

**Fresh Market Tomatoes in California and Baja California:
Regional Labor Markets and IRCA**

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Executive Summary

Overview -- Fresh Market Tomatoes in California and Baja

This case study focuses on fresh tomato production in the Stockton, Merced, Fresno, San Diego, and San Quintín areas. California ships approximately 25 percent of the fresh tomatoes in the U.S. market and Baja about 6 percent. Both California and Baja ship tomatoes mainly in the summer and fall, while Florida and Sinaloa account for most shipments in the winter and spring. Market shares have remained relatively stable for all regions over the past decade, with the exception that exports from Baja grew significantly as production shifted south from San Diego. Further growth in Baja has been constrained by limited water availability. There is a high degree of complementarity among the regions.

There has been a tendency for mature-green tomatoes (which are gassed) to displace vine-ripe tomatoes. In California, mature-green tomatoes are grown as bush tomatoes on the ground, and harvested once or twice. Vine-ripe tomatoes are grown on poles and wires, are harvested repeatedly, and require many more hours of labor per acre. Vine-ripe tomatoes are now mainly grown in the south coast region of California, and in Mexico. Mature-green tomatoes are grown in the Imperial, San Joaquin, and Salinas Valleys. Mature-greens now account for approximately two-thirds of California fresh tomato production versus one-half twenty years ago.

A relatively small number of shippers control most mature-green production in California, both through their own production and through contracts with growers. Whether the grower or shipper takes responsibility for the harvest, farm labor contractors are usually hired to supply labor for hand harvesting of mature-greens. It is more common for the shippers to hire the contractors, so that the same workers can be moved from field to field in a given region.

In contrast, vine-ripe producers hire their own labor, because they need to harvest for much longer periods. This is equally true in San Diego as it is in Baja.

Impact of the SAW Provisions of IRCA

Adequacy of the Labor Supply

There was a pronounced labor surplus in all areas of California. This surplus results from continuing, and even increasing, migration from Mexico, combined with the low exit rate of SAWs from the farm labor force. In fact, the supply of labor is the one area where IRCA has had a significant impact. Far from limiting

immigration, however, as the law supposedly intended, it has encouraged settlement of newly-legalized workers in California, which has in turn provided new opportunities for other Mexicans to migrate to the United States.

Overall, IRCA legalized about one-half of the tomato harvest workers interviewed in California, although the proportion was higher in Fresno (73 percent) and San Diego (67 percent) than in Stockton (32 percent), because the Stockton labor force has more long-term, settled (or back-and-forth) migrants from traditional Mexican sending regions. Over one-half of the Stockton workers were legally working in California before IRCA, while very small numbers of tomato workers in the other regions were legal. Similarly, while only 8 percent of the workers interviewed in Stockton were not authorized to work in 1991, 27 percent were not authorized in Fresno and San Diego. No U.S.-born workers were found.

Continued immigration since IRCA has brought many indigenous workers from the southern Mexican highlands, particularly Mixtecs from Oaxaca, who comprise the largest share of the labor force in Fresno and San Diego. They are also the main source of labor in Baja and Sinaloa, and they are actively recruited in Oaxaca by growers in those regions. Approximately two-thirds of the Mixtecs who worked picking tomatoes in California had previously worked in northwest Mexico at a similar job. All indications are that migration from southern Mexico is accelerating, which suggests that the share of unauthorized workers in the tomato labor force will continue to increase.

Wages and Availability of Work

Piece rates for picking tomatoes have risen in nominal terms since IRCA, but have fallen slightly after adjusting for inflation. Piece rates in Stockton were 47.5 cents a bucket in 1991, compared to 40 cents in 1986; in real terms, this represented no increase. Increases in piece rates in Stockton are partly owing to a series of strikes throughout the 1980s; IRCA has had a negative impact on this labor organizing. Piece rates in Fresno averaged 37.5 cents a bucket in 1991, compared to estimates of 33 to 36 cents in 1986; thus, in real terms, piece rates fell by 6 to 15 percent in Fresno.

Hourly equivalent wages in the survey averaged \$8.20 in Stockton and \$8.11 in Fresno, both regions where workers received piece rates. They averaged \$6.53 in San Diego, where most workers were being paid by the hour, and they averaged \$0.88 in Baja, where most workers were paid by the day. While the hourly wages in tomato harvesting were higher than in many agricultural jobs, workers complained that they could not work enough hours a day or days a week. Although workers in Baja averaged 58 hours a week, the average in San Diego was 44 hours, in Fresno 37 hours, and in Stockton only 27 hours. Thus, although Stockton workers received

the highest piece rates and the highest hourly wages, they averaged the lowest daily and weekly incomes of all California tomato workers.

Working Conditions

Working conditions were being impacted by the excess supply of labor. While this apparently had been occurring since the early 1980s, workers pointed to 1988--the year people arrived from Mexico to apply for IRCA--as marking a turning point. Many of the costs of the agricultural labor market--such as the provision of tools, transportation to the worksite, and recruitment--were increasingly borne by the workers themselves. Crew sizes had grown in the Stockton area, and this was limiting the number of hours that workers could pick. Workers complained about the use of farm labor contractors and their practices, but the shift to contractors had occurred before IRCA.

Housing

The increased settlement that has accelerated since IRCA is putting a great strain on housing in rural California, making it increasingly difficult for seasonal migrant workers to secure reasonable housing. Most seasonal farm workers now live in crowded conditions, in rented houses or outbuildings, in the various rural towns. Some tomato workers in San Diego continue to live in outdoor encampments. Many Mixtec workers in Madera live in extremely crowded structures without utilities, and must use the river for washing and bathing. Very few tomato growers or shippers in California provided any seasonal housing. This was in sharp contrast to Baja, where all of the larger growers maintained farm labor camps.

Approximately one-half of the Stockton tomato workers lived in two state-run camps, and a significant proportion of the rest of the labor force were former camp residents who have settled in Stockton. The camps are only open six months a year, and, since 1982, workers have been guaranteed a return spot for the next year. This guarantee, along with the family nature of the housing, has created a stable pattern of back-and-forth migration from several towns in Michoacán and along the border. The typical rate of return is over 90 percent.

The camps are also subsidized. The mean cost per working adult was \$9.28 a week, including utilities, childcare, and other services. In contrast, the average cost in Stockton per working adult was 21 dollars a week for housing alone. While the farmworkers capture this subsidy, the existence of the camps essentially guarantees a seasonal labor force for the local fruit and tomato growers, who otherwise would have a difficult time securing sufficient labor for their highly seasonal operations.

Ability of Workers to Organize

Fresh tomatoes in California have been an important arena for farm labor organizing for over 20 years. In spite of numerous elections and certifications, relatively few contracts have been signed, and those shippers who did sign contracts have largely circumvented them by letting the growers take charge of the harvest.

In analyzing the results of recent strikes and elections, it is apparent that the Agricultural Labor Relations Act, as it currently functions, is actually an obstacle to the resolution of problems between tomato workers and their employers. IRCA appears to have had little impact on this larger process, although legalization of workers has emboldened them to voice complaints in certain regions, such as Fresno, where the labor force was previously undocumented. In Stockton, however, the labor surplus attributed to IRCA has frightened older workers away from continued labor organizing, because they believe they will be easily replaced.

Continuing Involvement of IRCA-Legalized Workers in Farm Work

All of the tomato workers interviewed in Baja, and virtually all (86%) of those interviewed in California, planned on remaining in farm work. Some of the possible alternative jobs mentioned included bricklaying, cannery work, landscaping, housewife, and various manufacturing jobs. Most workers spoke little or no English, had little education (average of 4.3 years), and did not know how to go about getting another type of job. Legalization did not have any significant effect on willingness to stay in farm work. The California economy is also in serious recession, and a number of workers who had secured nonfarm jobs, particularly in southern California, had subsequently lost them and had to return to farm work.

Impact of Employer Sanctions

Although several tomato farm labor contractors had been checked by the INS and one had been fined \$150,000 for incomplete and missing I-9 forms, this contractor was still in business and none of the contractors interviewed had been checked recently. We verified that, although the majority of employers demanded the pretense of documents, it was possible to secure a job harvesting tomatoes in every region with no documents of any type. Thus, employer sanctions have had no impact on the labor supply, but they have created additional paper work for those employers who comply with the law.

Reliance on a Temporary Workforce

Fresh tomato harvesting is highly seasonal in a number of regions of California, such as Imperial (six weeks), Bakersfield (two

weeks), Salinas (two months), and Huron (two months and one month). Even the four-month seasons in Merced and Stockton are quite variable, with peaks and valleys of labor demand. Only the vine-ripe culture in San Diego and Baja provides long-term employment stability, which growers complement with other vegetables and strawberries. In most of the vine-ripe regions, however, other seasonal crops are grown, and tomatoes are not so important as to exceed the available labor supply.

While tomato harvest crews do move around within a given region, they do not usually travel from region to region like the lettuce crews. Growers and shippers are thus heavily dependent on farm labor contractors to supply them with seasonal labor. This has presented a considerable challenge on the west side of the San Joaquin Valley, where few people live and few other labor-intensive crops are grown. Workers are usually driven long distances from east valley towns to work in the Huron area. This situation is probably viable only with the large surplus of labor which currently exists. We estimate that at least 6,000 workers are currently employed in the various mature-green tomato harvests, but that with better coordination of labor use among the regions it would be possible to reduce this by at least one-half.

The Extent of Unemployment and Underemployment of Farmworkers

As discussed earlier, workers complain of an excess supply of labor and difficulty securing sufficient employment during the season. As most surveys of seasonal farmworkers have found, the workers interviewed in Fresno and Stockton averaged approximately six months of work in various locations, although they were working less than full time while employed. The workers in San Diego and Baja worked considerably more and moved around less, because the seasons are longer and they are hired directly by growers, who maintain complementary cropping patterns.

There is considerable specialization among farmworkers. In particular, the Stockton tomato workers who were settled in the area did not prune in the off-season, and Fresno tomato workers did not work in tree fruit or citrus. It may be possible to increase the flexibility and days of employment of farmworkers through more cross-training programs. It may also be advantageous to the workers to create more stable patterns of back-and-forth migration from Mexico, so that they can pass the off-season at lower cost in Mexico, but be assured of six months of employment every year. The biggest obstacle to this at present is the lack of guaranteed seasonal housing in California.

Labor Management

Because tomato employers in California are operating in a surplus labor situation, relatively little consideration is given to

improving conditions for the workers. Most of the attention is focused on having labor contractors compete against one another, bringing in new groups of workers--such as the Mixtecs--to moderate the demands of old groups, or preventing opportunistic behavior on the part of the workers. The large number of strikes and union elections in California tomatoes--in contrast to their virtual disappearance in many other crops--is evidence of a highly conflictive labor situation.

Efforts to mechanize the harvest in the early 1980s were prompted by labor organizing, but were abandoned when buyers rejected the poorer quality tomatoes. Even efforts to introduce harvesting belts have been abandoned. An ample supply of labor and declining real wages provide no incentive to change this situation.

Need for Special Programs

There is no need for special labor supply programs, such as the H-2A program. There is a surplus of labor, and employers turn away workers every day. Even the Job Service efforts of the Employment Development Department in California are largely superfluous to the functioning of the farm labor market, accounting for less than one percent of job placements. Virtually all job placements in fresh tomatoes in California resulted from walk-ins or employee referrals.

International Competitiveness

To the extent that IRCA increased the supply of labor in California agriculture, it has clearly improved the international competitiveness of California fresh market tomato production. Comparisons of costs in California and Mexico demonstrate that much of the movement to Mexico in the 1980s was due to an undervalued peso and various input subsidies. The revaluation of the peso since 1987 and the gradual removal of those subsidies has eliminated many of the cost advantages which Mexico offered. Export tomato acreage in northern Mexico has actually declined in recent years.

While labor costs are still much lower in Mexico than in California, when one factors in productivity, the differences are much smaller. Workers in Mexico pick relatively few buckets of tomatoes for their daily wage, and this makes unit labor costs higher than they at first appear. While hourly tomato wage differentials between Baja and California are approximately nine to one, unit labor cost differentials were calculated at about three to one.

California tomato growers also benefit from other advantages, such as higher yields and better infrastructure, as do growers in

Florida. We conclude that the fresh tomato industry is already largely restructured along the lines that would emerge with completely free trade with Mexico, and that the various regions are much more complementary than competitive. The continued large supply of immigrant labor, which has been further encouraged by IRCA, has allowed California to maintain its share of the U.S. market and even to begin to ship fresh tomatoes to Mexico. It is likely that real unit labor costs will continue to converge between Mexico and California, barring further intervention by either government.

Chapter 1. Background

Geography of Fresh Tomato Regions and Overview of Production

Fresh tomatoes are grown throughout California and Baja California. Figure 1 shows the principal areas discussed in this report. California and Baja are both arid regions, and tomatoes are grown from the late spring to the late fall. Sinaloa and Florida are also important producers of tomatoes for the North American market, but both are at tropical latitudes and produce tomatoes from the fall to the spring.

The following sections initially discuss the relative importance of all of these regions. They then focus on the Californias, which are the areas pertaining to this particular case study of agricultural labor.

Tomato Shipments in the United States, by Origin

As shown in Figure 2, Florida and California are the dominant domestic suppliers to the U.S. fresh tomato market, while Sinaloa is the primary supply source from Mexico. From 1981 to 1986, both Florida and California market shares declined somewhat, while the market share for Sinaloa increased from 21 percent to about 26 percent. Since 1986, the market share for Florida exhibited no clear trend in varying between 39 percent and 46 percent, while California increased its market share from 23 percent to 25 percent. Sinaloa's market share declined after 1986 to about 22 percent in 1990.

Although there were no dramatic changes in shipments or market share for Florida, California, or Sinaloa, there was a substantial increase in shipments from Baja California. Before 1983, Baja shipments were relatively insignificant. By 1988, however, shipments totalled about 296 million pounds and represented 9 percent of all shipments in the U.S. market. Shipments captured by USDA from other regions in the United States have increased, but still account for less than 10 percent of total shipments.

Although all production areas "compete" in the U.S. market, there is much complementarity among production regions that is determined primarily by climate. The "winter" market, defined as lasting from November through May, is primarily supplied by shipments from Florida and Mexico. As shown in Figure 3, Florida is the dominant supplier during the November-December period and again during the April-May period. Sinaloa, in contrast, is the predominant supplier in January and February. During March, both Florida and Sinaloa supply significant quantities of tomatoes, which makes March the most intense period of competition with Mexico. During the summer and early fall, the primary supply areas shift to

Figure 1

Principal Growing Areas for Fresh Tomatoes in California, and Baja California, Mexico

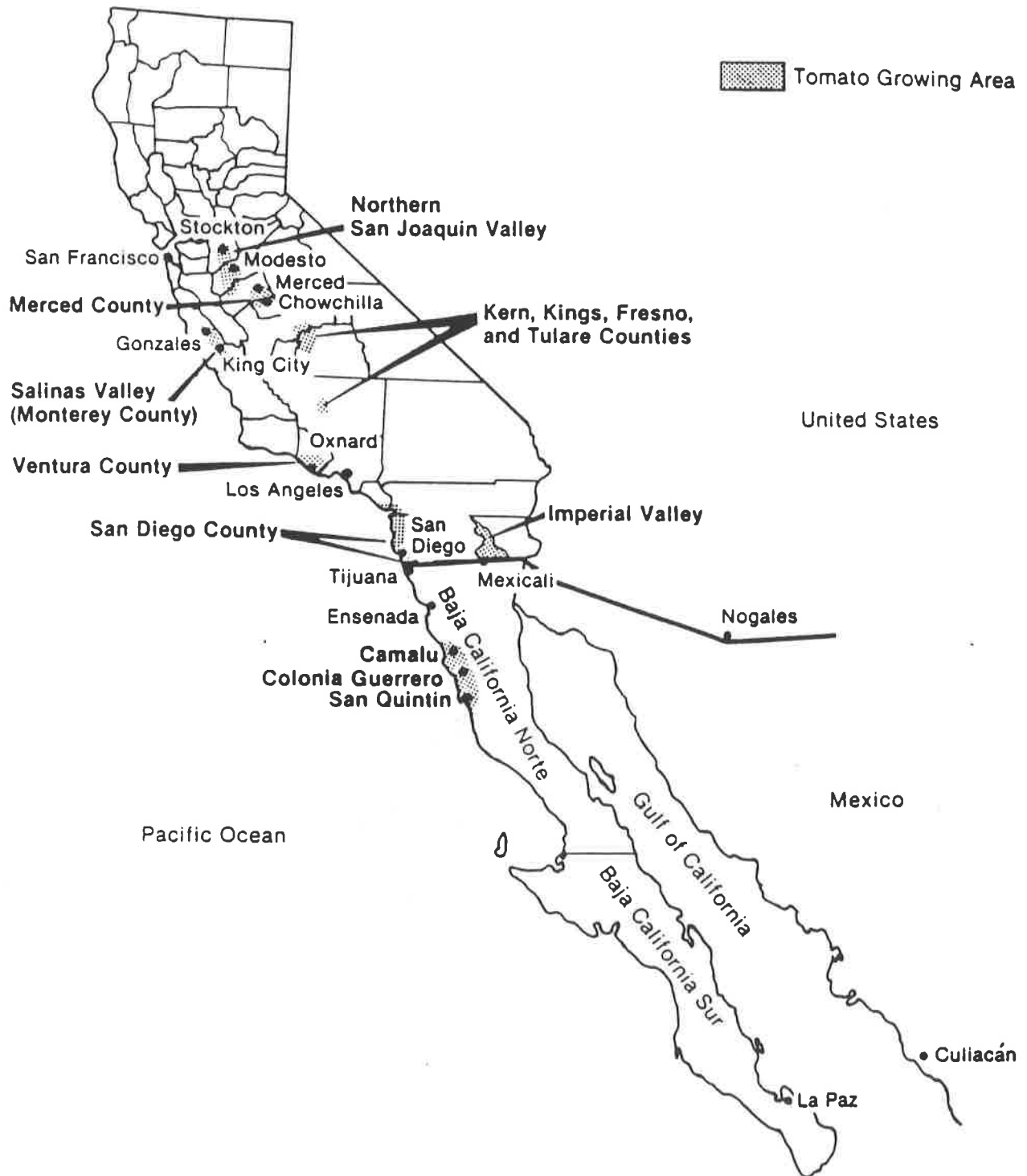
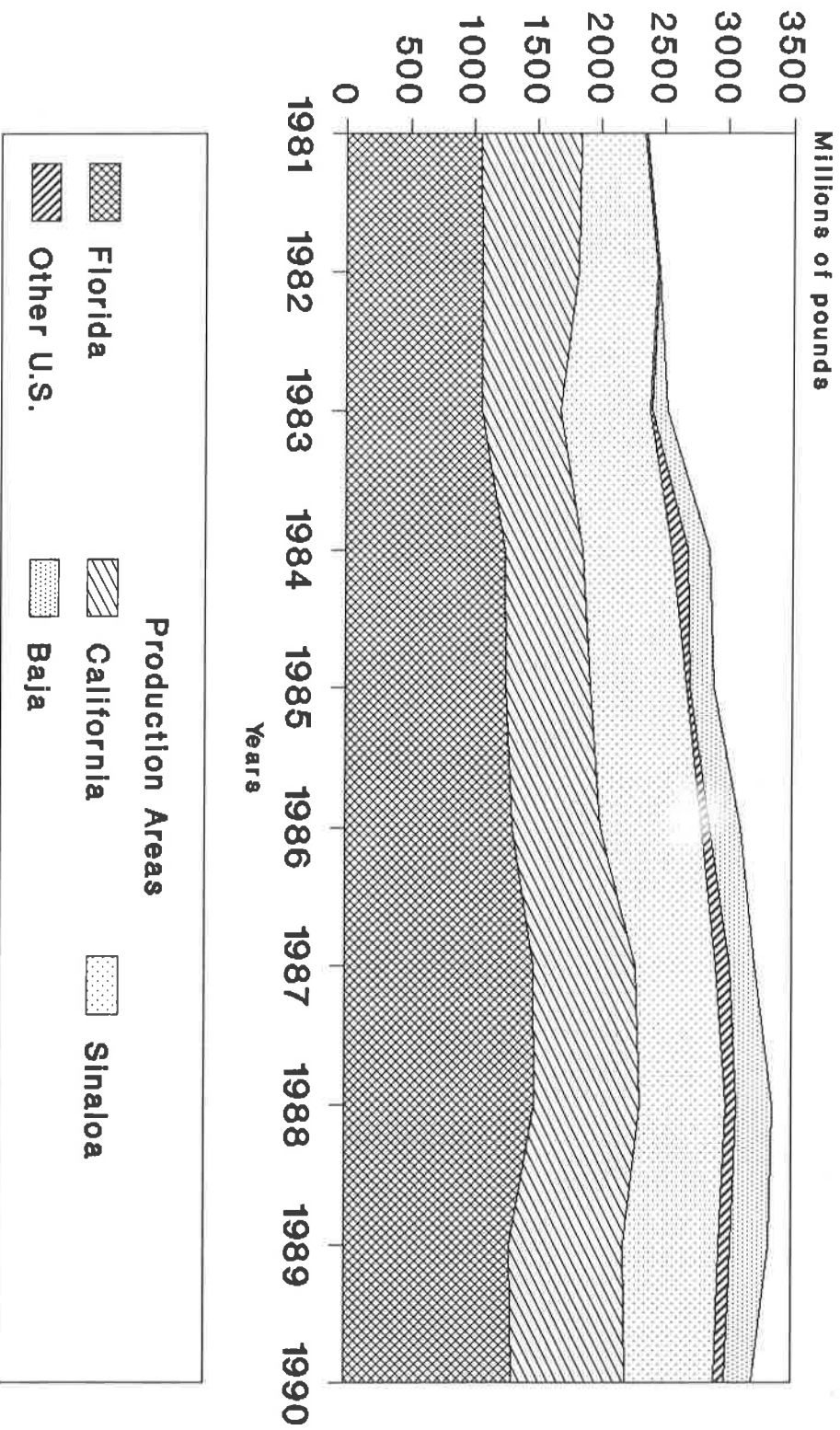
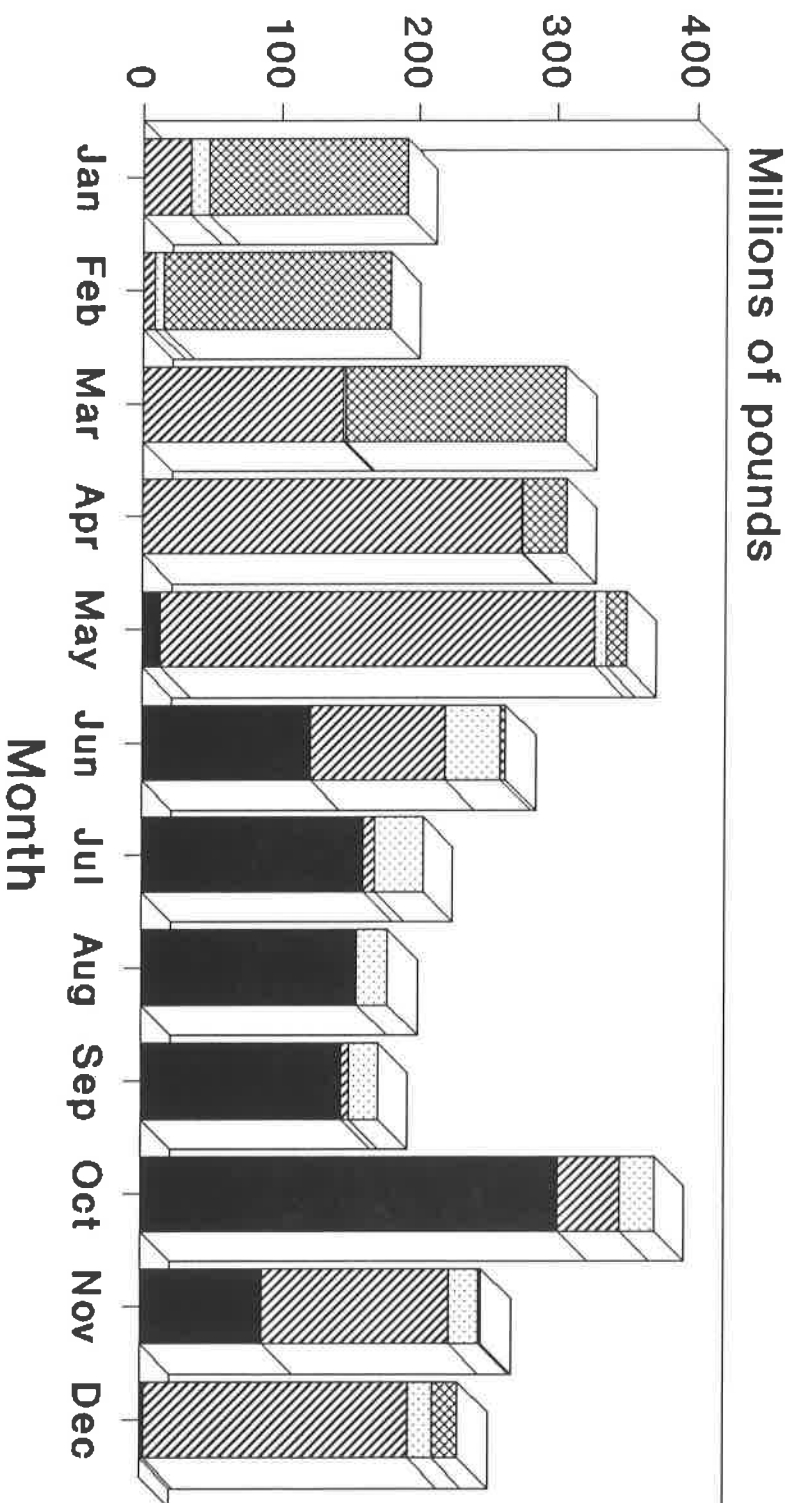


FIGURE 2
U.S. ANNUAL TOMATO SHIPMENTS BY MAJOR
PRODUCTION AREA, 1980-1981 to 1990-1991



Source: Fed-State Market News

FIGURE 3
U.S. 1990 MONTHLY FRESH TOMATO
SHIPMENTS, BY ORIGIN



Source: Federal State Market News Service, June 1991

California and, secondarily, to Baja. As shown in Figure 3, shipments from California increase substantially in June and peak in October. Shipments from Baja peak during the June-July period, but Baja provides a relatively small but steady supply of tomatoes from August through December, which tapers off in January.

U.S. Fresh Tomato Acreage and Production

Over the 1980 to 1990 period, total U.S. acreage devoted to the production of fresh tomatoes increased from about 124 thousand acres in 1980 to almost 141 thousand acres by 1989, before declining to 134 thousand acres in 1990. Total U.S. production over the decade increased by 32 percent.

As shown in Figure 4, Florida and California are the largest producing states; they accounted for almost 65 percent of total acreage during 1990. Since 1980, both California and Florida have exhibited increases in acreage, while the remaining states constituting the "other" category have registered a decline from just over 53 thousand acres in 1980 to about 45 thousand acres in 1990. Nevertheless, 21 states produce tomatoes, mainly during the summer; their combined acreage exceeds California's, and competes primarily with California.

The degree to which the commercialized nature of fresh tomato production in California and Florida enhances productivity is evident in Figure 5. Production in Florida and California, relative to the rest of the United States, is proportionately larger than acreage. During 1990, Florida accounted for 45 percent of total U.S. production on only 37 percent of the acreage, and California produced 30 percent of U.S. production on 28 percent of the acreage.

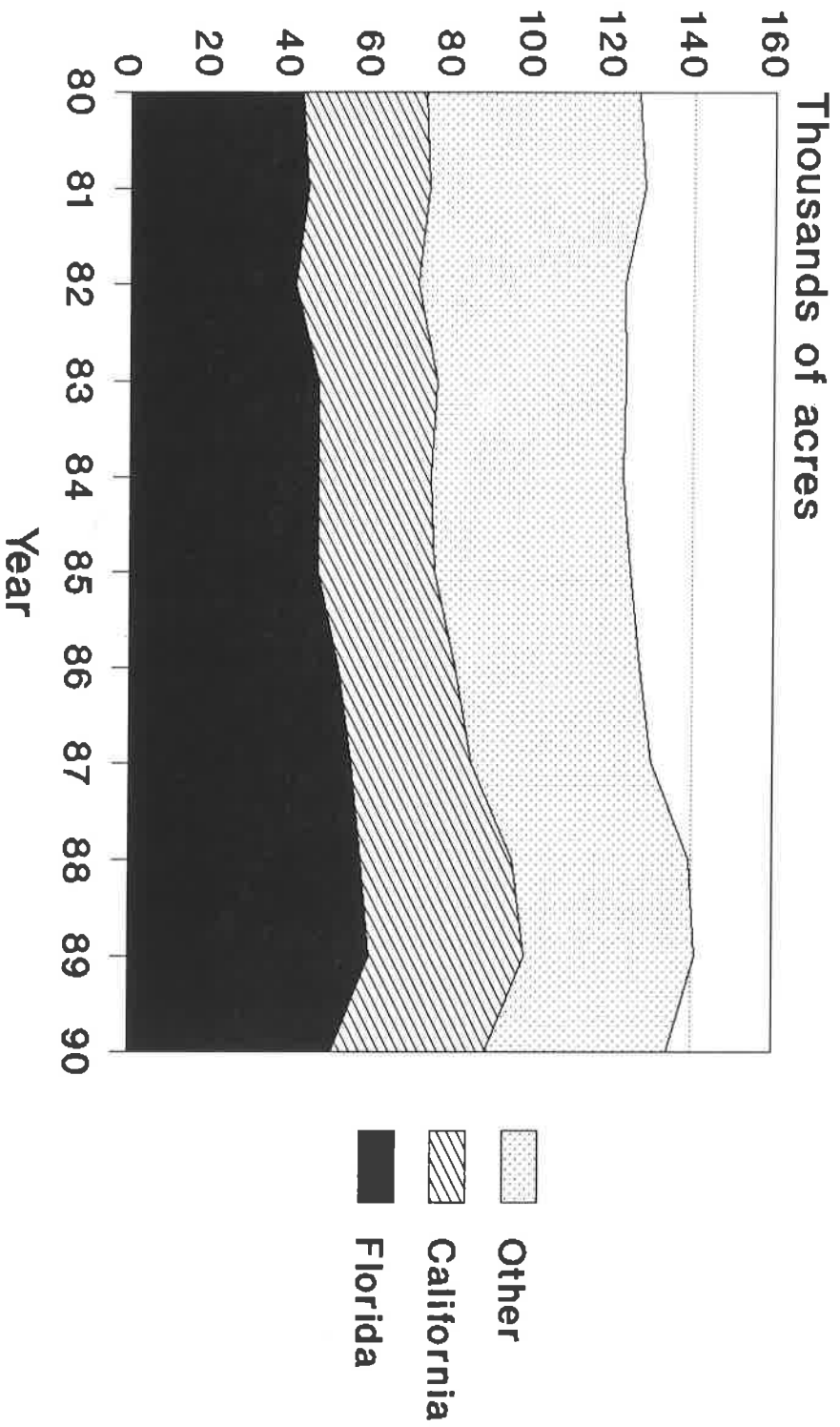
U.S. Tomato Consumption

In contrast, per capita consumption increased by less than 20 percent over the decade, from 13.4 pounds per capita in 1980 to 16.1 pounds in 1990, down from the 1988-1989 high of 17.9 pounds (The Food Institute Report). While the decline in per capita consumption in 1990 reflects lower product availability caused by the Florida freeze, production still grew at a proportionately higher rate than consumption over the decade. This created a surplus and caused real tomato prices to decline.

Furthermore, several growers and tomato industry leaders argue that per capita consumption has not recovered since the Florida freeze

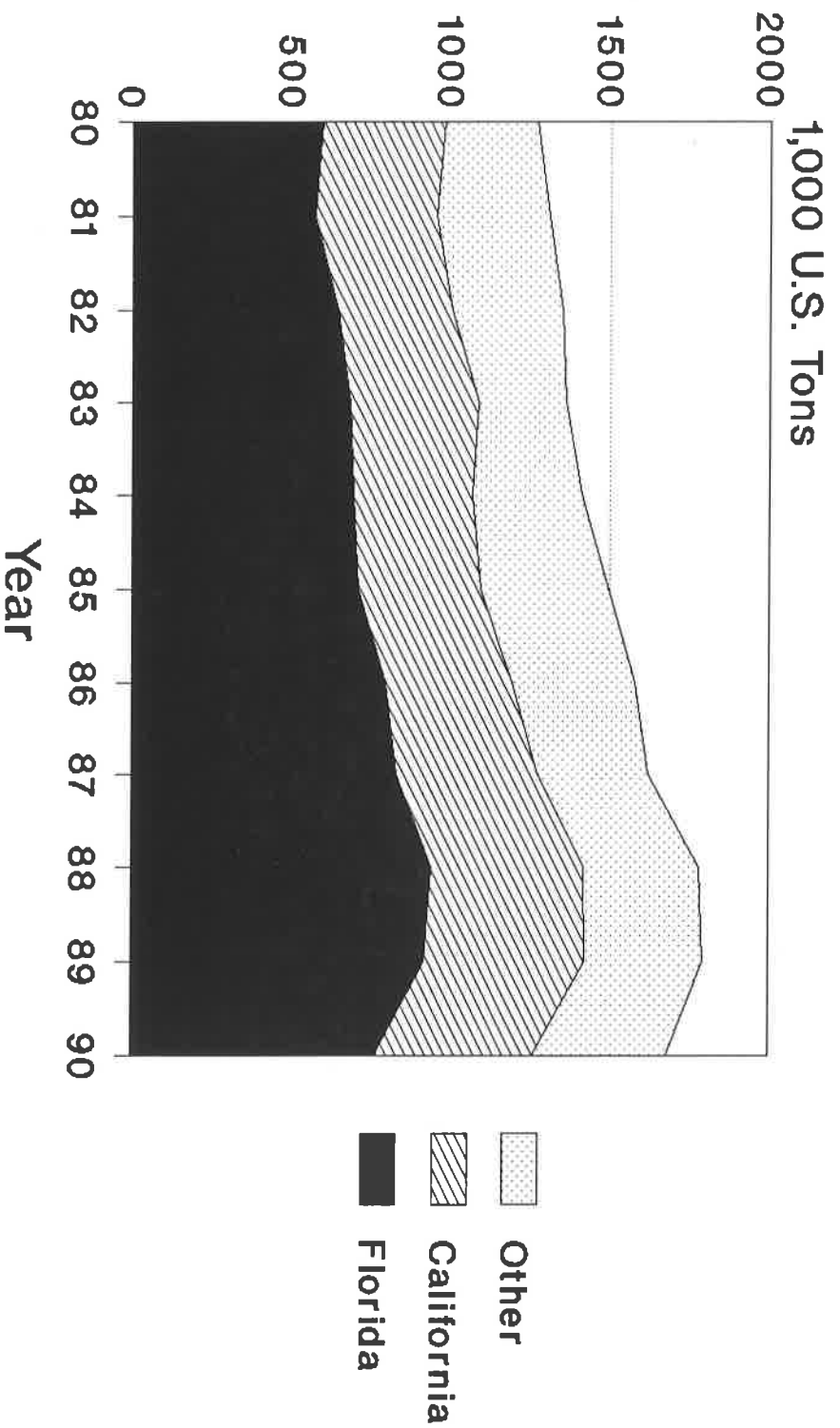
¹ Shipment data from other states are not reported by USDA's Federal-State Market News Service because these shipments are relatively small volume and are usually destined for local markets. They are not considered in these figures.

FIGURE 4
TOMATOES: U.S. ACREAGE
FOR FRESH MARKET, 1980-1990



Source: USDA, National Agricultural
 Statistics Service

**FIGURE 5
U.S. TOMATO FRESH MARKET
PRODUCTION, 1980-1990**



Source: USDA, National Agricultural
Statistics Service

because retailers determined during the ensuing period of historically high prices that consumer demand for fresh tomatoes was relatively inelastic. In other words, physical sales volume declined less than the increase in price. Consequently, growers argue that retailers became accustomed to higher profit margins and are unwilling to lower prices and buy the same volume of tomatoes as in the past.

If true, this is an important factor that contributed to abnormally low fall-1991 tomato prices, and production must adjust to this new reality. The California fresh tomato industry estimates that it lost \$40 million in 1991 from FOB prices that averaged less than production and marketing costs (personal communication from Ed Beckman, Manager of the California Tomato Board). Several California shippers have been forced out of business by the low prices in recent years, and some shippers in Baja California have also experienced difficulty.

California

As noted, California is the second largest tomato-producing state, producing over 497 thousand U.S. tons of fresh tomatoes in 1990. Production occurs from May to November with peak production in October, when California dominates the U.S. market. Primarily mature green tomatoes are produced at present, although vine-ripes were important historically and have been experiencing a resurgence in demand in the last two years.² The maturity of tomatoes at harvest (mature-green versus vine-ripe) is important because vine-ripes typically receive a price discount relative to mature-greens owing to shorter shelf life (although this price disadvantage may be reversing itself in certain markets). The level of maturity harvested varies regionally in California, along with yields and costs. Therefore, it is important to examine California's tomato production by region, which is covered in Chapter 2.

Florida

Florida is the largest domestic producer of fresh tomatoes with production occurring during the October through June period. In 1990, Florida produced 762 thousand U.S. tons of fresh tomatoes, despite the after-effects of the freeze in late-December 1989. In

²There are two basic types of tomato marketed in the United States: vine-ripe or "pinks" and mature-green or "gassed." Vine-ripe tomatoes are simply allowed to ripen on the vine until they turn pink, and are shipped to market as they are picked. Most vine-ripe tomatoes are grown with staked culture on wires strung between the stakes. An alternative culture is to grow bush tomatoes on the ground, pick them green, and then gas them so that they continue to ripen. One can also grow mature-green tomatoes with staked culture, as they do in Florida or at times in Mexico.

1989, Florida production was estimated to be 918 thousand tons, an historical high.

As indicated earlier, although Florida is often and correctly described as a winter producer of fresh tomatoes, the vast majority of Florida shipments occur around the late-fall (November-December) and spring (April-May) peaks. Like California, Florida primarily produces mature green tomatoes, but, unlike California, it uses staked cultural practices with plastic mulch.³

Mexico

Total Mexican tomato exports to the United States were lower in 1990 (in physical volume) than in 1989. Acreages for the 1991-1992 season in Sinaloa and Sonora were down relative to 1990-1991. Excess tomato supply in the United States, low yields in Mexico, and rising dollar costs of Mexican production contributed to financial losses for Mexican tomato growers and their U.S. joint-venture partners in 1990-1991. Consequently, U.S. investment to finance tomato production is currently decreasing in both Baja California and Sinaloa, which limits their ability to expand.

Fresh Tomato Production in Sinaloa

The Cuban revolution in 1959 provided the impetus for the expansion of the Sinaloa tomato industry, as Cuba was the primary supplier of winter vegetables to the U.S. market. After this trade ended, Florida and Sinaloa emerged as the dominant winter vegetable supply regions.

Sinaloa is a narrow Pacific coastal state located 650 miles south of the Arizona-Mexico border. Most Sinaloa vegetables exported to the United States enter through Nogales, Arizona, by refrigerated trailer truck. Sinaloa is the best-endowed production area in northwestern Mexico in terms of both water availability and storage and distribution infrastructure.

Sinaloa's tomato industry experienced important changes in the 1980s. One of the most notable was the growth in importance of the Mexican domestic market as a profit center for the Sinaloa industry. In recent years, the Mexican market absorbed slightly over half of Sinaloa's fresh tomato production, compared with only 30 percent at the start of the decade (CORHFES).

Total acreage devoted to the production of fresh tomatoes increased substantially over the 1980-1981 to 1990-1991 period (CAADES, 1988 and 1991), from about 36,500 acres in 1980-1981 to 55,027 acres in 1990-1991. However, 80 percent of this increase is attributable to

³An extensive discussion of the Florida industry can be found in the case study by Griffith and Camposeco.

new acreage devoted to producing Roma (saladette) tomatoes as opposed to the more common "round" tomato. Indeed, the area planted in Roma tomatoes increased 15-fold from about one thousand acres in 1980-1981 to almost 16 thousand acres in 1990-1991. In contrast, over the same period, acreage devoted to "round" tomatoes (ground and staked culture) only increased from about 33 thousand acres to 36,700 acres.

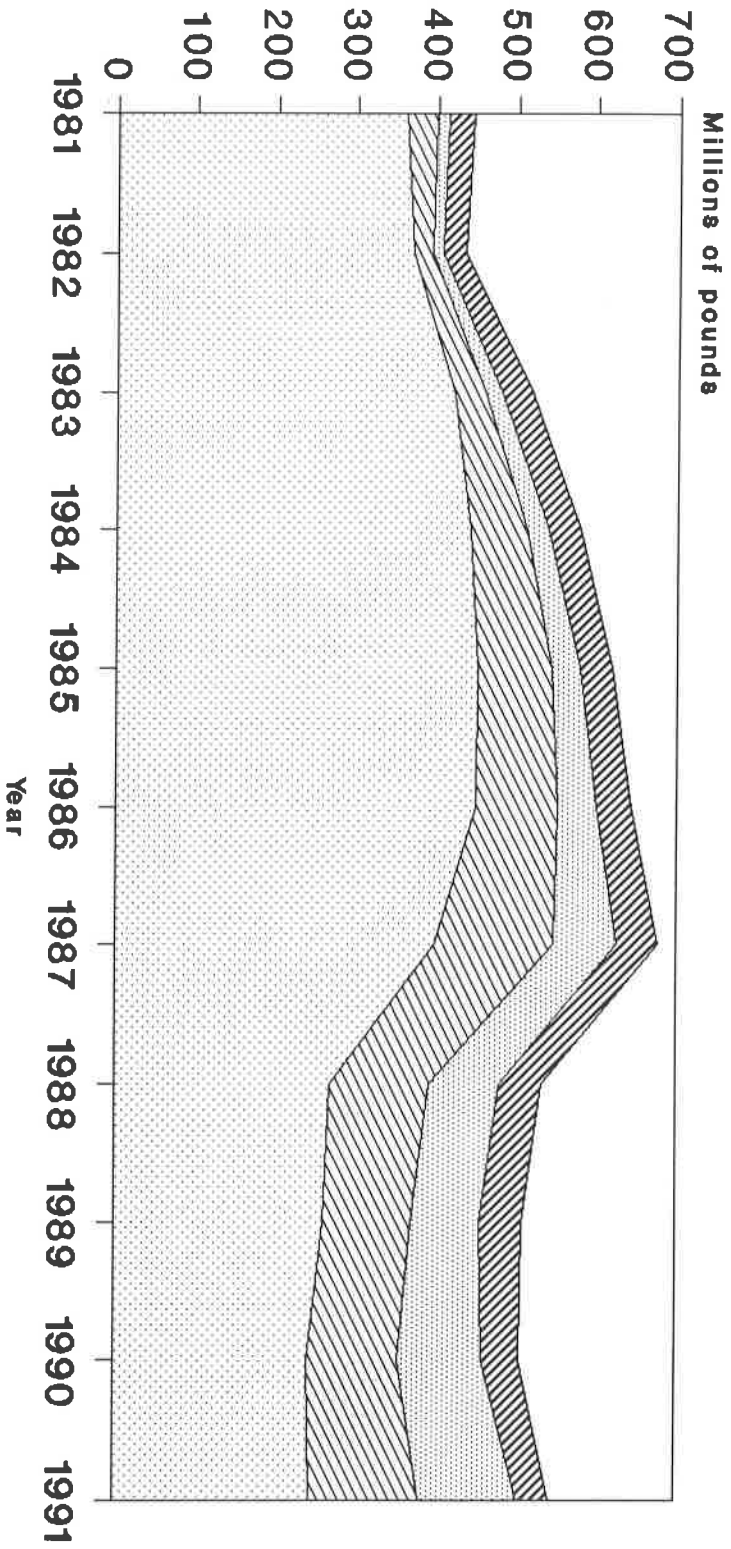
The increasing significance of Roma tomatoes is also clear in Figure 6. During the 1980-1981 season, Romas accounted for only 3 percent of total export production, compared with 23 percent in the 1990-1991 season. This was the result of changing consumer preferences in the United States in favor of the Roma, as well as the growing importance of the Mexican domestic market for tomatoes relative to the export market, and the historical preference of Mexicans for Romas. As the Mexican market became more of a factor in the profit functions of Sinaloa growers, interest in Roma production increased.

Figure 7 illustrates that, while staked tomato acreage rose steadily, ground tomato acreage declined significantly during the first two-thirds of the 1980s before rebounding with the 1988-1989 season. Traditionally, ground culture in Sinaloa was used for mature-green production, while staked culture was used in producing vine-ripe tomatoes. This rebound in ground culture caused increased mature-green shipments since 1988, but it was not the only factor contributing to higher mature-green shipments.

A new and complementary trend is to harvest staked tomatoes as mature-greens rather than vine-ripes, as in Florida. Indeed, as shown in Figure 6, during the 1980-1981 season, 81 percent of Sinaloa's fresh tomato production for export was marketed as vine-ripe, while only 9 percent was marketed as mature-green (the remainder includes cherry and Roma tomatoes). In contrast, during the 1990-1991 season, vine-ripes accounted for only 45 percent of total production while mature-greens reached 25 percent of total export production. The fact that only 14 percent of tomato acreage was planted as ground culture for mature-green tomato harvest, while 25 percent of exports were sold as mature-green, highlights the trend toward harvesting staked tomatoes as mature-greens.

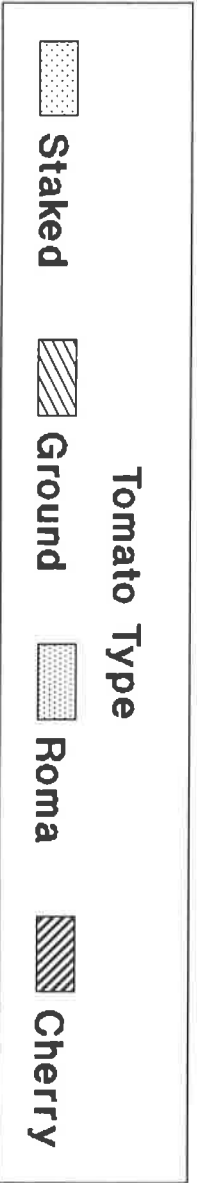
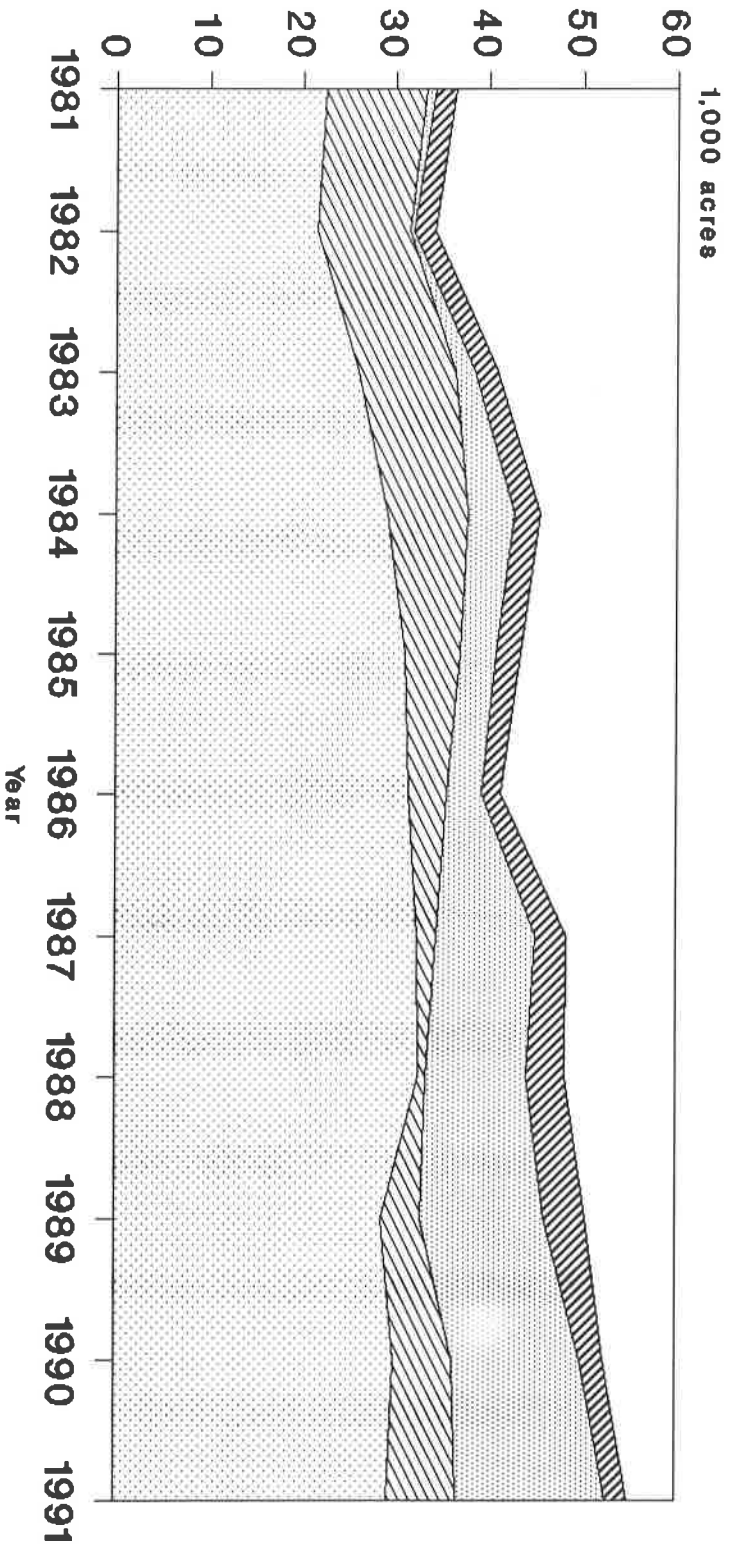
The growth in mature-green shipments is primarily caused by the consistent price premium that they receive in the U.S. market compared with vine-ripes. The price premium awarded to mature-green tomatoes is due to wholesale and retail buyer preference for firmer tomatoes with longer shelf life and lower shrink. According to data from CAADES, the average price received by Sinaloa growers for mature-green tomatoes in 1990-1991 was \$7.51 compared with \$5.72 for vine-ripes (CAADES, 1991). Sinaloa growers interviewed confirmed that they now tend to see a two dollar average price premium for their mature-greens relative to their vine-ripes, compared with only a one dollar premium in 1987-88. Many Sinaloa

FIGURE 6
EXPORT TOMATO PRODUCTION IN SINALOA BY
TYPE 1980-1981 to 1990-1991



Source: CAADES

FIGURE 7
EXPORT TOMATO ACREAGE IN SINALOA BY TYPE
1980-1981 to 1990-1991



Source: CAADES

growers and Nogales handlers expressed a perception that U.S. demand for vine-ripe tomatoes is declining, which jeopardizes the future of their industry. Some are hopeful that as consumer interest in "natural" products grows, there may be a renewed interest in the vine-ripe. As indicated earlier, California is receiving some indication that the vine-ripe niche may be strengthening. The overwhelming trend in the 1980s, however, was the growing dominance of the mature-green tomato.

Clearly, the price differential has stimulated interest in increasing mature-green shipments. This is easier said than done, however, because ground tomato cultural practices have never been adapted to Sinaloa growing conditions. Historically, ground tomato yields were significantly lower than for vine-ripes and the yield penalty was not offset by the lower production costs for ground tomatoes. This situation is currently changing owing to recent research to develop appropriate ground tomato varieties and cultural practices for Sinaloa. Interestingly, this research is largely proprietary and led by a large California shipper who has operated for many years in Sinaloa to ensure a year-round position in the U.S. market.

Fresh Tomato Production in Baja California

Baja California has produced fresh market tomatoes for many years, but significant export shipments did not begin until the early 1980s. Tomato production is concentrated in the vicinity of the San Quintín valley, which is a cool, coastal production region that is located 150 miles south of the U.S. border; it produces vegetables primarily during the summer through December-January. Product is exported by truck through San Diego and is received and marketed by distributors there, some of which are forward-integrated Baja growers.

The coastal production region of northern Baja extends from south of Ensenada down through San Quintín and covers approximately 60 thousand hectares of farmland. Area planted in vegetables in the coastal region of Baja was 11,034 hectares in 1991, down from 12,885 hectares in 1988. Total irrigated land in the area is about 20 thousand hectares (SARH).

San Diego county grower-shippers were attracted to Baja during the early 1980s, as urban sprawl progressed around San Diego, and the cost of irrigation water increased rapidly. The devaluations of the Mexican peso in 1982-1983 made Baja production far more attractive, because of lower labor costs. Tomato exports from Baja increased dramatically through much of the 1980s; then, they stabilized and declined, as water resources in Baja became strained and the peso was revalued relative to the dollar.

The coastal region's ability to expand vegetable production is

limited by the severe nature of the ground water situation. The aquifers in the San Quintín area are relatively shallow, and, of the 700 wells in the San Quintín valley, half exhibit salinity levels of two thousand to three thousand parts per million. Droughts have plagued this irrigated agriculture. A severe drought in the 1970s was followed by a large amount of precipitation in 1978-1980, which recharged the aquifers and led to the expansion of the 1980s. By 1986-1987, however, they had been drawn down such that salinity levels were increasing and there simply was not sufficient water to continue to expand. By 1990-1991, water quality problems had become so severe that some large operations had halted production in Baja, and local growers had reduced acreage. Low market prices have subsequently further reduced acreages.

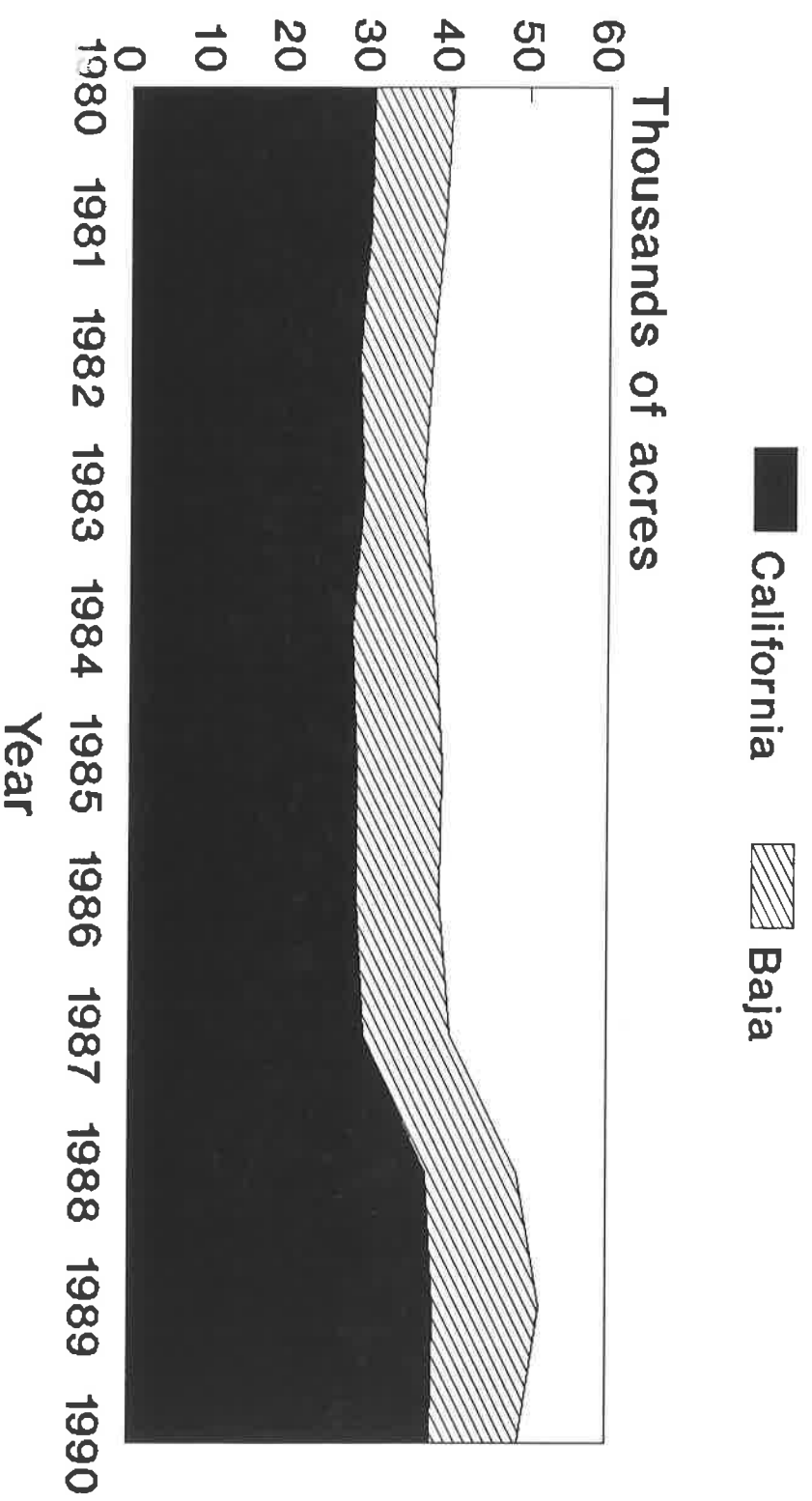
Because suitable water is often unavailable at the production sites, it is piped in 12-inch PVC pipe for some 10 to 20 kilometers. Most of these systems were installed in the 1980s, have been amortized, and probably could not be financed at present. Some growers estimate that their water costs are as high \$200 an acre-foot, if all costs of these systems are considered, although it costs less than \$20 an acre-foot to pump the water (Marsh and Runsten). Virtually all growers have adopted southern California drip technology to conserve water in fruits and vegetables. Because of the high salinity levels, however, yields are lower than in San Diego.

Export vegetable production in northern Baja is dominated by about ten families. Their ability to expand is limited not by land availability but by the water situation. One grower estimated that five thousand hectares of tomatoes was really the long-run sustainable production area for the San Quintín region. Unfavorable economics, however, have reduced acreage below this level.

Baja tomato export production developed primarily from a diversion of existing vine-ripe production for the Mexican domestic market to the U.S. market, as well as from increased yields, rather than from acreage expansion. As shown in Figure 8, Baja land dedicated to tomatoes was relatively stable during the 1980s. Total tomato acreage was 9,949 in 1980 compared with 11,053 acres in 1990. The latter is equivalent to 29 percent of total California tomato acreage and is more than double 1990 California south coast vine-ripe acreage.

The 1982 devaluations of the Mexican peso were the impetus for shifting vine-ripe production from California to Baja California, because they drastically reduced the dollar cost of production in Mexico. As with the frozen vegetable industry in central Mexico, where sufficient infrastructure and knowledge existed, large changes in exchange rates drove U.S. capital into Mexican export agriculture.

FIGURE 8
CALIFORNIA AND BAJA CALIFORNIA
FRESH TOMATO ACREAGE



Sources: USDA, NASS, 1991;
 SARH, Delegacion Mexicali

Shipments to the U.S. market from Baja began to increase in 1983 and 1984; they peaked in 1989 at 296 million pounds, as shown in Figure 9. As export tomato production developed in Baja, frequently on a joint-venture basis with San Diego growers, California production technology, including drip irrigation, was adopted which improved yields significantly over the decade. More recently, however, salt water intrusion into the aquifer and the draw-down on the aquifer that occurred in the 1980s caused production to decline from the 1989 high of 228,039 U.S. tons to 152,711 tons in 1990 (Figure 10). In addition, because Mexican inflation relative to U.S. inflation has been greater than the rate of devaluation of the peso, dollar costs of production in Mexico have tended to rise since 1987.

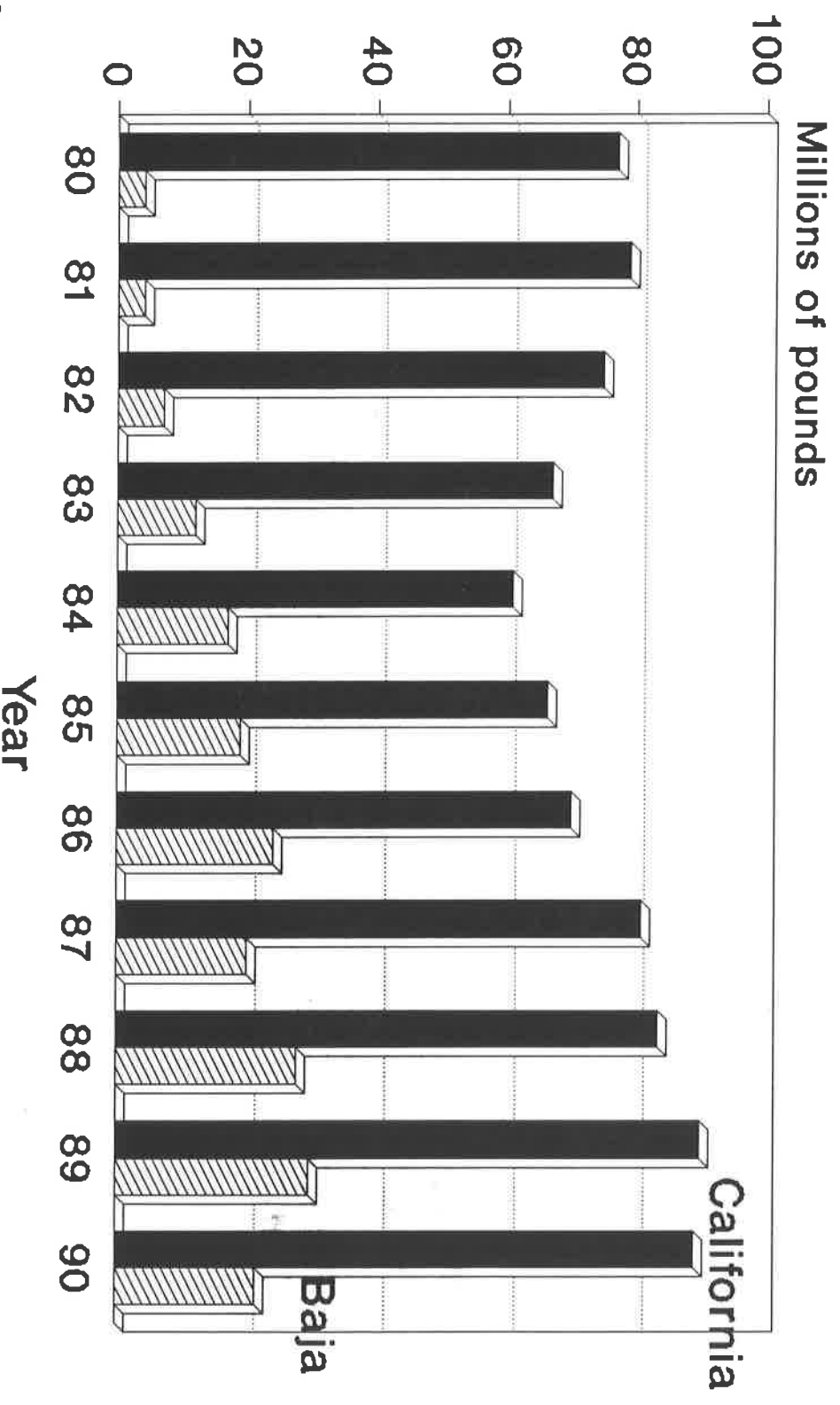
Although March 1991 rains improved both water quality and availability, the long-term water problem is far from resolved. Growers and U.S. investors are struggling to find creative solutions. Investment in the development of desalinization techniques is underway, and one large Mexican grower is using desalinated water produced in his own plant to irrigate strawberries. It is unlikely, however, that this is currently cost-effective. The prevailing trend appears to be intensification of production methods, using more advanced technology to generate greater production with less land and, thereby, less water.

The Growing Mexican Market for Fresh Tomatoes

In both countries "consumption" data actually represents disappearance, and, because postharvest losses are much higher in Mexico than in the United States, disappearance overstates consumption there to a greater extent. With this caveat in mind, according to the United Nations Food and Agriculture Organization (FAO), per capita consumption of fresh tomatoes in Mexico in 1989 was 31.1 pounds. Some estimates derived from USDA and Mexican sources are as high as 35 pounds per capita tomato consumption in 1990. To be conservative, if we reduce the FAO estimate by 20 percent to account for the relative differential in postharvest losses between the United States and Mexico, Mexican per capita consumption would be 25 pounds. Hence, tomato per capita consumption is at least 40 percent higher in Mexico than in the United States, and may be as high as 28 pounds. This is despite the a much lower per capita GNP in Mexico, which in 1989 was \$2,010, compared with \$20,890 in the United States (World Bank).

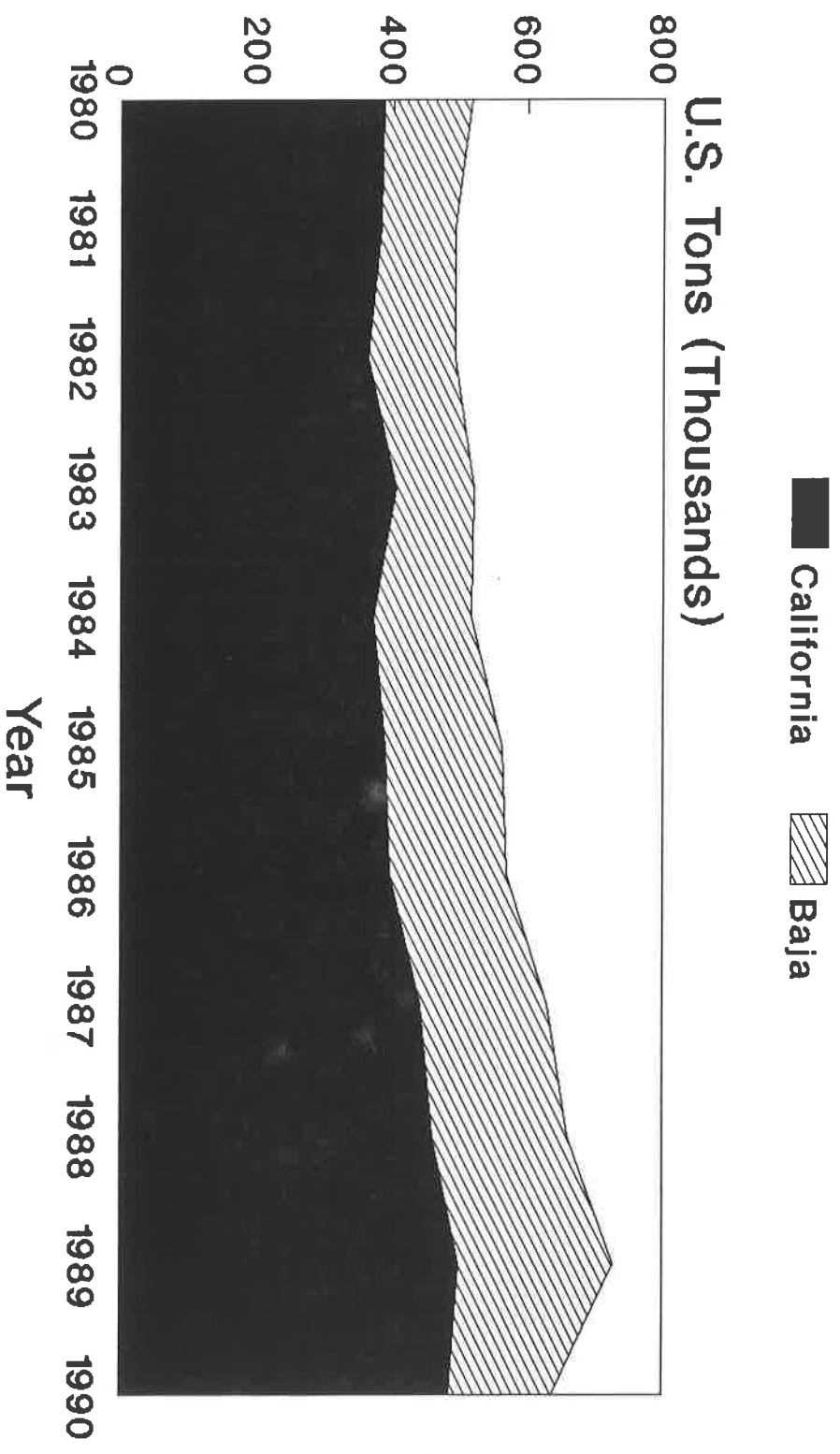
Furthermore, Mexico's population is expected to grow at an average annual rate of 1.8 to 2 percent over the next decade, compared with 0.7 to 0.9 percent in the United States. Consequently, even without considering a likely income effect that would increase demand, Mexico will need to increase tomato production at a greater rate than the United States to accommodate the expansion of its own domestic market. Projections by Belotti indicate that an additional 41,648 to 57,573 acres will have to be brought into production in

FIGURE 9
FRESH TOMATO SHIPMENTS FROM
CALIFORNIA AND BAJA



Source: Marketing California Tomatoes, Fed-State Mkt. News

**FIGURE 10
CALIFORNIA AND BAJA
FRESH TOMATO PRODUCTION**



Source: NASS/USDA, 1991 and SARH, Delegacion Mexicali

Mexico to meet domestic tomato demand in the year 2000, assuming per-acre yields in the 10 to 13.7 metric ton range. This will reduce the ability of Mexico to expand tomato exports to the U.S. market.

U.S.-California Fresh Tomato Exports to Mexico

The growth in Mexican tomato demand has presented an opportunity for California tomato growers since Mexico's entry into the General Agreement on Tariffs and Trade (GATT) in 1986 and the resulting reduction in trade barriers. Mexico receives summer and fall rains that can adversely affect tomato quality and supply, which create a market window. California tomato production is complementary to Mexico in that California produces during the summer and fall at a time when Mexico's production can be insufficient to meet demand. Although other regions in the United States also produce tomatoes during the summer, the longstanding joint ventures between California and Mexican growers have given California growers knowledge of, and easier access to, the Mexican market. California also has the advantage of closer geographic proximity to Mexico than most other states.

U.S. fresh tomato exports to Mexico were \$2,137,861 in 1990 compared with \$331,315 in 1988. In physical volume, 1990 tomato exports to Mexico were 4,849 metric tons. Total 1991 exports were apparently even higher. Although this volume appears insignificant for the total U.S. industry, it is quite significant for California. The California Tomato Board indicates that, at certain times during the summer of 1991, Mexico absorbed 10 percent of the California crop, which is equivalent to shipments to Canada. Because Canada traditionally represented the primary export market, this is an important change.

The California Tomato Board is proposing a major policy change for the 1992 marketing year to support development of the Mexican market. The Board is proposing to allocate \$250 thousand to market promotion in Mexico, of a total marketing budget of \$800 thousand. This compares with a total marketing budget (both domestic and foreign) in 1991 of \$280 thousand. Clearly, the California tomato industry is seriously considering the potential of the Mexican market, and every California shipper interviewed for this study expressed the intent to develop sales in Mexico.

Thus, a highly complementary production relationship is evolving between Mexico and California in the fresh tomato industry with production for both markets occurring in both countries.

Chapter 2. The Fresh Tomato Industry in California

History and Structure of Fresh Tomato Production in California

As with most industries, the fresh tomato industry in California has gradually become more concentrated, and has involved fewer shippers. Whereas at one time there were many shippers who only produced locally, for seasons that might last only a few weeks, this is no longer economically feasible.¹ Two factors driving concentration have been the shift to mature-green tomatoes, and the year-round demand for tomatoes by final markets.

Although mature-green tomatoes have been grown for decades, there has been continual improvement in the postharvest handling system. In particular, packinghouses have become much more automated and gassing facilities have improved. This greater investment in fixed capital creates economies of scale if the production season can be extended. Thus, as the investment in packinghouses grows, tomatoes are trucked from ever greater distances to fewer packers, thereby extending the number of weeks that the packinghouse can be run.

Simultaneously, the creation of ever larger buyers for fresh tomatoes, such as the supermarket or fast-food chains, who came to require year-round supplies of tomatoes, encouraged shippers to move toward multiple-area sourcing to be in the market for as many weeks of the year as possible. On the one hand, multiple-area sourcing allows one to sign a contract with, say, McDonald's, that needs tomatoes 365 days a year. On the other hand, being in the market year round reduces market risks because returns can be averaged over the greatest possible length of time. A couple of former tomato shippers that we interviewed, attributed their inability to compete to the relative shortness of their season.

Both of these trends are very clear in California. For example, a packinghouse in the Stockton area will typically be supplied with tomatoes from as far north as Sacramento and as far south as Huron. A packinghouse in Merced will source tomatoes from around Merced, but also from Huron and Stockton. Packinghouses in the Salinas valley truck tomatoes over Pacheco Pass from the San Joaquin Valley. Although this spreading out of packinghouse supply continues to develop, tomatoes have been trucked from Huron to the Salinas Valley for over 20 years.

Similarly, there are any number of shippers in California who also grow or market tomatoes from other regions, such as Florida or Mexico. In fact, while the shippers do compete against one another, to speak of competition between regions, such as Mexico

¹Of course there are always market niches for small-scale producers, as, for example, is currently true of organic tomato production.

and California or Mexico and Florida, is not entirely accurate, because a great deal of production has been rationalized among the regions, and is controlled by the same shippers.

Although most of this evolution has occurred with mature-green tomato production, it is not exclusively so. For example, Sun World developed a patented vine-ripe tomato and went to multiple-area sourcing to supply it on a year-round basis to various markets. Nevertheless, most vine-ripe producers in California were smaller-scale operations that grew and often shipped their own tomatoes. The surviving vine-ripe firms are mainly on the south coast, and will be discussed later.

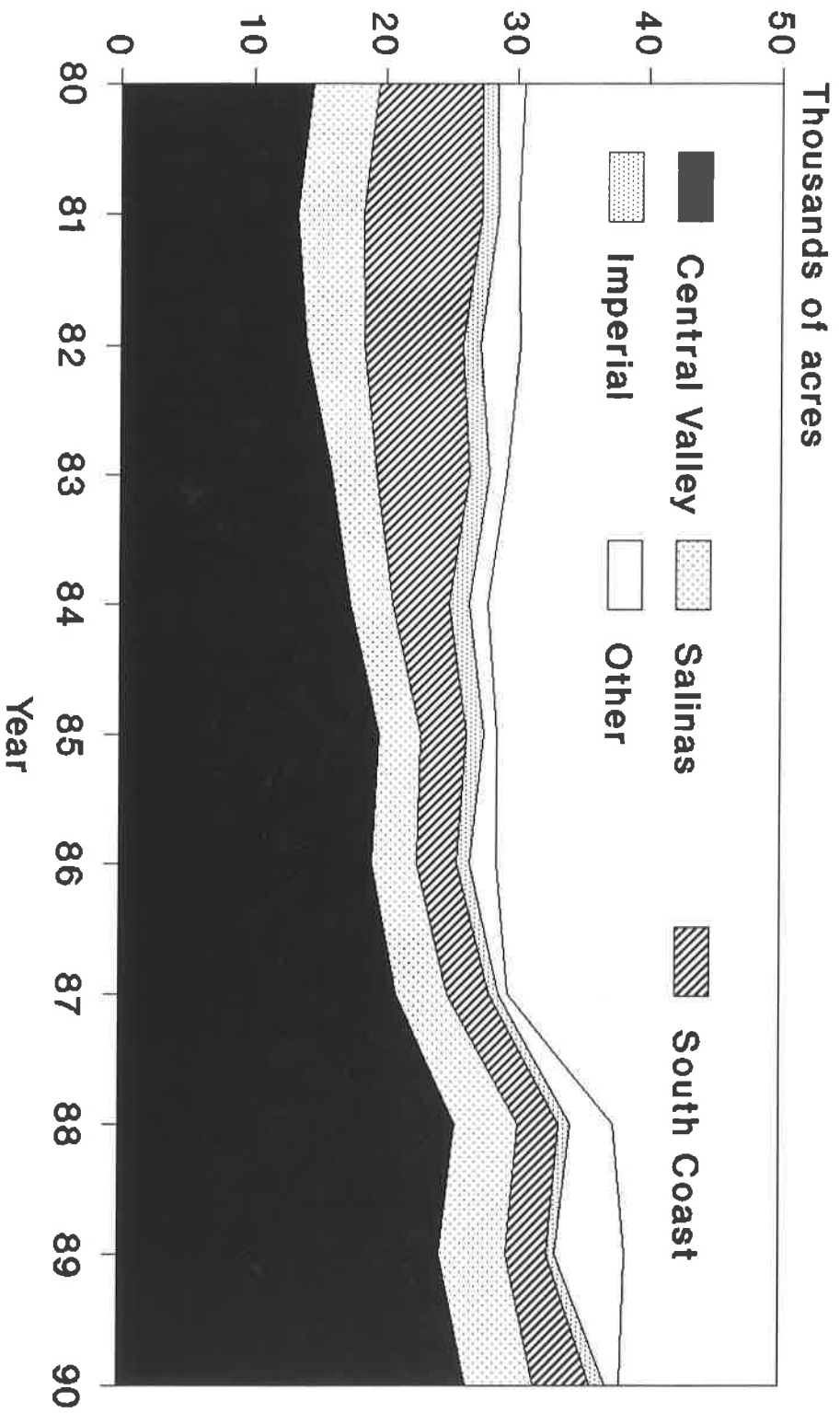
Tomato Growers and Location of Production

One of the results of the trends discussed in the previous section has been a shift in location of fresh tomato production in California as the industry has rationalized its structure under the control of a smaller number of shippers. As shown in Figure 11, there are basically four commercial production regions in California, dominated by the San Joaquin Valley. Total California area devoted to fresh-market tomatoes was 38 thousand acres in 1990 compared with 30,500 acres in 1980, or an increase of 25 percent. The growth in California acreage occurred in the San Joaquin Valley, while acreage was declining in southern California, principally because of urbanization pressures and the shift to Baja.

The regional shift in the location of California production was accompanied by a growth in mature-green tomato production, because the San Joaquin Valley (and the desert area) primarily produces mature-green tomatoes using ground culture with furrow or drip irrigation. In contrast, south coast California vine-ripe tomato production is on stakes with plastic mulch and all drip irrigation. The vine-ripe tomato production that was lost along the south coast was essentially replaced in Baja California with similar varieties and production technology.

To summarize, on the one hand, there has been a decline in vine-ripe, pole tomato acreage in California, as mature-greens have taken more market share, and as Mexico has become a bigger factor. Regions where pole tomatoes were grown, such as Cutler-Orosi in the San Joaquin Valley, Oxnard, or the south coast, have all become less important producing regions. On the other hand, the expansion of mature green production has favored the San Joaquin Valley, particularly on the west side, where production complements the seasons of the long-established regions of Merced, Stockton, and Salinas. Whereas about one-half of the tomatoes produced in California in 1972 were mature greens, now they are about two-thirds of production.

FIGURE 11
CALIFORNIA FRESH MARKET TOMATOES,
REGIONAL ACREAGE



Source: County Agricultural
 Commissioners' Annual Reports

Table 1 shows 1990 California fresh tomato acreage and production by county. One can see that the San Joaquin Valley regions (even though some acreage is missed in Kern county) together account for 68 percent of total acreage and 60 percent of total production. This has risen from about 37 percent of production in 1972 (Jesse and Machado).

Seasonality

The Imperial Valley initiates the California mature-green production season in the spring, producing from early May through June. Florida is the primary competitor for the Imperial Valley, because Florida ships throughout Imperial's season and Mexican imports are negligible at this time. Imperial Valley acreage remained small and stable over the last decade as a whole, at 1,196 acres in 1990 compared with 1,200 acres in 1980. Imperial Valley acreage decreased 50 percent in 1987, however, and only recovered in 1990. Acreage rose to 2,000 in 1991.

Production then begins in the San Joaquin Valley, starting in early June in the southern areas of Bakersfield and Huron, late-June around Merced, and in Stockton in early July. Production in the San Joaquin Valley then moves around from one micro-area to another throughout the summer and fall, finishing in early November. Tomato area harvested in the San Joaquin Valley was 14,460 acres in 1980 compared with 26,369 in 1990 with much of the growth occurring after 1986.

The south coast, San Diego and Orange counties, also begins producing in early June and continues into August. A second crop is harvested in the fall from September to November. Harvested acreage in the south coast, primarily San Diego, was 4,247 acres in 1990 versus 7,840 acres in 1980. This understates the magnitude of San Diego's decline since acreage was fluctuating between 3,000 and 3,200 acres between 1986 and 1989. The resurgence in 1990 of San Diego acreage appears to reflect the improving competitiveness of the San Diego tomato industry relative to Baja California. Both the south coast and Baja California, which produce from early May until the end of the year, are primarily shipping vine-ripened pole tomatoes, in contrast to the other regions discussed here.

Table 1
California Fresh Tomato Acreage and Production, 1990

COUNTY	ACRES HARVESTED	PRODUCT ION (tons)	YIELD (tons an acre)	PRICE for each ton (\$)
Northern San Joaquin Valley				
Contra Costa	17	420	24.7	481
Sacramento	600	7,200	12.0	500
San Joaquin	6,000	73,800	12.3	408
Stanislaus	4,490	67,400	15.0	410
Sutter	16	223	13.9	392
Southern San Joaquin Valley				
Merced	7,440	82,675	11.1	346
Fresno	6,000	113,000	18.8	400
Kings	1,200	24,000	20	340
Tulare	639	2,290	16.7	579
Central Coast				
Monterey	4,970	73,400	14.8	320
Santa Clara	250	3,350	13.4	462
Southern California				
Imperial	1,196	15,961	13.3	400
Riverside	337	2,490	7.4	403
San Bernardino	12	120	10	850
Orange	937	28,935	30.9	491
San Diego	3,310	113,700	34.4	349
Other counties*	1,424	8,079	5.8	n.a.
State Total	38,838	617,043	16.5	382

Source: County Agricultural Commissioner Reports and State summary report.

* -- Counties not reporting fresh tomato production separately, such as Kern, Ventura.

n.a. -- data not available.

Finally, the Salinas Valley begins producing around the fifth to tenth of August and continues to mid-October. Salinas, like Stockton, is cool enough to produce tomatoes in August and September.

This seasonality of production is summarized in Figure 12. Although there is overlap among the regions, nevertheless, the degree of complementarity is striking. And, although there is Mexican competition from Baja in June and July, very little product comes in during September or October.

Yields and Drip Irrigation

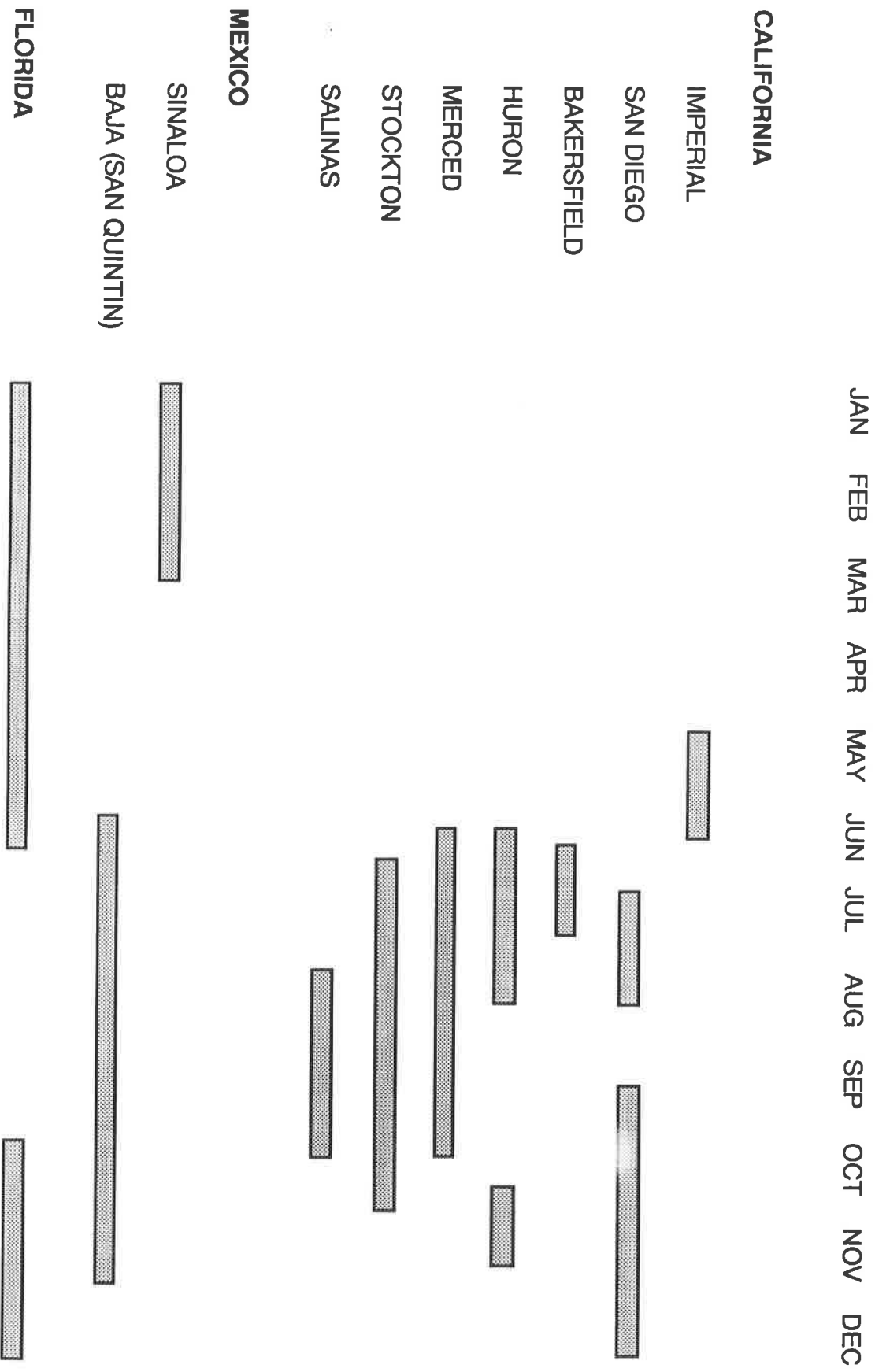
Drip irrigation was adopted in the San Diego area early on owing to water costs ranging from \$300 to \$500 an acre foot. The staked nature of tomato production in San Diego, coupled with a mild climate, gives a five to six-month picking season, which contributes to the highest tomato yields in the country, or 34 U.S. tons an acre, compared to an average yield of 15.3 tons in Florida and 14 tons in the San Joaquin Valley (Figure 13).

Baja California has also converted completely to drip irrigation, although yields are less than in San Diego. The yield shown in Figure 13 of 16 tons an acre includes many small producers in Baja. A typical yield of one of the large growers that account for most of the exports would be 23 tons an acre.

Drip irrigation in the San Joaquin Valley has been increasing and increased substantially in 1991 because of the drought. It frequently doubles yields of mature-green ground tomatoes, thereby approaching San Diego vine-ripe yields. One shipper estimated yields with drip at 1,800 to 2,500 cartons (22 to 31 tons) an acre in the southern San Joaquin Valley, versus a rule-of-thumb average in the San Joaquin valley of one thousand cartons an acre with furrow irrigation. This difference is observable in some of the county data shown in Table 1, where Fresno, with more drip acreage, had yields in 1990 averaging almost 19 tons an acre, versus 11 to 12 tons in Merced and San Joaquin counties. Some shippers have now gone entirely to drip, while others are just beginning. The water conservation, yield, and other benefits associated with drip irrigation make its future use likely to increase in the San Joaquin Valley.

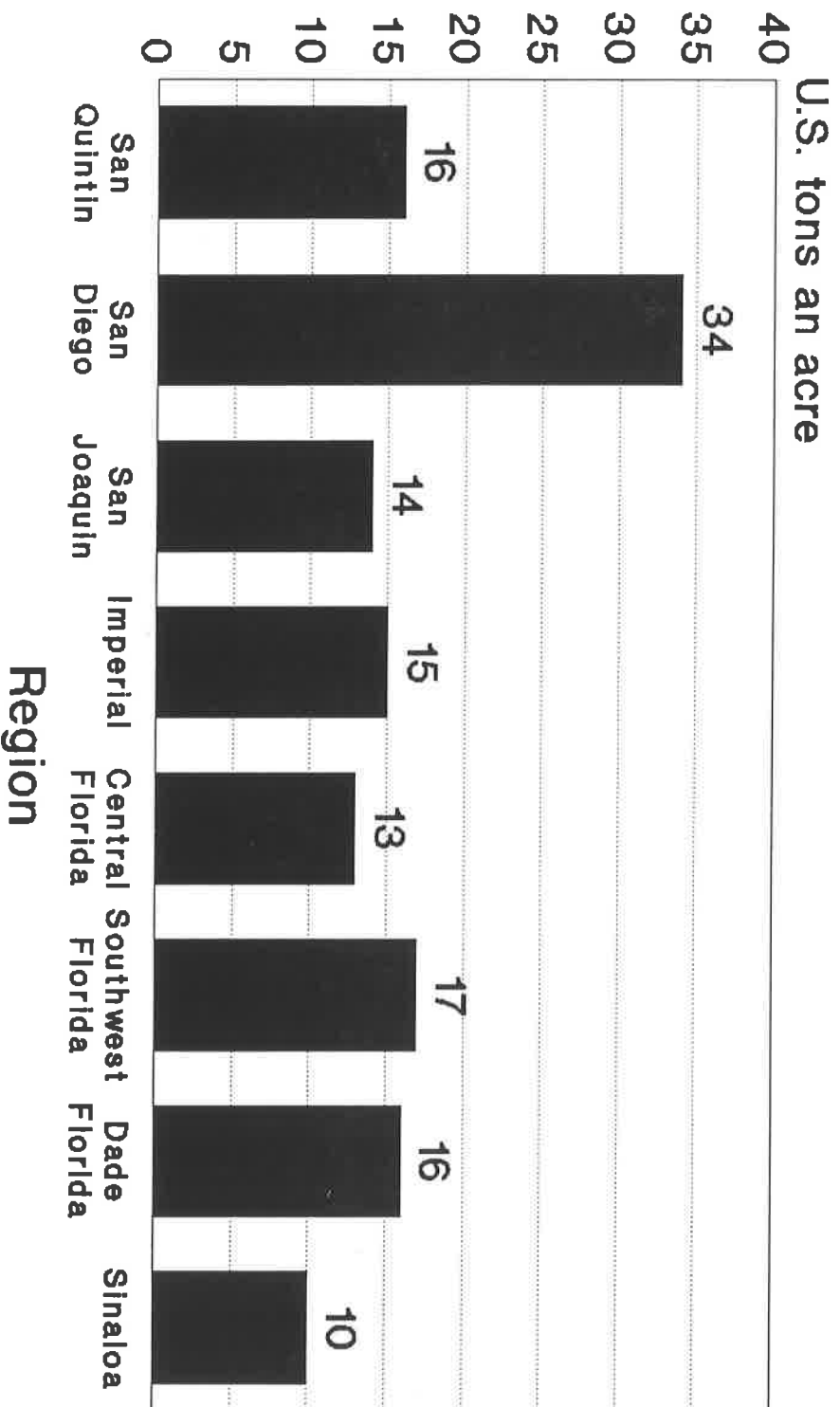
The San Joaquin Valley has become the dominant fresh tomato producer in California owing to lower unit production costs and greater demand for mature-green tomatoes than for vine-ripes. Unit production costs are discussed later, and they are lower in the San Joaquin Valley than in the vine-ripe regions, despite lower yields, because of significantly lower water and land costs. Mature-green production is also less labor-intensive than vine-ripe. The higher yields from drip irrigation will just increase the advantage of San Joaquin valley mature-green production.

**FIGURE 12
SHIPPING SEASONS FOR FRESH TOMATOES**



SOURCES: Federal State Market News Service, USDA, June 1991; and interviews with shippers.

FIGURE 13
FRESH TOMATO YIELDS
1988-1990 AVERAGE



Sources: CDFA; SARH; CAADES;
 Florida Dept. of Agriculture

California Tomato Marketing Order

California has a state marketing order for fresh tomatoes, administered by the California Tomato Board. Shippers are assessed ten cents a hundredweight to support production-oriented research and marketing promotion activities. The total 1991 budget was \$1.2 million, including \$280,000 allocated to market promotion. The order covers product grown in Baja California and handled in California. This indicates the close relationship between California and Baja growers and the willingness of Baja not to "free ride" on the benefits produced by the California Tomato Board. Baja producers have representatives on the Tomato Board and have an opportunity to participate in the allocation of the research and market development budgets.

California shippers, after years of low returns, have been discussing the possibility of a cooperative marketing arrangement that would allow them to talk to one another, under agriculture's exemption from antitrust laws. Florida apparently had such an arrangement for two years but voted against continuing it.

The Current System of Production

As noted above, the packinghouse is the central, organizing unit in fresh tomato production in California, as it is in fresh citrus or fresh stone fruit. In some other fruits and vegetables, such as lettuce, broccoli, cauliflower, or strawberries, methods have been developed to pack the product directly in the field, thus eliminating the need to handle the produce twice. This field packing gives rise to a more dispersed production structure, which is exactly the opposite of the tendency in fresh tomatoes. Field packing of fresh tomatoes is essentially blocked by the large number of grades and sizes that must be sorted and packed separately.

In mature-green tomato production, most shippers (but not all) have a large acreage of their own production, which is complemented by joint deals with contracted growers. We estimate from public records that about 90 percent of the fresh tomato acreage in California is leased. Thus, to say that a shipper grows his own tomatoes is not to say that he grows them on his own land. To avoid disease, tomatoes must be rotated with other crops, which undoubtedly increases the amount of leasing. In addition, tomatoes are grown in such areas as San Diego and the southern Salinas Valley, where most of the agricultural land is leased.

Various types of contracts exist. It is possible for a grower to get a contract where he bears no risk and is essentially paid to grow out the crop, but the shippers have the costs calculated quite well and the grower would be lucky to cover all fixed costs under such an agreement. Therefore, in most contracts, costs of production are shared, and returns are also shared.

In a typical arrangement, the shipper has the seed grown out in a nursery, and then transplants the tomatoes with his own crews. The grower prepares the ground and grows the tomatoes until harvest. The shipper then hires crews to harvest and arranges for the tomatoes to be hauled to the packinghouse. The shipper packs and markets the tomatoes, deducts his costs from the sale price, and splits the returns in some previously determined shares with the grower.

In some arrangements, the shipper pays for all "outside" costs, such as chemicals, fertilizers, and harvesting. In other arrangements, the shipper is only a packer and marketer, and the grower assumes responsibility for everything up to the packinghouse door, including hiring a contractor to harvest. This latter arrangement is more common in Salinas or Imperial--regions not studied in detail in this report--although it also occurs in certain instances in the San Joaquin Valley.

The labor consequences of these arrangements are that the grower is usually responsible for more permanent labor, such as tractor drivers or irrigators, and the shipper is responsible for seasonal labor, such as transplant crews or harvest crews, as well as the packing.² In California, shippers typically hire transplant crews directly and use farm labor contractors to provide harvesting crews. Some shippers hire one or more harvesting crews directly, and in San Diego all harvesting is done by direct-hire employees.

Production Structure

To give an idea of the concentration of California fresh tomato production, Villarejo assembled reported acreages from pesticide registrations for 1990, as shown in Table 2. These are actual plantings of fresh tomatoes--not farm sizes. They account for virtually all of the acreage reported in Table 1.

One can see that there are relatively few large acreages. In fact, less than 4 percent of the plantings (22 of them) account for 38.2 percent of the acreage, and 10 percent account for 63.4 percent of the acreage. This emphasizes the importance of the core acreages of the shippers themselves.

² We did not conduct an extensive survey of growers who were not shippers, but we did interview several in different regions.

Table 2
Size Distribution of Fresh Tomato Plantings
in California, 1990

Size of Fresh Tomato Planting	Number of Farms	Percentage of all fresh tomato farms	Acres by size class	Percentage of all fresh tomato acres
80 acres or less	490	79.4	6,565	17.1
81 to 160 acres	64	10.4	7,446	19.4
161 to 320	41	6.6	9,672	25.2
321 to 480	9	1.5	3,437	9.0
481 to 640	9	1.5	4,959	12.9
641 to 960	1	.15	642	1.7
961 to 1,280	1	.15	1,202	3.1
1,281 acres or more	2	.3	4,403	11.5
TOTAL	617	100.0	38,326	100.0

Note: Percentages may not total 100 owing to rounding.

Source: County Agricultural Commissioners, *Applications for Restricted Material Permits, and Applications for Operator I.D. Number, 1990 Crop Year*, Compiled by CIRS staff.

Some of this data can be analyzed separately in the more important counties. Table 3 shows fresh tomato acreage structure for 1990 in San Joaquin, Merced, Fresno, Monterey, and San Diego counties. These totals differ from those reported in Table 1, because of reporting variations; nevertheless, they give an idea of the relative importance of size in the different areas.

Of interest again is the small number of very large acreages in the San Joaquin Valley, which account for most of the production. The farms on the west side of the valley typically produce field crops, such as cotton, wheat, corn, beans, and alfalfa, all of which are mechanized and require little labor. The other major labor-intensive crops on the fresh tomato farms in this area are processing tomatoes, which is mechanized, and lettuce, which is not. The expansion of processing tomato production into this region with the development of the mechanical tomato harvester was the basis for the expansion of fresh tomato production as well, because many cultural practices are similar. The demand for labor, however, is much greater with fresh tomatoes and is very seasonal, which has led to the current structure of using contractors to bring workers to the west side of the valley from the eastern towns.

The area around Stockton (San Joaquin County) has a more dispersed structure, and farms typically grow other fruits and vegetables, such as cherries, asparagus, or squash, in addition to many field crops. Nevertheless, 11 farms accounted for over 50 percent of the fresh tomatoes grown in San Joaquin County.

In Baja California, a similarly concentrated structure exists, except that there is little contracting. In general, about nine large grower-shippers, often in partnership with U.S. firms, lease land and grow most of the tomatoes themselves. Because access to water is the scarce resource, the ability to invest in wells, pipelines, and drip systems is the determining factor.

Table 3
Size Distribution of Fresh Tomato Plantings
in Various Counties of California, 1990

Size in Acres	San Joaquin		Merced		Fresno		Monterey		San Diego	
	Number of Farms	Acres by Size Class	Number of Farms	Acres by Size Class	Number of Farms	Acres by Size Class	Number of Farms	Acres by Size Class	Number of Farms	Acres by Size Class
1 to 10	34	79	2	6	128	295	7	35	33	103
11 to 50	6	218	6	149	8	273	30	886	9	195
51 to 100	15	1,162	13	981	6	443	11	791	2	168
101 to 200	16	2,104	9	1,196	13	1,900	6	717	3	510
201 to 300	6	1,544	2	506	4	1,109	3	681	1	240
301 to 400	2	652	2	718	3	995	0	n.a.	1	353
> 400	3	1,537	5	3,746	4	3,177	0	n.a.	1	681
TOTAL	82	7,296	39	7,302	166	8,192	57	3,110	50	2,250

Source: Same as Table 2

Note: These data do not agree with the data reported in Table 1 for several reasons. First, these are taken from restricted use material permits, and so are projections by growers of expected acreage, not after-the-fact reports of harvested acreage. Second, County Agricultural Commissioner Reports are generally compiled from the shippers, not the growers, which introduces unknown errors. Finally, some of this data may be incorrectly recorded in permits or the compilations of the data; in particular, some fresh tomatoes may be confused with processing tomatoes.

The Current Economics of Fresh Tomato Production

Summarizing Florida-Sinaloa Cost Competitiveness

Because this report focuses on California and Baja California, it will not pursue in-depth comparisons of Florida and Sinaloa costs (see Cook, et al.). To summarize the results of earlier study, however, it is clear that during the main period of seasonal competition (December through May) Florida maintained its market share over the last ten years. From the 1981-1982 to 1984-1985 season, Florida market share declined from 63 percent to 58 percent of the U.S. winter market, while Sinaloa increased its market share from 33 percent to 40 percent. Since 1984-1985, however, Florida increased its market share to 64 percent in 1990-1991, while the market share for Sinaloa tomatoes declined to 35 percent.

The U.S. tariff on imported tomatoes varies according to the time of year. Between September 1 and November 14 and between March 1 and July 14, the tariff is equivalent to 52 cents a 25-pound box. From November 15 through February 28 and July 15 through August 31 the tariff is 38 cents a 25-pound box.

Obviously, removal of the current tariff would erode the cost competitiveness of producers in all regions of Florida. The cost advantages gained by Sinaloa over tomato producers in Dade county and west central Florida would be small, however, and it seems unlikely that any significant changes will occur in either shipping patterns or market share away from the trends of the last decade.

Data reported by Cottrell and Lucier on fresh tomato arrivals over the 1987 to 1990 period based on a 12-month season, as opposed to only the winter (December to May) season, indicate that Florida is the largest supplier to 18 of the 23 cities included. Furthermore, Florida producers supply over 50 percent of the tomatoes in 11 cities. In contrast, Mexican tomatoes represent the majority of arrivals in only five cities, all, with the exception of Dallas, located on the West coast of the United States or Canada. In addition, the market share of Mexican tomatoes is 10 percent or less in 14 of the 23 cities for which data are reported.

These results are very similar to the pattern observed by Jesse and Machado in the early 1970s. They concluded that "Mexico's competitive advantage increases the closer the receiving city is to Nogales" (Jesse and Machado, p. 15). The stability of these results, the relative cost parity, and the increased shipments of northwest Mexican producers into the Mexican market, all suggest that the industry is already structured in much the form that would emerge with freer trade. There is no indication in these data that the competitiveness of Florida tomato producers has been affected negatively by IRCA.

California - Baja Cost Competitiveness

Costs of production and marketing for California and Baja-grown tomatoes were obtained for 1990-1991 as follows. California costs represent University of California Cooperative Extension cost studies. The San Joaquin Valley cost study used the UC budget generator, managed by Dr. Karen Klonsky in the Department of Agricultural Economics at UC Davis, and was carried out by Pete Livingston. San Diego costs were estimated by Wayne Schrader, a San Diego county farm advisor. We also include a discussion of costs obtained from interviews with California growers and shippers. Costs were estimated for Baja from data obtained in personal interviews with five of the nine primary tomato exporters, and three U.S. distributors handling product for several of the Baja exporters.

Changing Relative Costs

The absolute cost competitiveness of the California fresh tomato industry relative to Baja California appears to have increased markedly since 1987. At that time the estimated landed cost in San Diego was about four dollars a 25-pound carton, including the 52-cent duty (Cook). As shown in Figure 14, the estimated landed cost in 1990-1991 for Baja tomatoes was \$5.07. Although per unit production and marketing costs have been relatively stable in California, Baja California faces rising costs on several fronts: labor, electricity, fertilizer, diesel, and water. Many of these increases are a result of the Mexican government's policy of eliminating subsidies to agriculture.

Water costs are estimated to reach \$200 an acre-foot in Baja in some instances after accounting for the costs of maintaining extensive pipeline and pumping stations to distribute water over large distances. Suitable water is usually not available at the production sites, which makes 20 to 50 miles of pipeline for each grower not uncommon. Hence, while the direct cost of the water itself is not important, because they are pumping from shallow aquifers, the cost of distribution matters in Baja. Investments in these pumping and pipeline systems were made during the 1980s by individual growers for their own use, without public sector support. This type of investment can cost \$1 million and is no longer being made, owing to the uncertain outlook for vegetable production in the San Quintín Valley.

Labor availability is also an issue in San Quintín. Baja has always been an underpopulated part of Mexico, and workers had to be brought in from other areas of the country. In addition, labor costs have risen significantly in the last couple of years.

Diesel and fertilizer costs, which were previously heavily subsidized in Mexico, are now comparable to U.S. prices. Electricity for agricultural pumping, which was even more heavily subsidized, is now on a schedule of subsidy elimination, and, in

Figure 14
 Estimated Fresh Tomato Costs, 1990-1991

Item	Baja	San Diego	San Joaquin
Yield/acre (25-pound carton)	1,820	2,720	1,120
Total preharvest cost/acre	3,564.00	5,284.00	1,015.26
Total preharvest cost/unit	1.90	1.94	.91
HPPS	2.00	3.78	3.52
Crossing & other fees	.25	0	0
Freight to border	.40	0	0
U.S. import duty	.52	0	0
Total export/import cost/unit	1.17	0	0
Total cost/unit	\$5.07	\$5.72	\$4.43

Sources: Univ. of California and grower interviews

early 1992, had reached 3 cents a kilowatt hour--six times its dollar cost in the mid-1980s (Marsh and Runsten).

In addition to these input cost increases, the differential rates of inflation in the two countries combined with the Mexican government's slowing of the peso devaluation has meant that costs in Mexico denominated in dollars have risen constantly since 1987--independent of peso costs.

San Quintín versus San Diego Costs

As can be seen from Figure 14, one of the factors decreasing the competitiveness of Baja as a vine-ripe producer is a lower yield relative to San Diego. It should be noted that the estimated yield shown here of 1,820 cartons an acre is based on personal interviews with large, export-oriented growers who achieve the best yields. The district average yield, as reported by the SARH and shown in Figure 13, is lower because it includes production from small growers. The San Diego yield of 2,720 cartons an acre is based on the county average, as reported by the Agricultural Commissioner.

Per acre preharvest costs are 32 percent lower in Baja California than in San Diego, but the yield differential reduces Baja's advantage, giving similar preharvest costs on a per unit basis: \$1.90 in Baja compared with \$1.94 in San Diego. Predictably, Mexico's main advantage lies in lower harvesting and packing costs. Harvest, haul, pack, and sell is an estimated \$2.00 a carton versus \$3.78 in San Diego. Inevitably, however, the imperatives of exporting reduce some of this cost advantage, adding \$1.17 to land the product in San Diego. San Diego production and marketing costs are higher at \$5.72 a carton, but the gap between Baja and San Diego costs has narrowed since 1987. San Diego costs were estimated at \$5.25 a carton in 1987, which implies a 9 percent increase, compared with a 27 percent increase in costs in dollar terms for Baja since 1987.

Hence, although San Quintín may still have a cost advantage relative to San Diego, and this advantage would, of course, be greater if the tariff were removed, San Quintín's advantage is eroding. These estimated costs depend greatly on yields, and, if salinity continues to be a problem in Baja, yields will continue to be lower than those in San Diego. Indeed, as of the 1991 season, some California firms believed that the cost advantage of Baja is insufficient to warrant a major investment there. Although labor is cheaper in Mexico, more of it is used, and highly efficient south coast California operations can now sometimes outperform San Quintín. This is essentially a reversion to the situation before the large-scale devaluations in Mexico in 1982-1983; Zepp and Simmons found that Baja did not have a cost advantage over California in 1978.

San Quintín versus the San Joaquin Valley

Although the San Joaquin Valley predominantly produces mature green tomatoes, it is still valuable to compare production and marketing costs between the San Joaquin Valley and Baja because they have overlapping shipping seasons. If costs were substantially lower in Baja relative to the San Joaquin Valley, it might adversely affect the competitiveness of tomatoes from this latter region.

The San Joaquin Valley yield of 1,120 cartons an acre (Figure 14) is a weighted average yield that was compiled by using Agricultural Commissioner yield and production data from the various counties in the valley. As previously mentioned, however, more San Joaquin Valley growers are adopting drip irrigation and significantly increasing yields. Mature-green tomato yields are typically lower than vine-ripe yields because of the substantially lower number of pickings (1 to 2 versus 10 to 15 for vine-ripes), but some shippers now report getting as many as 2,500 cartons an acre with mature-greens in the southern San Joaquin Valley.

Although the San Joaquin Valley has typically had 38 percent lower yields than San Quintín, its per acre production costs are 72 percent lower. Consequently, per unit preharvest costs are 91 cents a 25-pound carton in the San Joaquin Valley, compared with \$1.90 in San Quintín. On the other hand, harvest, haul, pack, and sell costs are \$3.52 a carton in the San Joaquin Valley compared with two dollars in San Quintín. Total production and marketing costs for each carton are \$4.43 in the San Joaquin Valley versus \$5.07 in San Quintín. If the 52 cent-duty were eliminated, estimated San Quintín costs would be \$4.55--still slightly higher than costs in the San Joaquin Valley.

The UC cost study assumes a "normal" yield without drip irrigation of 1,040 cartons an acre. Various San Joaquin Valley shippers estimated their total costs using similar technology at from \$4.00 to \$4.50 a carton, so the UC costs may be on the high end.

These lower costs in California are partly attributable to the less labor-intensive nature of mature green tomato production, lower water costs and adequate water quality in the San Joaquin Valley, and the highly efficient industry that has evolved there. Farming operations in the San Joaquin Valley benefit from the world's best agricultural, postharvest handling, and transportation infrastructure. Yield and quality gains from adopting drip irrigation will only increase the region's advantage. Hence, the northern part of the Baja Peninsula does not appear to represent a threat to tomato production in California's Central Valley given current cost, yield, and exchange-rate structures.

Tomato Production in Baja Sur

Given the plateau reached by tomato producers in the San Quintín area, it is worth examining the prospects for increased tomato production in Southern Baja (Baja Sur). Water quality is significantly better there, and tomato production is expanding, particularly in the La Paz area. Development is being led by a large Mexican grower-shipper with ties to Sun World. The shipping season is late fall-winter or early spring, however, which means that the product enters when California production is unavailable. Shipments are insufficient to impact Florida, and high transportation costs to the border (\$1.17 to \$1.30 a carton) ensure that production from Baja Sur will remain relatively small and specialized.

In addition to the transportation cost disadvantage of Baja Sur, operations there are inherently expensive owing to the limited development of agricultural infrastructure, including agricultural input suppliers. To produce vegetables, virgin desert must be converted into ground suitable for farming, and packing and cooling facilities must be constructed. Because no local agricultural labor force exists, workers must be brought in from the Mexican mainland at significant expense, and housing must be constructed. For example, for an operation requiring 500 workers, a construction cost of one thousand dollars for housing for each worker would not be unusual.

Most production inputs such as plastics, drip tape, seeds, chemicals and certain fertilizers are imported from the United States. This is also true for vegetable producers in San Quintín, but Baja Sur growers must incur substantially higher transportation costs to deliver the inputs from the border to the production sites. Although water quality is much better than in San Quintín, the government of Baja Sur is exercising close management over this scarce resource. It has determined that the economic return on water use is three times higher in tourism than in agriculture, and is closely regulating agricultural water use. Consequently, water availability will always be a major constraint in Baja Sur, imposing an absolute physical limit on agriculture.

Summarizing California-Baja Competitiveness

The decreasing attractiveness of the San Quintín area has already caused some California growers and multinational produce corporations to reduce their investment there. In the future, if the coastal region receives significant rain to recharge the aquifer, then production might return to, and conceivably surpass, the 1989 peak. Since we have already experienced that (approximate) level of output without adverse consequences for the California industry, it is unlikely that Baja could become a serious threat in the future. Most of the California tomato industry does not view Baja as competition, because Baja is

considered to occupy the vine-ripe niche--an extension of San Diego.

Furthermore, Baja and Sinaloa are both experiencing similar growth in the relative importance of the Mexican domestic market. Even large growers that traditionally exported 70 percent to 80 percent of total production are now shipping half their volume to the Mexican national market. This product is mainly sent overland in refrigerated trucks to the Guadalajara and Mexico City markets.

To summarize, Baja Sur will not be allowed to develop a major horticultural export industry owing to the higher potential return to the use of the scarce resource water from tourism than from agriculture. Northern Baja production is "maxed out," because of overuse of the aquifers. Water, not land, is the constraint to horticultural production in Baja, and, barring a technological breakthrough, such as cost-effective desalinization, future expansion of horticultural exports from Baja will not represent a major competitive threat to most of California agriculture.

Cost Trends in California

California has remained competitive by relentless increases in yields, but also by automating the packinghouses, holding down real wages, and more efficiently utilizing inputs. This can be seen by comparing the 1991 UC cost study (Guerard, et al.) to a study done in 1972 of mature green production in Merced (Jesse and Machado). The results are presented in Table 4.

It was estimated to cost \$2.30 to grow, harvest, haul, pack, and sell a 25-pound box of tomatoes in Merced in 1972. This is equivalent to \$6.94 a box in 1991 dollars. The UC cost study estimated current costs in 1991 at \$4.43 a box, or only 64 percent of 1972 costs, considering the general level of inflation in the economy over that period. Although the cost of hauling increased four times in real terms--partly because tomatoes are now grown at greater distances from the packinghouses--the cost decreased in the other categories. And, although the cost of packing and selling fell somewhat, undoubtedly owing to mechanization and greater scale economies, most of the savings were realized on the farm.

The costs of growing and harvesting tomatoes in 1991 were all less than 50 percent of the real costs in 1972. The key to this is, of course, the increase in yields. Whereas the 1972 study assumed a yield of 8 tons an acre, the 1991 study assumed 18 tons per acre. While this explains most of the savings in cultural costs and overhead, which are mostly tied to acreage, it is remarkable that the cost of harvesting was reduced in the same proportion, since harvesting costs are tied to yield, and the harvest labor process has not changed at all in the intervening 20 years. Clearly, there are some time savings in being able to pick more tomatoes in a given field, but they are insufficient to explain the decline in real harvest costs. Rather, as will be discussed later, a

considerable proportion is due to a decline in real remuneration to the workers.

Table 4
Fresh Tomato Costs of Production, San Joaquin valley, 1972 and 1991

Category	1972 Cost Study		1991 Cost Study	1991 Costs as a percentage of 1972 costs
	1972 dollars	1991 dollars	1991 dollars	(1991 dollars)
Pre-harvest cultural	\$.43	\$ 1.30	\$.62	48 %
Overhead	.23	.69	.29	42 %
Harvest	.55	1.66	.78	47 %
Haul	.02	.06	.24	400 %
Pack and sell	1.07	3.23	2.50	77 %
Total cost per 25-lb. carton	\$ 2.30	\$ 6.94	\$ 4.43	64 %

Source: Jesse and Machado; Guerard, et al.

Conclusions

Clearly, over the past decade, staked mature-green tomato producers in Florida have been able to compete successfully with both vine-ripe and mature-green tomatoes produced in Sinaloa. As documented by Taylor and Wilkowske (1984) and Kalaitzandonakes and Taylor (1990), the strong record of productivity growth exhibited by Florida tomato growers has enabled them to remain competitive.

Similarly, mature-green tomato shippers in the San Joaquin Valley of California have competed successfully with vine-ripe tomato producers in the San Quintín Valley of Baja California. Vine-ripe tomato production in San Diego declined during the 1980s primarily because of urbanization and high water costs. This production was replaced in northern Baja, but production there has peaked as a result of serious water quality and supply problems. The cost advantage of Baja relative to San Diego has declined since 1987, as has Baja's market share.

In general, Mexico's competitiveness in the U.S. fresh tomato market declined after 1987. This is a result of stagnant or declining yields, the revaluation of the peso, and the policy of

the Mexican government of eliminating agricultural input subsidies. All of these factors have increased per unit production and marketing costs in Mexico in dollar terms. In contrast, thanks to productivity growth, per unit costs in the United States have been relatively stable since 1987. Because the current U.S. tariff on tomatoes is usually equivalent to well under 10 percent of the value of tomatoes, its removal would not be expected to have a major impact relative to these other, more significant, industry trends.

U.S. tomato production expanded more rapidly than consumption during the 1980s, causing downward pressure on grower prices. Relatively low prices in the U.S. market and rapidly expanding Mexican fresh tomato demand, are now causing about half of Mexico's tomato production from the traditionally export-dominated regions to remain in Mexico. Mexico will have to increase tomato acreage and yields significantly during the 1990s to meet the rising demand of its young and growing population. This necessity will place real constraints on Mexico's ability to increase tomato exports to the U.S. market, and appears to present growing opportunities for California firms to ship to Mexico. A significant increase in California yields, combined with declining real labor costs, has made California competitive even in the Mexican market.

Chapter 3. The Farm Labor Force in Fresh Tomatoes

A Very Brief History of California Farm Labor

California has a long and diverse history in the use of farm labor. The development of fruit and vegetable agriculture in California depended on the availability of an ample supply of low-wage labor. The first individuals were the Chinese, who had been brought over to work on building the railroads. They were succeeded by various immigrant (or impoverished) groups over the decades, such that seasonal farm labor came to be seen in California as something apart from the normal labor markets. Agricultural labor was paid less than other labor, and Fuller argued that the availability of this type of labor force was actually capitalized into land values, just as with the crop-producing value of inexpensive irrigation water.

With the advent of World War II, growers had recourse to Mexican labor through the Bracero program, which was a system of contract labor in which associations of growers paid for the transportation, housing, and board of Mexican male workers. This program was continued after the war through 1965. In the late 1940s, and throughout the 1950s, the principal employer of Bracero labor was cotton. As cotton was mechanized, however, the use of Braceros was increasingly concentrated in fruit and vegetable production in California. By 1962, California employed 60 percent of all Bracero labor in the United States (Craig), in such crops as tomatoes, lettuce, citrus, melons, sugar beets, asparagus, and strawberries (Runsten and LeVeen).

Of importance here is the great dependence of tomatoes in California on Bracero labor. From 1958 to 1964, never less than 80 percent of peak tomato harvest labor was accounted for by Braceros in California, and they accounted for 89 percent of peak use in 1964 and 48 percent of total tomato labor in 1963 (Runsten and LeVeen, pp. 65 and 70). The vast majority of these workers were used to pick processing tomatoes, but it is striking, nevertheless, that tomatoes employed more Braceros in the early 1960s than all of the other crops in California combined.

With the termination of the Bracero program, fresh and processing tomatoes went separate ways in the farm labor market. Processing tomato harvesting was completely mechanized in California between 1965 and 1970, in response to rapidly rising wages. This did not prove possible with fresh market tomatoes, however, because final markets were more concerned about the appearance of the fruit.

As with the other crops that were dependent on Bracero labor and

¹There is a very large literature which discusses this history, for example, McWilliams, Fuller, Majka and Majka, Daniels.

were unable to mechanize, such as lettuce or strawberries, fresh tomatoes were able to adapt by encouraging the continued migration of workers from Mexico. Nevertheless, union organizing efforts had a considerable impact in tomatoes after 1965, and such considerations continue to play an important role in decision making, unlike most other crops in California today. However, most work stoppages in California tomatoes in recent years have been led by the workers themselves--not by union organizers.

The Current Farm Labor System

Our information on tomato workers is mainly based on interviews with 86 such workers spread over a period of two years. Most of the data, however, refer to a group of 56 tomato harvest workers interviewed in three regions of California and 14 tomato harvest workers interviewed in Baja California. The structure of shippers and farm labor contractors was constructed in each region, and workers were interviewed who worked for the different employers. In San Diego, a stratified random sample of farms growing tomatoes was taken, and a few workers were interviewed at each farm in the sample. While the information gathered in these surveys is of very high quality, one should keep in mind the relatively small numbers and the somewhat purposive sampling and not make too much of small differences in numbers reported, since they usually would not be statistically significant.

The information presented here also relies heavily on open-ended interviews with participants in the fresh tomato industry. Interviews were conducted with a dozen grower-shippers of varying sizes in California and Baja, who collectively operated in all of the fresh tomato regions of California and northwestern Mexico. Several contracted growers were interviewed in three distinct regions. Information on the operations of farm labor contractors was obtained through an earlier study conducted by Suzanne Vaupel in the Fresno area (Vaupel), and through interviews conducted by CIRS as part of a state-wide survey of farm labor contractors (California Employment Development Department). Finally, in-depth interviews of tomato workers and former tomato workers were conducted by Anna García in Stockton, Fresno, and San Diego.

Once again, the workers surveyed were grouped into four regions: Stockton (or the northern San Joaquin Valley, which here also includes Sacramento, Stanislaus, and Contra Costa counties), Fresno (as proxy for the southern San Joaquin Valley, which here includes Madera and Merced), San Diego (which includes Orange county), and Baja California (which is essentially the coastal region from Ensenada south to San Quintín). Workers were not interviewed in

the other regions, such as Imperial or Salinas. ²

In the following tables, the four regions are labeled as above, but "California" refers only to workers in Fresno, Stockton, and San Diego, whereas "All regions" refers to the entire sample, including Baja.

Worker Characteristics

Legal Status

As shown in Table 5, about one-half of the tomato workers interviewed were SAWs, although there were many more SAWs in San Diego and Fresno than in Stockton. The labor force was heavily undocumented in San Diego and Fresno before IRCA. In fact, some Fresno tomato farm labor contractors reported legalizing 100 percent of their workers through IRCA (Vaupel). In the initial survey by Alvarado, et al. in the Fresno area after IRCA (in 1989), only 7 percent of the workers they interviewed were undocumented. The proportion of undocumented, therefore, appears to be increasing. As we will argue later, high turnover and short seasons in the Fresno area leads employers to hire new entrants in the farm labor force.

Table 5
Legal Status Reported by Tomato Workers

Legal Status	Calif.	Stockton	San Diego	Fresno
SAWs	48 %	28 %	60 %	73 %
Pre-1982	4	4	7	0
Green Cards	25	52	7	0
Marriage	2	4	0	0
Temporary Family Reunification	2	4	0	0
Not legally documented	20	8	27	27

Source: Worker survey

²One could quarrel with the inclusion of the area around Merced with the west side of the San Joaquin Valley around Huron, in that they are distinct regions, but at present they are drawing on the same labor force, which is the important consideration here.

By contrast, in Stockton only 28 percent of the tomato workers interviewed were SAWs, because over half of the Stockton workers already held green cards before IRCA. Note that only 7 percent of the San Diego workers and none of the Fresno workers reported having green cards.

Of the workers without proper documents, only 8 percent had applied for the RAW program, and only 15 percent had ever been denied a job for lack of documents. Although workers reported that some employers demanded documents, they were not required by many contractors in the San Joaquin Valley. At least one contractor was willing to hire people at the field by the day, without documents, without filling out an I-9, and paid cash without giving the worker any evidence of payment. Most undocumented workers were treated like everyone else, however, including having deductions taken from their checks which they would not be able to claim, such as unemployment insurance. We observed children and pregnant women working in Stockton as "helpers,"--that is, under someone else's name, which is also a common practice for undocumented workers.

Despite the contrary assertion of Conway (1991), over a quarter of the workers interviewed in San Diego were undocumented, and informants reported that the majority of workers were undocumented at certain ranches. In fact, we interviewed two workers in San Diego who would have qualified for the SAW program but failed to apply out of fear that it would prejudice their job in some way.

Although there was great concern to demand and present some type of documents in the early years after IRCA, the lack of enforcement has greatly reduced the pervasiveness of this requirement. Vaupel's interviews with 6 tomato farm labor contractors in Fresno, in 1989, showed that three of them had been checked for document compliance by the INS, and one of these was fined \$150,000 for 300 incomplete or missing I-9 forms. This contractor is still working, however, and none of the other tomato contractors interviewed more recently in Fresno or Stockton had been fined by the INS.

A recent survey in which we cooperated found that only 30 percent of contractors had been visited by the INS over the 1987-1990 period, and that small contractors were only half as likely as large contractors to have been checked. Of all the enforcement penalties issued over this period, the INS only accounted for 7 percent of occurrences (Employment Development Department). In addition, the rate of enforcement has declined.

Time in United States Agriculture

The mean time in U.S. agriculture for all of the workers surveyed in California was 11 years; the median was seven years. However, 21 percent had been in U.S. agriculture three years or less, and 41 percent had been in U.S. agriculture five years or less at the time of the interview--that is, they had entered since 1986.

The mean time working varied greatly by region. In Stockton it was 14 years, in San Diego it was 10.7 years, and in the Fresno area only 6.5 years. It is interesting that the labor force in Fresno would be more recently arrived than the workers in San Diego, particularly because the proportion of undocumented were the same in both areas. Possibly, newly arrived workers want to distance themselves from the border, or perhaps the numerous jobs available in Fresno agriculture attract new immigrants. It could also be owing to the shift of the Mixtec population toward the Central Valley, which, in turn, has been tied to their ability to enter the farm labor force in short-season tasks, such as thinning tree fruit, harvesting wine and raisin grapes, and harvesting tomatoes.

The mean time for all Oaxacan workers surveyed in California was 7.4 years. The comparable time in the United States from an earlier survey of Mixtec farmworkers was 7.2 years (Zabin, et al.) By contrast, the mean time in U.S. agriculture for the non-Oaxacan workers in our study was 13 years.

State of Origin in Mexico

It should be noted initially that all of the workers interviewed were born in Mexico. Our random interviewing of tomato workers did not turn up any U.S.-born individuals. There may be some, but probably very few. Recent estimates of U.S.-born workers in California agriculture consistently place them at less than 10 percent of the labor force (Kissam, García, and Runsten; Alvarado, et al.; Mines, Gabbard, and Boccalandro).

Including the workers in Baja California, 41 percent of the tomato workers interviewed were from Oaxaca (43 percent were Mixtec) and 36 percent were from Michoacán--the new and the old sending regions. The increasing presence of Oaxacan workers in California tomatoes is a fairly straightforward substitution of networks, and will be discussed at length below. Other states of origin are shown in Table 6.

The regional variation of origins was striking. In Stockton, 92 percent of the workers interviewed were from Michoacán, Guanajuato, or Jalisco, the traditional core sending region, and the rest were Mixtec. In Fresno, by contrast, none were from the traditional region, two-thirds were from Oaxaca, and 80 percent were Mixtec (although this extreme difference may be due to sampling error). In San Diego, which has a very mixed labor force, 20 percent were from the core states and 40 percent (who were also Mixtec) were from Oaxaca. Finally, in Baja, 79 percent were from Oaxaca; the rest came from the core sending states, especially Michoacán.

Table 6
State of Origin of Tomato Workers

State	All Regions (%)	Calif. (%)	Stockton (%)	Fresno (%)	San Diego (%)	Baja (%)
Michoacán	35.7	41.8	84.0	0	13.3	14.3
Oaxaca	41.4	30.9	4.0	66.7	40.0	78.6
Guerrero	5.7	7.3	4.0	6.7	13.3	0
Puebla	4.3	5.5	0	20.0	0	0
Jalisco	2.9	3.6	4.0	0	6.7	0
Querétaro	2.9	1.8	0	0	6.7	7.1
Nayarit	1.4	1.8	0	0	6.7	0
D.F.	1.4	1.8	0	0	6.7	0
Morelos	1.4	1.8	0	6.7	0	0
Hidalgo	1.4	1.8	0	0	6.7	0
Guanajuato	1.4	1.8	4.0	0	0	0

Source: Worker interviews

Occupation in Mexico

The data continue to support the proposition that most farmworkers come from agricultural backgrounds in Mexico. In the sample, 58.6 percent of the tomato workers had been working in some agricultural job in Mexico before coming to the United States: 30 percent were agricultural wage workers, 21.4 percent were running their own farms, and 7.1 percent were working on their family's farm. In addition, another 27.2 percent were dependents: 14.3 percent students, 8.6 percent housewives, and 4.3 percent children neither working nor studying. Only 14.4 percent of the workers interviewed had been working in a nonagricultural occupation in Mexico--2.9 percent in construction, 8.6 percent in services, and 2.9 percent in manufacturing.

About 28 percent report owning land in Mexico, including 7 percent who own irrigated land. Over half (51 percent) owned a house in Mexico.

Age

The mean age of the workers was 32 years, the median 28 years--with a range from 16 to 68. The mean age was highest in Stockton (35.2 years), lowest in Fresno (26 years); San Diego (34.1 years) and Baja (30.4 years) fell in between.

Education

For the entire sample, the mean years of education were 4.3 years--56 percent had four or fewer years of schooling, and 15 percent had never attended school. Only 3 percent had studied in the United States. There was no evidence that the Oaxacan workers had any less education than other groups.

Jobs in the United States

The vast majority of workers came to the United States and began working in agriculture: 88 percent started as fieldworkers, 3 percent in a farm repair job, and 3 percent in urban landscape maintenance. The only completely different occupations reported were dishwashing and a metal foundry. Although agriculture represents an increasingly small proportion of jobs taken by new Mexican immigrants, this study suggests that farmworkers continue to enter agricultural work directly--not via urban jobs.

The workers were asked whether they were considering changing their occupation in the next year. None of the Baja workers contemplated leaving agriculture. Of the California workers, 14 percent said yes, that they might. In Stockton, where 12 percent thought of leaving agriculture, occupations mentioned included bricklayer, cannery worker, and housewife; in San Diego, the 13 percent who might leave mentioned manufacturing jobs; and the 20 percent of Fresno-area workers considering doing other work mentioned landscaping, working for the parks department, and being a mayor-domo. The last category is, of course, not an exit from agriculture.

The majority of California tomato workers (86.4 percent) began working in the United States in California. Combined with the data above, this implies that 79 percent of the tomato workers interviewed began working in the United States in California agriculture. California agriculture has been, and remains, an important entry point for Mexican immigrants.

Although most came directly to the United States from the interior of Mexico, 14 percent had come first to Baja or Sinaloa to work before arriving in the United States. Because the labor force in northwest Mexico is increasingly composed of indigenous workers from Oaxaca and the south of Mexico, the active recruitment of

these workers by northwest Mexican growers is an important element in their increasing presence in California (see below).

The first employer in agriculture for the workers interviewed was about evenly split between growers (55 percent) and farm labor contractors (45 percent). Contractors did not account for a larger percentage because many of these workers start in San Diego, where contractors are not used in vegetables.

In contrast with these first jobs, the California tomato workers reported that, in their current or last tomato job, 68 percent worked for contractors. Although some workers had spent as many as 23 years with their current tomato employer, 33 percent were in their first season with the employer and 75 percent had spent five years or less with the employer.

When asked about their first job in U.S. agriculture, the crops broke down as in Table 7. Although the most frequent response was tomatoes, people had started working in various crops.

Table 7
First Job in U.S. Agriculture
for California Tomato Workers

Crop Type	Percent
Tomatoes	31.1
Vegetables	18.0
Grapes (all)	16.4
Tree fruit and citrus	13.1
Field crops	11.5
Strawberries	9.8

Source: worker interviews

If we compare these crops to the crops actually worked in 1990 by the same workers, shown in Table 8, the relative importance of the crops is similar, except that field crops are unimportant to these workers now, because most of the tasks done previously by hand have been mechanized.

It should also be noted that the data indicate that the work is heavily compartmentalized by region. In Stockton, workers harvest cherries, apricots, or asparagus, in addition to tomatoes, but they do not prune. In the Fresno area, most of the alternative work is in grapes, which includes pruning among other tasks, but Fresno tomato workers do not work in tree fruit or citrus. The Mixtec

also travel to such places as Oregon or Florida to harvest tomatoes, berries, or vegetables. In San Diego and Baja, growers complement tomatoes with plantings of other vegetables and strawberries, which accounts for most of the additional employment in those regions.

Table 8
Job Tasks of Tomato Workers by Crop, 1990

Crop Type	Percent
Tomatoes	45.9
Vegetables	22.2
Grapes (all)	12.4
Tree fruit and citrus	9.8
Strawberries, blueberries	6.1
Field Crops	1.3
Other	4.0

Note: These percentages are the proportion of all job tasks in a particular crop in 1990, as reported by the respondents in their job histories. Because pole tomatoes often require the same workers to perform a variety of tasks over many months, they are counted more heavily here. Also, this table includes some workers interviewed in Baja who had never worked in U.S. agriculture, and, thus, are not included in Table 6.

Source: Worker survey

Migration Patterns

Because some of the peak seasons were missed in surveying the workers, it is likely that the workers interviewed are less migratory than the population as a whole. With that caveat, of the workers interviewed, 46 percent reported not leaving California in 1990, 48 percent went to Mexico at some point during the year, and only 6 percent migrated to another U.S. state without also going to Mexico. About 14 percent of the California tomato workers migrated to another U.S. state; the only states reported were Oregon, Washington, Florida, and Arizona, in that order of importance.

There were regional differences. In Stockton, 50 percent said they stayed all year in California, 36 percent stayed in the Fresno area, and 31 percent stayed in San Diego. Viewed from the other side, 42 percent of Stockton workers went to Mexico, while 57

percent of Fresno workers and 69 percent of San Diego workers went to Mexico. This evidence of greater settlement by the Stockton workers confirms other information presented here.

The Baja workers that were interviewed usually stayed in Baja all year, although 14 percent reported coming to work in California at some point during the year. The workers who migrate to other regions of Mexico were not present during the interviews in Baja.

Family

The more family-oriented housing arrangements impact clearly by region. The workers were asked whether they were living with their spouse: 72 percent were living with their spouse in Stockton, 47 percent in Fresno, 33 percent in San Diego, and 57 percent in Baja. The average in the National Agricultural Worker Survey for Mexican-born farmworkers was 47 percent (Mines, Gabbard, and Boccasandro); therefore, although the Fresno workers were average in this regard, there are clearly numerous settled families in Stockton and relatively few in San Diego.

Government Transfers and Insurance

As is true of the results of most surveys of Mexican migrants, California tomato workers were relatively infrequent users of government transfers when compared with the U.S.-born poor. Only 5 percent of the workers surveyed used Aid to Families with Dependent Children, 5 percent used WIC, 4 percent received emergency services, and no one received social security or general assistance payments. One worker in Stockton and one in the Fresno area received housing assistance (apart from the state-owned camp residents). The most heavily used welfare program was food stamps, which 21 percent of the workers reported receiving. All of these transfers were fairly evenly distributed across the three regions.

The workers were heavier users of insurance programs. Approximately 27 percent used Medi-Cal--40 percent of the workers in the Fresno area versus 20 percent in San Diego and 24 percent in Stockton; 5 percent received disability payments, which was the same in each region; and 59 percent received unemployment insurance payments--76 percent in Stockton, 73 percent in Fresno, but only 20 percent in San Diego. This lower percentage in San Diego doubtless reflects the much longer season of work there.

Characterization of the Tomato Labor Market in Stockton

The Stockton tomato labor force is a more stable group of farmworkers than those in the other regions. As previously mentioned, the Stockton workers average more time in the United States, have more green card workers, are much more likely to be living (and working) with their spouse, are older, and mainly come from traditional migration sending regions of Mexico.

The Stockton labor force is composed primarily of workers from Michoacán, from such towns as Jiquilpan or Jaripo. The core groups for the different crews are often large kinship networks from one or more of these towns. There is also a group of workers from Guanajuato, which is another core sending state in Mexico, and a small group of indigenous workers from southern Mexico.

Most of the workers are hired via farm labor contractors. Each firm uses one or more contractors, although at least one firm also has direct-hire crews, ostensibly to keep a check on the contractors' costs. The crew bosses are mostly from the same towns in Michoacan or Guanajuato as the workers.

As previously noted, tomatoes in California relied heavily on bracero labor up to 1965, and there are workers in the current labor force who worked as braceros in the Stockton area. One worker interviewed had deserted the Bracero program in 1958 after working in Tracy. He returned to the area to harvest cherries in 1962, and has been returning since then. In fact, significant numbers of the long-term, seasonal migrants also work in cherries and apricots, and it appears that fresh tomatoes drew on this fruit-picking labor force, because the harvest periods are complementary.

There is considerable solidarity among these workers, and they have gone on strike repeatedly in the past ten years (see the section on organizing). The most recent strike in 1989 led some shippers to bring indigenous workers from Merced and Madera as temporary strikebreakers.³ Some of these crews continued to come in 1990 and 1991, but Mixtec workers in Madera say that few want to make such a long trip for relatively short hours.

It seems likely that the Michoacán group will continue to account for the bulk of the labor force, due to the housing situation.

³By indigenous workers is meant native peoples from southern Mexico and Central America, such as the Mixtec, Zapotec, Triqui, or Maya. They are called "Oaxacans" and are discussed extensively in a later section.

Farm Worker Housing: A Digression⁴

A key feature in the perpetuation of this group of workers has been the existence of two state-owned seasonal farm labor camps in the area south of Stockton, which is close to where most of the tomatoes are grown. Between them, the two camps have 192 units and house almost one thousand people. We estimate that these camps account for about one-half of the Stockton area fresh tomato labor force. A large proportion of the other half of the labor force are former camp residents who have settled in Stockton.

As in other studies of these state-run camps in California (Kissam, Garcia, Runsten; Goldring), workers from certain villages in Mexico are able effectively to take over the camps and return year after year. This possibility has been legalized through a system first instituted in 1981 in Watsonville, Parlier, and King City.

Until that year, returning workers had to wait in line for the camp to open, and places were distributed on a first-come, first-served basis.⁵ This led, however, to long lines of cars camped out for weeks ahead of time, unsanitary living conditions, fights, and so forth. Therefore, the state Office of Migrant Services decided to give camp residents vouchers guaranteeing them a place the following year. This institutionalized the pattern of return migration, because now families had to return every year to maintain their place in the camp. In fact, workers usually return to the same housing unit every year, which they consider a seasonal home. The voucher system was instituted in the Stockton camps in 1982 or 1983.

The typical rate of return to these camps is over 90 percent. In 1992, seven of 96 units were available in each of the two Stockton camps, which is to say that there was a 93 percent return rate; in 1991, only five units were open; in 1990, there were ten. This is a rather remarkable rate of return when one considers the relatively high turnover rates in much of agriculture. It is not unusual for these state camps, however, because the Parlier camp in Fresno had 95 percent of its families return in 1992. A lottery is held for the few open spaces, and friends and relatives of the families in the camps are the usual applicants. Young married couples often live with one of their parents until they can secure

⁴Most of the facts presented here about the state camps result from personal communications with Manuel Castro of the California Department of Housing and Community Development.

⁵The federally funded FMHA centers still use a first-come first-served system because of federal rules. These centers include the camps in Ripley, Westley, Patterson, Firebaugh, and Harney Lane (east of Lodi).

a place of their own in the camp.

There are three important characteristics of the camps that contribute to shaping the Stockton tomato labor market. These include their family orientation, their limited six-month season, and their subsidized rents.

There is a tendency in California agriculture away from family labor and toward the increasing use of single male migrants. The time-series data to prove this trend does not exist, but it is an impression widely shared by observers of the the farm labor scene. Possibly a result of the large numbers of available migrants, it is also the result of housing constraints. Single men are able to crowd together (as in Madera) or even sleep outdoors (as in San Diego) in ways that would be unacceptable for women and children.

The state camps are, however, family housing. More important, they are seasonal family housing, which has become extremely difficult to find in California. For example, one farm labor contractor that employs many families from south Texas and northeast Mexico (who live in the Parlier camp and pick stone fruit), said he could bring many more families, but there is no place to house them. The Stockton tomato labor force has more women working than other regions of California because of the camps.

Much of the effort to build "farmworker" housing in California during the past 20 years has gone into the construction of single-family homes for sale at subsidized rates to long-time farmworkers. However, many of these were resold by the farmworkers to nonfarmworker families, in order to cash out the subsidy, and because of their difficulty in meeting regular mortgage payments. Migrants, whether families or individuals, need seasonal housing.

Much of the permanent housing that was built ultimately served the interests of neither the growers nor the farmworkers, because it was unavailable to new farmworkers as the labor force turned over. It was a reward for a certain cohort of farmworkers, but it has had little impact on the farm labor market.

Thus there has been a bias against migrants on the part of worker advocates in the housing programs. The tacit assumption was that migrancy was bad, and that by providing permanent year-round housing, one would stabilize the farm labor force. Granting farm workers the right to collect unemployment insurance was considered a permit for them to live year-round in California.

Some of this has occurred. For example, significant numbers of Stockton tomato workers live in the Sierra Vista housing project, because they have moved out of the camps and into permanent residence in Stockton. This was often possible because some members of the family had found year-round jobs, especially in

nonfarm work. And now, considering the increase in housing prices in the San Joaquin Valley, it seems unlikely that couples who combined earn 8 thousand to 10 thousand dollars a year can qualify for even low-income homes.

The basic problem with the settlement vision, however, was that the farm labor market did not stabilize into well-paying jobs for a settled labor force. It was undermined by new immigrants that were willing to work for lower wages. The availability of this labor force provided no incentives to growers to reduce the seasonality of production. Thus farmwork in California remained a relatively low-paid, seasonal occupation in which the average farmworker works about half the year.

Under these circumstances, it is very difficult for farmworkers to live in California, which is one of the most expensive places on earth, when they are not working. For this reason, they often establish back-and-forth migration patterns to Mexico or to some other, less expensive, winter residence, where they may or may not work during the off-season.

The state camps, which are open to migrant farmworker families for only six months each year, encourage this type of back-and-forth migration. The workers in the Watsonville camp pick strawberries and return to Gomez Farías, Michoacán, during the off-season. The workers in the Parlier camp pick stone fruit and return to Doctor Cos, Las Aldamas, or Linares, Nuevo Laredo in the off-season. And the workers in the Stockton camps pick tree fruit and tomatoes and return to Michoacán, Yuma, Coachella, or Mexicali during the off-season. A camp manager in Stockton estimated that 50 percent of the workers went to the border to do some work, mainly in lettuce and asparagus. These are stable migration patterns, and they reproduce themselves, because children are often born and raised in Mexico, and the ability to come to work in California six months each year is a desirable job opportunity compared with other alternatives in Mexico.

Thus, the Stockton camps bring back a group of families from relatively few towns or villages in Michoacán, Mexico: 80 percent to 90 percent of the workers are from Jaripo, Churitzio, Sahuayo, Jiquilpan, or Purépero. The same people return every year. Spaces become available as people retire in Mexico or settle in the Stockton area. Because workers are working for a limited period, they want to work as much as possible. This is characteristic of back-and-forth migrants, but it means that the camps are a relatively dependable, and self-reproducing, supply of labor.

The camps are also subsidized, although state budget crises may threaten this arrangement. From our interviews, a typical unit in Stockton had 2.8 wage earners and rented for \$22.75 to \$29.75 a week in 1991 (depending on whether it had two, three, or four bedrooms). The mean cost was \$9.28 a week for a working adult in

the camp. Noncamp tomato workers in the Stockton area reported paying an average of \$20.87 a week for housing. Single tomato workers in the Fresno area were paying only \$10.25 a week, but some paid as much as \$20 a week. In Madera, single workers averaged \$18 a week, but some payed as much as \$31 a week. Workers with families paid an average of \$25 a week in Fresno and \$28 a week in Madera. One worker, who rented a separate apartment for his family in the Fresno area, paid \$75 a week.

Thus, it is fair to say that the workers in Stockton who live in the camps are saving \$10 to \$20 a week for each worker, or \$28 to \$56 for each family, which, over the course of the six months the camps are open, saves a family \$728 to \$1,456. Adding one thousand dollars to family incomes that are typically 10 to 12 thousand dollars a year is a significant subsidy.

The advantage of this subsidy to the worker is that he captures it, because the same wages are paid to everyone, no matter where he lives. In addition, one can live alone with one's family in the state camps, while most apartments or houses have a number of families or single workers crowded together.

The desirability of the camps can be seen by the increasing demand for them. Camp managers in Stockton report that in the 1970s as many as 20 percent of the units would turn over each year and it took two to three months to fill the camps completely. This changed in 1986, however, when 70 families applied for the ten available spaces, and worsened in 1988, which was the year people arrived from Mexico ostensibly to apply to regularize their status under the SAW program. The camps now fill up on opening day, and a lottery must be held to allocate the few open spaces.

The existence of these camps, and their "capture" by a group of Michoacanos, has led to the current characteristics of the Stockton tomato labor force. The employers cannot replace them in the camps with other workers, because the system is set up to perpetuate their access to the camps. Thus, the workers are available every year, they become skilled at tomato picking, and they have few alternative jobs available to them during tomato season. These Michoacanos also occupy most of the positions of contractors or foremen for the shippers. For these reasons, workers and employers attempt to accommodate one another, even through the series of strikes that have occurred.

Characterization of the Tomato Labor Market in Fresno

The tomato labor force in the Fresno-Merced area is an entirely different story from Stockton. The preponderance of the work force is made up of "Oaxacans," indigenous workers, mostly Mixtecs, from the southern highlands of Mexico. There are many more single men than in Stockton, and they averaged only 6.5 years in the United

States, which is less than half the length of experience of the Stockton workers. In fact, the labor force is so recent that we ended up not understanding who formerly picked tomatoes in Fresno, as the Oaxacans are a phenomenon of the 1980s.

The labor force in this region in fresh tomatoes is very fluid, because the work is uneven. Most of the workers interviewed complained of sporadic employment in Huron tomatoes. They said that they might work only two days a week, and then have to hook on with another crew to go to Merced to work. Even when there is a significant stretch of work, the season is not that long. It starts and stops, so workers are thinking of their next job, and leave when they find it.

Crew sizes are smaller than in Stockton, and the labor process seems better organized to provide the workers with the opportunity to maximize piece rate earnings. Contractors are responsible for virtually all harvest activities, as in Stockton.

Vaupel found in interviews with Fresno tomato contractors that they experienced very high rates of turnover--as many as 11 workers a job slot in a season. The lowest turnover was three workers a job slot at the largest contractor, who was best able to secure continuous employment for his workers (Vaupel). One large shipper said they had shifted to contractors because it was simply too difficult to retain workers when they could not offer them enough employment. Nevertheless, the contractors reported no problem finding workers, which indicates the large pool of labor available to them.

Under these circumstances, it is not surprising that the Mixtecs have found their way into Fresno tomatoes. In studying the Mixtec, it is clear that, as the newest immigrant group, they are concentrated in agricultural jobs that have undesirable characteristics, such as low wages or short seasons (Zabin, et al.). It is not only the uneven work that is undesirable here, but also the long commutes from the east-side towns to the west-side fields, which take about one hour each way. Workers complained of having to get up very early in the morning, wait to be picked up, ride out to the fields, wait to start harvesting, then later ride home. There is a great deal of unpaid time in this system.

In addition, the workers have to pay a raite (ride), which is quite high for traveling out to the west side. The average is \$4.57 a day for the Fresno area--or \$1.50 more a day than in Stockton. Only one worker interviewed in Fresno did not pay a raite.

It is interesting to note that Huron, a west-side town where a lot of this tomato-growing is centered, has also become an important area for lettuce production. The people living in Huron are primarily mestizo lettuce workers. Many work for a large firm

under a union contract, and travel to other regions with the firm to complement their lettuce work in Huron. Fresh tomatoes do not provide enough continuous employment in the area to lead to settlement by tomato workers in the town. When one interviewer asked some residents if they worked in tomatoes, they looked at her as though she were crazy and said, "Tomatoes! Oh, that's done by those Oaxacos. They bring them out from Madera."

Characterization of the Tomato Labor Market in San Diego⁶

San Diego's importance as an agricultural production area has declined as urbanization has increased. This situation has evolved in a manner similar to that in Orange and Los Angeles counties to the north.

Whereas most tomatoes were grown in the south-county area into the 1970s, this cropland has been almost entirely displaced by housing development. Now, tomato and vegetable production is centered in the north-county hills, on leased federal land at the Pendleton Marine Base, and on the Irvine Ranch and vacant lots in Orange County. Virtually all of the land is leased, because its value for development far exceeds even the most remunerative agriculture, and it is being held by speculators or developers.

One might expect that, given the proximity of such large urban areas, agriculture would experience severe competition for labor. San Diego's location as the principal entry point into the United States for Mexican migrants, however, ensures a steady flood of workers. One person described the few remaining tomato growers as "islands in a stream of labor headed north." Some growers reported that their biggest problem with labor was turning people away.

In fact, in interviews with a number of former farmworkers, they reported that many people who had found jobs outside agriculture had been laid off during the current recession, which made workers afraid to leave agricultural jobs. And, at one tomato ranch where there had never been problems with pay, workers had not been paid for two months, but were afraid to quit working for fear they could not find another job.

The farm labor force in San Diego is a diverse group, with some long-term workers from Michoacán and other core sending areas at certain ranches, but it is still dominated by indigenous migrants from Oaxaca. As these groups of indigenous workers, especially Mixtecs, have moved beyond San Diego to Madera or Oregon, the concentration on San Diego by new arrivals has lessened. There may be a certain desire among the undocumented to move north into areas

⁶Much of the information in this discussion has been previously covered by Fred Conway (1991), and owes a great deal to that study.

that are away from the border and its related enforcement activities.

Nevertheless, in interviews with Mixtec workers throughout California and Oregon, impressive numbers of such immigrants had first worked in the United States on one of the San Diego tomato ranches, and these ranches are known by the nicknames the workers have given the owners, such as "Los Diablos" or "El Hindu."

In addition to these ranches' role as arrival points for migrants who eventually move on, there is a sizable group of back-and-forth seasonal migrants who return every year from many different areas of Mexico. The SAW program appears to have stabilized this labor force. Growers have also extended the season of work in a year by planting a more diverse crop mix of vegetables and strawberries, although this varies from farm to farm.

Interestingly, unlike the Imperial Valley or southern New Mexico, other border agricultural regions where workers are bussed from Mexican border towns on a day-haul basis, few workers in San Diego vegetables commute from Tijuana, although such commuters are reportedly more important in the nursery industry. It is doubtless the availability of a virtually all-male labor force that is willing to live in proximity to the fields--that is, in crowded apartments or in outdoor camps in the canyons--which obviates the need to haul workers any distance.

With expensive land and water costs, restricted parcel sizes, and hilly topography, San Diego growers must pursue a high-value cropping strategy. For all these reasons, vine-ripe pole tomatoes are the crop of choice. As shown earlier, vine-ripe tomatoes actually are worth less a pound than mature-green tomatoes, but one can repeatedly harvest vine-ripe tomatoes, whereas a field of mature greens are usually picked only once. Pole tomatoes are, thus, more appropriate where input costs (land, water) are high. San Diego has the highest tomato yields in the country, and one can recoup the high investment in the crop because of the long season that lasts from late June through early December.

Pole tomatoes, however, are also the most labor-intensive crop on a per-acre basis; therefore, one needs a large supply of relatively inexpensive labor for a viable operation. Although Sinaloa and Baja California growers have had to spend considerable sums to recruit labor in southern Mexico, San Diego is ideally situated at the U.S. gateway, and growers do not recruit.

Most tomato workers in San Diego are paid minimum wage and are required to pick a minimum number of boxes each day (100 appears typical). Because workers pass over the fields regularly, as long as the market price is reasonable, the grower is more interested in the quality of harvesting. Conway reported that growers at times went to piece rates when market prices fell, but we only found

workers being paid piece rates in this manner on a large ranch with generally high wages.

On this ranch, which offers workers such benefits as vacations, health insurance, and bonuses, piece rates are a means to minimize the number of workers hired. Workers report having to pick 100 boxes a day, or they are given a ticket. Once three tickets are received, they are demoted to an hourly wage job. While most pickers average 125 boxes, and can pick over 200 boxes on an exceptional day, older workers have increasing difficulty meeting the minimum. There has been some recent union organizing around this issue.

Because workers repeatedly harvest the same land, there is no need to move around from field to field; therefore, growers hire directly. The only reported use of contractors was for transporting some workers to the Marine base (Conway). All workers are hired through walk-in.

Legal services reports problems with nonpayment of wages and minimum wage violations under piece rates, but these appear to be endemic to a small group of "problem" growers. As an example of the attitude of some of these employers, one had refused to sign letters or give evidence of employment for IRCA legalization, fearing that legalized workers would leave or make other demands. He said, "You can continue to work here, why do you need to be legalized?" This stance so infuriated the workers, that some went to the INS to complain, were fired, and subsequently went to work for other employers in the area. As one worker recounted it:

When asked about the problems which resulted in the exodus of a number of workers in 1986, he stated that the firm refused to give letters verifying their employment with the firm during 1985 and 1986. They refused because they had paid employees in cash during that time. The informant states that workers were paid \$20 per day at both the Carlsbad and Del Mar ranches. This included those workers who were spraying, tractor-drivers, etc. Workers who had worked for the firm for some time and were employed in the strawberry harvest were the only workers who were being paid at minimum wage and with a check. All these workers were employed at the San Luis Rey site. Only these latter workers were provided letters verifying that they had worked for the firm during the time allowed for SAW status. Other workers who were not given letters of verification circumvented the firm by finding a lawyer who was willing to gather declarations from fellow workers. Only in this way were workers who had not been provided letters able to get SAW status. (Anna Garcia fieldnotes, 12/8/91)

Only one worker we interviewed reported being paid less than the minimum wage in San Diego. And, in some respects, the situation appears to have improved over the earlier 1980s, perhaps because of the considerable public scrutiny and legal action that have occurred, or perhaps because of the legalization of a significant proportion of the labor force under IRCA. As one worker remarked, "At least they pay you now."

The biggest problem in San Diego is the housing situation. According to Conway, workers have lived outdoors for decades in makeshift camps in the hills and canyons of the north county area. These camps are an ongoing scandal in southern California. Pictures of cardboard shacks, tree houses, or holes in the ground appear periodically in the local newspapers. This was not of great note for many years, because of the camps' relative isolation. As urbanization spread, however, suburbanites in expensive homes were not pleased to find themselves next to farmworkers' encampments, and have often had them cleared as health hazards.

Workers live in such outdoor camps because of both the lack of seasonal farmworker housing and the high rents in the San Diego area. Nevertheless, most of the workers interviewed were living in apartments, crowded in with numerous other immigrants. From our Mixtec census of 1991, there are probably as many as three thousand workers camped out in rural San Diego county, many of whom do not work in agriculture.

The largest tomato grower built a dormitory to house almost his entire labor force, and it has been filled to capacity. He has lease access to the Marine base, however, which would warrant such an investment. Because San Diego tomatoes are grown almost entirely on leased land, most growers are not in a position to build such housing or make long-term plans.

Ironically, although this dormitory was built as single-male housing because virtually all fieldworkers in San Diego are male, it was opposed by worker advocates because it was not family housing. Such positions are more strategies to settle immigrants in the United States than they are efforts to provide housing for farmworkers, which emphasizes the difficulty current farmworkers have in expressing their own needs. The cost of living in this dormitory was quoted at \$38.60 per week in December 1991 for room and three meals each day. This is a very reasonable charge and it is not surprising that there are more people who want to take advantage of the offer than can be accommodated.

⁷Local observers and governments estimate there are 10 to 40 thousand people camped out in San Diego County, including the homeless in urban areas (Zabin, et al.). Our direct survey suggests that, at least in the rural areas, these numbers are inflated.

Characterization of the Tomato Labor Market in Baja California

The San Quintín labor force is mostly composed of indigenous workers from the southern highlands of Mexico, an estimated 80 percent from Oaxaca, mostly Mixtecs (Garduño, et al.). An agricultural labor force was developed during the 1980s in the San Quintín area, which was tied to worker migration from southern Mexico to Sinaloa during the fall and winter and then on to northern Baja in the spring. Growers in Sinaloa had recruited workers from Oaxaca for many years, and this practice was also adopted in San Quintín. Growers interviewed in San Quintín reported sending many buses and even chartering airplanes to bring workers up in 1991.

There was a great deal of labor strife in San Quintín during the 1980s, as an independent union (CIOAC) tried to organize workers in the area. The union was repressed and was not allowed to register legally. Many compromises were reached and the situation seems more tranquil now. For example, workers who had no access to land and had to live in very mean circumstances in grower-owned camps were allowed to invade certain land parcels and construct their own shacks--partly to encourage settlement of the labor force. The camps are still in use, although workers now have access to health and other services from the government. In addition, the growers began to provide free transportation to the fields and reduced the verbal harassment of the workers by supervisors. There is a certain casualness to the labor process in Baja that is never encountered in California.

In addition, nominal wages have increased in Baja as growers try to retain laborers. The proximity to the United States is a constant temptation for workers, and now that the Mixtec have established migration networks in the United States, there is real competition for this labor force. In fact, to avoid this competition, growers in Baja have attempted to recruit in villages in Oaxaca that do not send migrants to the United States (Zabin). In our interviews in Baja, we found a number of villages and regions represented that were not among the 180 villages found in a 1991 Mixtec census in California (Runsten and Kearney).

A significant proportion of tomato workers in Baja are women--more so than in any region of California. This is undoubtedly because of both the difficulty women have in migrating and working in the U.S. farm labor market and the more flexible work environment in Baja. Women can take days off in Baja to attend to their children without repercussions (Zabin). In addition, the convention of paying workers on a daily basis has permitted more women to participate, as the daily minimum number of pieces required has been set at relatively low levels. Finally, the ability of families to self-construct small shacks allows them to live as a group much more cheaply than would be possible anywhere in California.

Although real wage rates are not yet increasing in Baja, the gap in real wage rates between Baja and California has declined recently. In the San Quintín Valley, daily wage rates as of December 1991 were approximately 20 thousand to 25 thousand pesos (\$6.51 to \$8.14 a day) compared with 13 thousand pesos a day (\$5.28) in 1989. The official minimum wage in Baja as of 11 November 1991 was 13,300 pesos, so it is clearly no longer relevant to actual wage rates. Although the current labor rate is still extremely low relative to typical California wages of \$4.25 to \$6.00 an hour, labor is generally less productive. This partly offsets Mexico's advantage in lower wage rates, which makes labor costs not as low as would be expected given the differential in wage rates (see the discussion of productivity).

Furthermore, because growers often must provide worker housing (no longer a common practice in California), incur significant transportation costs to attract workers from distant regions, provide local transport, and offer social services for large worker families, there are many labor costs for which the wage rate does not account. Increasing grower concern about labor availability is sparking some to pay greater attention to labor management, and more producers are introducing at least partial piece wage rates as a means to increase productivity. Piece wages can double daily wages. In addition, some areas of northern Baja, with more seasonal work than the San Quintín Valley, pay closer to 30 thousand pesos for the basic daily wage rate.

Current Trends and Future Prospects

In reflecting on the differences and similarities between these different regions of fresh tomato production, it is clear that the situation in Stockton is distinctive in the long-term, family nature of the tomato labor force. In fact, the Stockton labor force is characteristic of California farmworkers in the 1970s, and has been perpetuated in part by the ability of this group of workers to control access to publicly funded farmworker housing for families in the area.

In contrast, the tomato labor forces in Fresno or San Diego have become dominated by single male Mexican migrants, who are both more recently arrived than the Stockton cohort, and from other regions of Mexico. In particular, fresh tomato harvesting is a crop task that is increasingly dominated by indigenous migrants, especially Mixtecs, from the southern Mexican highlands. Raisin grape harvesting in Fresno, strawberry picking in Santa Maria, or berry and vegetable harvesting in the Willamette Valley of Oregon are examples of other crop tasks where this new cohort of workers has made significant inroads. The Mixtec also dominate tomato harvesting in Baja California, where the need to retain workers has accommodated many more women and children in the work force than in similar tasks in California.

The interface between these two cohorts of workers is beginning in the Stockton area. The repeated strikes that have occurred in Stockton tomatoes suggest a certain militancy among the workers there. This militancy is now being curtailed by the surplus labor situation in California agriculture and by the ready availability of Mixtec workers through alternative farm labor contractors. Although one is tempted to believe that the Stockton workers' militancy has driven up wages, which is undoubtedly true, we will attempt to demonstrate in the following sections that the converse is also true--the militancy is driven by low incomes.

Chapter 4. The Effects of IRCA in the Fresh Tomato Industry

The Effects on Workers

Effects on Wages and Hours in California Fresh Tomatoes

Fresh tomato picking jobs in California are bifurcated into jobs paid by the hour and jobs paid by the piece. Most of the harvesting jobs in San Diego are paid by the hour. Growing vine-ripe tomatoes in San Diego is an expensive proposition, and quality is paramount. Only one firm uses piece rates in San Diego, and they are quite high. In the rest of the state, workers are usually paid by the bucket to pick green tomatoes, although there is some hourly pay, particularly when there are few tomatoes in the fields.

Wages for tomato picking not paid piece rate are at or near the minimum wage. Of 14 tomato jobs in San Diego and the San Joaquin Valley where workers were not paid by the bucket, ten were paid \$4.25 an hour, one was paid \$3.44, and the other three were paid \$4.35 or \$4.50. The mean wage was \$4.24 for this group. As noted, we interviewed only one harvester who was paid less than the minimum wage--in San Diego--although as one in a small sample, he represented many others in the population of San Diego farm workers.

A study of Mixtec farmworkers in California and Oregon reported that in approximately one-third of the jobs, Mixtec workers received less than the minimum wage (Zabin, et al.). Thus, there are many other crop tasks that pay the Mixtec less than tomatoes.

Hourly equivalent wages for piece-rate tomato harvesting averaged more than twice these hourly wages. In fact, in every case, the piece-rate jobs paid more than the hourly jobs on an hourly basis. Piece-rate pay for harvesting tomatoes ranged from \$5.20 to \$16.84 an hour in California, with a mean of \$9.30 an hour. Combining hourly and piece-rate harvesting jobs, the mean wage was \$7.91 an hour in California; the median was \$7.14.

Thus, picking tomatoes under a piece-rate system in California is not a low-paid job on an hourly basis. Workers are not able to pick tomatoes for as many hours as they would like, however, so high hourly wages do not imply high daily or weekly incomes. All tomato harvesters interviewed in California averaged 6.3 hours of work a day and 5.3 days a week, or a mean of 34 hours of work a week (the median was 27.5 hours a week). Because one often works six days a week in agriculture, 48 hours would be considered a full week. Under this definition, only 31 percent of tomato harvesters were "fully employed."

The mean daily income was \$49.95 (the median \$40), ranging from

\$21.25 to \$160. The mean gross weekly income was \$219.53; the median was \$204; the range was from \$110 to \$490 a week.

If we take the minimum wage as a standard, it is \$4.25 an hour, \$34 an 8-hour day, and \$204 a 48-hour week. One might think of this as the opportunity cost of picking tomatoes, because there are often hourly minimum wage jobs available in agriculture during the season. For example, San Diego is replete with such jobs (the mean hours worked in San Diego in this survey was 44).

With this standard, 22 percent of tomato pickers made the hourly minimum wage or less, 39 percent made the daily minimum wage or less, and 55 percent made the weekly minimum wage or less. The problem from the worker's point of view is not the hourly wage but the weekly income. Thus, a little experience picking tomatoes often suggests to workers that a full-time minimum wage job (or its equivalent) will generate higher total income, which helps to explain the relatively high turnover among many tomato crews. These aggregated data are somewhat misleading, however, because there is significant regional variation.

Regional Wages and Hours

Table 9
Wages, Incomes, and Hours in Fresh Tomato Harvesting

Region	Piece rate (\$)	Hourly equiv.	Daily Income	Gross Income each week	Net Income each week	Hrs. a week	N
Stockton	.475	\$8.20	\$42.94	\$203.52	\$168.58	27.4	25
Fresno	.375	\$8.11	52.77	227.87	209.22	37.4	19
San Diego	n.a.	\$6.53	54.69	273.06	253.00	44.2	13
Baja Cal.	n.a.	\$.88	7.00	47.61	47.61	57.7	14
California	----	\$7.91	49.95	227.50	201.38	34.6	57

Source: Worker survey

Table 9 shows the interview estimates of mean wages, incomes, and hours a week by region. The San Diego numbers are inflated somewhat by relatively high piece rates paid by one firm; nevertheless, the basic comparison is accurate--higher wages picking green tomatoes in the San Joaquin Valley are counteracted by less than full employment. Stockton workers net less than workers in other regions of California, which is partly attributable to fewer hours, and partly to tax deductions taken out of the paychecks of some settled families.

Workers averaged only 27 hours a week in Stockton, versus 37 in the Fresno area, 44 in San Diego, and 58 in San Quintín. Workers interviewed in Stockton complained that the hours they can work in a week have declined in recent years as more and more workers are used. That is, with larger crew sizes, the work is completed more rapidly. Although workers in Stockton receive the highest hourly wages, they receive the lowest daily and weekly earnings in California.

Workers worked all week long in Baja California in an attempt to make enough money to support themselves. These numbers are based mainly on the fixed daily wages that have been traditionally paid in Baja, but they include some piece-rate earnings that have not raised incomes appreciably, as the average reported was less than \$50 a week, or 24 percent of mean California net income.

Oaxacan workers in California were actually earning on average a bit more than non-Oaxacans, primarily because they were picking tomatoes in places where workers earn more. Where Oaxacans and non-Oaxacans were working side by side, the differences were insignificant. The data do not support the contention that Oaxacans are systematically discriminated against. In this sense, picking tomatoes is a relatively good job for Oaxacan workers, as other survey data have shown that they earn less than the minimum wage in one-third of the farm jobs they reported (Zabin, et al.).

Piece Rates, Productivity, and Incomes: A Bucket is not a Bucket

It became apparent from region to region that different buckets were being used, and that the reported piece rate might not be strictly comparable from one area to the next. To check this, we bought some buckets and filled them with the same tomatoes at the levels that local workers said were satisfactory.

Now, how full a bucket has to be is in and of itself a matter of great contention and variability. For example, long-time workers in the Fresno area reported that it used to be that buckets had to be *copeteado* (filled to heaping), but that, in recent years, it has become acceptable that they are just filled to the rim. In Stockton, every worker maintained that buckets had to be *copeteado* or one was threatened with not being given credit for them.

In any case, we discovered that there are basically two buckets: a 5-gallon bucket that is usually white and that is not much wider at the top than at the bottom; and a red bucket, which is much wider at the top than at the bottom. The red bucket is used in Stockton and (reportedly) Florida. The white bucket is used in Salinas, Fresno, Baja, and by some crews that travel to Stockton from Merced or Madera. Both buckets weigh the same when empty.

The white bucket, filled to the rim, held 24.75 pounds of tomatoes. This is exactly the average weight reported for the 1991 season by one California shipper who uses this bucket. He said it was a constant battle to get it to 25 pounds. The red bucket, filled slightly above the rim, held 31.75 pounds of the same tomatoes. People will argue that workers do not fill the red bucket that full--that they shake it up to make it look fuller than it is. The workers are very proud of this trick, called the *maroma* (somersault), where the bucket is shaken up while being pulled toward him when the worker thinks there might be enough tomatoes to look heaped. If it does not work, then a few more tomatoes are added. It is undeniable, however, that the red bucket holds more tomatoes. One long-time worker estimated that the heaping demand added from 10 to 15 tomatoes to the red bucket.

We made only one observation on weight in Stockton, noting that on average each of 22 bins on a trailer was filled with 40 buckets, and that, according to the driver, the net weight was 24,470 pounds of tomatoes. This implies 27.8 pounds a bucket.

Assuming that the red bucket holds 28 pounds of tomatoes (and we have demonstrated that it could hold more, depending on how much one wanted to supervise the workers), then at \$.475 a bucket in Stockton, the unit cost is 1.7 cents a pound. If the white bucket holds 25 pounds of tomatoes, then at \$.375 a bucket in Fresno, the unit cost is 1.5 cents a pound. The unit cost of picking tomatoes would be only 13 percent higher in Stockton, although the piece rate is 27 percent higher.

In the Salinas Valley, workers are paid about 43 cents for a 25-pound bucket working for a farm labor contractor. The one firm operating under a union contract in 1991 paid \$.495 for a similar bucket *copeteado*, which worked out to 26 pounds on average according to the firm. (Once again, this evidence that even "heaped" the white bucket only holds 26 pounds demonstrates that the red bucket is larger.) At these rates, contractors in Salinas were paying 1.7 cents a pound and the unionized firm 1.9 cents a pound.

The mystification of the Stockton bucket is widespread. Newspaper accounts of the 1989 strike in Stockton constantly referred to a "24-pound" bucket. And workers in Stockton who were interviewed told us that the Mixtecos who were brought up from Merced or Madera used a "larger bucket"-- that is, the white bucket.

In San Quintín, workers are picking 25-pound buckets. With extensive data provided by some firms in Baja on their costs, we calculate that in the fall of 1991, the average cost to pick a bucket was 448 pesos, or 14.6 cents at that time. That works out to about 0.58 cents per pound, or 39 percent of the Fresno unit cost of picking (1.5 cents), which is the lowest we found in

California. The firms in Baja are moving toward a modified piece-rate system that pays workers a flat daily wage to pick a minimum number of buckets, and then so much a bucket after that. At one firm this piece rate was only 6.5 cents a bucket. It is clearly much less expensive to pick tomatoes in Baja, but the gap is not so great as the hourly wage differential would seem to imply. The survey data showed that hourly wages in Baja were 11 percent of Fresno hourly wages (Table 9), while these unit costs of harvesting in Baja are 39 percent of Fresno's.

Piece-Rate Trends

Table 10 shows the California State Employment Development Department estimates of piece rates for picking tomatoes in Stockton and Fresno, along with worker interview estimates of piece rates that they were paid in recent years in the Fresno area. The table also includes these rates in constant 1991 dollars.

The Stockton rates have been deflated with both the implicit Gross Domestic Product (GDP) deflator, which is a measure of overall inflation in the economy, and the Consumer Price Index (CPI) (a basket-of-goods index) for comparative purposes. The CPI has been faulted for overstating inflation in the 1970s, so the GDP deflator is a more conservative measure. The Fresno estimates have been deflated with this latter index.

It is obvious that in Stockton, real piece rates were considerably higher in the 1970s than in the 1980s. Using the GDP deflator numbers, real piece rates did not decrease at all between 1970-1972 and 1979-1981, but they fell 15.4 percent during the period from 1979-1981 to 1989-1991. Using the CPI, they fell 4.2 percent in the 1970s and 17.4 percent in the 1980s.

In interviewing the camp manager at one of the Stockton state camps, he fondly recalled that, as a former farmworker, he picked tomatoes in 1972 at 25 cents a bucket (as reported by the state in Table 10), and said that he made \$25 a day, which would be about \$75 in 1991 dollars. When compared with the mean daily income in the Stockton survey of \$43 in 1991, it is apparent that 1972 was truly a golden year for Stockton tomato pickers.

Table 10
EDD and Survey Estimates of Piece Rates for Picking
Fresh Market Tomatoes

Year	Stockton			Fresno			
	Nominal Piece Rate*	In real 1991 dollars, Implicit GDP deflator	In real 1991 dollars, Consumer Price Index	Nominal Piece Rate*	In real 1991 dollars, GDP Deflator	Mean survey estimates	In real 1991 dollars, GDP deflator
	EDD	EDD	EDD	EDD	EDD	Survey	Survey
1970	.15	.50	.53				
1971	.15	.47	.50				
1972	.25	.75	.81				
1973	.20	.57	.61				
1974	.25	.65	.69				
1975	.30	.71	.76				
1976	.30	.67	.72				
1977	.30	.63	.67				
1978	.30	.58	.63				
1979	.35	.63	.66				
1980	.35	.57	.58				
1981	.35	.52	.52				
1982	.35	.49	.49				
1983	.40	.54	.55				
1984	.40	.51	.52	.35	.45		
1985	.40	.50	.51	.35	.43		
1986	.40	.48	.50	.33	.40	.362	.44
1987	.45	.53	.54	.33	.39	.353	.41
1988	.45	.51	.52	.35	.39	.357	.40
1989	.45	.49	.49	n.a.	n.a.	.363	.39
1990	.475	.49	.49	.37	.38	.374	.39
1991	.475	.475	.475	n.a.	n.a.	.375	.375

* Note: We have reported the lower, base rate, here if there were more than one reported. In tomato picking there a basic bucket rate, and then workers are sometimes paid more if the crop is light or a field is being picked a second time. As more and more firms pick fields only once, the higher piece rates become less relevant. There is some real variation in piece rates in the Fresno area, which are captured by the means from the survey data. The Stockton rates are uniform in the 1980s.

Source: EDD, 881-A; Worker survey

Although there is less data available for Fresno, a similar picture emerges. The EDD data, which are less reliable in Fresno, show a decline in real piece rates for those years since 1984 where the data were reported in the known range. The survey data also show a decline in real piece rates in the Fresno area since 1986.

Time-series data from other regions are even sketchier. EDD data in the Salinas area show a similar pattern of slight increases in nominal piece rates, which imply declines in real terms. EDD data in Kings County show nominal piece rates unchanged for five years.

Thus, while nominal piece rates in tomatoes have risen slightly or stayed constant since IRCA, they have uniformly fallen in real terms. Although this is often the case when one looks across California crops, there are a number of crops, such as broccoli and lettuce harvesting in Imperial valley, or asparagus and cherry harvesting in Stockton, where piece rates or hourly wages have actually fallen in nominal terms since the early 1980s.

Nonharvest labor

Because the majority of labor use in tomatoes occurs during the harvest, our study concentrated on harvest labor. Consequently, there are only a few observations about other jobs.

The next most labor-intensive task in the fields is transplanting, where a driver (usually male) is paired with a crew (usually women) of transplanters. These crews are typically hired by the shippers, and they move from farm to farm transplanting in the same progression that harvesting crews will later follow. In the Stockton area, drivers were paid \$5.50 to \$5.85 an hour and transplanters were paid \$4.70 to \$5.00 an hour. By contrast, union contracts in the Salinas area paid drivers \$7.75 an hour and transplanters \$7.35 an hour.

The other important area of labor use is in the packing sheds. As these have become increasingly automated, the number of workers in the sheds has actually declined, even as production has increased. Estimating from the statewide acreage, there are probably 2,000 workers employed in tomato packinghouses. The bulk of labor in the sheds is now in sorting. Sorters are mostly settled, local women. The job is often considered a desirable one in rural communities, because it provides steady seasonal employment that allows women to work only part of the year and to collect unemployment insurance.

Many of the sheds are unionized. Union sheds in Salinas paid entry-level workers such as sorters \$7.50 to \$8.00 an hour in 1991. By contrast, the comparable union wage was six dollars an hour in the San Joaquin Valley and a nonunion shed in that region paid sorters \$4.60 to \$4.85 an hour. One unionized shed in the San Joaquin Valley had reached a bargaining impasse with the union and was reducing wages from \$6.00 to \$5.40. Workers at that shed

reported that they had been paid \$5.00 an hour in 1975 and now faced the prospect of wages sinking back to that level. A wage of five dollars in 1975 would be \$11.89 in 1991 dollars, after adjusting for inflation.

Thus, it is clear that real wages in the sheds have declined, and, in some cases, workers have experienced reductions in nominal wages. This is a process parallel to most food processing in California, where the combination of increased product market competition and a surplus labor market situation has encouraged employers to attempt to reduce labor costs.

Benefits

The workers were asked whether they were eligible to receive disability insurance. While probably all of the California workers were eligible, their perception of this eligibility affects claims. Only 70 percent of the workers reported knowing that they were eligible, while 14 percent said they were not and 16 percent did not know. In Baja, only 15 percent of the workers thought that they might be covered by this type of program.

Workers were asked whether their employer provided health insurance for non-work-related illness. Of the entire sample, 13 percent answered affirmatively; only 12 percent of the California workers did so. Only 8 percent said "yes" in Stockton and Fresno versus 21 percent in San Diego. Once again, the direct hiring of workers by growers in San Diego and the long work season creates some better situations for the workers.

Workers were asked whether they received paid holidays or paid vacation. Sixteen percent said "yes" in Stockton, 29 percent in San Diego, 8 percent in Fresno, and 21 percent in Baja. Once again, the long work seasons with a single employer in San Diego and Baja provide benefits to some workers, in contrast to the short-season, contractor employment in Fresno. Thus, although benefits are not entirely absent among California fresh tomato harvesters, they are available to only a small proportion of the workers--usually those hired directly by growers.

Impact of IRCA on Working Conditions

Labor Supply and Crew Size

Because time-series data is unavailable, we cannot prove either that crew sizes have grown or shrunk since IRCA, or that workers are working more or fewer hours, but this section presents the survey data and reports some opinions from various informants. Table 11 compares survey results in the four regions for tomato harvest crew sizes and their composition.

Table 11
Tomato Harvest Crews

Region	Mean crew size	Crew size range	Percent of women in own crew	Percent of crews with women	Percent of own crew from own village	Percent of own crew Oaxacan if Oaxacan
Stockton	120	75-150	34	95	26	n.a.
Fresno	32	10-60	17	56	33	91
San Diego	19	4-35	1	21	21	57
Baja CA	73	20-200	38	69	12	89

Note: We asked workers who were from Oaxaca for the number of other workers from Oaxaca on their crew, and we asked workers identified as Mixtec for the number of other Mixtecos on their crew. "Oaxacan" here in column 7 refers to a combination of these answers.

Source: Worker interviews

Stockton has the largest average reported crew sizes and San Diego the smallest. Crews in the southern San Joaquin Valley are relatively small, and crews in Baja vary greatly in size. Stockton workers maintain that crew sizes used to average about 80 workers on each crew. In fact, there are still some crews in Stockton of this size, particularly a crew working directly for a large shipper. The vast majority of workers, however, are now on crews of 100 to 150 people. Workers reported that farm labor contractor crews for one shipper occasionally numbered as many as 300. Why have crew sizes grown in Stockton? We were unable to develop a definitive answer to this question in our interviews, but there are several possibilities.

Larger crews enable the work to be accomplished more rapidly, and permit the packing houses to operate efficiently. Also, in Stockton during the fall, one must wait in the morning for the

tomatoes to dry out before they are picked. Because this waiting often wastes a significant portion of the day, it is probably desirable to then pick as rapidly as possible.

Because the piece rates are high in Stockton, employers believe that they can organize the work in this manner to their benefit, and workers will still earn sufficient incomes. As shown above, Stockton tomato workers have significantly lower daily and weekly incomes than workers in other regions, which is a direct result of this arrangement, and is undoubtedly at the root of the series of strikes that have occurred there.

The key element in this arrangement, however, is the ready availability of labor. One shipper claimed that it was difficult to control crew size because there were too many workers: "They just show up and start working." This seems disingenuous, however, as no worker works without the permission of the mayordomo; we observed workers who were turned away at numerous of fields, and firms that want to limit crew sizes certainly are able to do so.

Nevertheless, without the large numbers of available workers, the social cohesion of the Stockton work force would not allow the increasing crew sizes, and the strikes would be more successful. It is no accident that Stockton workers report that the situation has been deteriorating since 1988, when large numbers of workers came up from Mexico, ostensibly to regularize their status as SAWs (*los rodinos*). Over 100 thousand workers picked up temporary authorization to enter the United States and apply during that year (Martin and Mason).

In other years of economic recession and surplus labor, however, such as 1982-1983, there were also many more people competing for jobs in Stockton tomatoes. It is fair to say that the supply of farm labor has been increasing in California since at least the mid-1970s, owing to economic dislocations in Mexico, and that IRCA was only a contributing factor.

Another aspect to large crews is the need for greater supervision. Because workers have to walk farther and wait in line longer, it is difficult to get them to pick all of the tomatoes, particularly those farthest from the truck. They want to start picking at a point where they can fill two buckets as rapidly as possible. Therefore, we observed the greatest degree of harassment on the part of supervisors in Stockton--a constant barrage of yelling, of threatening not to credit workers for their buckets, of forcing them to return to pick overlooked tomatoes.

The southern San Joaquin Valley presents a great contrast to Stockton. The average reported crew size in our interviews with workers was 32, and no one reported a crew as large as the smallest crew in Stockton. The primary problem for tomato employers in the

Fresno area is turnover, because the picking seasons are relatively short, and it appears that they are more efficiently utilizing labor.

Crew sizes on the larger tomato farms in San Diego also number approximately 30 workers, although there are many smaller crews on the small farms, because growers hire their own labor in San Diego.

In Baja California, crew sizes vary all over the map, from 20 to 200 in our survey. The region has a history of putting many workers out to pick--"throwing people at the fields"--because labor has been seen as relatively inexpensive. As wages have begun to rise in dollar terms, and as recruitment from southern Mexico has become more expensive, however, employers have become concerned about labor productivity, and have reduced crew sizes. This also allows workers to earn more income, because they work an eight-hour day, and some firms have adopted a modified piece-rate system that pays by the bucket after the worker has picked a daily minimum.

In sum, there are very different organizations of the work process among the regions. The Stockton area puts more workers into the fields than even Baja California, which is a situation that both employers and workers in Stockton attributed to the excess supply of labor.

Gender

Table 11 also includes the proportion of women that workers reported in their crews. In general, women are present on a large number of crews, but their share of the labor force is considerably less than the men's.

The highest shares of women tomato harvesters are in Stockton, where women were reported on 95 percent of the crews and constituted about one-third of the labor force. The strong presence of women in Stockton is a result of the state camps, which provide family housing (discussed earlier).

In the southern San Joaquin valley, women were only reported on about half the crews, and were estimated to constitute less than 20 percent of the labor force. There are many all-male Mixtec crews in this area. There were apparently more women employed when tomatoes were concentrated on the east side of the valley, near settled populations, such as the pole tomatoes in the Cutler-Orosi area.

In San Diego, there are very few women working in tomatoes, a little over 1 percent by our estimates. It must be partly a result of the absence of family farmworker housing in San Diego. The one grower who houses workers provides only dormitory-style housing for men.

In Baja California, by contrast, a large percentage of the workers are women. There are all-male, all-female, and mixed crews in Baja, and many Mixtec women are working there. Fewer Mixtec women are working in California, probably because there are more lone males in the population in California, with families in Oaxaca or northwest Mexico (Zabin, et al.). In addition, many of the Mixtec women who are in California are pregnant or have small children, and it is harder for them to find and keep work under California labor conditions than it is in Baja (Bonnie Bade, personal communication).

Oaxacans

We use the word "Oaxacan" here in the slang sense in which it is used in California agriculture by Anglo and mestizo groups, to refer to all indigenous workers from southern Mexico and Central America. Rafael Alarcón and Macrina Cardenas noted this use of the term in Madera, where one mestizo referred to an indigenous worker as "un Oaxaquito de Guatemala." Lettuce workers in Huron referred to them as "Oaxacos," and the Anglo chief of production for one shipper called them "Oaxakies," which is an interesting association with an earlier group of destitute migrants. Most such indigenous workers in California agriculture are Mixtec, from Oaxaca, Puebla, and Guerrero states in Mexico. However, there are also Triqui, Zapotec, and Guatemalan Mayan groups in California.

In the far right column of Table 11, we report the results of asking workers who were identified as either Mixtec or Oaxacan about the proportion of their tomato crews that were of similar origin. In the Fresno area, this was over 90 percent. Because crew size is fairly small in Fresno, it is not surprising that all-Mixtec crews are common.

In San Diego, however, crews are more mixed. Conway reported that San Diego tomato workers had been more Oaxacan, but that the labor force was becoming mixed with workers from all regions of Mexico. This is difficult to explain, except that Mixtecs have spread out more in California and have other destinations where they can arrive, and employers in San Diego may be consciously trying to diversify their labor force.

Baja California has a high proportion of Oaxacan workers. In fact, Baja and Sinaloa have acted as launching pads to the United States for many such workers. In this survey, 64 percent of the Mixtec tomato pickers who worked in California had previously worked in northwest Mexican agriculture. In an earlier survey of 130 Mixtec farmworkers in California and Oregon, over two-thirds had worked in northwest Mexico before entering the United States (Zabin, et al.). This is in stark contrast to other groups of farmworkers, because only 9 percent of the non-Mixtec tomato workers in California had previously worked in northwestern Mexican agriculture.

Village Networks

A significant proportion of the workers in any tomato crew come from the same village in Mexico. As shown in Table 11, on average, workers interviewed said that 27 percent of the workers on their crew in California were from their home village. The percentage was highest (33 percent) in the Fresno area, where there are many all-Mixtec crews.

This finding demonstrates the high degree of network recruitment that characterizes this labor market. The origins of a typical crew can be accounted for by approximately four villages in Mexico. It is neither a random nor disorganized labor market in any sense.

Transportation

There is a tendency in California agriculture to shift the cost of daily transport to the fields from employers to workers. This is most evident in the farm labor contractor system, where competition has driven contractors to eliminate most free services that were formerly provided to workers. Only in the Salinas and Imperial valleys does there appear to be continued use of buses and provision of transport, and, even in those areas, it is declining.

The norm that is emerging is the provision of rides for a fee by crew leaders (or their associates), who then are commonly referred to as *raiteros*. Usually, the worker must pay for the ride, even if he might have his own car. In effect, the crew leaders are given the right to sell this service to the workers, which represents a chief source of income for them.

This system is most developed in the Fresno area, which was confirmed in the survey, because 93 percent of the tomato workers interviewed in Madera and Fresno paid for daily rides to the fields versus 48 percent in Stockton and 36 percent in San Diego. Of all California tomato workers interviewed, 57 percent paid for rides. In Baja California, employers circulate buses to provide free rides to the fields.

The charge for a ride averaged \$3.61 among the California tomato workers who paid, ranging from two to five dollars. The cost of transportation was also highest in Fresno, averaging (among those workers who paid) \$4.57 a day versus \$3.04 in Stockton and \$2.30 in San Diego. Thus, the Fresno workers paid on average \$1.53 a day more than the Stockton workers, or \$9.18 more each week. Half of the Stockton workers and two-thirds of the San Diego workers were not required to pay. As with the subsidized housing in Stockton, this is one way the Stockton workers compensate for their lower incomes.

Because many of the Stockton workers are settled or are long-term migrants with their own cars, they have been able to drive themselves to the fields. In contrast, the more recently arrived Oaxacan workers in the Fresno area are entirely subject to the *raitero* system, and must pay relatively high charges because the fields are often more than an hour's drive away. In San Diego, many workers live on or near the tomato ranches, and firms hire them directly. Thus, the incidence of rides is lower and the cost is lower to those who need them because there are no *raiteros* attempting to profit from the activity.

The Oaxacan workers in California who paid for rides averaged \$4.39 a day; the non-Oaxacans averaged \$2.97 a day. This difference reflects the Oaxacans' insertion in the labor market, and principally their location in Madera (north of Fresno) far from the west-side fields. It is also an indication of their dependence on the contractor-*raitero* system for work.

Field Sanitation

Table 12
Proportion of Tomato Workers Reporting
Presence of Sanitary Facilities

	Toilets	Wash Water	Drink Water
Stockton	100 %	57 %	100 %
Fresno	100	67	100
San Diego	79	93	100
Baja Calif.	93	21	93

Source: Worker interviews

As shown in Table 12, workers reported broad compliance with sanitation laws. Drinking water was universally present; toilets were almost as prevalent, although smaller farms in San Diego neglected them; only water with which to wash hands was irregularly provided. Interestingly, tomato farms in Baja California were almost as compliant as California employers, despite the absence of similar laws.

Workers' Complaints

Workers always have many complaints, particularly in situations where they are not consulted on the organization of work. The complaints of workers in the Stockton area were particularly revealing and numerous, more so than in other regions, which undoubtedly reflect both their long experience and their lower incomes. Because understanding what the workers thought about their situation was an important part of the fieldwork, it seems necessary to present these findings here. The following list,

while by no means exhaustive, attempts to organize some of these complaints in a way that helps to clarify the nature of current working conditions in California tomato harvesting. They refer to Stockton unless otherwise noted.

Farm Labor Contractors

The workers drew a clear distinction between one crew that worked directly for a Stockton-area shipper and the rest of the crews that worked for various farm labor contractors. The shipper-hired crew was held up as an object of envy, not because they were paid more for each bucket, but because all of the conditions of work were thought superior--the number in the crew, the supervision, the number of dumpers, and so forth.

Thus, while shippers set boundaries or limits within which farm labor contractors operate, and these boundaries (such as crew size) vary from shipper to shipper, the contractors clearly engage in practices that the shippers themselves would avoid. The workers' complaints are, therefore, as much complaints about farm labor contractors as they are about fresh tomato work.

Crew Size

As previously noted, workers complained that crew sizes had grown, which reduced the amount of work available on a given day. This was considered particularly onerous late in the season, when there were fewer tomatoes to pick. Numerous workers reported that their crews' size increased from 90 to 150 people as the season progressed. In addition, larger crews required two trucks simultaneously to absorb the quantity being harvested. Because they were not always available, there would often be considerable waiting in lines.

Harvesting as Sorting

Picking tomatoes is not without skill requirements. In particular, workers are essentially asked to serve as sorters while they pick. They sort for both size and color, which might change even in the course of a day, depending on market conditions and orders. They also sort out a variety of misshapen or bad tomatoes: "cat-faced," "monkey-faced," worm-eaten, rotten, and so forth.

Workers also must remove the stem, if it does not come off as the tomato is picked, which takes time and often tears their gloves. Some varieties are more difficult to separate from the stem than others, but no differentiation is ever made in piece rates. Piece rates might be raised only for picking a field a second time or for salvaging a particularly damaged field, but even these contingencies do not seem to raise them in Stockton.

Workers must wipe off the mud from the tomatoes, if it is stuck on, because it damages other tomatoes in the buckets and bins. This activity takes time and has been largely resolved by drip irrigation, where muddy furrows do not exist. It continues to be

a problem for workers in the northern San Joaquin valley, however, because little drip irrigation is used in tomatoes in that region.

Some crews also reported being required to move tomato vines out of the furrows as they picked. Because most fields are picked only once, this has economic sense only when the market is especially good, although a few shippers are still in the habit of picking fields twice. Workers called this combing the vine (*peinar la mata*) and some said that the justification given them was that people might slip and fall on the tomatoes left in the furrows. This seemed unlikely to them, and, whatever the reason, they viewed it simply as unpaid work.

Thus, workers are not only picking tomatoes, but also cleaning and sorting them, and possibly also cultivating the field. These latter tasks significantly slow the work. They have probably assumed even more importance, however, as the packinghouses have become automated. As one shipper said, "If you get junk into the packinghouse, it kills you."

Supervision

With the large crew sizes and the use of various farm labor contractors--some of whom are much newer at their jobs than the workers they are hiring--supervision is more of an issue in Stockton than in other regions, although some of the same complaints were lodged against farm labor contractors in the Fresno-Merced area.

The workers are endlessly harangued while they are working, because it is assumed that the workers are basically trying to cheat and must be threatened with adverse consequences. This adversarial management style actually leads to opportunistic behavior by the workers. As previously noted, workers in Stockton used the somersault (*maroma*) to try to make the buckets look fuller. And some firms in Fresno have begun to provide buckets, which they pass out and collect at the end of the day, because the workers were installing false bottoms in their own buckets.

In many interviews with Mexican farmworkers in California, however, a recurrent theme is their bitterness at what they term a lack of respect by management. Anyone who has spent time in rural Mexico knows that dignity is the minimum people insist on, regardless of their economic or social circumstances. It is the failure of supervisors to respect the workers' sense of dignity that Mexican immigrants find most galling in situations such as tomato harvesting in California.

They are essentially being treated as errant children who must be reprimanded. They are not consulted about the work process, they are made to do seemingly pointless tasks (cleaning the furrows) without adequate justification, they have no seniority nor job security,

and they are threatened with having pay withheld for some of the buckets they have picked.

In Stockton, workers pick two buckets at a time; they then carry them to be dumped into bins on a truck. Their buckets are returned by the dumper as a *fichera* (checker) throws a *ficha* (token) into one bucket. The *ficha* is currently worth 95 cents. The permanent threat is that they will not be given a *ficha* for some failing: wrong color, wrong size, three misshapen or bad tomatoes, buckets not full enough, and so forth. For this threat to be credible, the penalty must actually be imposed on occasion. Although management denied withholding *fichas*, every worker interviewed reported its occurrence. Several workers said it happened to them on average once a week.

This tactic serves as a form of control, but it also serves as a petty cost-saving measure when the contractor is paid by the ton of tomatoes delivered, as is common in Stockton, but also reported in other regions. Denying workers one *ficha* a week would net the contractor \$80 to \$300 a week, depending on the crew size. It is through such measures that low-bidding contractors survive, yet simultaneously create the greatest resentment among the workers.

If the contractor is paid by commission on total wages, as is the most common practice in California agriculture, then he would just be hurting himself by lowering the workers' wages. To the extent that the workers try not to fill the buckets to the required weight, however, not paying them for some buckets would be a means to keep the average weight up.

Payment

Several contractors reportedly cash the workers' checks as they are issued, thus giving the worker cash and a pay stub. These contractors, however, give out no coins (*feria*)--only bills--and always round the sum down to the dollar. Because the mean of a random distribution of change (1-99 cents) would be 50 cents, the workers were essentially being charged this amount for cashing their checks. Although this is less than workers often must pay to cash checks, it discriminates against more settled workers who have bank accounts. In the survey, workers were asked whether they had ever not been paid, and 16 percent answered affirmatively, although this included many crops. Nonpayment was almost exclusively associated with contractors.

Lunch Wagon

A common practice in Stockton is for the contractor to have a relative bring a food wagon out to the field. As workers often must arrive early in the morning and wait hours to start harvesting, this is a viable business. Workers complained that food and drink were overpriced (one dollar a can for beverages), and that water was often left far away while the lunch wagon was

kept close by to encourage purchases.

Too Few Dumpers

While the number of dumpers varies among crews and shippers, the number of dumpers on at least some Stockton crews has been reduced since 1989. A full complement would be four dumpers to a truck, but some crews operate with only two to a truck, which means that workers must lift the buckets higher up, rather than pass them to an intermediate dumper. This maneuver is particularly difficult for women. The workers view this simply as punitive retribution for their last strike, but it clearly saves the employer about \$100 a day for each truck.

Tools

Workers in Stockton are now expected to buy their own tools, which in tomato harvesting consists of buckets and gloves. Buckets in Stockton cost about \$8.50 each. A worker needs two buckets for the season, if he is lucky, and they do not break. So, depending on how much of the season is worked, buckets cost between one and two dollars a week.

Gloves cost anywhere from \$.80 to \$1.70 a pair, and workers report using two or three pairs each week. Thus, gloves cost from three to four dollars a week for each worker.

Combining these items, a reasonable estimate of tool cost would be \$5.00 a week for each worker. Long-time workers report that they were given the buckets free until 1983-1985, but that, since 1985, they have had to buy them. This change thus occurred before IRCA. By contrast, tools are provided for workers in Baja and San Diego, and buckets also are generally provided in Fresno.

Recruitment

Whereas formerly contractors curried the favor of workers and went to the camps to recruit, now the situation is reversed--workers must look for the contractor. In the entire survey, of the workers who had some contact before the season started with the employer, 74 percent said the worker contacts the mayordomo, contractor, or grower.

Essentially, the only form of recruitment in Stockton now is walk-in by word of mouth. Some contractors or shippers register the workers register at a central office a month before the season, but more people usually appear at every field each day than are allowed to work. Thus, people are turned away daily, and it is because of this system that problems arise in limiting the numbers in the field.

This system serves as a constant reminder to workers that there is a surplus of labor at present. To the extent that it allows crew sizes to increase, however, it frustrates workers with excessive waiting and lowers their incomes, which causes resentment.

One long-time worker fondly recalled that mayordomos occasionally used to pay for gas, to encourage people to come to work for them. The current reality is far removed from these memories.

In the southern San Joaquin Valley, the crew sizes are much smaller, and the workers often are transported considerable distances to isolated fields. Thus, the walk-on-at-the-field recruitment found in Stockton is absent, and workers obtain jobs through mayordomos or contractor offices in the usual manner.

In San Diego, because growers hire directly, workers simply arrive at the ranches looking for work. There are so many workers passing through that it is a major task to turn people away.

Waiting

Fresh tomato work, as with much agricultural labor, is replete with unpaid waiting time. It is not uncommon for workers in Stockton to arrive at the fields and wait four or five hours to begin harvesting. If a truck gets stuck in the mud, workers wait. If there are too many workers for the number of trucks and dumpers, then they wait in line to dump their buckets.

Workers hauled from Madera to the west side or to Stockton face long rides. Workers typically get up at 2:00 a.m. to go to Stockton, and, if it is wet, may not begin to work until noon. The few successful efforts to force employers to pay workers for travel or waiting time, such as with "wet time" in citrus, have been almost completely eliminated from California agriculture.

Conclusion

These complaints of the Stockton workers effectively demonstrate the extent to which working conditions and incomes are being affected by the excess labor supply and the competition among contractors. Essentially, the workers are being nicked and dined and asked to bear more and more costs themselves. They must spend their time sorting, cleaning, and cultivating, and they must heap the buckets. They lose one dollar a week in "fines," maybe 50 cents a week to cash their checks, and pay five dollars a week for tools. They pay their own transport to the fields, are overcharged at the lunch wagon, and suffer direct physical pain to save on dumpers. In addition, they wait long hours at times to start harvesting; they must often wait in line to dump their buckets.

Some of these cost savings accrue to the shippers, some to the contractors. The contractors in Stockton are small family businesses. The dumpers, *ficheras*, supervisors, and lunch wagon are usually all staffed by relatives of the contractor. It is a group enterprise that is proving highly efficient at cost minimization-- with many impacts on working conditions.

Net Incomes and Expenses

One can get a sense of the importance of some of these nonwage factors by deducting them from net incomes. In Table 13, reported mean net income in Stockton and Fresno is reduced by the cost of rides, tools, and (family) housing.

Table 13
Tomato Worker Weekly Incomes and Expenses

	Stockton	Fresno
Net Pay per week	\$168.50	\$209.22
Less:		
Rides	18.24	27.42
Tools	5.00	3.50
Housing (family)	9.28	25.00
Net disposable weekly income	\$135.98	\$153.30

Source: Worker interviews

Rides and tools, which are the costs of having the job, reduce net income by just under 14 percent in both regions.

Table 13 shows the cost for each adult worker of family housing in the state-subsidized labor camp in Stockton as compared with the reported comparable cost in the private rental market in Fresno. As discussed earlier, the camp subsidy is significant for families. Single-male tomato workers can find a place to sleep in the Fresno area for a comparable ten dollars a week, but families cannot.

The effect on relative income of living in the Stockton camps is seen in the bottom line. Shorter and cheaper rides and less costly housing in Stockton reduces the Fresno income advantage from 24 percent greater on the weekly paychecks to only 13 percent greater after these costs are accounted for.

¹Family housing is compared here to demonstrate the subsidy to workers in the state camps in Stockton.

Impact of IRCA on the Ability of Workers to Organize

Unquestionably, tomato production in California has been highly affected by union organizing. Consider:

At the end of the Bracero program during the mid-1960s, organizing and strikes (which had begun around 1959) drove up wages by over 30 percent and led to the adoption of the mechanical tomato harvester for processing tomatoes (Runsten and LeVeen).

Growers claim that organizing in southern San Diego County affected decisions to experiment with production in Baja California, even if the major shift of acreage was eventually driven by urbanization pressures and exchange rates.

Organizing during the the late-1970s and early-1980s caused shippers to experiment with mechanical tomato harvesters for fresh market tomatoes in Stockton, Salinas, and the southern San Joaquin Valley, although this was abandoned owing to technical problems with scuffed fruit and the opposition of buyers.

Organizing and strikes in the Stockton area throughout the 1980s (1983, 1987, 1989) had an upward effect on piece rates that shippers acknowledge, even though the piece rates fell over 15 percent in real terms.

Union contracts have led directly to the increased use of farm labor contractors in the Salinas area, as some shippers abandoned the harvest responsibility to growers.

This study is not intended to be a history of organizing in California tomatoes. Nevertheless, because of the importance of organizing in tomatoes in California, a number of conclusions can be drawn from recent experiences.

Stockton

As previously mentioned, there are only a few tomato shippers in the Stockton-Tracy area, and they draw on the same pool of labor. Thus, labor actions have usually occurred at two or three firms simultaneously.

Organizing efforts began in the early 1970s, and strikes occurred in 1973, 1974, 1978, 1983, 1987, and 1989. Elections were held in the early stages of the Agricultural Labor Relations Board (ALRB) in 1975 at the two largest firms in the area, and the UFW nominally won both. One election was thrown out by the ALRB, however, and the other, although certified in 1978, was appealed and eventually overruled in the 1980s. An election was held again at the firms in 1983; the UFW nominally won, but one was appealed and overturned,

and the other was still on appeal by the 1989 strikes, when it was voided, and a new set of elections was held at all three firms. The results of those elections are still being contested.

The point appears to be that the firms have no intention of recognizing the UFW as the bargaining agent for the workers, and they have successfully pressed this position in the courts. Despite almost 20 years and three sets of union elections, nothing positive has resulted from the workers' point of view. The UFW closed its office in Stockton in 1975, and it has not reopened.

There is another side to all of these strikes, however, which is that often they were simply work stoppages--or wildcat strikes--led by an independent committee of the workers elected at mass meetings. This was true in 1983, 1987, and 1989. In 1983 and 1989, the UFW took over the strikes only after workers had been out for some days. In 1987, the strike lasted only 48 hours, and the UFW was never present. Thus, while the union and its organizers were leading the workers in the 1970s, the consciousness this imparted to the workers persisted, and the workers themselves led the strikes during the 1980s.

In each of these three cases, the workers went out demanding increases in the piece rates. In 1983, they asked for a 15-cent a bucket raise and settled for five cents. In 1987, they asked for ten cents and settled for five cents. In 1989, they were looking for five to ten cents and got nothing. The workers had other complaints about too many workers in the fields, not enough dumpers on the trucks, having to walk too far to the trucks, and so forth. All of these things affected their ability to earn money; the fundamental cause of the strikes was economic.

In news reports from 1989, growers are quoted as calling the Stockton tomato workers the "best-paid tomato workers in California." As we have shown above, just the opposite is true. Although Stockton tomato workers receive the highest hourly wages, they have the lowest daily and weekly incomes of any tomato harvest workers, because they work the fewest hours. The situation is feasible only because of the subsidized housing, not having to pay extortionate rates, and the ability of entire families to work together in the fields. It is not at all surprising that they have gone on strike so often, particularly considering their common origins and the social cohesion discussed above.

Several interesting aspects of the strikes in the 1980s should be noted. First, the ability of the firms to bring in strikebreakers has gradually improved. Whereas in 1983, they had recourse to inexperienced local Stockton workers, such as Southeast Asian refugees (many of whom walked out once they understood the situation), by 1989, they were able to bring in crews of experienced tomato workers from Modesto, Merced, and Madera. This

is undoubtedly owing to the increased use of farm labor contractors and the employment of these contractors in the more extended plantings of the firms along the west side of the San Joaquin Valley. The firms report that they had every intention of permanently replacing the strikers in 1989, if they had not gone back to work, and the workers viewed that as a credible threat.

We interviewed some Mixtec workers in Madera who had gone to Stockton as strikebreakers. They were not terribly keen on traveling that far every day, and they found that the short length of the work-day and the organization of the work limited their incomes, just as the Stockton workers did. We also interviewed some workers who went to Stockton to work as part of a contract for a Merced-area shipper. They reported being paid the same piece rates as in the Fresno area (using the white bucket), and they, too, complained of the travel. At least one crew of such workers was kept on at a Stockton shipper in 1990 and 1991, perhaps to serve as a reminder to the workers that an alternative labor force was available.

Another interesting aspect to the strikes is that they were held in July, at the beginning of the season. It was obviously the intention of the workers to establish a piece rate early in the season. July and August are usually the months of greatest competition for Stockton tomatoes, however, and, hence, the lowest market prices. Later in the fall, Stockton is one of the only regions in the country shipping tomatoes. In fact, after the last ALRB elections in July, shippers argued that the election was inappropriate because they would not reach peak employment until late August. Thus, the strikes were probably less effective than they might have been because they were never held at the most crucial moments.

Third, the strikes were handicapped by the availability of an excess supply of labor. This was clearly the case in 1983, when unemployment rates were higher than normal, and many local workers came out to the fields, and again in 1989, when it was relatively easy for the firms to bring in crews of strikebreakers. In fact, workers reported that they did not even contemplate a strike in 1988 because of the numerous workers who had come up from Mexico--ostensibly to apply for SAW status--*los rodinos*. That there have been no work stoppages since 1989 is partly because the workers are extremely aware of the many workers available to replace them.

In summary, then, the Stockton tomato strikes have been driven by economic considerations, started (at least during the 1980s) by independent walk-outs, but characterized by the subsequent arrival of the United Farm Workers and a series of ALRB elections. In reality, there have been two parallel processes: one, the efforts of the workers to obtain higher wages; the other, the efforts of the UFW to gain contracts. The workers have had some success, the

UFW has had none.

In talking to the workers now, one discovers a great deal of frustration with regard to the whole ALRB process. They believe it has failed them. They blame the union, the growers, and the government. The union comes, makes promises, and then is not heard from until the next strike. The growers fight the certifications, and refuse to bargain. The government takes many years to resolve each case. It appears to the workers that the ALRB does not function in their interest.

In addition, the union is not functioning as a representative of the workers, partly because the union is not in regular contact with the workers. In our interviews with a random assortment of Stockton workers, while all had participated in the last strike in 1989, none of them was willing to associate himself with any union, which indicates the degree of frustration with the entire process.

Salinas

The United Farm Workers won elections at a number of shippers in the late 1970s or early 1980s. At that time, the shippers had their own harvest crews. Some shippers fought it with attorneys; some signed contracts.

One firm that signed a contract and actually operated under it for several years found that wages and benefits had gotten so out of line with the rest of the industry that it was untenable. By 1987, they were paying 55 cents a 25-pound bucket to harvest, which was at least ten cents a bucket more than the competition. They estimated they were paying \$25 to \$30 a ton more to harvest--or approximately 50 percent more than others, after all costs were calculated. Therefore, they allowed the growers to assume responsibility for harvesting the tomatoes, and the growers turned to farm labor contractors.

This is a fairly typical story in California agriculture; it has occurred in such crops as citrus, lettuce, and broccoli.² The basic force that drove the "shelling out" of these contracts was the union wage differential. For example, the last UFW broccoli contract in Salinas included total labor costs that were approximately twice the going rate with local farm labor contractors. Martin has argued that the overall California agricultural union wage differential rose from about 8 percent in 1976 to 28 percent by 1985 (Martin, et al., 1986). That is clearly the story here. From the employer's point of view, competition does not permit these kinds of wage differentials to persist. The employer expects that the union will organize the competition--to drive up their labor costs to a similar level.

²The citrus story is told in detail in Lloyd, et al.

Very little organizing occurred in California agriculture in the 1980s, however. Having won many certifications, the unions concentrated their energies on negotiating contracts (Arizmendi). The change in personnel at the ALRB after the election of a Republican governor, however, rendered this strategy difficult, as there was less threat of the Board's implementing the make-whole remedy or imposing large fines for bad-faith bargaining, which reduced the potential cost to employers of stalling negotiations. In addition, the UFW lost some of its best negotiators to internal strife.

But unionists still argued, "If elections do not result in contracts, why pursue elections?" (Arizmendi). This is logical from the union's point of view, if the idea is to maximize membership and income on a short-run basis. Organizing costs money, and incurs many social costs; if it pays no return in terms of more members and dues, why pursue it?

The labor market, however, seems to obey the law of entropy. Where there is constant turnover, as in seasonal agriculture, and where there is a labor surplus, as in California agriculture in the 1980s, there is a tendency for wages and working conditions to deteriorate, unless they are held up by organizing or the threat of organizing.³ And, for the threat to be credible, it must occur. Thus, the answer to the question, "Why organize?" is simply that it is a long-term investment in maintaining the existing contracts.

By not organizing the competing employers, the general level of wages and benefits and working conditions began to deteriorate around the islands of unionization in California. Whether or not they declined absolutely in all cases is less important than that they declined relatively compared to the unionized firms, which is the point Martin has made (Martin, et al.). This can, perhaps, continue indefinitely when a firm has a sufficiently differentiated market position, such as Coca Cola's citrus in Florida. But most California agricultural firms are not selling branded consumer goods; therefore, they are ultimately susceptible to cost competition. It is not an accident that one of the stabler areas of agricultural unionization in California was the mushroom industry, in which there were relatively few firms, most of which were unionized. (Smith)

Agricultural unions were certainly not the only unions in the United States to make the mistake of halting organizing drives. Many other unions argued that it was too difficult and costly to organize, and they experienced similar shrinkage.

³ This point is made more generally by Richard Freeman and James Medoff, *What Do Unions Do?*, New York: Basic Books, 1984.

As previously noted, the strategy shifted from gaining certifications to gaining contracts. In this regard, it is worth considering another tomato shipper in Salinas who resisted signing a contract for many years. This shipper introduced mechanical harvesters, and then sold them after a couple of years, raised wages unilaterally, and did numerous other things during a ten-year period that were not permitted under the Agricultural Labor Relations Act (ALRA) without the agreement of the union. The union, however, was apparently never notified of these actions.

The shipper recently signed a contract, perhaps partly to redress these legal transgressions, but the same thing could have been accomplished ten years earlier. The surprising factor in this case is that the union did not know what was happening. The elected representative of the workers had so little communication with the workers that many years could pass without any knowledge of what was actually occurring in the field. Is this an active attempt to gain a contract? Contract negotiations were left to attorneys for both sides, who met or did not meet, who filed charges against one another and appealed the decisions of the board, which is an expensive legal process that is completely removed from the reality of agriculture, with no participation from the workers. One citrus grower in southern California reported that the union had won an election, and 11 years had passed without his ever having heard from them. Thus, there is plenty of responsibility on both sides for the failure of the bargaining process.

Huron

A small work stoppage occurred during the tomato harvest in the Huron area of the southern San Joaquin Valley in July 1991, while this fieldwork was being conducted. Work stoppages frequently occur in agriculture. The workers are unhappy about the piece rate that is being paid, or about some other aspect of working conditions, and they walk out. Direct negotiations usually ensue between the employer and the workers, some compromise is reached, and people go back to work.

In this case, however, Mixtec workers had been trying to get the attention of the shipper for more than a year. They were unhappy about some of the supervision supplied by the farm labor contractor, and they wanted to organize a labor cooperative of their own and bypass the contractor. The United Farm Workers had won an election in 1987, however; therefore, the firm told the workers that legally it could not even talk to them, that the UFW was their elected representative, and that they should talk to the union. Given the high rate of turnover in Huron tomatoes, very few of the workers had been around in 1987, so this was news to many of them.

The 1991 work stoppage was held under the UFW banner to protest the employer's "bad faith" bargaining, as determined by an ALRB

decision. The UFW representative said they were seeking a ten-cent a bucket raise (Podger). Of course, piece rates are frozen as long as bargaining continues--as long as a union is certified as a bargaining agent, but no impasse has been reached. Thus, as the attorneys argued away, the workers continued to receive 37 cents a bucket. In this sense, the union certification and the bargaining process are actually obstacles to the workers' gaining anything they want in the short run. They cannot talk to the employer about their labor cooperative; they cannot get a raise in the piece rate. Their only option is to decertify the union, but no one organizes them to that end. The system as currently constituted does not operate in the interests of the workers.

Summary of Labor Organizing

The Stockton labor force has many long-term workers from Michoacán who have experienced the organizing of the 1970s. The idea of unionization still resonates with these people. The loss of the 1989 strike, however, has made this group fearful of replacement and that newer workers will not support more strikes. To the extent that IRCA contributed to an increase in the labor supply, it has helped to create this fear.

In the southern San Joaquin Valley, where the labor force is more and more Mixtec, legalization has emboldened the workers. There is the potential for cohesiveness in this indigenous culture, because there is a strong sense of collective responsibility. Oaxacan workers in California come from so many different villages, however, that this cohesiveness has seldom been realized in work situations.

In San Diego, only one large firm is really affected by the possibility of unionization. In the others, it would be difficult to find many workers who have any experience with the organizing drives of the 1970s. IRCA has somewhat stabilized the labor force in San Diego, which could help any organizing attempts.

Thus, to enquire into the effects of IRCA on workers' ability to organize is to ask a largely irrelevant question. Certainly, the legalization of workers makes them feel more secure, and workers in Huron, where most were undocumented, reported just this result. In fact, the only worker in our entire survey who would associate himself with the union was a Mixtec who worked in Huron.

Legalization, however, is not the obstacle to organizing in California agriculture. Workers go out on strike in tomatoes, promises are made, they vote for the union, and nothing happens. As is apparent from the preceding discussion, the Stockton workers are angry, the Huron workers are frustrated. The unions win elections but fail to obtain contracts, which has discouraged organizing. In a certain sense, both the ALRA itself, and the way it functions, are now obstacles to organizing.

The Effects of IRCA on Producers

One is tempted to write, "Employers report: 'IRCA had no effect.'" This would be an accurate description of California tomato employers' attitudes and the vanishing enforcement effort. In interviews with over a dozen California tomato growers and shippers, we found virtually no willingness to attribute any change to IRCA. But, of course, there are effects, both direct and indirect, that can be summarized.

Paperwork

One clear effect is that the law created more paperwork for employers. There is a cost to such burdens, but it is unclear what has been gained that would justify this cost. When both employers and workers agree to fill out forms with fraudulent numbers--and no one comes to check--what is the point? None of the growers or shippers we spoke with had been checked.

Some employers require that workers have valid-appearing papers. Many do not. We verified that it is possible in California to have absolutely no papers of any kind and to obtain a job harvesting tomatoes with at least one farm labor contractor or grower based in Stockton, Madera, Fresno, or San Diego.

Farm labor contractors

There was no increase in the use of farm labor contractors in fresh tomatoes that could be attributed to IRCA. The use of contractors in fresh tomatoes is motivated by other considerations--such as seasonality and union organizing--and has been the general rule outside San Diego for at least 10 years.

Supply of labor

Employers have experienced such an increased supply of labor in recent years that a number of employers that were interviewed for this study complained of the burden of turning people away--or, as in Stockton, trying to keep them out of the fields. Clearly, some of this increased labor supply is a result of IRCA, because it legalized over a million workers who claimed to have worked in agriculture. These workers were thereby granted certain eventual rights to U.S. government transfer payments, which has encouraged increased settlement in California, along with increased migration by family, relatives, and friends from the corresponding Mexican villages (Alarcón; Zabin, et al.). As noted in Table 5, over one-half of the California tomato workers interviewed were legalized by IRCA, but 20 percent were not employment-authorized.

The increased supply of labor has contributed to declining real wages, as demonstrated earlier. This, in turn, may have encouraged overexpansion of acreage. After two years of low prices, acreage has now been reduced.

Mechanization

The abundant supply of labor also acts as a deterrent to any change in the labor process. In particular, mechanization has been abandoned.

The processing tomato harvest first began to be mechanized in the early 1960s; the mechanization was complete in California by 1970. It occurred fairly rapidly because processors altered their handling systems, and then gave growers price incentives to mechanize (Runsten and LeVeen).

There was talk at the time of finding a way to mechanize fresh tomato production, which was increasingly shifting toward mature green tomatoes that were grown as bush tomatoes on the ground. This culture was a clear offshoot of the breeding for processing tomatoes. The University of California worked with various manufacturers for several years in an attempt to develop a machine that would be gentle enough to harvest fresh tomatoes. In addition, as tomato varieties were toughened to withstand transport, they became more suited to machine harvest.

Several shippers in different regions of California eventually attempted to mechanize in approximately 1980. As one shipper put it, "The tomatoes look good on the day you harvest, but by the next day all the scuffs start showing up." The basic problem is that dirt builds up in the machine and the dirt bruises the fruit. This is a problem even with hand-harvesting, particularly in the fall when it is damper, because if mud is left on the tomatoes, it will bruise the other fruit. For this reason workers are cajoled to wipe the mud off of the tomatoes as they pick them. Another shipper, commenting on the machines, said, "If you could pick up the plants cleanly, it would work."

A mechanical harvester is not being actively developed at present, and no shipper interviewed plans to use one, as long as there is enough labor available. The buyers put a stop to it, and it would be used with the current technology only if everyone did it simultaneously. Given the extent of production in Mexico, this is highly unlikely, as it would give Mexico a significant quality advantage.

What happened to the machines? One shipper reported selling his to Ohio tomato growers for seven cents on the dollar, after Campbell Soup signed a contract with the Farm Labor Organizing Committee.

Another shipper has recently tried to introduce a harvesting belt, where workers would dump buckets of tomatoes directly onto a belt close to them in the field, with sorters along the belt. They have abandoned it, however, because they were unable to lower the piece rate to cover the added costs of the workers on the belt. The shipper argued that the pickers were more productive with the belt, because they did not have to walk as far to dump their buckets,

and, therefore, should be willing to accept lower piece rates, but the workers did not agree. One of the belts has been sent to Mexico to see whether it functions any better there, because labor productivity is a big problem in Mexican tomatoes, as discussed earlier.

One can conclude that mechanization in various forms is undoubtedly possible. The large supply of increasingly less expensive labor (in real terms) precludes any move in this direction, however.

Seasonality and Demand for Labor

The abundant supply of labor in California leads to indifference about high rates of turnover, and little effort is made by shippers to mitigate the impact of seasonality on the labor force. Some contractors must try to string together jobs for their workers, however, because of the high degree of seasonality of tomato work in certain regions, such as Fresno.

Most of the labor used in mature green tomatoes occurs during the harvest. Based on the 1991 U.C. cost study (Guerard, et al.), and estimates in Mamer and Wilkie for processing tomatoes, nonharvest labor without drip irrigation is about twelve hours an acre, including transplanting. If there are 33 thousand acres of such tomatoes in California, then they require about 400 thousand hours of preharvest labor, or the equivalent of less than 200 full-time farmworkers. Even if drip and other practices doubled labor requirements, the demand for these more permanent workers is insignificant.

From our survey data, harvest workers in mature green tomatoes picked anywhere from 300 to one thousand pounds an hour. Shippers with high yields and all-male Mixtec crews placed the average at 750 pounds an hour, but the mean rate in the San Joaquin Valley regions, including the women and all the waiting in Stockton, was about 500 pounds an hour.

The average yield in 1990 in the California counties where mature greens are grown was 14 tons an acre, or about 466 thousand tons. At 500 pounds an hour, it would take 56 hours of labor to harvest an acre, or 1,864,000 hours to harvest all mature greens in California. In addition, there are dumpers, checkers, truck drivers, mayordomos, and field men, which add no more than a dozen people to the field, or, at typical crew sizes in Stockton, about six hours of labor an acre. This is another 198,000 hours (or 5,000 40-hour weeks) for all mature-green tomatoes in California.

Harvest workers in our survey averaged 32 hours per week in San Joaquin Valley tomatoes. Thus, 58,250 weeks of work by tomato pickers was required. As noted earlier, the harvest season in some regions is quite short, but as long as four months in others. If the average worker managed 10 weeks picking tomatoes, then about 6,000 workers were needed for this harvest. If a labor shortage

were to develop, contractors could move workers around from one region to the next. If they worked 40 hours a week for four months, the harvest could be accomplished with less than 3,000 pickers, or about one-half the current requirement.

As this example demonstrates, and as the Bracero program demonstrated more concretely, the harvests could be accomplished with considerably fewer workers.

Chapter 5. Conclusions

Because tomato employers uniformly expressed the opinion that IRCA had no real effect in terms of constraining their operations, one must turn to the workers to evaluate the real effects of the law. The workers' view of IRCA can best be summarized by this quote from a Stockton worker: "The amnesty was an agreement with the growers so that many new people would come [from Mexico] to work." By legalizing over one million Mexican immigrants under the SAW program, there can be little doubt that IRCA encouraged more migration to the United States.

This conclusion stems directly from our understanding of Mexican migration, especially that it operates as a cumulative process. From the point of view of a potential migrant in any village in Mexico, there are a limited number of alternative destinations in the United States--namely, those where fellow villagers are already working or residing. As more migrants settle in the United States, they provide arrival points and job contacts for new migrants. By encouraging settlement in the United States, therefore, IRCA led to increased migration in its wake. The steadily rising numbers of migrants apprehended at the border after 1988 support this conclusion.

Considering that IRCA increased the supply of labor, it has indirectly contributed to declining real wages, less favorable working conditions, lack of interest in productivity-increasing investments, and the ineffectiveness of union organizing. In addition, employers continued to have access to new immigrants, because IRCA did not limit unauthorized workers' ability to secure jobs. All of these factors have been discussed and documented in this case study of fresh market tomatoes.

Given these circumstances in the farm labor market, one of the striking conclusions in this study was the importance of housing in conditioning local labor markets. Longer-term family migrants have been able to retain their position in the Stockton tomato harvest principally owing to their control of subsidized seasonal public housing. If it is considered desirable to slow the turnover in the farm labor market, seasonal housing must be built and maintained in a manner that allows migrants the assurance that they can return.

In broader terms, it appears that IRCA indirectly improved the competitiveness of U.S. tomato producers by increasing the labor supply. Our comparisons of costs in Mexico and the United States indicate that free trade agreements are unlikely to restructure

¹The arrests of undocumented foreigners by the U.S. Border Patrol along the U.S.-Mexican border are reported by fiscal year: 1986--1,615,854; 1987--1,122,067; 1988--943,063; 1989--854,939; 1990--1,103,353; 1991--1,132,933.

significantly the U.S. fresh tomato industry--that, indeed, it was already largely restructured by the mid-1970s, and that market shares have subsequently changed little. Shifting production from San Diego to Baja California in the 1980s was prompted by large devaluations of the Mexican peso in 1982-1983, and this process has now reversed itself as dollar costs continue to rise in Mexico.

The key element in competitiveness appears to be factor productivity (apart from marketing considerations). California has remained competitive primarily because of increased yields. Adopting drip irrigation in mature green tomato production in California, which has also markedly increased yields, will likely improve California's position, which will allow California to increase tomato shipments to Mexico, and lead to even greater demand in California for hand harvest labor in fresh tomatoes.

This case study reveals that such labor is increasingly being supplied by indigenous immigrants from the southern Mexican highlands--the same labor force used in northwestern Mexican tomato production, and similar to the indigenous Guatemalan labor force increasingly utilized in Florida tomatoes. Given the much higher productivity of this labor in the United States than in Mexico--and the declining real wages in California--there is a clear tendency toward convergence of unit labor costs in U.S. and Mexican tomatoes, which is a tendency that is likely to continue as the two economies become more integrated and actually utilize the same workers to pick tomatoes in both countries.

References

Alvarado, Andrew J., Gary L. Riley, and Herbert O. Mason. *Agricultural Workers in Central California in 1989*, California Agricultural Studies 90-8. Sacramento: State of California, Employment Development Department, September 1990.

Arizmendi, David. "Discussion," in Miriam J. Wells and Martha S. West, *Regulation of the Farm Labor Market: An Assessment of Farm Worker Protections Under California's Agricultural Labor Relations Act*. Working Paper No. 5, Working Group on Farm Labor and Rural Poverty. Davis: California Institute for Rural Studies, February 1989.

Belotti, Mario. "Mexico: Fresh and Processing Tomatoes." Paper presented at Conference on *The Impact of the Proposed Free Trade Agreement with Mexico on California Agriculture*. Santa Clara University, November 4, 1991.

Buckley, K., J.J. VanSickle, M. Bredahl, E. Belibasis and N. Guterriez. *Florida and Mexico Competition for the Winter Fresh Vegetable Market*. Agricultural Economics Report 556. Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, 1986.

CAADES. "Presentación de Resultados, Temporada Hortícola 1990-91." Asamblea Estatal Especializada de Productores de Hortalizas. Culiacán, Sinaloa, July 16, 1991.

CAADES. "Catorce Años de Estadísticas Básicas Hortícolas, 1973-1987." Culiacán, Sinaloa, Abril-Junio, 1988.

California County Agricultural Commissioners, "Annual Reports," various counties and years.

Conway, Frederick J. "The Fresh Market Tomato Industry in San Diego County, California," In *Immigration Reform and Perishable Crop Agriculture: Vol. II -- Case Studies*, edited by Monica L. Heppel and Sandra L Amendola. Washington, D.C.: Center for Immigration Studies, 1991.

Cook, Roberta. "Evolving Vegetable Trading Relationships: The Case of Mexico and California." *Journal of Food Distribution Research*. 21(1990):31-45.

Cook, Roberta, Carlos Benito, James Matson, David Runsten, Kenneth Shwedel, Timothy Taylor. *North American Free Trade Agreement: Effects on Agriculture, Vol. IV -- Fruits and Vegetables*. Park Ridge, Ill.: American Farm Bureau Research Foundation, 1992.

CORHFES. "Comparativo de Envios y Precios Semanales." México, D.F., 1991.

Cottrell, D. and G. Lucier. "U.S.-Mexican Vegetable Trade." *Vegetables and Specialties Situation and Outlook Report*. U.S. Department of Agriculture, Economic Research Service, April 1991.

Craig, Richard, *The Bracero Program*. Austin: University of Texas Press, 1972.

Federal-State Market News Service. "Marketing Florida Vegetables," various annual issues.

Food Institute Report. "Produce Outlook." American Institute of Food Distribution, Inc. September 28, 1991.

Freeman, Richard, and James Medoff. *What Do Unions Do?* New York: Basic Books, 1984.

Fuller, Varden. *The Supply of Agricultural Labor as a Factor in the Evolution of Farm Organization in California*, Ph.D. diss. University of California, Berkeley, 1939.

Garduño, Everardo, Efrain García, and Patricia Moran. *Los Mixtecos de Baja California*. Mexicali: Univ. Autónoma de Baja California, 1989.

Goldring, Luin. *Development and Migration: A Comparative Analysis of Two Mexican Migrant Circuits*. Working Paper No. 37. Washington, D.C.: U.S. Commission for the Study of International Migration and Cooperative Economic Development, May 1990.

Griffith, David and Jerónimo Camposeco. *Labor, Immigration Reform, and the Production of Winter Vegetables in South Florida: A Case Study*. Washington, D.C.: U.S. Commission on Agricultural Workers, 1992.

Guerard, John, Michelle le Strange, Don May, Jesus Valencia, Karen Klonsky, and Pete Livingston. *Sample Costs to Produce Fresh Market Tomatoes in the San Joaquin Valley, 1991*. Davis: University of California, Cooperative Extension, 1991.

Heppel, Monica, "The Raisin Grape and Tomato Industry in Fresno County." In *Immigration Reform and Perishable Crop Agriculture: Vol. II -- Case Studies*, edited by Monica L. Heppel and Sandra L. Amendola. Washington, D.C.: Center for Immigration Studies, 1991.

Jesse, E.V., and M.J. Machado. *Trends in Production and Marketing of California Fresh Market Tomatoes*. Davis: University of California, Division of Agricultural Sciences, 1975.

Kalaitzandonakes, N.G. and T.G. Taylor. "Competitive Pressure and Productivity Growth: The Case of the Florida Vegetable Industry." *Southern Journal of Agricultural Economics* 22(1990):13-20.

Kissam, Ed, Anna García, and David Runsten. "Northward Out of Mexico: Migration Networks and Farm Labor Supply in Parlier, California." in *The Farm Labor Supply Study: 1989-1990, vol. 2 -- Case Studies*, edited by Ed Kissam and David Griffith. Final Report to the U.S. Department of Labor. Berkeley: Micro Methods, December 1991.

Lloyd, Jack, Philip L. Martin, and John Mamer. **The Ventura Citrus Labor Market.** Giannini Information Series No. 88-1. Berkeley: University of California, 1988.

Marsh, Robin R., and David Runsten, *Preliminary Comparisons of Agricultural Energy Costs in U.S. and Mexican Fruit and Vegetable Regions.* Sacramento: California Energy Commission, March 1992.

Martin, Philip L., et al., "Farmworker Unions: Status and Wage Impacts," *California Agriculture* 40, nos. 7-8, (July-August 1986).

Martin, Philip L., and Bert Mason. **SAWs, RAWs, and Farmworkers.** California Agricultural Studies No. 90-1. Sacramento: State of California, Employment Development Department, August 1989.

Mines, Richard, Susan Gabbard, and Beatriz Boccalandro. *Findings from the National Agricultural Workers Survey, 1990.* Research Report No. 1. Washington, D.C.: U.S. Department of Labor, Assistant Secretary for Policy, Office of Program Economics, July 1991.

Podger, Pamela J., "Tomato Pickers Stop Work to Demand Raise," *Fresno Bee*, July 17, 1991.

Runsten, David, and Michael Kearney. *A Census of Mixtec Immigrants in Selected Regions of California, 1991.* Davis: California Institute for Rural Studies, forthcoming.

Runsten, David, and E. Phillip LeVeen. *Mechanization and Mexican Labor in California Agriculture.* La Jolla: University of California at San Diego, Center for U.S.-Mexican Studies, 1981 .

SARH (Secretaría de Agricultura y Recursos Hidráulicos), Mexicali, unpublished data.

Simmons, R.L., J. Pearson and E. Smith. *Mexican Competition for the U.S. Fresh Winter Vegetable Market.* Economic Report 348. Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, 1976.

Smith, Robert, "Labor Relations and IRCA in the Pennsylvania and California Mushroom Industries," *Rural California Report* 3, no. 1, April 1991.

Smith, S.A. and T.G. Taylor. *Production Costs for Selected Vegetables in Florida, 1990-91*. Economic Information Report EC 91-2. Gainesville: Food and Resource Economics Department, University of Florida, June 1991.

Taylor, T.G. and G.H. Wilkowske. "Productivity Growth in the Florida Fresh Winter Vegetable Industry." *Southern Journal of Agricultural Economics* 16(1984):55-61.

U.S. Department of Agriculture, Foreign Agricultural Service. *Horticultural Products Review*. December 1988.

Vaupel, Suzanne. "Farm Labor Contractors in the Fresh Market Tomato Harvest, Fresno County." In *Immigration Reform and Perishable Crop Agriculture: Vol II. -- Case Studies*, edited by Monica L. Heppel and Sandra L. Amendola. Washington, D.C.: Center for Immigration Studies, 1991.

World Bank, *Economic and Social Indicators*, Washington, D.C., 1991.

Zabin, Carol, "Binational Labor Markets and Segmentation by Gender: Agriculture and the North American Free Trade Agreement," Tulane University, 1992.

Zabin, Carol, Michael Kearney, Anna Garcia, David Runsten, and Carole Nagengast. *Mixtec Migrants in California Agriculture: A New Cycle of Poverty*. Davis: California Institute for Rural Studies, 1992.

Zepp, G.A., and R.L. Simmons. *Producing Fresh Tomatoes in California and Baja California: Costs and Competition*. Washington, D.C.: U.S. Department of Agriculture, February 1980.