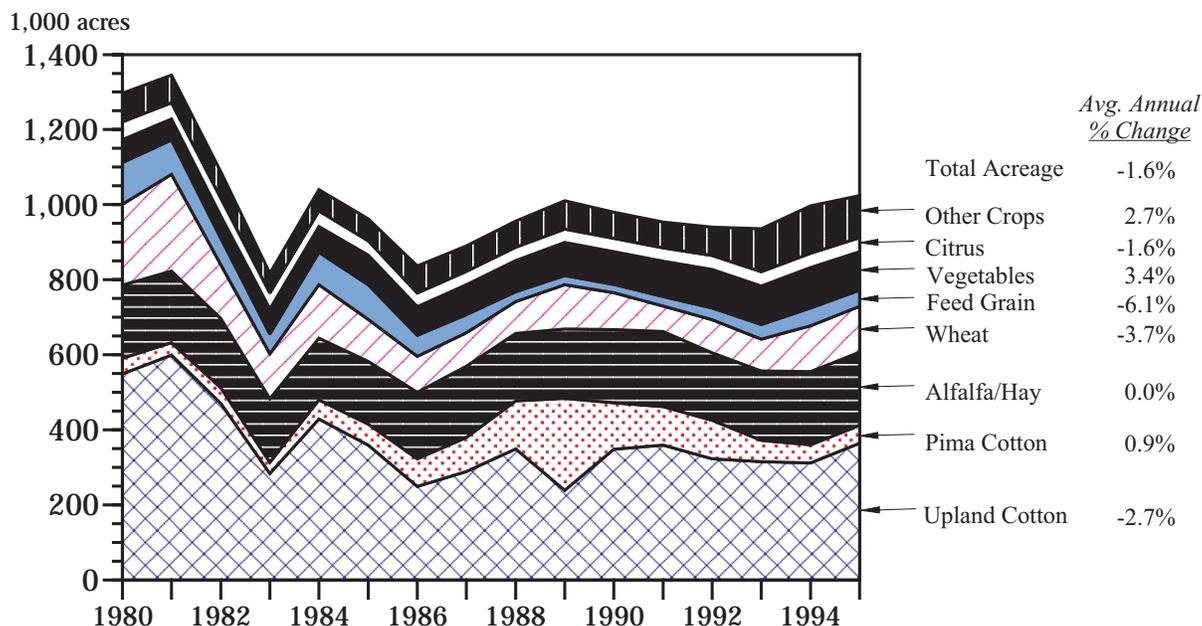
Sonora's crop acreage is relatively more diverse and individual crop acreage varies more from one year to the next than Arizona's, as described in figures 4.2a and 4.2b.

Figure 4.2a. Sonora's Crop Acreage, 1980-95.



Source: Elaboracion Propia en base a datos de SAGAR.

Figure 4.2b Arizona's Crop Acreage, 1980-95



Source: Arizona Ag Statistics.

But like Arizona, Sonora also has just a few crops that account for over half of their harvested acreage and total acreage has trended lower. Sonora is known as the “bread basket” of Mexico. On average, wheat accounted for 43 percent of Sonora’s crop acreage from 1980 to 1995. Part of the reason why Arizona’s acreage for individual crops has not varied as much as Sonora’s is due to the US farm programs that used to exist. These programs didn’t allow for a great deal of planting flexibility from one year to the next. From 1980 to 1995, total harvested acreage has declined at about half the percentage rate for Sonora that it has for Arizona. Total acreage has dropped at an average annual rate of 1.6 percent for Arizona and 0.8 percent for Sonora. Over this time period, Sonora’s crop acreage reached a high of 1.85 million acres in 1981 while Arizona also reached its peak in the same year at 1.35 million acres.

Even though Arizona harvested about 500,000 fewer acres in 1995 than Sonora, cash receipts from crops were similar for the two states. This is because Sonora had a larger percentage of its acreage planted to wheat and feed grain crops, which require fewer inputs than cotton and also yield lower gross returns per acre. Arizona’s vegetable industry also yielded better returns than earlier years in 1995.

Figure 4.2c describes the irrigated areas of Arizona and Sonora. Arizona’s acreage is found primarily in Central Arizona and along the Colorado River. Southern Sonora’s Yaqui and Mayo valleys 950,000 acres of irrigated land account for the largest concentration of irrigated land in Sonora and the Arizona-Sonora Region. Irrigated acreage around Hermosillo and along the Colorado River are also noteworthy for Sonora.

There are substantial differences in the distributions of crop acreage both within Arizona and Sonora and between them, as described in figure 4.2d. In Arizona, the Cen-

Figure 4.2c. Irrigated Land in Sonora and Arizona.

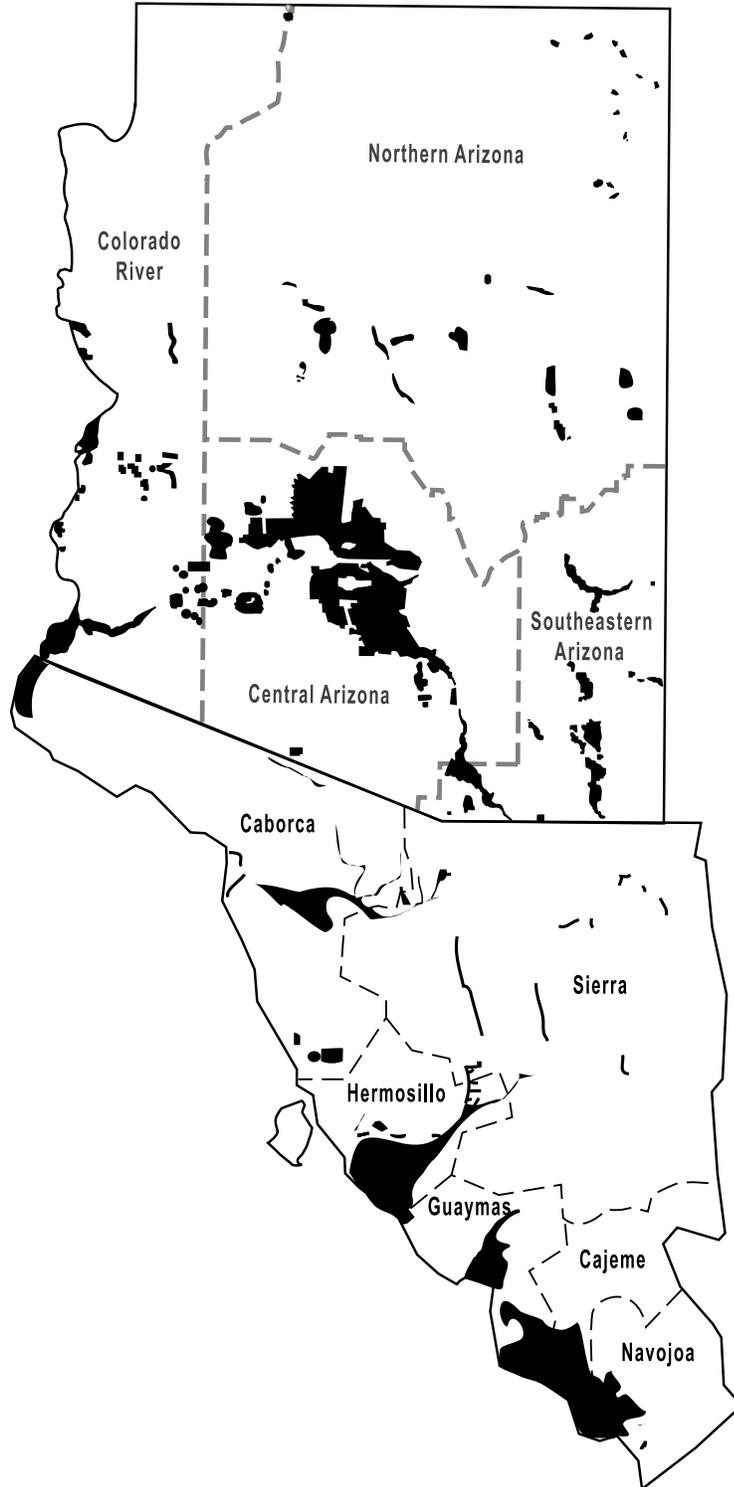
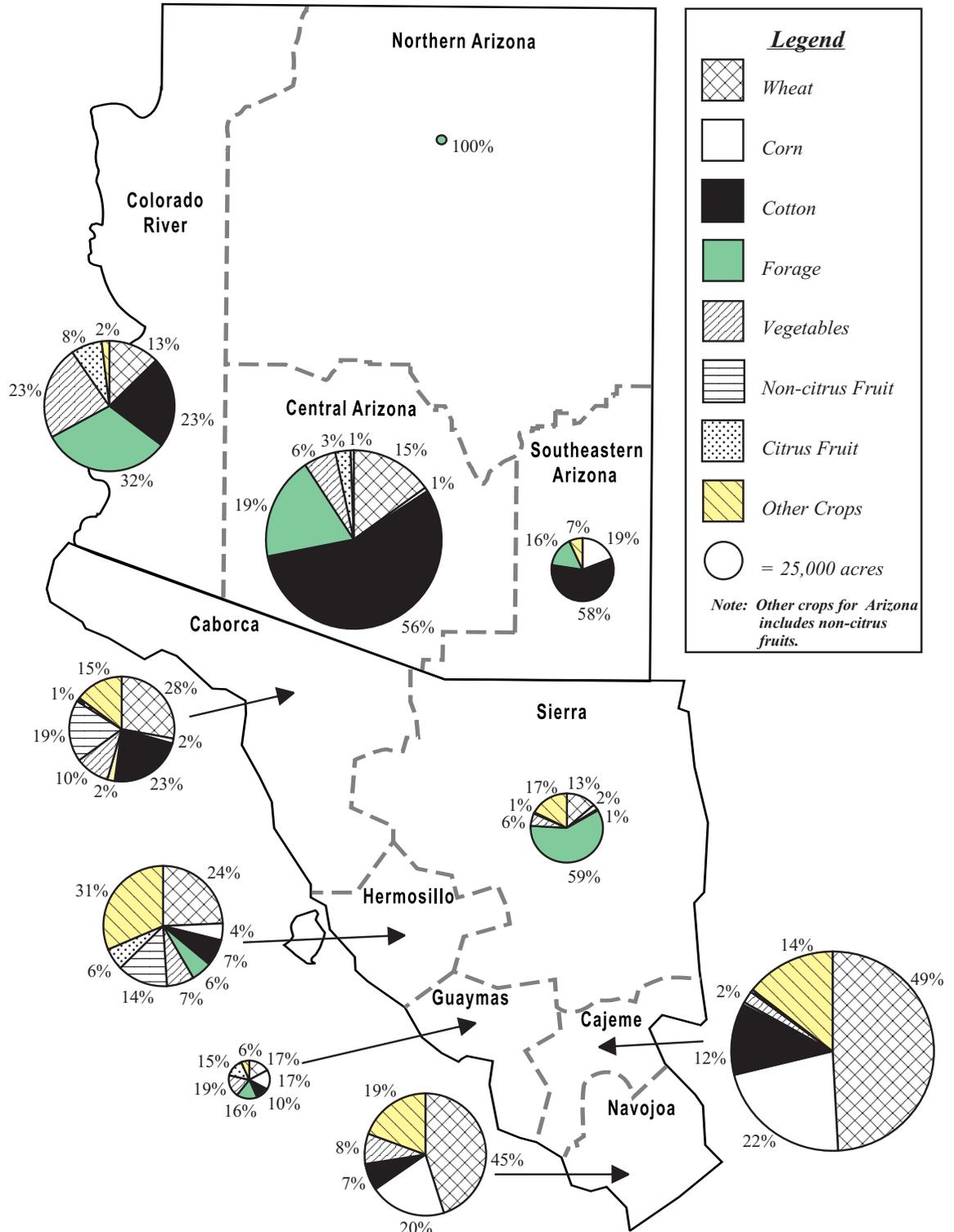


Figure 4.2d. Regional Crop Acreage for Arizona and Sonora, 1995.



Source: Arizona Ag Statistics and Sonoran Research Team.

tral region has the largest overall acreage, over 50 percent of which is in cotton. Forage and wheat, with cotton, make up 80 percent of the Central region's acreage. The Colorado River region, while smaller than the Central region in total acreage (288,300 to 546,720) has a much higher percentage of acreage in citrus and vegetables, a fact reflected in much higher cash receipts per acre (total cash receipts similar to the central region despite the smaller acreage). Cajeme, Sonora's largest region, is similar to Arizona's central region in its distribution. Wheat replaces cotton as the primary crop, and corn replaces forage, but overall, field crops are 75 percent of the acreage. Navojoa, while quite a bit smaller, has similar percentages. Caborca and Hermosillo regions show a greater degree of diversity. Hermosillo, at 253,655 acres, very close to the size of Navojoa, has only 41 percent of its acreage in the four field crops. Importantly, "other crops" includes dry bean production in Sonora.

In, comparing the two states, Sonora has a larger overall number of acres (1,524,051 to 904,820). However, in some of the more specialized crops Arizona has a slight advantage. Arizona has more acreage in vegetables (99,400 to 83,779) and more in citrus (37,600 to 23,992).

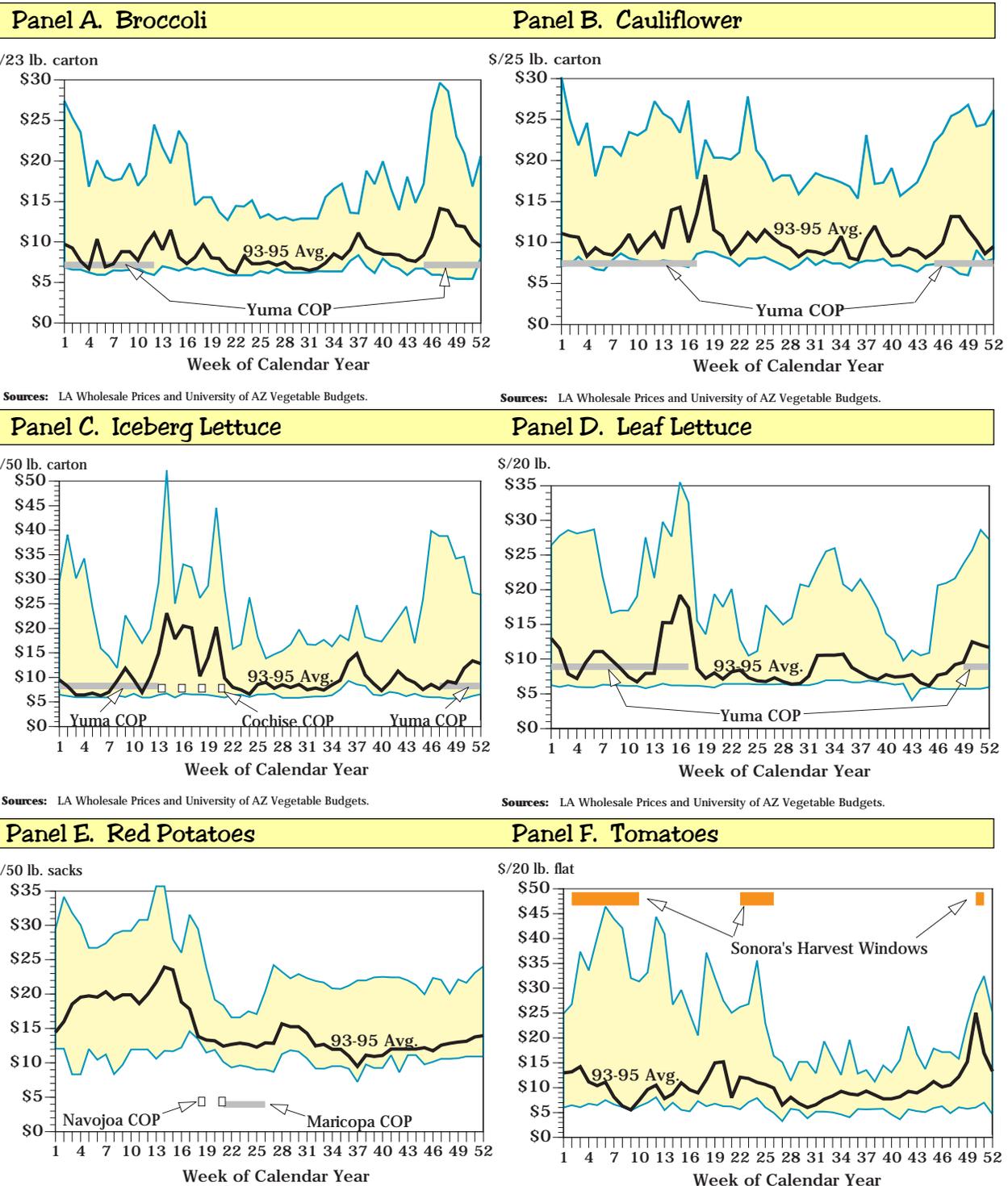
Regional Competitiveness

The ability of the Arizona-Sonora region to effectively compete with the rest of the world is mainly determined by relative production costs, trade policies, and transportation costs. The competitive position of the Arizona-Sonora region for perishable products is evaluated in this section by looking at how production windows coincide with Los Angeles wholesale prices, an established reference market. Market windows are described by week for the calendar year in figure 4.2e by plotting the 1993-95 average price and 1980-95 price range. This shows the price fluctuations that occur in selected markets and gives a feel for what recent prices have been. Please note that the farm level price will be lower than the wholesale price since transportation, packaging, grading, and other service costs are not included in the farm price. Prices were deflated by the monthly Consumer Price Index so that all prices and costs shown are in 1995 US dollars.

Perishable commodities described in figure 4.2e are, broccoli, cauliflower, iceberg lettuce, leaf lettuce, red potatoes, tomatoes, watermelon, dry onions, cantaloupes, flame grapes, valencia oranges, and lemons. The price range given for all of these perishable commodities illustrates how prices can fluctuate greatly from one week to the next. Cost of Production (COP) estimates at the farm are also provided where available to give a feel for where grower production costs lie in relation to the market price. COP estimates given coincide with the harvest window for a crop and region. Counties or Municipalities that accounted for the largest acreage in each state were selected to represent COP for each state. Watermelons, red potatoes, and flame grapes are commodities where Sonora's cost of production and harvest window is contrasted with Arizona.

Panel G for watermelons portrays production windows for Caborca and Maricopa that is largely complimentary in nature, although there is some harvest period overlap. Caborca's per pound COP is estimated to be below Maricopa's by almost 15 percent and Caborca has a much better harvest window. Average prices have been about double in the winter and early spring months compared to mid-summer, Arizona's peak harvest period.

Figure 4.2e. Weekly Los Angeles Wholesale Prices, Production Windows, and Cost of Production (COP) Estimates for Selected Fruits and Vegetables by Location..



Sources: LA Wholesale Prices and University of AZ Vegetable Budgets.

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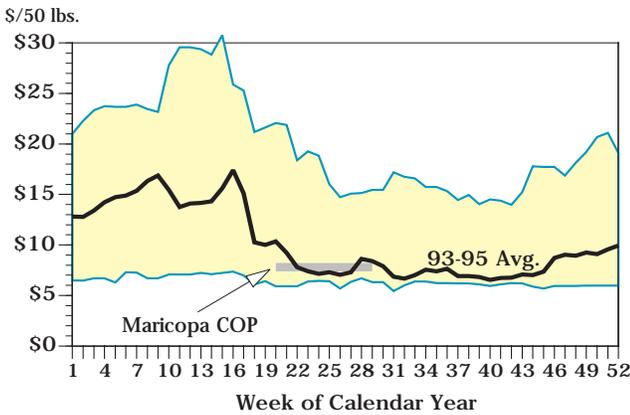
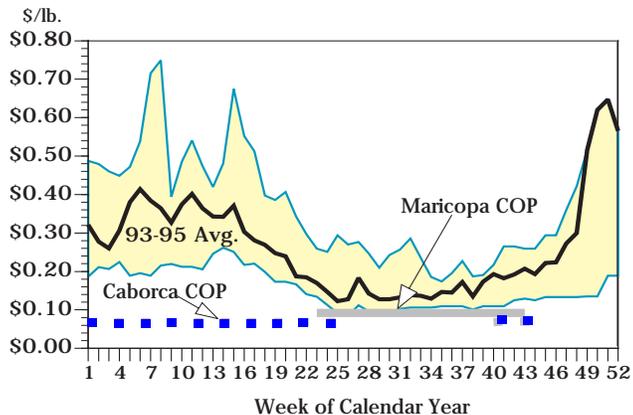
Sources: LA Wholesale Prices and University of AZ Vegetable Budgets.

Sources: LA Wholesale Prices and University of AZ Vegetable Budgets and Sonora Researchers. Sources: LA Wholesale Prices and Sonoran Research Team.

Legend Price Range (1980-1995)

Figure 4.2e. (Continued)

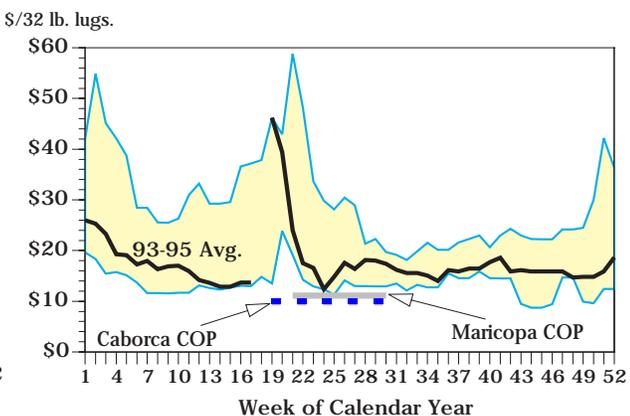
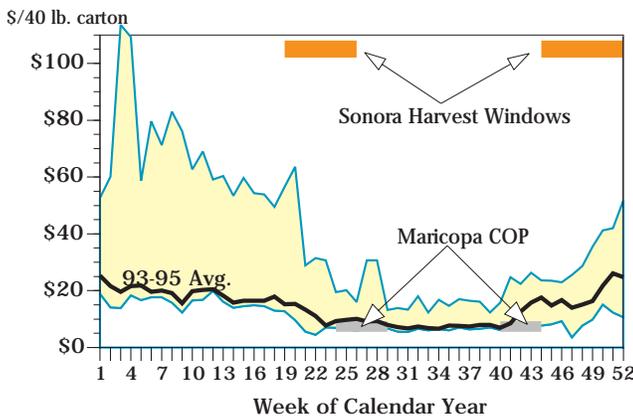
Panel G. Watermelons **Panel H. Dry Onions**



Sources: LA Wholesale Prices, University of AZ Vegetable Budgets and Sonoran Research Team.

Sources: LA Wholesale Prices and University of AZ Vegetable Budgets.

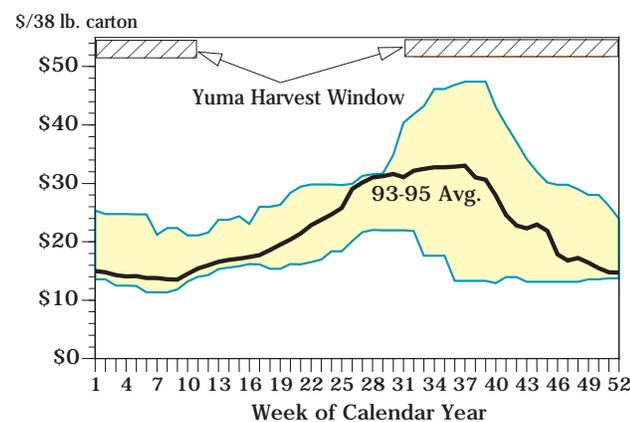
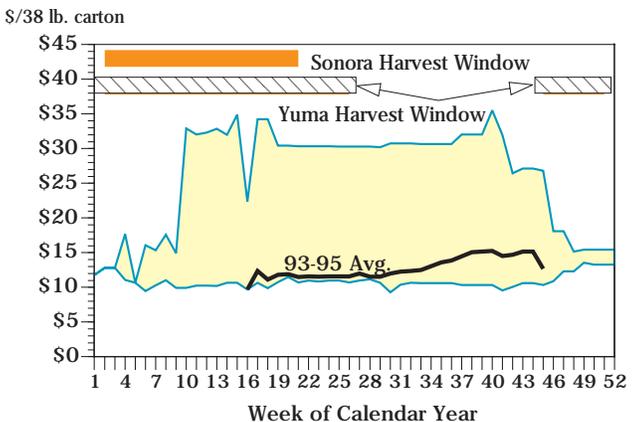
Panel I. Cantaloupes **Panel J. Flame Grapes**



Sources: LA Wholesale Prices, University of AZ Vegetable Budgets and Sonoran Research Team.

Sources: LA Wholesale Prices, University of AZ Vegetable Budgets and Sonora Ag Budgets.

Panel K. Valencias **Panel L. Lemons**



Sources: LA Wholesale Prices, University of AZ Vegetable Budgets and Sonoran Research Team.

Sources: LA Wholesale Prices, University of AZ Ag Statistics.

Legend Price Range (1980-1995)

As described in panel E, Sonora's harvest window for red potatoes in Navojoa starts about 3 to 4 weeks before "early potatoes" in Maricopa County. Production costs are estimated to be essentially the same for both regions with per pound costs in Navojoa slightly higher. Differences in potato size and grade along with sorting, culls, and transportation costs are reasons why the cost of production for red potatoes appears to be almost half that of the L.A. wholesale price.

The table flame grape window and COP described in panel J is particularly interesting. Caborca's harvest window is about 2 to 3 weeks ahead of Maricopa and this makes a huge difference given the way prices start to plummet around week 19 or 20 (May 10 to 15). From 1993 to 1995, wholesale flame grape prices have dropped from over \$35/lug to less than \$20/lug in only a couple weeks. Since the estimated COP is slightly lower for Caborca than Maricopa, Caborca has had the advantage recently by being able to enter the market a couple of weeks sooner than Arizona.

Table 4.2a gives 1995 average yields for Arizona and Sonora for selected crops and presents a Sonora/Arizona yield ratio. Arizona has higher yields than Sonora for all of the commodities shown below. Higher yield does not necessarily translate to lower unit costs though. Of the four different cost comparisons in table 4.2b between Arizona and Sonora, Sonora is estimated to have a lower unit cost of production for upland cotton, durum wheat, corn, and alfalfa. However, we will note that discrepancies in procedures for obtaining cost of production estimates were found and the very low cost of producing alfalfa in Sonora was never resolved.

Table 4.2a. Average Crop Yields for Arizona and Sonora, 1995

Crop	Units (per acre)	Arizona Yield	Sonora Yield	S0-AZ Yield Ratio
Watermelon	lbs.	23,600	23,207	98.33%
Valencia Oranges	1000 ctns.	744	595	79.98%
Alfalfa	lbs.	17,000	13,388	78.76%
Upland Cotton	lbs.	1,076	835	77.56%
Potatoes	lbs.	28,000	21,555	76.98%
Durum Wheat	lbs.	6,290	4,463	70.95%
Honeydews (Spring)	lbs.	28,600	17,851	62.42%
Corn	lbs.	10,780	4,581	42.49%

Note: Arizona yield figures for corn are for Cochise County, durum wheat and valencia oranges are for Yuma County, and other yields are for Maricopa County. Sonora yield figures are for durum wheat are for the Cajeme Municipality, upland cotton, potatoes, and corn are for the Navojoa Municipality, and other yields are for the Hermosillo Municipality.

Table 4.2b. Historical Arizona Prices and Cost of Production for Field Crops.

	High Price	Low Price	Average Price	Arizona Price	Cost of Production	
	<i>(1980-95)</i>	<i>(1980-95)</i>	<i>(1980-95)</i>	<i>(1995)</i>	<i>(All Costs, 1995)</i>	
					Arizona	Sonora
Upland Cotton (\$/lb.)	1.27	0.56	0.83	.71	0.79	0.57
Pima Cotton (\$/lb.)	2.00	0.84	1.32	1.31	1.47	—
Durum Wheat (\$/US ton)	266.14	134.24	175.27	156.7	181.27	149.30
Barley (\$/US ton)	238.98	114.18	153.14	122.9	170.16	—
Corn (\$/US ton)	257.64	106.66	147.54	132.1	148.5	137.72
Alfalfa (\$/US ton)	157.64	67.47	115.87	103	71.8	37.77

Note: Cost of production for corn are for Cochise County, Upland cotton and alfalfa are for Maricopa County, and Pinal County for all other. Source: Arizona Field Crop Budgets and Sonoran Research Team.

4.3 Trade Patterns and NAFTA

Foreign Trade Patterns

Mexico is the main import source of winter vegetables for the US. In 1993, the year before NAFTA began, Mexico supplied 99 percent of eggplant imports, 96 percent of tomatoes, 94 percent of snap beans, 93 percent of squash, 90 percent of cucumbers, and 83 percent of bell peppers. The impact of NAFTA on trade in these commodities is of great interest to US vegetable producers, US consumers, and Mexican producers. During the first three years of NAFTA, imports increased by 42 percent for bell peppers and 71 percent for tomatoes (Calvin and Lucier). Despite growth in imports, Mexico's share of US tomato imports fell slightly to 93 percent in 1996 as countries like Netherlands and Canada increased shipments of greenhouse/hydroponic tomatoes to the US.

Comparative advantage is critical for understanding winter vegetable trade and it is the driving force behind trade in an economy with no trade barriers. Comparative advantage is determined by relative resource endowments and technological capacity which determines the economic efficiency of producing various commodities. Weather is also an important resource endowment for winter vegetable production. Winter vegetable crop production is concentrated in Florida and Sinaloa, Mexico with Sonora emerging as an important state for growing and shipping winter vegetables to the US.

Under NAFTA, all tariffs will be eliminated over a period of 15 years. Tariffs on winter vegetables were in general quite low even before NAFTA for many production windows (see Table 3.1b). The US has two tariff rate quotas for tomatoes (quota varies by season) and quotas grow by a compounded 3 percent annual rate until the tariff is completely phased out.

US demand for fresh vegetables has increased since the early 1980s. At the same time, domestic production has not kept pace with demand for the last few years

during the winter months, largely due to a series of adverse weather conditions. Imports, largely from Mexico, have allowed wholesalers and retailers to maintain their supply of fresh winter vegetables.

Although imports of most fresh vegetables from Mexico have increased during the last few years, the increase in tomato imports is the most dramatic. In 1994, the first year of NAFTA, US imports of Mexican tomatoes totaled 376,034 metric tons. In 1995, US imports of Mexican tomatoes climbed by 58 percent and imports for 1996 were up 16 percent.

Although reduced tariffs due to NAFTA helped increased US imports of Mexican vegetables, much of the increase can be attributed to factors unrelated to NAFTA. The 1995 economic crisis and peso devaluation in Mexico have had a widespread impact on winter vegetable trade. The Mexican economic crisis had several short run impacts on Mexican producers. First, the Mexican domestic market contracted. Reduced domestic opportunities made the US a much more attractive and critical market. In addition, the devaluation of the peso made prices in the US more attractive to Mexican producers or conversely, Mexican vegetables became more attractively priced for US importers.

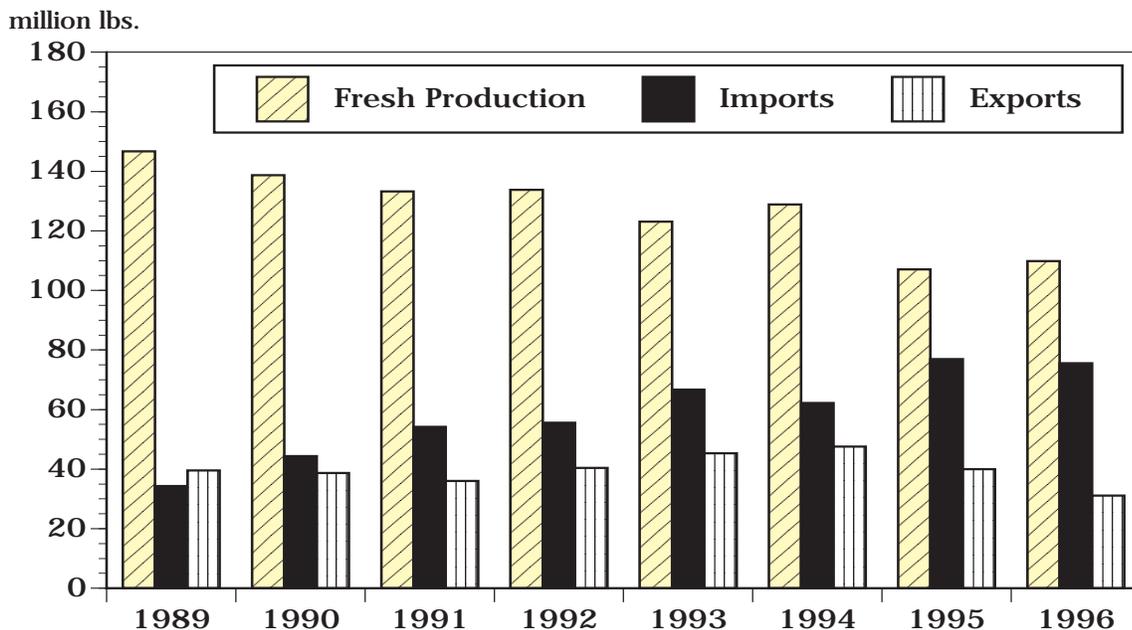
Adverse weather conditions in Florida and technological advancements in Mexico's vegetable production have also positively impacted vegetable trade between the countries. Adoption of new tomato varieties in Mexico has resulted in significant trade changes. In the last few years, Mexican tomato exporters in Sinaloa, Baja California and Sonora have successfully adopted new technology to produce "vine-ripe" extended shelf life (ESL) tomatoes. During the winter and spring, the Mexican vine-ripe tomatoes from Sinaloa-Sonora compete against Florida's mature green tomatoes. Current varieties of ESL tomatoes do not grow well in Florida because heavy rains cause the tomatoes to crack on the vine. An ESL vine-ripe tomato lasts a week longer in storage than a mature green, reducing waste and marketing costs. A vine-ripe tomato is bright red and firm which is a desirable factor in a marketplace that demands a high quality appearance of produce. The food service industry on the other hand prefers firmer mature green tomatoes for slicing. The market is becoming more segmented and Mexican and US tomatoes are not always perfect substitutes (Calvin and Lucier). But in the fresh-vegetable tomato market, Mexican tomatoes appear to be gaining an upper hand. Mexican tomatoes continue to erode away the market share of Florida tomatoes.

The US is one of the world's largest producers and consumers of fresh asparagus. In the past, fresh asparagus was consumed only when US production was available (Calvin and Cook). Now fresh asparagus is available year round, mainly due to an increase in imports as shown in figure 4.3a. In 1980, the US imported just 8 percent of fresh asparagus supply, but by 1996 that share increased to 40 percent. Mexico is the largest source of US imports. Asparagus is a labor intensive, high-value crop that is very attractive to countries with ample cheap labor.

Much of the US's asparagus is grown in Washington (42% in 1996), California (38%) and Michigan (15%). US asparagus production has declined steadily over the last seven years, due mostly to lower output in California while the production grew in Sonora. Sonora has an overlapping shipping season (January-March) with California.

Between 1989 and 1996, imports during January almost doubled, lowering early-season prices. Sonora is Mexico's leading producer of asparagus and most of Mexico's exports to the US are shipped through Sonora from December through early April.

Figure 4.3a. US Asparagus Production, Imports and Exports, 1989-1996.



Source: ERS/USDA.

Mexico's sizable asparagus shipments to the US occur, despite high tariffs. NAFTA should further improve Mexico's position as a source of US imports (Calvin and Cook). Before implementation of NAFTA, the US assessed a 25 percent tariff on fresh green asparagus imports from Mexico. Now the tariff schedule varies by the time of year. For the month of January, the tariff was reduced immediately in 1994 to 17.5 percent from 25 percent and is being phased out over 15 years. Similarly, tariffs for other months are being phased out. Even though other countries are vying for the US asparagus market, Mexico has a transportation advantage over other countries and will eventually firmly establish its status as a number one supplier of asparagus to the US.

Prospects for increased US trade with Mexico are perhaps brightest in horticultural and processed food products, particularly after economic growth resumes in Mexico. Although Canada currently accounts for three-quarters of US exports of fresh fruits and vegetables, future growth is expected to be stronger in Mexico. As the Mexican

economy forges ahead with strong growth, US exports of high value products such as fresh fruits and vegetables, and snack foods are expected to increase. According to USDA, pet food exports to Mexico will probably more than double over the next decade.

Regional Trade

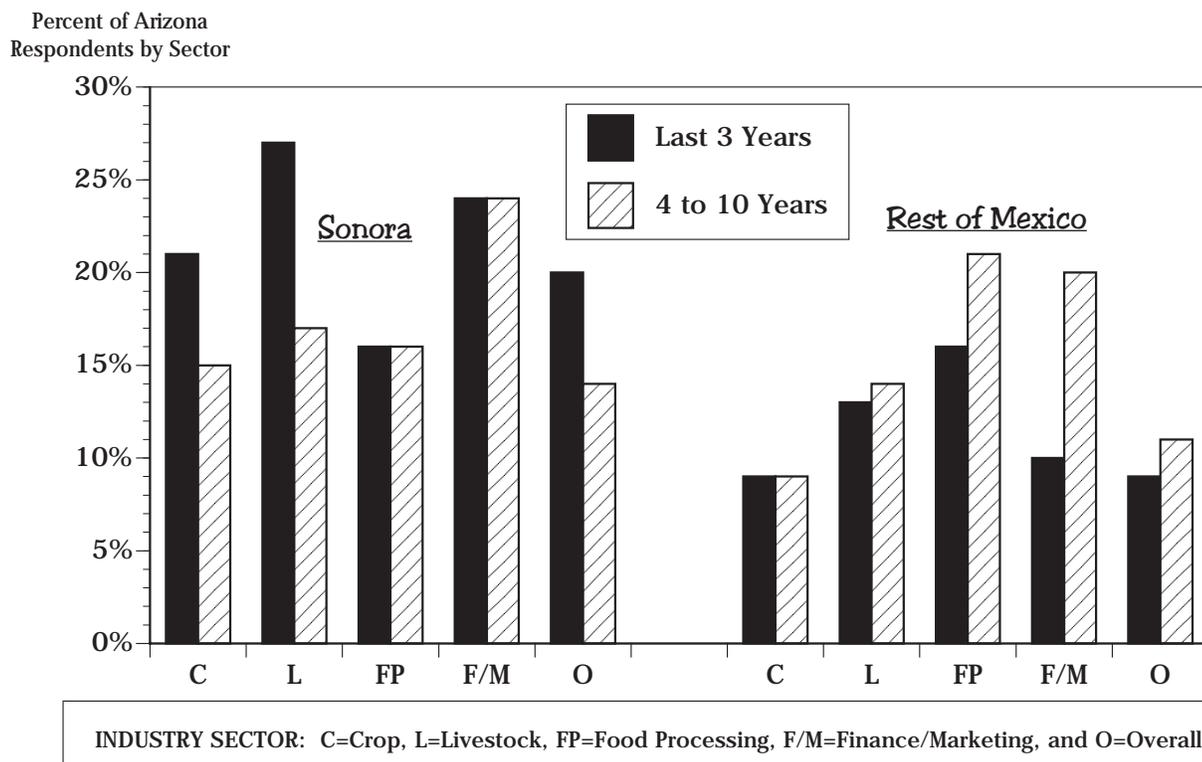
Production inputs account for the largest share of products that Arizona crop individuals export to Sonora. Seeds are the most common item exported by Arizona respondents and they range from specialty vegetable seeds (e.g., asparagus, radish, bunching onion) to common grain seeds (e.g., barley, wheat, and oats). Sonoran crop individuals interviewed indicated that they also import fertilizers, pesticides, herbicides, machinery, defoliants, and other similar materials from Arizona and the rest of the US. California supplies a large share of these inputs for the San Luis Rio Colorado region and Arizona could move into this market. Of the Sonoran crop producers interviewed, 39 percent obtain most of their production inputs from Mexico, 39 percent from Arizona, 6 percent from California, and 15 percent from other regions of the US. It is noteworthy that Arizona is suggested to be as strong an input supplier as Mexico for Sonora, and over six times as important as California. However, Arizona crop respondents also said that their exports to Sonora were generally 5 percent or less of their total business sales.

Sonora's importation of production inputs from Arizona is fairly well known, but Arizona also purchases production inputs and receives technical assistance from Sonora. Figure 4.3b describes the percentage of Arizona respondents by sector that have made these purchases from Sonora. In the last three years, 20 percent of all Arizona respondents (21 percent for crops) indicated that they have received production inputs or technical assistance from Sonora. This figure is up from 14 percent for the last 4 to 10 years. Most noteworthy is how the percentage of Arizona respondents purchasing production inputs from the rest of Mexico has decreased or been flat for all sectors while they have increased or remained constant with Sonora. Livestock has shown the most growth for Sonora, increasing from 17 to 27 percent, followed by the crop sectors increase of 15 to 21 percent.

Arizona crop producers have primarily grown or imported vegetables, fruit, and nut products from Sonora. Melons, squash, green peppers, grapes, and pecans (inshell) are among the most common items listed. These products grown or purchased were indicated to make up a higher percentage of Arizona crop producers' total business (around 10 percent on average) than production inputs and technical assistance (less than 5 percent) from Sonora.

Of the Sonoran crop producers interviewed that export abroad, 25 percent utilize an association or organization of producers as their broker for exporting abroad while the remaining 75 percent utilize a broker from either Arizona and/or California. Location of broker was split equal between Arizona and California based brokers. Export destinations included Japan, Canada, Spain, England, Algeria, and the Middle East.

Figure 4.3b. Survey Results: Arizona Respondents that have Purchased Production Inputs or Received Technical Assistance from Mexico in the Last 3 Years or 4 to 10 Years.



NAFTA Regulations and Legal Issues

With increased market interaction a foregone conclusion with the implementation of NAFTA, the limitations of national government regulation will become more apparent. The two most common examples mentioned are the Perishable Agricultural Commodities Act (PACA) and USDA grading of meat products. In the US fruit and vegetable crop sector, PACA has widespread industry support. PACA was first passed in 1930 to support fair trade practices in the US fruit and vegetable industry. It enforces financial and legal contracts and maintains formal and informal avenues for resolution of contract related problems. PACA evolved as a result of the highly perishable nature of the products being traded. A process was needed that dealt with disputes while minimizing delays that could lead to complete loss of the product at issue. PACA, “by spelling out the responsibilities of all parties, enables the product to be marketed promptly while still protecting buyers’ and sellers’ rights in the event that a contract dispute occurs.” (PACA fact finder, <http://www.usda.gov/ams/fvpaca.htm>)

A PACA license is the key to cooperation and proper resolution of disputes. A PACA license is required by federal law for almost anyone that deals in fresh or frozen fruits and vegetables. With the license suspended or revoked, a dealer in fresh or frozen

fruits and vegetables is essentially unable to operate legally in the industry. A license from PACA protects members from a wide range of unfair trade practices including failure to pay and unreasonable rejection of product as well as giving priority to produce suppliers under bankruptcy proceedings.

While Canada has a law to deal with produce disputes, Mexico has no similar statute. Many US produce growers see the PACA as a model for produce in Mexico. US produce growers believe that a PACA-like statute in Mexico is essential for exporting to Mexico (Waterfield).

The importance of a PACA-type agreement that extends into Mexico was quite strongly voiced by Arizona survey participants. In response to a question asking whether their level of trade with Mexico was lower as a result of no PACA, 33 percent of the Finance/Marketing respondents answered in the affirmative as opposed to only 14 percent in the negative. Crop respondents said “no” by a 3 to 2 ratio. These results might seem to not support the conclusion unless one remembers that PACA is primarily concerned with the protection of suppliers and in the fruit and vegetable sectors, imports from Mexican suppliers are far greater than exports from American suppliers at the present. As the Mexican economy fully recovers from the peso devaluation, this could change and American exporters will desire the same kind of protections in their dealings with Mexico as they face in the US.

This conclusion is further supported by responses on other questions. In ranking risks (see #19, Appendix C), payment defaults ranked number one for food processing and tied for number one by Finance/Marketing respondents. The importance of “legal agreements that offer enforcement of contracts,” (see #36c, Appendix C) was ranked number one in importance for the crop sector, number two in food processing, and finance/marketing sectors, and number two overall. Over 50 percent in every Arizona sector answered “Very Important” and overall 85 percent considered this important to some degree. Also, “Unified standards and grading,” an issue related to PACA, ranked second with the crops sector and third overall in importance.

With regards to pesticide, herbicide, and fungicide use only 25, 18, and 16 percent of Arizona respondents, respectively, thought that more are used in Mexico than in the US. Hence, at least among the participants, there is no support to the popular belief that more agricultural chemicals are used in Mexico. This is an important finding especially in light of the fact that the survey participants are familiar with Sonora and Mexico.

4.4 Cluster Analysis

This section summarizes the strengths and weaknesses for the region’s crop sector along with potential opportunities and threats to growth. Based on prior discussion in this chapter, tables 4.4a and 4.4b highlight the situation for Arizona and Sonora, respectively.

The demand for fresh non-citrus fruits, vegetable and nuts is very strong in the US. As the Mexican economy becomes stronger, the demand for these high-value products will increase. Thus, the market outlook for Arizona and Sonora’s vegetable and fruit indus-

tries is optimistic. Joint venture opportunities for labor intensive crops like asparagus production in Sonora are likely to exist for Arizona. Sonora will also need to purchase equipment, seeds, and fertilizers from Arizona or other US businesses. The developed distribution network center in Nogales for winter produce is an asset for the region. The region will be challenged to keep the distribution services provided by Nogales as NAFTA is further implemented. Trucks that are loaded by the produce fields in Sinaloa and other regions south of Sonora can head straight for their destination in Canada or the US with no reason to stop.

Although the harvest windows are similar for many fruit and vegetable crops that both Arizona and Sonora produce, opportunities do exist for extending the season. For example, the harvest window for watermelons can be almost doubled for both Arizona and Sonora by combining harvest windows. Similarly, the harvest window for cantaloupes can be almost doubled for both states by combining harvest windows. Some individuals in Arizona and Sonora are already taking advantage of these complementary windows but opportunities for expansion exist.

Inadequate transportation, cooling, post-harvest storage, and shipping facilities in Sonora restrict the Region's ability to compete more effectively abroad. Other weaknesses and threats for the crop sector of Sonora and Arizona include decreasing real prices for most traditional crops, financial difficulties, insect and pest outbreaks, food safety scares, and the inability to enhance and develop new marketing channels. A more stable free trade policy combined with a legal system of protecting property rights would likely lead to more joint-ventures, strategic alliances, collaborative research, and private investment that would overcome many of these weaknesses and threats for the Region.

Table 4.4a Assessment of Crop Sector for Arizona**Strengths**

- Strong US consumer demand for non-citrus fresh fruits, vegetables, and nuts.
- Cutting edge of technology adoption.
- Developed distribution network center in Nogales.
- Proven ability to grow high quality produce, durum wheat, and cotton.
- Main supplier of winter lettuce for the US.
- Strong demand for nursery products.

Weaknesses

- Diminishing farm program payments for traditional program crops.
- Decreasing real price of traditional crops.
- Increasing cost and scarcity of water for some agricultural regions.
- Decreasing share of farm value in consumer food expenditures.
- Difficulty in obtaining financing with the elimination of target price supports.

Opportunities

- Potential to grow in agribusiness activities that expand the harvest season for some crops by combining the harvest windows of the two states.
- Uninhibited ability to rotate crops and plant for the market with new farm bill.
- Access to a deep water port in Guaymas with potentially quicker transportation and lower cost in the midst of a growing global economy.
- Joint venture opportunities for labor intensive crops in Mexico.

Threats

- Phytosanitary trade barriers for trading with Mexico.
- Insect outbreaks that damage yields and quality reputation in the marketplace.
- Food safety scares.
- Urban encroachment and associated restrictions on chemical and fertilizer use.
- Lack of a PACA type system in Mexico that will continue to inhibit the expansion of produce exports to Mexico
- Increased competition from Mexican imports with a fully implemented NAFTA for some crops.

Table 4.4b Assessment of Crop Sector for Sonora**Strengths**

- Low labor costs.
- Strong foreign demand for main export-oriented crops (asparagus, grapes, green onion, melons, zucchini, watermelon).
- Strong linkages between northern Sonoran growers and international brokers.
- Good access to high technology for crop production.
- Closer location to US markets than most other Mexican regions.
- Favorable natural environment for warm season vegetables and fruits.
- High level of engineering expertise for technical work.
- Specialized workers for horticultural crops.
- Increasing foreign demand for Sonoran products

Weaknesses

- Lack of strategic planning for short and long term horizons.
- Excessive bureaucracy and regressive tax policy.
- High indebtedness.
- High interest rates and selective credit.
- Lack of producer trust with crop insurance companies.
- Poor information on new markets and alternative crops.
- Marketing channels are not well developed in southern Sonora.
- Weak integration between farmers and research centers.
- Not enough consultant firms in marketing, planning, technical and legal issues.
- Post-harvest storage and shipping facilities are inadequate.
- Obsolete pumping equipment in areas using wells.
- Health and antidumping export barriers.
- Problems with “white flies” in cotton and horticultural crops in northern Sonora.
- Salinity in the coastal area of Sonora.

Opportunities

- Access to Arizona’s market infrastructure to reach new markets.
- Integration opportunities between crop and food processing sectors in basic grains, oilseeds and vegetables.
- Duty free access to import inputs and technology.
- Strategic alliances to access new technology and credit sources.
- Japanese and American distributors are willing to establish joint-ventures with domestic farmers.
- Growth in international demand for organic products, and potential in the Sierra region to cultivate such crops.
- New irrigated agriculture in the Fuerte-Mayo region with joint-venture opportunities.
- Amendments to Article 27 (privatizing ejido lands) that will create incentives for attracting private investment.
- Strategic alliances to develop niche markets in Mexico and Central America.

Threats

- High debt levels leading to bankruptcy.
- Market saturation and high price variability for some crops.
- No strategic alliances developed with US brokers.
- Lack of continuity with agricultural policies.
- Increasing imports for basic grains and oilseeds due to trade liberalization.
- Strong dependency from a single supplier for inputs.
- Insect and pest outbreaks (white fly, etc.).
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4.5 References

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