

Kick the Can

Production and Employment in the West Coast Fruit and Vegetable Processing Industries

A Special Report

Prepared for

U.S. Department of Labor

By

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“Campbell Soup Co. may be moving into the business of selling fresh soup...Facing sluggish sales of canned soup...the company has been in talks with closely held Fortun Foods, Inc...Fortun’s main business is selling freshly made soup concentrates to restaurants and other...food service outlets...Its line of soups and sauces come in resealable, plastic stand-up bags emblazoned with ...the Stockpot slogan: ‘The Fresh Soup Company’...It’s uncertain whether Campbell would adopt the Stockpot brand or advertising strategy with Stockpot’s tagline: ‘After 100 years, it’s time to kick the can.’”

---*The Wall Street Journal*, June 24, 1998, p. A4

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Introduction

In 1997, the U.S. Department of Labor (DoL) initiated a modest program to identify near-term job training needs that might arise from employment dislocations arising from established firms. The program also sought to address the needs of population sub-groups who had been under-served by DoL activities in the past. Funds were made available through grants to labor unions representing employees in the affected industries. Clearly, employees and their representatives have as great an interest in addressing these issues as do the firms themselves.

This report summarizes findings regarding production and employment trends in the West Coast fruit and vegetable processing industries. Historically one of the most important industries in the important agricultural regions of the states of California, Oregon and Washington, recent events have directed attention to the precariousness of employment in major segments of the food processing industry. Plant closures, substantial layoffs, technological change, and dramatic shifts in the types of products needed in the marketplace have all taken a toll.

Ten local unions of the International Brotherhood of Teamsters (IBT) represent most employees in the West Coast canneries and freezers. IBT contracted with the California Institute for Rural Studies (CIRS) to produce an independent report that examined the principal factors affecting production and employment in the food processing sector. CIRS assembled a team of experienced and knowledgeable experts to conduct the needed research and prepare this report.

Methodology

There were two major phases to this study. First, information from secondary sources was collected regarding the processed fruit and vegetable industry in the U.S. This included data on trends in production, consumption, imports and exports, and employment. Most of this data was obtained from U.S.D.A.'s Economic Research Service and state government agencies. Notable information regarding employment trends was obtained from California's Department of Employment Development. News articles and academic journals were also reviewed.

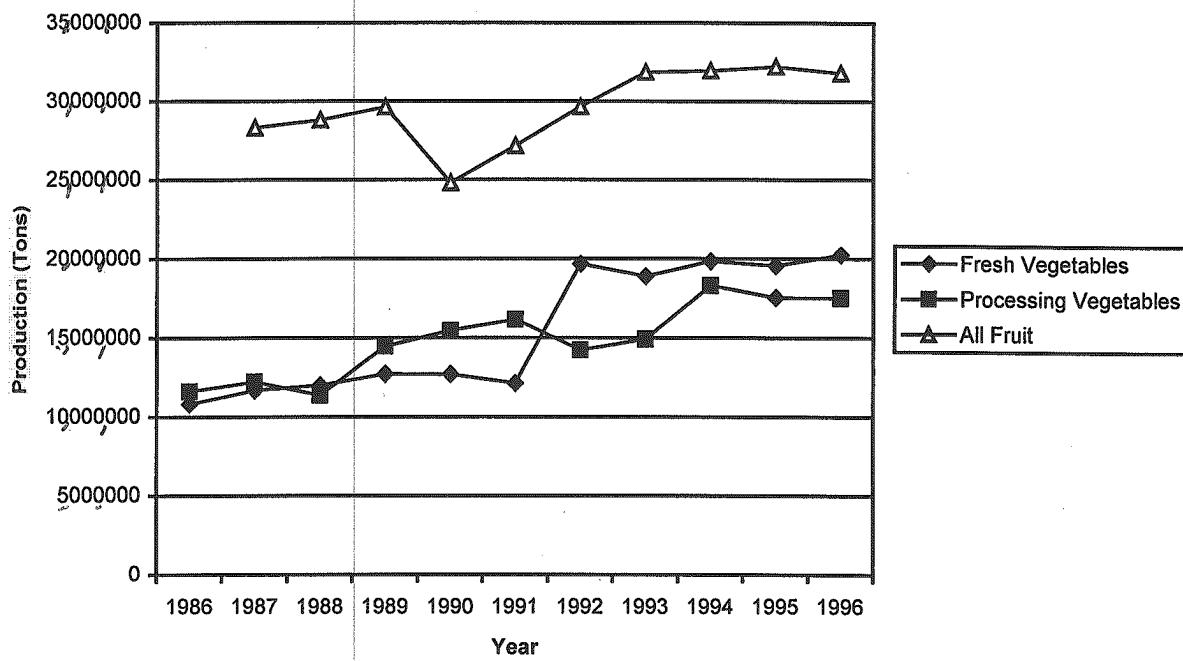
The second phase of this study involved conducting detailed interviews with management at most of the leading firms in the industry. To complete this activity, a comprehensive list of the firms located on the West Coast was prepared. These firms were grouped into five categories: tomato processors; canned fruit and juice concentrate; canned vegetables; frozen fruit and vegetables; and frozen potatoes. Some firms produced products in more than one category. Within each category, the leading firms and some smaller companies were selected for interviews. Seventeen interviews were conducted. The interviews concerned a broad range of issues affecting the firms, including demand side issues such as consumption trends and international competitiveness, and production side issues such as raw product production trends, environmental regulations, energy costs and manufacturing changes. The firms' plant locations, processing capacities, product lines and employment trends were also reviewed.

Fruits and vegetables: Production and Consumption

Trends in farm production

Fruit and vegetable production are, together with ornamental horticulture crops, the most rapidly expanding segments of U.S. agriculture (sometimes abbreviated as "F-V-H" crops). In just the past ten years (1987-1996), the annual tonnage of harvested fruits and vegetables has increased by one-third, from 52.2 million tons to 69.6 million tons, see Figure 1. Importantly, fresh vegetable production has doubled in this period. Perhaps equally significant is the fact that whereas processing vegetable production exceeded fresh production prior to 1992, for the past five straight years the reverse is true: fresh exceeded processing.

Figure 1
Vegetables & Fruit, Farm Production, United States



California is the nation's leading agriculture producer and today accounts for half of all of U.S. vegetable production and two-fifths of all fruit production, as measured by annual production volume. Together with Oregon and Washington, the West Coast states grow more than half of all U.S. fruits and vegetables.

The reasons for this rapid increase in fruit and vegetable production are complex, but are mostly related to increased consumer preference for these commodities, both in domestic and foreign consumption. There is also a strong tendency over long periods of time for agriculture to shift from extensive crops, such as field and forage crops, toward intensive crops. For example, two hundred years ago California farmland was nearly entirely devoted to livestock production. A half-century later, field and forage crops became dominant. By the period just after World

War II, thanks to enormous federal irrigation projects, fruit and vegetable crops emerged as the predominant commodities. Today, fruit, vegetable and ornamental horticulture account for nearly 80% of California crop production (based on farm cash receipts from the sale of agricultural commodities). In 1998, in part due to the phase-out of U.S. Department of Agriculture price support programs, many producers of cotton are shifting to vegetable crops.

From the perspective of the farmer, fruit and vegetable production, though risky, offers potentially greater returns than most field crops. Switching from wheat or hay crops to grapes or strawberries, for example, as was done by some farmers in the Central Coast of California, has resulted in an increase in crop revenue from about \$400 per acre to as much as \$20,000 per acre in the case of strawberries. Of course, a grower will experience parallel increases in production costs so that farm profits will certainly not increase in proportion to the revenue gains. Already, the share of all U.S. crop production represented by the F-V-H segments has increased to nearly one-third today from just over one-fifth in 1982.

There will be limits on the growth of fruit and vegetable production. Most often, these limits are imposed both by market and growing conditions. Unlike most hard goods, prices for agricultural commodities, particularly fresh produce, are subject to very large swings reflecting the available supply relative to demand. As a California fruit farmer once put it, "I hope I have a great crop, but I also hope that my farmer neighbors don't."

The major labor-intensive crop industries of the U.S. are presently enjoying boom years, and 1997 was the best year yet for most F-V-H farmers. A majority of U.S. F-V-H production is now concentrated in the Pacific Region states of California, Oregon, Washington and the southwestern Arizona desert. Taken together, the four states of this region account for 51% of the entire U.S. farm gate value of these commodities. Further, almost three-fourths of all crop production (cash receipts from farm marketing) in the Pacific Region is now associated with these industries.

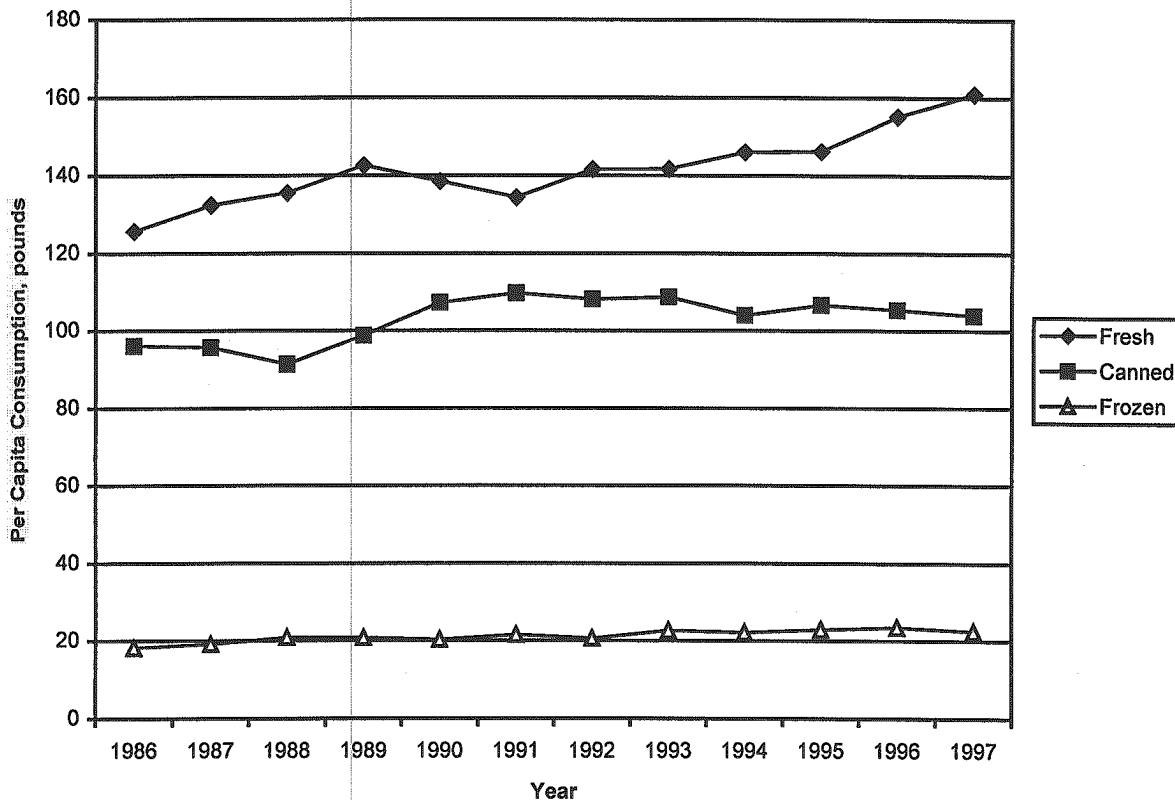
In California alone, the annual tonnage of harvested fruit and vegetable crops has doubled in the past two decades. Contrary to popular perceptions concerning the encroachment of urban development on the state's agriculture, there is more land planted in trees and vines than ever in California history, and harvested vegetable acreage has increased by 41% in the Central Valley alone in the past decade. As further described below, there have been important changes in the location of production within the state for some commodities. Nevertheless, the overall trend is toward increased production. Careful review of acreage and production data suggests that about half of this growth is due to increased plantings and half is due to increased yields.

Trends in consumption

One of the important factors underlying the large increase in the production of fruits and vegetables is the change in dietary habits of U.S. residents. During the past ten to fifteen years, consumers have significantly altered their overall preference for certain products. It is fair to say that the trend has favored fresh market products at the expense of canned and frozen products, although this preference is by no means uniform regarding all fruits and vegetables.

Overall, in 1986, per capita consumption of fresh vegetables accounted for about 52% of all commercial vegetable production, canned vegetables about 40%, and frozen vegetables about 8%. By 1997, the canned share had declined to 36% and the frozen share remained at 8%, whereas the fresh share had increased to 56%. Actual per capita vegetable consumption data for each type of product, expressed in pounds per person for each year, is shown in Figure 2.

Figure 2
Vegetables, Per Capita Consumption, U.S.

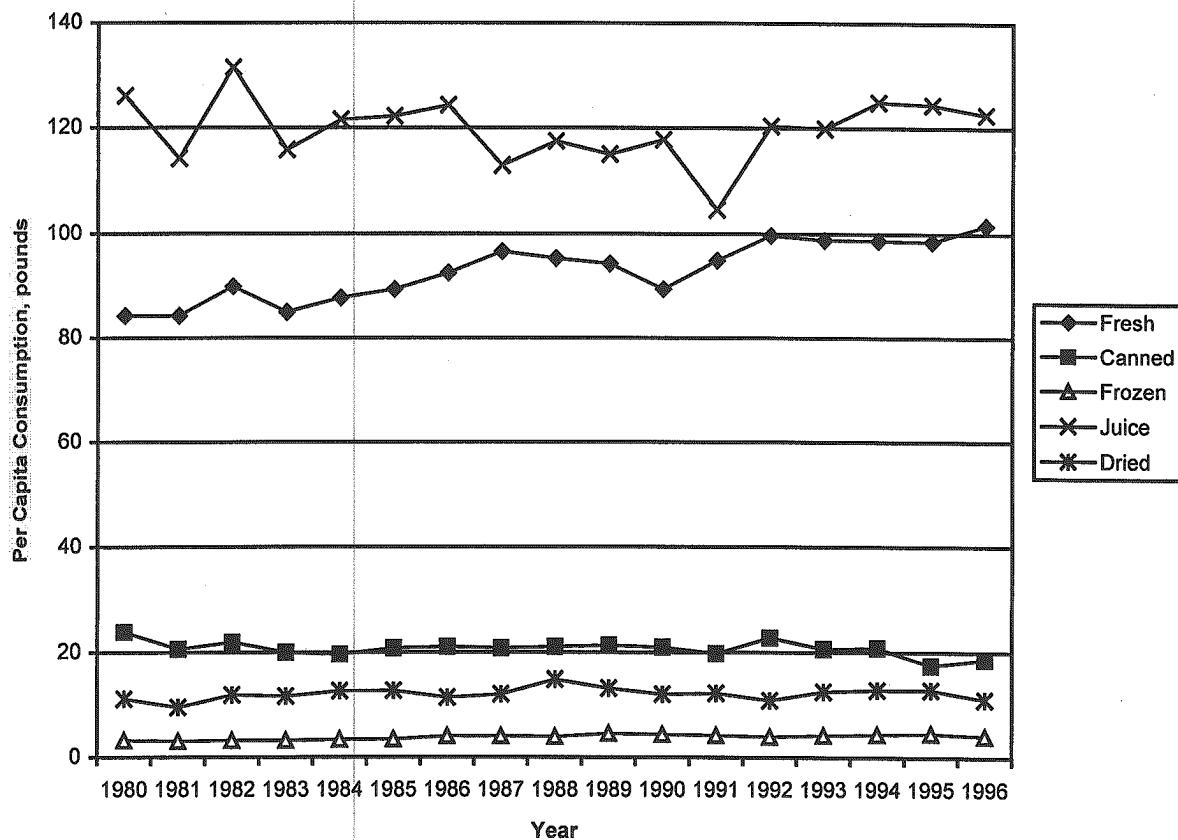


* The 28% increase in fresh vegetable per capita consumption since 1986 is apparent in Figure 2. In contrast, canned vegetable per capita consumption evidently peaked in 1991 and has declined in subsequent years, by about 5% between 1991 and 1997. Frozen vegetable per capita consumption has been relatively steady, increasing very slightly since the early 1990s.

Fruit consumption trends show some overall similarities but differ in important respects from the data for vegetables. The data regarding per capita consumption of various types of fruit products is shown in Figure 3. The main point of these data is that per capita fresh fruit consumption has increased by about 21% between 1980 and 1996, but canned fruit consumption declined by 22% in the same period. Frozen fruit consumption increased somewhat, juice consumption fluctuated quite a bit but is roughly unchanged overall, and dried fruit consumption has remained steady. An important factor in understanding trends in per capita consumption of fruits and vegetables is that major commodity organizations operating under federal or state

market orders have been able to secure substantial funds from assessments of their producers, or from federal or state agricultural agencies, to support intense advertising campaigns. Most major fresh commodities, from table grapes to deciduous tree fruit, have benefited from these efforts.

Figure 3
Fruits, Per Capita Consumption, U.S.



Additionally, the produce industry started its privately financed "Five-a-Day" campaign in 1986 to promote the consumption of five servings of fresh fruits or vegetables each day; the program has stressed the health benefits that accrue from this dietary preference. Many Americans, concerned about diet and health, have changed their preferences in the belief that increased consumption of fresh produce will better enable them to meet their personal goals. In contrast, canneries and other processors have evidently been unable to unite to sponsor a generic advertising program in support of canned and frozen fruits and vegetables, perhaps because each has a primary commitment to their individual brand identification.

Overall, canned fruit and vegetable products have lost, both in absolute amount and in market share, to fresh products. Specific canned items, as further described elsewhere, may have either gained or lost in this period.

Employment in the canned and frozen fruit and vegetable industries

The major share of employment in the West Coast canned and frozen fruit and vegetable industries has historically been in California. Recent data indicates that this is still the case. Annual average employment in the Food & Kindred Product sector (SIC 20) in California was 180,400 in 1996. The next largest Pacific Region state regarding employment in this sector is Washington with 41,900 as of 1996.

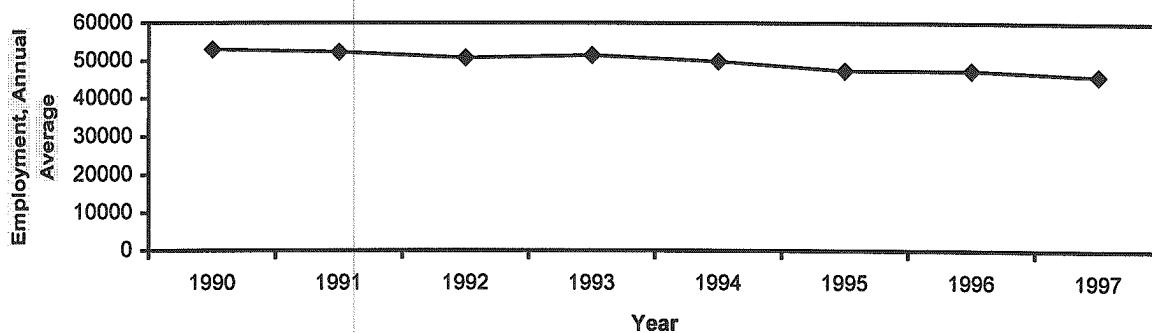
Production worker employment, as of 1992, in canneries (SIC 2033) and freezers (SIC 2037) in the four states which are the focus of this study (California, Idaho, Oregon, Washington) was 52,950. The total is surely smaller today. Production worker employment by state and sector in 1992 is shown in Table 1.

Table 1
Employment, Production Workers, 1992

State	Canneries	Freezers
California	18,700	8,600
Idaho	750	6,500
Oregon	1,500	7,200
Washington	3,400	6,300

Overall employment in the Canned, Frozen, and Preserved Fruits, Vegetables and Food Specialties industries (SIC 203) in California was reportedly 45,883 in 1997, down significantly from the figure of 52,933 in 1990. Figure 4 shows the trend in California employment in this

Figure 4
**Preserved Fruit & Vegetables, California,
Employment**

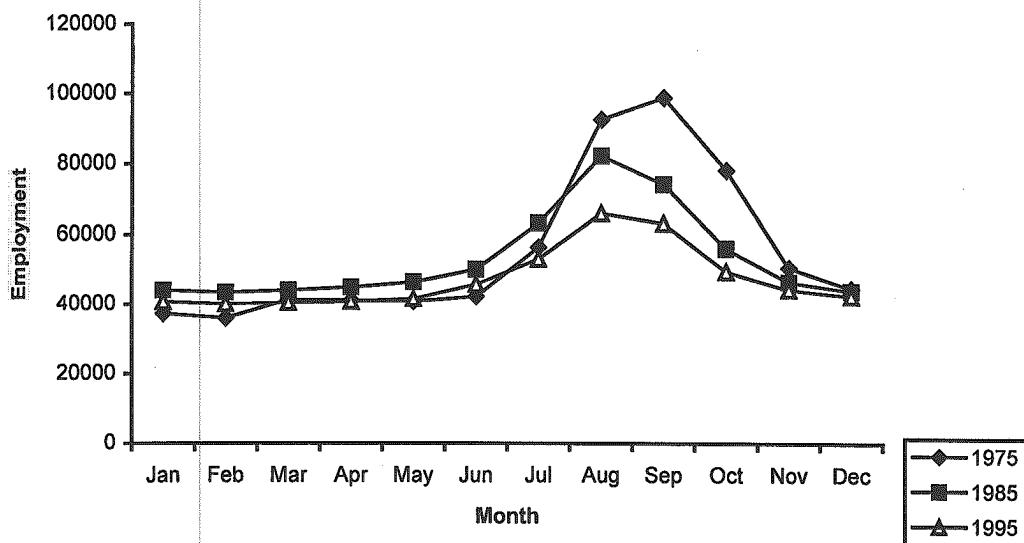


sector in the 1990s.

The declining reported employment is qualitatively consistent with expectations from the findings regarding trends in farm production and per capita consumption of these products as discussed above. Examination of independent payroll data, uncorrected for inflation, shows that aggregate wages paid to production workers in canneries fell by about 11% and freezer worker payroll plummeted by 36% during the five-year period from 1990 through 1994. This fall-off in payroll is qualitatively consistent with but quantitatively larger than the decline in employment shown in Figure 4.

What is not apparent from these annual average employment data is the dramatic decline in the number of seasonal jobs that has also occurred in this industry. Essentially, the very large variations in employment, especially the huge number of peak season jobs that formerly characterized the industry, have been substantially reduced over the course of the past two decades. This is shown in Figure 5. In September 1975, for example, peak season employment reached 98,755, although annual average employment was about 55,000. By 1995, when peak employment reached a high of 66,000 in August, the annual average employment was just 47,300. Thus, in a period of two decades, peak season employment fell by about 32,800, but annual average employment fell by just 7,700. From the point of view of workers, there were fewer jobs, but those that were available were of longer duration. It is significant to note as well that the number of year-round jobs remained essentially unchanged during the same two-decade period.

Figure 5
Preserved Fruit & Vegetables, California,
Employment, Monthly



While much of the decline of employment in the canneries is attributable to reduced consumer demand for canned fruit and stagnant demand for canned vegetable products, other factors must also be considered. First, processing tomato production now focuses on bulk paste,

which has led to revamping of production with corresponding decreases in labor requirements. Primary processors now store the paste and ship it to other locations throughout the U.S. and the world, where it is "remanufactured" into sauce, ketchup, soups, or other packaged products. The savings in transportation costs alone are significant. And "just-in-time" inventory is also now possible. This shift in the form of primary product production is associated with a substantial reduction in demand for labor even when overall demand for the final product has actually increased. Plants that can not be easily modified to produce paste may become obsolete in the future.

Whether it is large drums or "bags-in-a-box" the several hundred pound containers are not only more economical to ship but they are more suited to today's demand. In fact, much of the rise in demand for processed tomato products during the past decade is attributed to the growing popularity of pizza, salsa and other convenience foods. All cannery officials interviewed agreed that since the late 1980s, new facilities built in California as well as modifications of existing plants have been intended to expand the capacity of the industry to meet the growing demand for bulk paste.

Second, plant closures and relocation of production out of the state have adversely impacted employment in food processing. The 1996 closing of the Heinz-Tracy plant and the planned 1999 closing of the Del Monte-San Jose facility are not reflected in the employment data shown in Figure 4 above. Relocation of freezer facilities to the midwest and Mexico has resulted in substantial declines in employment in the freezer plants in California's Central Coast, symbolized by the closure of the Green Giant plant in Watsonville. Some major players, such as Birds-Eye, have completely revamped their supply strategy following acquisition by Dean Foods Co.

Third, on the positive side, it is possible that increased consumer demand for organic or other highly specialized products may stimulate new demand for processed vegetables. The relative success of organic prepared frozen meals, and other types of vegetarian products, might encourage new investment in vegetable processing.

Processing Industry Structure and Leading Firms

In 1994, within California, there were reportedly 86 firms engaged in canning of fruits or vegetables, and 20 firms producing frozen fruit or vegetable products. Together with additional firms in Idaho, Oregon and Washington, we find sixty major companies (defined as having \$25 million or more in annual sales of processed fruit or vegetable products). According to the *Directory of the Canning, Freezing, Preserving Industries*, as well as knowledgeable industry informants, the sixty leading firms with operations in California, Idaho, Oregon and Washington are listed in Appendix A.

Industry-by-industry review: processing tomatoes

California is the leading producer of processing tomatoes in the U.S.; it supplies about 95% of the nation's processing volume. Between 1986 and 1994, annual production rose from 6.5 million tons to 10.7 millions, and then dropped off 9.3 million tons in 1997 in response to excess supply conditions in the international market.

There has been considerable restructuring in California's processing tomato industry during the past 10 years. The general trend has been for the national branded firms to close their aging facilities while independent firms have replaced this capacity by building new facilities with specialized production capabilities. Their production is then sold to the national firms who remanufacture the product at facilities located in the Midwest and the East Coast. In 1972, approximately 25% of the State's production was packed into tomato paste; by 1997, it had increased to 70%.¹

One third of the State's tomato paste processing capacity is in plants built during the past 10 years. Furthermore, one fourth of the State's tomato paste processing capacity is controlled by growers who have vertically integrated to have greater control over the processing and marketing of their tomato production.² A few of the 28 tomato processing facilities in California specialize in lower volume products, primarily whole, peeled tomatoes and fresh pack sauces.

According to industry insiders, the four leaders in tomato processing are Morning Star, Hunt-Wesson, Tri-Valley Growers and Campbell, followed by Heinz, Del Monte and Lipton. Morning Star is the State's largest tomato processing firm; it produces only bulk tomato paste, pizza paste and diced tomatoes at its two plants that were built during the past five years. It has the state's single largest tomato processing plant, which is located in the northern Sacramento Valley (Williams). In 1997, this plant reportedly processed 900,000 tons of raw product. Morning Star also has a plant in the Southern San Joaquin Valley (Los Banos) with a reported capacity of 600,000 tons; approximately 300,000 tons of additional processing capacity was added in 1998 at this plant. Morning Star has also taken over the former Harter plant in Yuba City (Sacramento Valley). This aging facility has capabilities for processing canned peaches, as well as about 200,000 tons of tomatoes. In total, Morning Star processes about 20% of the State's crop. It is rumored that Morning Star will be building another tomato processing plant soon in the Southern San Joaquin Valley.

¹ Based on information provided by Morning Star.

² Based on capacity estimates provided by Morning Star.

Del Monte Foods acquired the Contadina brand of canned tomato products and certain related product lines, as well as Contadina's tomato processing facilities in Hanford and Woodland, from Nestle in November 1997. Del Monte Foods is owned by Texas Pacific Group. It announced a major reorganization of its California plants in January, 1998.. Its San Jose fruit canning plant will be closed at the end of the 1999 season and the Modesto plant will be dedicated to fruit packing. Primary tomato processing will be switched to the Contadina facilities in Hanford. Presumably, the Woodland Contadina plant would also continue to process tomatoes.

Tri-Valley Growers, a cooperative, is reported to process about 10% of the State's tomato production. Last year, it announced that its tomato pack will be reduced by 20% by closing its tomato processing operation in Stockton; however, this decision was reversed earlier this year and Stockton will continue to operate on a year-to-year basis.

Other restructuring in the processed tomato industry has included the closing of Heinz's aging ketchup plant in Tracy. Campbell Soup discontinued tomato processing at its 50+ year old Sacramento plant in 1996. Earlier this year, San Tomo Group sold its organic Muir Glen product line and announced that it would no longer operate its Gilroy Canning plant (located in the Santa Clara Valley.) San Benito Foods (Northwest Packing) is the only tomato processor left on the Central Coast. Two smaller tomato processors are expected to merge later this year and consolidate their operations. In addition to Morning Star, at least one other independent tomato processing firm is rumored to be considering building another plant in the Southern San Joaquin Valley.

Clearly, some firms are expecting the demand for processed tomato products to increase in the U.S. despite the leveling off of per capita consumption of canned tomato products (see Appendix B, Table I). Another tomato-based product, salsa, has reportedly displaced ketchup as the leading condiment. Bottled pasta sauces are a convenient, healthful and inexpensive meal component for today's busy households, yet their sales have not been as high as expected. Some firms have focused on fresh pack premium sauces (instead of re-manufacturing paste) as food service gourmet-style products.

One factor supporting an optimistic outlook for California's tomato processing industry is the recent research findings linking the consumption of processed tomato products to the reduction in risk for development of several forms of cancer. The findings are attributed to lycopene, the carotenoid that functions as a powerful antioxidant. Representatives from California's tomato processing industry have agreed to work with international organizations and researchers to further investigate these potentially powerful findings. Thus far, individual firms have not promoted these health benefits to consumers.

Industry representatives do not consider processed tomato imports to be a significant threat. Due to continuing increases in raw product yields and improved plant efficiencies, California's processed tomato industry is able to compete effectively against imports. Severe shortages arose during the 1980s and U.S. imports of processed tomato products rose to a peak in 1989 at 182,000 tons. New domestic processing capacity was built; by 1996, imports had

dropped off to 57,000 tons. Most of these imports are from Turkey and Chile, and are marketed on the East Coast.

Conversely, the U.S. has become a net exporter of processed tomato products. Exports have grown from 36,000 tons in 1986 to 300,000 tons in 1996. Paste and sauce comprise the majority of the exported product. Although exports of most U.S. products to Asia have dropped significantly in 1998, representatives of California's tomato industry expect the Pacific Rim to become a major market for processed tomato products in the long term as these economies regain their momentum and westernize their diets. The extent to which California's processors benefit will depend on their ability to compete pricewise with Australia, Brazil, Chile and the European Union's exporters. The European Union's production subsidies can be significant.

Processing tomato production has been shifting away from the Central Coast and Southern California areas into the San Joaquin Valley for a number of years. Nearly all processing tomatoes are now grown in California's Central Valley; during the past 10 years, production in both the Sacramento and Southern San Joaquin Valleys has expanded significantly (see Appendix C, Figure I). The Northern San Joaquin Valley's share of total production has been steadily declining in recent years. Due to urbanization, production has all but vanished from the Southern California and Central Coast areas. Fresno County is the largest producer of processing tomatoes; since 1986, its production has increased from 2.0 million tons to 3.9 million tons. Although there have been some shifts in cropping patterns in California, the heavy plantings of wine grapes have displaced primarily cotton, rather than tomatoes.

For many years, transportation costs for tomato processors were excessive because the fixed plant locations were not well matched to the best growing areas. It is widely recognized that the highest yields have been obtained on the west side of the San Joaquin Valley, roughly south of Los Banos. Yields in Fresno County averaged 40 tons per acre in 1996 while yields in the second largest producing area, Yolo County in the Sacramento Valley, averaged 33 tons per acre. For this reason, over the course of the past ten to fifteen years, new plants have been established in the west side of the San Joaquin Valley. Los Gatos built in Huron, Contadina set up a plant in Hanford, and Tomatek put in a plant in Firebaugh. Morning Star located its large plant in Williams to be close to the large tomato crops grown in Colusa and Yolo Counties. The processors at existing plants have shifted their sourcing patterns. It is believed by industry insiders that the geographic mismatch that once existed between growing centers in the Southern San Joaquin Valley and processing plants in the Central Coast or Northern San Joaquin Valley has now been largely overcome by the new facilities.

Although additional processing capacity might be added soon in the Southern San Joaquin Valley, there are long term concerns about water quality and availability of crop production in this region. Water transfer markets are developing and some conveyance systems will probably be developed to ship more water from Northern to Southern California; however, these changes will probably lead to increased growing costs. Producers in the Northern Sacramento Valley currently have higher production costs due to their lower yields; however, their water supplies are more secure than those of the Southern San Joaquin growers.

Other outstanding issues to be resolved in the industry center on accommodating to

environmental regulations related to wastewater disposal and growers' use of pesticides. Several industry insiders indicate that wastewater effluent is a serious concern in urbanized areas. The tomato processors in Stockton attempted to establish a wastewater reuse system that would handle the disposal in a cost-effective manner, but the City of Stockton did not find this approach acceptable. Thus, the processors in Stockton have to pay high sewer fees and cannot expand their plants cost effectively.

The industry appears to be approaching the limit on being able to reduce costs by automating. According to information provided by Morning Star, seasonal labor expenses comprise only 5% of the average tomato paste production costs while the raw product represents 46%. Other major cost components are: capital and overhead (18%), containers (10%) and trucking (8%).

Plants built in the 1980s and 1990s contain extensive automation. Most of the older plants have been retooled to take advantage of cost savings. In some cases, the national firms opted to close a facility rather than retool it because the capital investment would not have generated an adequate rate of return. It is more cost effective for them to buy product, particularly paste, from other California processors and then ship it to other plants (usually in the Midwest or East Coast) for re-manufacturing into value-added products for the retail and food service markets. Wastewater disposal costs were a significant factor in these considerations.

Sorting for color and foreign material is the most labor-intensive activity in tomato processing plants. Color sorting (for green tomatoes) is essential for peeled and diced tomato products; thus, these products are more labor intensive than bulk tomato paste production. Recently, Tri-Valley Growers introduced state-of-the-art color sorting equipment in all three of its plants. This will result in the elimination of some 80 union jobs, or about 8% of the total of 1,000 tomato processing jobs. Another processor expects to install color sorters during the next two years and reduce its sorting labor requirements by 80%. Thus, its overall seasonal labor requirements should drop from 2,500 to 1,450 people.

The availability of field labor for processing tomato production is not a significant problem. Plant labor availability is somewhat more problematic; in particular, processors reported having difficulties recruiting qualified personnel for year-round supervisory positions. Their seasonal labor situations vary by location. In some communities, there is a steady supply of local residents who return annually to their plant positions. At other plants, reliance is high on migrant labor. Some plant managers expressed concern about inadequate training for their personnel, including the seasonal workers. They wanted to educate the workers on problem solving and worker safety; however, there is no immediate return on such investment. Cost sharing programs with the Federal government could make such efforts more attractive to the processors.

The overall outlook for California's processed tomato industry is relatively promising. Crop yields are expected to continue to increase and provide protection from lower cost foreign imports. Some concern remains about the access to reasonably priced, good quality water in the Southern San Joaquin Valley. If the health benefits of lycopene can be promoted effectively, there should be a considerable surge in domestic consumption of tomato sauces. Exports to the

Pacific Rim could increase significantly when economies in this region recover. It is expected that any plants that are built will be specialized, producing either tomato paste or diced tomatoes. There could be additional reduction in the demand for seasonal labor, as some plants continue to modernize and install color sorters.

Industry-by-industry review: canned fruit

The West Coast is the primary production region for canned fruits in the U.S. Bartlett pears and cling peaches are the primary fruits that are canned on the West Coast; production of canned apricots, apples and cherries is limited. Limited amounts of juice concentrate, baby food and dried fruit are also made from these fruits.

Processed sales of Bartlett pears on the West Coast peaked in 1980 at 492,000 tons; since then, they have dropped to about 400,000 tons. California is the largest supplier of Bartlett pears for the canned fruit industry; in 1997, it supplied 208,600 (51%) of the 410,000 tons processed on the West Coast. Sixty-four percent of California's 1997 crop was canned while 23% was sold fresh. Higher proportions of Washington's and Oregon's Bartlett crops are processed.

Total bearing acreage of Bartlett pears has decreased by 50% in California over the past 20 years. However, California's total Bartlett production has only dropped about 25%; yield increases have kept production levels up.

California is the leading producer of cling peaches for canning. Between 1986 and 1992, cling peach production increased from 842 million pounds to 1,117 million pounds; by 1996, it had dropped slightly to 1,041 million pounds (see Appendix B, Table III).

The canned fruit industry on the West Coast underwent significant restructuring during the 1970s. The major firms processing canned peaches, pears and fruit cocktail on the West Coast has diminished to Del Monte, Tri-Valley Growers, Pacific Coast Producers , Northwest Packing, Independent Food Processors and Snokist. Most of the product is packed for retail sales and institutional use. A significant proportion of the institutional use is for the U.S. Department of Agriculture's School Lunch program.

Del Monte has announced that it will be closing its fruit packing operations in San Jose and Stockton and consolidating them at its Modesto facility. Tri-Valley Growers packs canned fruit at its two Modesto plants and only peaches at its Gridley plant. It stopped processing fruit at a leased facility in Sacramento in 1997. Pacific Coast Producers produces canned peaches at its Lodi plant and peaches, pears and fruit mix at its Oroville plant (about 75 miles north of Sacramento). Snokist has one facility, located in Yakima, Washington; this plant produces canned pears, cherries and plums, as well as fresh pears. Northwest Packing and Independent Food Processors have similar canned product mixes; Northwest Packing's plant is in Vancouver, Washington and Independent's is in Yakima, Washington.

As indicated in the table (see Appendix B, Table II), canned fruit consumption is declining while fruit juice and fresh fruit consumption is increasing. Much of this shift is due to the growing availability of a wide range of fresh fruits year-round; this trend is primarily

attributable to counter seasonal imports from southern hemisphere nations, such as Chile. Between 1976 and 1996, canned peach consumption dropped by 36%, from 5.9 to 3.8 pounds per capita and canned pear consumption decreased similarly from 4.3 to 2.8 pounds per capita.

California's fruit growers have voted to significantly decrease funding for the generic promotion of canned fruits. New product development opportunities appear limited. Two firms have reintroduced "glass packs" with a nostalgic appeal. Flexible packaging is also being investigated.

One promising development for the canned fruit market is the aging of the U.S. population. Canned fruit consumption has consistently been higher among the elderly. One processor is anticipating this growth in demand by developing easy-to-open cans with ring-pull lids for its products.

Although the U.S. remains the world's leading producer of canned fruits overall, it no longer is a significant exporter. Due to its higher production costs, the U.S. ranks lowest of all major producing countries in the percentage of domestic product exported. According to a recent review published by the USDA, Greece is the largest exporter of canned peaches and canned apricots, and Italy is the leader in pears and mixed fruits.

U.S. canned peach exports have averaged about 20,000 (metric) tons during the past 5 years; in some years, the US is actually a net importer of canned peaches, with Greece as its primary supplier and Canada and Japan as its primary export markets.³ Its fruit mix exports have declined from 35,000 metric tons to 25,000 metric tons during the past 5 years, with Canada, the Philippines and Japan as the largest markets. Canned pear exports are considerably lower, averaging about 5,000 metric tons.

Despite the implementation of the Canned Fruit Agreement in 1985, the European Union continues to increase subsidies, production and exports of canned fruits.⁴ During the past two years, industry delegates from various countries (including Argentina, Australia, Chile, South Africa and the U.S.) have met to pressure the European Union to reduce its canned fruit subsidies. In response, some reforms were introduced; the minimum grower price will continue, but processor aid, withdrawal price provisions, and the quantities on which the prices will be paid are to be reduced each year until 2002. Given the unified efforts of several countries, U.S. industry sources are relatively hopeful that some reforms will actually be implemented.

Domestically, urbanization has affected the production of tree fruits in California. As shown in Figure, production in the Sacramento Valley rose and then declined significantly. For cling peach production, the Sacramento Valley remains the dominant production region, although urbanization pressures exist (see Appendix C, Figure II). Production in the Southern San Joaquin Valley is increasing. Fluctuations in Bartlett pear production in the Northwest are attributable to weather conditions.

As in the case of processing tomatoes, fruit canners have had to face significant threats

³ USDA, *World Horticultural Trade & U.S. Export Opportunities*, November, 1997.

⁴ USDA, *World Horticultural Trade & U.S. Export Opportunities*, January, 1997.

from environmental regulations. In 1998, California's pear growers have been battling to retain access to Guthion; re-registration of some other pesticides needed for production is tenuous. Wastewater disposal costs have contributed heavily to firms' decisions to consolidate their fruit processing facilities. The potential for further automation in the canned fruit industry is unclear. Pear processors have indicated that the irregular shape of the fruit makes it difficult to be color sorted effective.

The Modesto Bee reported in January, 1998 that Del Monte is consolidating its fruit processing into a state-of-the-art plant in Modesto and closing its eighty year old San Jose plant and its seventy-two year old Stockton plant. The consolidation is expected to make Del Monte more price competitive. Altogether, approximately 2,900 seasonal and year-round jobs will be affected by the closure of the San Jose and Stockton plants. The Modesto plant currently has 275 full-time and 725 seasonal employees; with the restructuring, 1,400 new jobs should be added at the Modesto plant.

Tri-Valley Growers has publicly stated that it is planning to improve its cost competitiveness through further automation, as well as other initiatives. However, there is considerable uncertainty about Tri-Valley Growers given its recently announced operating loss of \$53 million for 1997-98. Much of the loss is attributed to the coop's failed attempt to raise prices and its subsequent sales losses to Del Monte. A company spokesperson was quoted recently as saying that "...We haven't forecast our employment, and we won't for a while."⁵ As noted in the article, Tri-Valley's financial problems, ironically, may force the coop to delay installing labor-saving machinery. This would preserve processing jobs in the short-term, but Tri Valley's plight could have significant impacts on the Central Valley's economy in the long-term.

Industry-by-industry review: fruit juice concentrate

In addition to canning, fruit grown on the West Coast is processed into juice concentrate. Apple and grape juice are by far the highest volume products. There is significant grape juice concentrate production in both California and Washington, although actual production volumes in California are unknown. The major processors are Canandigua (located in Madera), Gallo (in Livingston) and Vie-Del (in Fresno); all of these facilities are in the Southern San Joaquin Valley. The primary white grape varieties currently used for concentrate in California are Thompson Seedless, French Colombard and Chenin Blanc; the primary red grape variety used is Ruby Seedless.

In Washington, the major grape juice concentrate producers are Welch's (the marketing arm of National Grape Cooperative), Seneca and Valley Processing. These firms process primarily Concord grapes, along with a bit of Niagara. As shown in Appendix B, Table III, production is very cyclical in Washington although bearing acreage is stable.

Washington's grape juice concentrate producers also make apple juice concentrate. Tree Top (in Cashmere, Washington) is also a major producer of apple juice concentrate. Washington is the largest producer of apple juice concentrate, but production is increasing in Michigan,

⁵ Modesto Bee, July 7, 1998.

California and New York. Naumes, located in California's Sacramento Valley and in Wapato, Washington, also produces apple and pear juice concentrate, as well as limited volumes of concentrates from other tree fruits, strawberries and kiwis. Unlike grape juice concentrate, apple juice concentrate is made from cull fruit. Most juice concentrate is shipped in tankers or by rail; smaller quantities are sold in 55 gallon drums. Due to high shipping costs, much of the West Coast's juice concentrate production is used specifically on the West Coast.

Although most of these firms have older facilities, they have modern processing equipment and significant storage capacity. The most labor-intensive activities in juice concentrate production are at the beginning and end of the production cycle--receiving and packaging; juice concentrate production requires significantly less labor than canning. There have not been any major technological breakthroughs affecting the industry during the past 5 years. Industry representatives do not expect to implement major labor-saving programs in the near future.

In the U.S., per capita consumption of apple juice rose rapidly through the 1980s and stabilized in the mid1990s (see Appendix B, Table II). Per capita consumption of grape juice followed a similar trend, but at significantly lower levels. Industry representatives expect straight apple juice consumption to remain flat; they believe that the adulteration problems with imported juices and the E-coli fresh juice outbreak have damaged consumer confidence in the product.

Growth in demand for both concentrates is expected to come from the increased popularity of juice-based beverages, such as Coca-Cola's Fruitopia and Tropicana's Twister. The growth potential for juice concentrates as an alternative sweetener in fruit spread and baked products is considered to be much smaller. Grape juice concentrate is typically more expensive than apple juice concentrate.

Although the U.S. is the world's largest producer of apple juice concentrate, it is a net importer. The U.S.' major suppliers of apple juice concentrate are Germany and Argentina. Argentina, along with Chile, is also a major producer of grape juice concentrate.

Industry-by-industry review: other canned vegetables

The canned vegetable industry in U.S. has been facing more challenging market conditions than the processed tomato industry. There are two major production regions for canned vegetables in the U.S., Oregon and Washington in the Northwest and Wisconsin and Minnesota in the Midwest.

The major canned vegetable processors in the Northwest are Agripac (Salem, OR), Norpac (Stayton, OR) and Del Monte (Toppenish, WA). All of these production facilities are over twenty years old and have been modernized.

Production of processed vegetables in the Northwest is displayed in Appendix B, Table IV; these data include frozen, as well as canned, production. Corn is the highest volume vegetable. Production levels in Washington have increased significantly over the past 10 years

as shown in Appendix C, Figure VII. Nationally, about 54% of the processing corn crop is canned. There are also slight upward trends in green pea and snap bean production for processing in Washington (see Appendix C, Figures V & VIII).

Per capita consumption in the U.S. of canned corn and snap beans both declined 24% during the past twenty years, while green pea consumption dropped 48%. Consumption levels now appear to have stabilized. Much of the decline is attributable to the increased availability of inexpensive, but high quality, frozen vegetables and the year-round availability of fresh vegetables due to counter-seasonal imports. Del Monte attempted to enhance the image of its canned vegetables by adding a Fresh Cut label, but this is unlikely to offset the negative perception that many consumers have of canned vegetables.

Most of the growth potential in canned vegetable production appears to be in the export market. The U.S. is the world's largest producer of sweet corn production for processing.⁶ Exports have trended upward; they increased from 84,000 tons in 1986 to 196,000 tons in 1996, a 133% increase.⁷ Japan has been the best customer for the U.S.'s canned corn. Other Asian countries importing significant quantities of canned corn are Taiwan, Hong Kong and Korea. The Northwest is geographically well-positioned to supply these markets. Germany is the other large importer of U.S. canned corn. Thailand has become a major competitor in Asia's canned corn market.

The U.S.'s canned pea exports are also growing, but the volumes are considerably lower. Between 1986 and 1996, they increased from 1,700 tons to 7,900 tons. The export market for canned snap beans is declining; U.S. exports declined from 8,600 tons in 1986 to 3,200 tons in 1996.

Thus, the overall outlook for U.S. canned vegetable production is relatively grim. This could be the reason why both grower cooperatives, Agripac and Norpac, have become key producers of frozen vegetables, and Norpac has further diversified into processed salads and soups.

Industry-by-industry review: frozen vegetables

Overview

The frozen vegetable industry in the United States has historically been divided into several segments, in general separated geographically due to agronomic and economic factors. For example, the potato processing industry is clustered in the Northwest (80% of production), with northern Midwest production increasing; corn and peas are also concentrated in the Northwest (65%), though the Midwest has an important share; and broccoli (83%), brussels sprouts (all), and spinach (60%) have been mainly packed in California.

⁶ USDA, Foreign Agricultural Service. *FAS Online*. Processed Sweet Corn Situation in Selected Countries. Last modified 4/7/98.

⁷ Export information cited is from USDA, Economic Research Service publication, *Vegetable and Specialties Situation and Outlook Yearbook, 1997*.

Table 2 shows the relative size in terms of weight of the principal U.S. freezer vegetables in 1996, including the U.S. pack and import and export data, where it exists. Potatoes are far and away the leading product, an 8 billion pound market, followed by sweet corn at 1 billion pounds, broccoli at 500 million, and peas, carrots, and beans at 400 million each. For most of the frozen vegetables, import penetration is relatively low, less than 10 percent of the market. However, several frozen vegetables show significantly higher import market share, including broccoli (74%), cauliflower (46%), asparagus (21%), and brussels sprouts (19%). Except for asparagus, all of these import-impacted commodities are packed mainly in California (asparagus is packed in Washington, Michigan, and California).

Table 2
U.S. Pack and Trade of Frozen Vegetables, 1996

Frozen Vegetable	U.S. Pack 1,000 lbs.	U.S. Domestic Exports 1,000 lbs.	U.S. Imports for Consumption 1,000 lbs.	Import share of U.S. Market percent	Input to U.S. Market (ignores carryover) 1,000 lbs.
Potatoes	8,419,203	828,339	456,222	5.7	8,047,086
Sweet corn	1,030,229	126,382	22,296	2.4	926,143
Broccoli	138,387	NRS	399,728	74.3*	538,115*
Green peas	369,390	2,784	33,074	8.3	399,680
Carrots	397,967	6,723	2,902	.7	394,146
Beans, exc. Lima	378,149	15,362	12,316	3.3	375,103
Spinach	182,999	7,203	4,557	2.5	180,353
Onions	111,021	NRS	NRS		
Beans, lima	107,698	NRS	659	.6*	108,357*
Cauliflower	48,541	NRS	41,318	46.0*	89,859*
Okra	60,847	NRS	9,840	13.9*	70,687*
Bell peppers	44,858	NRS	NRS		
Brussels sprouts	30,154	NRS	6,913	18.7*	37,067*
Asparagus	10,364	458	2,708	21.5	12,614

NRS: not reported separately

* Assumes no US exports, which is not true, so import share is actually larger

Interestingly, frozen broccoli saw the greatest increase in per capita consumption in the United States in the 1980s. This is no doubt partly due to its lower relative price due to import competition, and the consequent substitution of broccoli for other vegetables in institutional, food service, and frozen dinners. There was also a significant increase in per capita consumption of frozen carrots, sweet corn, and potatoes in the 1980s.

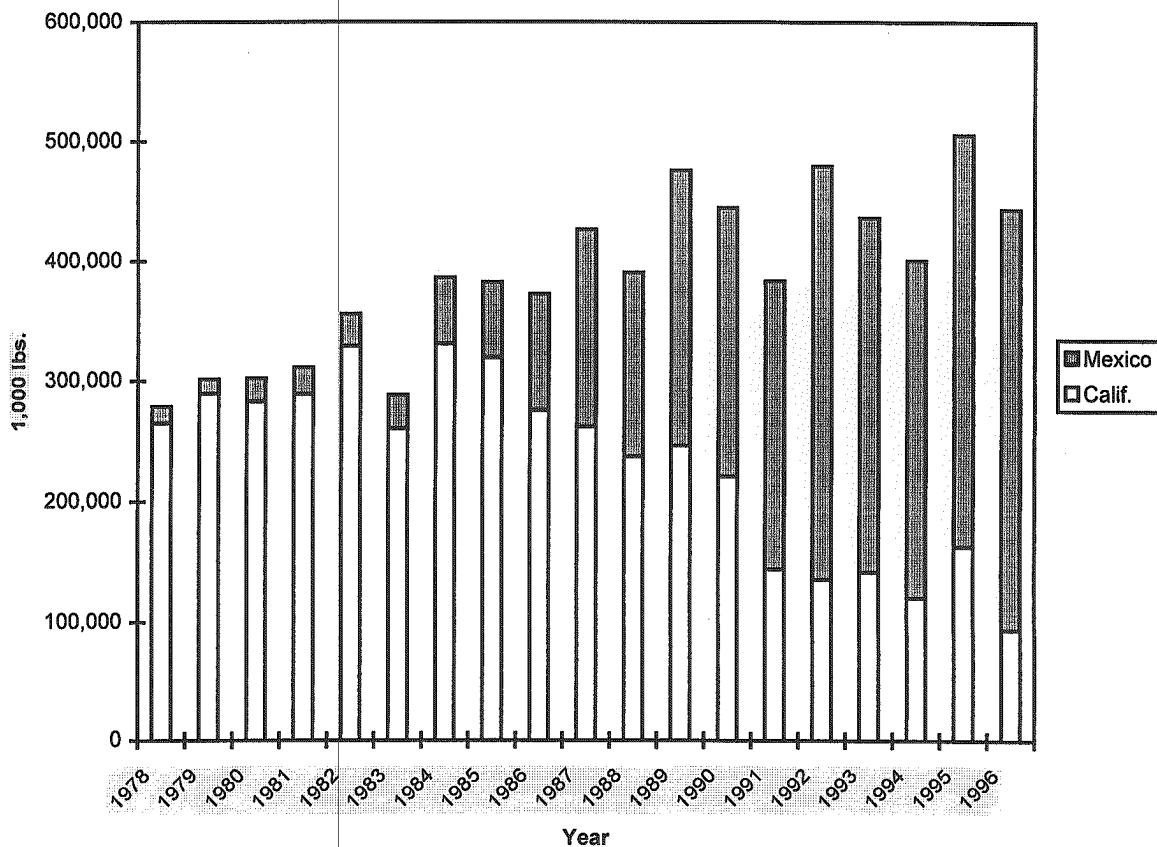
In 1991, there were 27 plants freezing vegetables in Mexico. By 1996, this number had apparently declined to 20 plants (some plants in the north had closed and some fruit freezers had given up vegetables), with an effective capacity for vegetables of well over 700 million pounds. Imports of frozen vegetables into the United States from Mexico in 1995 were over 500 million pounds, and with sales in other markets relatively small, there is significant excess capacity in the Mexican industry. A more detailed review of the development of the Mexican frozen

vegetable industry and of the current situation is presented in Appendix D

The Evidence from Trade Data

The main crop exported by the Mexican frozen vegetable industry, and the crop with the greatest import market share in the United States, has been broccoli. Figure 6 shows the trade data for imports of frozen broccoli from 1978 through 1996, along with data from the American Frozen Food Institute on production of these commodities in California. Imports from Mexico of frozen broccoli in 1996 were approximately equivalent to their all-time high in 1992.

Figure 6
California Frozen Broccoli Production and U.S.
Imports of Mexican Frozen Broccoli



The Impact of the Shift of Frozen Vegetables on California

The California frozen vegetable industry was historically scattered around the state in such areas as: Modesto, Fresno, Bakersfield, and Patterson in the San Joaquin Valley; Oxnard and Santa Maria in the southern coastal valleys; and Watsonville and Salinas in the central valleys. There was, however, a particular concentration of plants in Watsonville (and across the

river in Pajaro) because of the year-round growing season, local access to certain crops grown nowhere else (e.g. brussels sprouts), proximity to the Salinas valley, and the historic terminus of a rail line.

Many frozen vegetable plants were closed in California in the 1980s and 1990s as the result of Mexican competition:

The Oxnard Cooperative closed in the late 1980s (but the plant was apparently still run by Dean Foods)

The United Foods plants in Modesto and Salinas were closed

Santa Maria plant now only doing strawberries

Simplot closed their two plants in Salinas, operated a plant in Morelia, Michoacán (for avocado paste), and then became partners with the Mexican firm MarBran, which operates three plants in Guanajuato and one in Guatemala

Four plants were closed in Watsonville/Pajaro: John Inglis, J.J. Crosetti, Green Giant, and NC Foods.⁸

There has been a clear tendency toward consolidation in the industry as a whole, and more joint ventures between the originally independent Mexican plants and U.S. firms. The rapid growth of the Mexican industry, combined with the recession in the United States, led to very low prices and a significant restructuring. One result was the tendency toward mixing in the Midwest of the United States or Texas, bringing intermediate products from many sources, including Mexico and Central America. This reduced the role of the California plants in mixing, and made California into more of a regional industry. At the same time, small-scale regional vegetable processing has increased in other areas of the United States, such as the Midwest and Southeast.

The remaining independent frozen vegetable firms in the United States, such as Patterson Frozen Foods and NorCal-Crosetti, vigorously opposed NAFTA, claiming it would be the death knell for the industry in California. As finally negotiated, NAFTA would remove the 17.5 per cent tariff on most frozen vegetables imported from Mexico (including broccoli and cauliflower) over a period of 15 years, the maximum amount of time allowed under the agreement. But even though this reduction was stretched out, it was now clear to everyone that product from Mexico would be cheaper every year, and so the final restructuring of the industry in the United States was begun.⁹

Green Giant closed its plant in Watsonville in early 1994 and consolidated production in Mexico. It contracted out production of spinach and brussels sprouts—crops that are highly mechanized in the United States—to Del Mar Foods, which had largely been a fruit freezer, and moved some of its equipment to that firm. Del Mar continues to operate in Watsonville.

⁸ NC Foods was originally Watsonville Canning, which went bankrupt and was given to David Gill, a King City broccoli grower and the principal creditor, renamed NorCal, then merged with Crosetti and renamed NorCal-Crosetti, and finally sold to Dean Foods, which closed it.

⁹ In fact, because of the restructuring which subsequently occurred, the Mexican government is now seeking to have the remaining tariffs removed more rapidly.

The peso was still significantly overvalued throughout 1994, as it had been for some years, and this made Mexican product more expensive than it otherwise would have been. At the end of 1994, however, the peso was devalued and then allowed to float. It fell from 3.2 pesos/dollar to 7.5 pesos/dollar. This huge devaluation of the peso was obviously a much greater reduction in the price of Mexican product than if the whole 17.5 per cent tariff had been taken off at once. It bankrupted Nor Cal-Crosetti in Watsonville.

Dean Foods had purchased the Richard Shaw plant in Watsonville in 1988. The Shaw plant was the last plant built in California, had the most efficient engineering, and it made sense that this would be the surviving plant in the Central Coast region of California. Dean Foods bought the Birdseye company shortly after NAFTA was passed. They thereby acquired the oldest frozen vegetable plant in Mexico, but one of the best located. Dean Foods bought the NorCal-Crosetti plant in Watsonville in August 1995. As NorCal was bankrupt; Dean Foods liquidated the debts and sold the plant to a cold storage firm. They admitted at the time that they didn't need two facilities in Watsonville, so they clearly bought the plant to shut it down.

The remaining frozen vegetable plants that we have identified in California are:

Dean Foods, in Watsonville; also operating 13 other plants, including one in Mexico

Del Mar, in Watsonville [mainly fruits, spinach and brussels sprouts]

Patterson Frozen Foods, Patterson; also invested in plants in Texas, Midwest, Mexico, and Guatemala

Farmers Processing, Watsonville [seasonal broccoli]

JR Wood, in Atwater; also operating a plant in Guatemala [fruit, peppers, organic vegetables]

Grimmway Frozen Foods, in Arvin [carrots, bell peppers]

Nature Quality, in San Martin [bell peppers]

Eckart, in Modesto; has plant in Mexico

Future of the California Industry

The near future looks difficult for a number of the larger vegetable processors in California, and at least one or two more plants will likely close. Competition from Mexico and other sources continues to increase in broccoli, and has spread to a number of minor crops important in California as well, such as asparagus, bell peppers, and brussels sprouts. For example, one processor has experienced falling prices in bell peppers due to Mexican competition, which has rendered the crop unprofitable in the last two years. One of the remaining processors remarked 12 years ago that without broccoli it would not be profitable to run a large plant in California. With the California frozen broccoli pack having fallen from 330 million pounds to less than 100 million, the outlook is not favorable. For the plants more diversified in fruit freezing, the outlook may be better.

The Northwest Frozen Vegetable Industry

The industry in the Northwest is divided between potato processors and peas/corn vegetable processors. The potato processing industry went through a significant transition in the latter part of the 1980s when most of the previously independent plants were sold to large

corporations such as Nestle and ConAgra. The level of competition increased as the industry suffered from excess capacity.

Imports of frozen potatoes have almost doubled in the past two years, rising from 161,000 MT in 1995 to 317,000 MT in 1997, almost all coming from Canada. The Canadian dollar has been devalued in recent years, in a manner parallel to Mexico, if not as severely. NAFTA countries are thus squeezing the U.S. frozen vegetable industry from both sides: California vegetables from Mexico and frozen potatoes from Canada.

Exports of frozen potatoes continued to rise over the same period, from 365,000 MT in 1995 to 421,000 in 1997, but there is concern that the Asian economic crisis will slow exports, most of which are French fries for fast food restaurants in that region. These developments, along with fierce competition in the fast food French fry market in the United States, has reduced profits and put downward pressure on grower prices.

The potato industry is still a very large industry in the Northwest, however. Oregon, Idaho, and Washington continue to process approximately 80 percent of all frozen potatoes packed in the United States, a proportion they have maintained since the early 1960s. There have been no significant plant closings, though some workers have been laid off in Idaho due to technological changes and consolidations.

The peas/corn industry has also been a mainstay of the Northwest. The industry is characterized by large plants with high capital investment. Firms such as Smith Frozen Foods, National Frozen Foods, Twin City Foods, and AgriPac are all important players. More recently, firms in the Midwest that canned vegetables have also entered the frozen industry. After potatoes, sweet corn is the biggest frozen vegetable product, at about 1 billion pounds, and demand doubled in the 1980s. Corn imports are negligible, exports are principally to Asia. The industry is reportedly profitable.

However, the basic technology is perhaps susceptible to undermining. As it is now, production is highly seasonal, running about three months per year, with the large fixed capital in the plant idle most of the year. A new machine in development in New Zealand for ten years, the Byron 2000, harvests and strips the ears of corn in the field, allowing the corn to be processed in any freezing plant. This opens the possibility of harvesting sweet corn in any area without the need for the large investment in plant. The machine could potentially be moved from one region to another, increasing its annual utilization. A similar transformation occurred in fresh broccoli and lettuce packing, rendering packing houses obsolete in California.

Fresh processing: the emerging giant of fruit and vegetable processing

The single most important development of the past decade in the fruit and vegetable industry is fresh processing. Just one product - salad mix - serves to illustrate the significance of these trends. As recently as 1990, bagged salad mix was a novelty, found mostly at natural food stores or farmers direct markets. Today, it is a \$1 billion industry. Major salad mix plants have been established throughout the U.S. The three largest in California - Dole, Fresh Express, and River Ranch Fresh Foods - each employs approximately 900 workers for a six-month season. Another dozen or so salad plants have from 200 to 1,000 employees each. It is likely that this industry will continue to expand. Most facilities are presently non-union.

Employment in the fresh processed industry is not well-documented. The lack of data has its origin in the great variety of types of firms involved, from citrus packing houses to salad mix plants to carrots processing facilities, as well as deciduous tree fruit and table grape packers. However, a cursory review of the available data suggests that production worker employment and payroll in California alone exceeds 60,000 and \$1 billion, respectively. Most of these employees are not unionized.

Conclusions

There have been numerous factors driving the restructuring of the processed fruit and vegetable industry on the West Coast. Demand for canned fruits and vegetables declined significantly as consumers' preferences shifted to primarily to fresh produce. There was significant growth in demand for processed tomato products; it has leveled off and any future growth will most likely be spurred by the health benefits of lycopene and/or the Asian export market. Some growth is expected in the juice concentrate market as consumers continue to buy increasing amounts of juice-based beverages. Demand for frozen vegetables has weakened considerably; NAFTA and other forces have squeezed the industry on both sides, with California's frozen vegetable processors being pressured by Mexico while Canadian frozen potato imports impacted the Northwest's processors.

The supply side has also changed dramatically. California's tomato processing industry has been transformed from a collection of broadly dispersed plants producing many products to a group of specialized, state-of-the-art facilities in the northern and southern ends of the Central Valley. These plants primarily supply bulk paste and diced tomatoes that are then shipped and remanufactured in value-added products at other facilities. Urbanization pressures, wastewater disposal and transportation costs forced the closure of older plants and the relocation of plants closer to high yielding production regions. Some additional mechanization is likely given the advances in sorting technology for the canned fruit industry and the introduction of onsite harvesting and stripping of corn for freezing.

The implications of these changes for labor are significant. Due to the mechanization and the specialization of the plants, the demand for seasonal labor has declined substantially, and some further declines are planned by the year 2000. It is likely that some of the job losses in the canned and frozen industries will be offset by gains in the rapidly expanding fresh processed sector for vegetables and fruits. As more of the employment becomes year-round, the need for supervisory personnel will continue to increase. There is a growing need for employee training, among the year-round workers and the supervisory personnel, as well as the displaced workers. Employers, unions and the government need to work together to ensure a well-trained work force for the West Coast's processed fruit and vegetable processing industry.

Appendix A

Leading Fruit and Vegetable Processing Firms

Tomato Processors (Weekly capacity – tons) and plant locations

Campbell Soup Company (63,500)

Dixon (Dixon Canning), Stockton (Valley Tomato)

Conagra (Hunt-Wesson) (76,000 - Note: no estimate for Helm)

Davis, Oakdale, Helm, Fullerton

Heinz (34,000)

Stockton, Escalon (Escalon Premier Brands)

Ingomar Packing (27,000)

Los Banos/Volta

International Home Foods (27,000)

Vacaville

Lipton (formerly Van den berg/Ragu Foods) (64,500)

Stockton, Merced, Sunnyvale

Northwest Packing (33,500)

Hollister (San Benito Foods), Firebaugh (Tomatek)

Pacific Coast Producers (24,000)

Oroville (no longer processes tomatoes), Lodi

Texas Pacific (Del Monte Foods, Contadina) (71,500 – Note: no estimate for Hanford)

Woodland (Contadina), Modesto, Hanford (Contadina)

Tri-Valley Growers (104,000)

Stockton, Thornton, Modesto, Volta

All Other Plants (each with less than 20,000 – aggregate total = 112,500; all listed in Directory of Canners)

Atwater Canning - Atwater

Gangi Brothers - Riverbank

Quality Assured Packing - Stockton

Redwing Co (Colusa County Canning) - Williams

Other plants - capacity unknown (all listed in Directory of Canners, unless otherwise noted)

Los Gatos Tomato Products - Huron

Morning Star Packing - Los Banos, Williams, Yuba City

S K Foods L P - Lemoore

Stanislaus Food Products – Modesto

Other Fruit & Vegetables (estimated processed vegetable & fruit sales, millions)

Canned Fruit & Juice Concentrate

Barlow Co, Sebastopol, CA

apple juice concentrate; applesauce

brands:Barlow's, ValMar, PL

Canandigua, Madera, CA

grape juice concentrate

Del Monte (Texas Pacific)

canned vegetables, tomato products, fruit

brands:Del Monte

E & J Gallo Winery, Livingston, CA

grape juice concentrate

Giumarra Vineyards, Bakersfield, CA

grape juice concentrate

brands:PL

Green Valley, DiGiorgio, CA

apple juice concentrate

Independent Food Processors, Yakima, WA

canned pears

Kerr Concentrates (subsidiary of Intl. Flavors & Fragrances), Salem, OR (\$32)

juice concentrates, frozen juices, canned juices, canned & frozen pastry fillings

brands:Kerr, Conroy, PL

Knott's Berry Farm Foods, La Puente, CA

jams, salad dressing, syrups

brands:Knott's Berry Farm

SE Martinelli & Co, Watsonville, CA (\$25)

apple juice

brands:Martinelli's Gold Label

National Grape Cooperative Association, Westfield, NY, Grandview, WA, Kennewick, WA

(Bama Foods is a subsidiary in Birmingham, AL packaging condiments, jams and peanut butter.) a coop

juice concentrate, canned, glass & frozen juices, jam

brands:Welch's

Naumes Concentrates, Marysville, CA, Wapato, WA

juice concentrates

brands:PL

Nestle Beverage Company, San Francisco, CA

consumer pack juices

brand-Kern

Northwest Packing, Vancouver, WA

canned pears, apples & pears

Pacific Coast Producers, Lodi, CA,Oroville, CA

tomato products, canned fruit

brands:PL

Seneca Foods, Western Division-Juices, Prosser, WA, Yakima, WA
canned & aseptic applesauce, frozen fruit, canned, glass, aseptic & frozen juices, apple chips, bulk juice concentrates
brands: Seneca, Libby, Nature's Favorite, TreeSweet

J.M. Smucker Co, Orrville, OH, Salinas, CA, Woodburn, OR (\$511) (subsidiaries include California Farm Products, Watsonville, CA, Dickinson Family Inc., Salinas, CA, Mary Ellen's, Salinas, CA, A.F. Murch Company, Grandview, WA, Smucker Quality Beverages, Chico, CA, JMS Specialty Foods, Ripon, WI, Mrs. Smith's, Pottstown, PA) jams, juices, pies, fruit syrups, toppings
brands: numerous, including Smucker's, Mary Ellen's, Dickinson's, Lost Acres, After the Fall, Santa Cruz, Knudsen Family, Heinkel's, Natural Brew, Mrs. Smiths

Snokist Growers, Yakima, WA. A coop.
Canned fruit & aseptic packs.
Brands: Blue Ribbon, Nu House, Snokist, Cohort, Dear Lady, Tri Our, Red Ribbon, PL.

Sunmet (formerly known as Met West Agribusiness), Del Rey, CA
apple juice concentrate
brand: Sunmet

Tree Top, Selah WA, Wenatchee, WA, Cashmere, WA. (Sun Ridge Foods is a subsidiary in Sunnyside, WA packing dehydrated fruits). (\$280) a coop

Truitt Brothers, Salem, OR.
Canned fruit, retorted entrees and side dishes.
Brands: Pembrook, Trufaire, Garden Harvest, PL.
juice concentrate, canned apples

Tri-Valley Growers, Modesto, Sacramento, Gridley. (S&W Fine Foods is a subsidiary in San Ramon packing canned vegetables & fruits, sauces, vinegar, relishes, pasta salad, mincemeat. Redpack Foods is a subsidiary in New Jersey marketing juices and tomato products). a coop
tomato products, canned vegetables & fruit, juices, pumpkin, olives, olive oil
brands: Oberti, S&W, Libby, Sacramento, Red Pack, Tuttlorosso, Diet Delight, PL.

Vie-Del Co, Fresno, CA
grape juice concentrate

JR Wood, Atwater, CA, Sanger, CA
juice concentrates, fruit purees, frozen vegetables & fruit
brands: Big Valley, Glacier, PL

Canned Vegetables

Agripac, Salem, OR, Woodburn, OR, Eugene, OR (\$150)
canned vegetables, frozen vegetables & berries
brands: Diamond A, Jack & the Bean Stalk, Oregon's Finest, PL

American Fine Foods, Payette, ID (\$55)
canned vegetables, soups, chili, pastas
brands: Our Tiny, Tom Thumb, Sunny Valley Lodge, Walla Walla, Cimarron, PL

Curtice Burns Foods, Rochester, NY (Nalley's Fine Foods, Tacoma, WA) (\$829) coop
canned vegetables, meats, soups, salad dressing, condiments, peanut butter, maple syrup

brands:Nalley's, Adam's, Bernstein's, Riveriera, LaRestaurante, LaSuprema, Lumberjack, PL

***Del Monte* (Texas Pacific)**

canned vegetables, tomato products, fruit

brands:Del Monte

***Norpac*, Stayton, OR**

canned vegetables

***Seneca Foods*, Vegetable Division, Janesville, WI, Dayton, WA**

canned vegetables

brands:Libby, Rosedale, Seneca, Perfection, PL

Frozen Fruit & Vegetables

***Agripac*, Salem, OR (\$150)**

frozen vegetables & berries

brands:Diamond A, Jack & the Bean Stalk, Oregon's Finest, PL

***Dean Foods Vegetables Co.* Watsonville & Oxnard, CA; Bellingham, WA (\$170)**

frozen vegetables & fruit

brands:Freshlike, Veg-All, Larsen, Shaw, Birds Eye, PL

***Del Mar Food Products*, Watsonville, CA**

frozen vegetables & fruit, canned apples

brands:PL

***Eckart*, Modesto, CA**

***Farmers Processing*, Watsonville, CA**

***Flavorland Foods*, Forest Grove, OR (\$45)**

frozen & dehydrated fruit

brands:Flavorland, PL

***Grimmway Frozen Foods*, Arvin, CA**

frozen carrots, bell peppers

***National Frozen Foods*, Seattle, WA, Albany, OR, Burlington, WA, Chehalis, WA, Moses Lake, WA (\$78)**

frozen vegetables & fruit puree, vegetable/pasta blends

brands:Valamont, Misty Vale, Lucky Find, Tastefull, PL

***Nature Quality*, San Martin, CA**

frozen bell peppers

***Norpac Foods*, Stayton, OR, Salem, OR (Hermiston Foods is a subsidiary in Hermiston, OR; packs frozen vegetables) Stone Mill Foods is a subsidiary in Portland, OR; packs refrigerated salads) (\$237) a coop**

frozen fruit & vegetables, canned fruit & vegetables, refrigerated salads

brands:Flav R Pac, Westpac, Santiam, Staco, Gold Label, Sack O'Corn, Valley Maid, Soup Supreme, Pasta Perfect, Gold Club, PL

***Patterson Frozen Foods*, Patterson, CA (\$80)**

frozen apricots, vegetables, vegetable blends

brands:Microfresh, Springtime, Fresh Pact, PL

***Smith Frozen Foods*, Weston, OR (\$45)**

frozen vegetables, vegetable blends

brands:Smith, Mountain Meadows, PL

Twin City Foods, Stanwood, WA, Lewiston, ID, Ellensburg, WA, Prosser, WA.

Frozen vegetables, frozen potatoes.

brands:PL

Wawona Frozen Foods, Clovis, CA

frozen fruit

brands:Wawona, Summer Prize, PL.

J R Wood, Atwater, CA, Sanger, CA

frozen vegetables & fruit, fruit purees, juice concentrates

brands:Big Valley, Glacier.

Frozen Potatoes

Carnation (Nestle Brands Food Service, Nampa, ID, Moses Lake, WA, Othello, WA)

frozen potatoes

brands:Carnation, Trio, Wild West, Mariner, Lynden Farms, Spudsville

Lamb-Weston, Inc (Division of ConAgra), American Falls, ID, Twin Falls, ID, Boardman, OR, Hermiston, OR, Quincy, WA, Pasco, WA, Connell, WA, Richland, WA

frozen potatoes

brands:numerous

McCain Foods, Oakbrook, IL, Othello, WA.

Frozen potatoes

brands:Chef Reddy, Handipak, Lil' spuds, Golden Fry, McCain, PL.

Ore-Ida Foods, Boise, ID, Burley, ID, Ontario, OR (\$840)

frozen potatoes

brands:Ore-Ida, Rosetto, Louise, Steakumm, Bagel Bites, PL.

Pillsbury (subsidiary of Grand Metropolitan PLC), Minneapolis, MN, Shelley, ID.

Dehydrated & fresh potatoes

brands:numerous including Pillsbury, Green Giant, Niblets, LeSueur, B&M, Boise, ID, Aberdeen, ID, Heyburn, ID, Caldwell, ID, Santa Maria, CA, Hermiston, OR, Quincy, WA, Pasco, WA. (Mar-Bran is an affiliate in Mexico—Irapuato, Celaya and Jaral—packing frozen vegetables).

Frozen potatoes, frozen vegetables, avocado products, guacamole and frozen boxed beef.

Brands:Simplot, MicroMagic, Sun Crop, Polar, Frost Queen, PL.

Appendix B

Supplemental Tables

- I. U.S. per capita use of selected fresh & processed vegetables, 1976-96
- II. U.S. per capita use of selected fresh & processed fruit, 1976-96
- III. Production of selected fruit for processing, by state
- IV. Production of selected vegetables for processing, by state

TABLE I

U.S. PER CAPITA USE OF SELECTED FRESH & PROCESSED VEGETABLES, 1976-1996

	1976	1981	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997f	% change 1976-96
CROP															
Snap beans, all	7.8	7.6	6.7	6.7	7.1	6.7	7.0	7.2	7.3	7.4	6.9	7.1	7.1	-9%	-9%
Fresh	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.5	1.5	1.6	1.7	7%
Canning	4.9	4.6	3.9	3.8	3.8	3.9	3.7	4.1	4.0	3.8	3.5	3.8	3.8	3.7	-24%
Freezing	1.5	1.7	1.5	1.7	2.0	1.9	1.8	1.7	2.0	1.7	1.8	2.0	1.7	1.9	27%
Broccoli, all 1/	2.2	3.2	4.7	5.3	6.2	6.0	5.6	5.4	5.8	5.2	6.2	6.6	6.7	6.7	205%
Fresh	1.1	1.7	3.0	3.1	3.8	3.8	3.4	3.1	3.4	2.9	3.9	4.0	4.1	4.1	44%
Freezing	1.1	1.5	1.7	2.2	2.4	2.2	2.3	2.4	2.3	2.3	2.6	2.6	2.6	2.6	273%
Carrots, all 2/	10.0	9.5	9.3	11.3	10.4	11.5	11.7	11.2	12.3	12.0	12.8	13.2	14.6	14.4	59%
Fresh	6.4	6.1	6.5	8.3	7.1	8.1	8.3	7.7	8.3	8.2	8.7	9.0	10.2	10.2	-16%
Canning	1.9	1.5	1.0	0.9	1.0	0.9	1.1	1.1	1.7	1.0	1.3	1.7	1.6	1.6	53%
Freezing	1.7	1.9	1.8	2.1	2.3	2.5	2.4	2.3	2.8	2.8	2.5	2.8	2.6	2.6	53%
Sweet corn, all	27.0	24.6	25.8	24.7	24.9	24.4	26.3	26.4	27.8	28.0	27.6	28.8	29.3	28.6	6%
Fresh	8.0	6.2	6.1	6.3	5.8	6.5	6.7	5.9	6.9	7.0	8.2	7.8	8.3	8.1	1%
Canning	13.1	12.1	12.1	10.6	10.4	9.5	11.0	11.1	11.9	11.2	10.2	10.5	10.5	10.0	-24%
Freezing	5.9	6.3	7.6	7.8	8.7	8.4	8.6	9.4	9.0	9.8	9.2	10.5	10.5	10.5	78%
Green peas, all	4.8	4.4	4.1	3.7	3.7	3.7	4.2	4.2	4.1	3.5	3.7	3.7	3.4	3.5	-27%
Canning	2.9	2.7	2.2	2.0	1.8	1.7	2.0	1.9	2.1	1.6	1.5	1.6	1.5	1.5	-48%
Freezing	1.9	1.7	1.9	1.7	1.9	2.0	2.2	2.3	2.0	1.9	2.2	2.1	1.9	2.0	5%
Tomatoes, all	78.3	71.6	79.4	81.0	78.1	86.2	90.9	92.8	89.2	92.4	90.1	92.8	90.8	92.5	18%
Fresh	12.6	12.3	15.8	16.8	16.8	15.5	15.4	15.5	16.0	16.5	17.2	16.6	17.0	17.0	35%
Canning	65.7	59.3	63.6	65.2	61.3	69.4	75.4	77.4	73.7	76.4	73.6	75.6	74.2	75.5	15%
Potatoes, all	125.2	116.5	126.0	126.0	122.4	127.1	127.6	130.4	132.4	136.9	140.2	137.9	142.8	142.4	14%
Freezing	41.8	41.5	46.3	47.9	43.3	46.8	50.2	51.3	51.0	54.5	59.3	55.3	59.8	57.7	38%

f=Forecast.

1/ All production for processing broccoli is for freezing.

2/ Industry allocation suggests that 27% of processing carrot production is for canning and 73% is for freezing.

Source: Economic Research Service, USDA. Vegetables and Specialties Situation and Outlook Yearbook.

TABLE II

US PER CAPITA USE OF SELVED FRESH & PROCESSED FRUIT, 1976-1998

	1976	1981	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	% change 1976-96
CROP														56%
Apples, all	30.0	35.0	43.2	48.2	47.3	46.5	48.1	43.9	46.7	48.7	49.7	45.7	46.9	13%
Fresh	17.1	16.8	17.8	20.8	19.8	21.2	19.6	18.2	19.2	19.6	18.9	19.3	19.3	9%
Canning	4.3	4.4	4.9	5.4	5.7	5.3	5.5	5.2	5.8	5.4	5.0	4.7	4.7	225%
Juice	6.3	11.5	18.2	19.4	19.1	17.4	20.7	18.2	18.8	21.5	19.2	20.5		
Grapes, all														8%
Fresh	40.6	41.2	47.6	44.9	49.4	46.2	43.4	43	45.7	44.7	41.6	46.2	43.9	97%
Juice	3.5	4.1	7.1	7.1	7.7	7.9	7.9	7.3	7.2	7.1	7.3	7.5	6.9	75%
Wine	2.4	2.6	2.4	3.3	3.0	3.4	3.1	3.9	4.2	3.9	3.2	5.0	4.2	3%
Peaches, all 1/														
Fresh	11.5	12.1	10.5	10.6	11.9	10.8	10.5	11.5	11.5	11.1	10.6	9.5	9.2	-20%
Canning	5.1	6.9	5.8	6.1	6.8	5.9	5.5	6.4	6.0	6.0	5.5	5.4	4.3	-16%
Pears, all 4/														-36%
Fresh	7.2	7.3	6.4	7.5	7.1	7.1	7.6	7.0	7.4	7.6	8.3	7.3	7.2	0%
Canning	2.8	2.8	3.0	3.5	3.2	3.2	3.2	3.1	3.4	3.5	3.4	3.1	2.8	11%
	4.3	4.4	3.9	3.7	3.9	3.4	3.7	3.4	3.8	3.0	3.4	3.0	-35%	

1/Includes nectarines.

Source: Economic Research Service, USDA. Fruit and Tree Nuts Situation Outlook Yearbook.

TABLE III

Production of Selected Fruits for Processing, by Region

Crop by State	Units	Production by Year									
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
apples, CA, processed	mil lbs	216	292	245	284	318	315	325	350	500	400
apples, OR, processed	mil lbs	9.5	62	23	35	46	25	47	27	31	22
apples, WA, processed	mil lbs	430	1,400	620	990	1,045	755	950	870	1,190	840
grapes, table, CA, processed	tons	243,500	170,000	329,000	225,000	181,000	170,000	230,000	162,000	138,000	184,000
grapes, WA, juiced	tons			185,800	141,800	169,800	176,800	291,800	181,000	266,000	109,000
peaches, cling, CA	mil lbs	842	791	887	848	897.5	970	1,117	1,037	1,083	821
pears, Bartlett, CA, processed	tons	21,500	250,000	227,300	234,000	239,000	228,000	252,000	227,000	245,000	187,000
pears, Bartlett, OR, processed	tons	31,000	55,000	52,500	46,500	59,000	48,000	53,000	44,000	57,000	41,000
pears, Bartlett, WA, processed	tons	86,500	115,000	105,000	116,000	134,000	115,500	124,000	116,000	125,000	126,000
											67,000

TABLE IV
Production of Selected Vegetables for Processing

Crop by State	units	Production by Year												
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	
SNAP BEANS														
Oregon	tons	138,710	117,940	125,210	173,990	147,320	137,940	124,430	122,210	147,200	139,950	134,100	148,190	
Washington	tons	4,900	4,960	3,660	4,790									
BROCCOLI														
California	tons	138,000	125,000	123,000	120,000	105,000	78,000	76,500	57,000	61,070	48,000	82,000		
CARROTS														
California	tons	89,900	70,000	76,000	125,750	105,000	100,000	108,000	100,000	126,610	121,990	144,010	86,500	
Oregon	tons	15,480	12,750	15,390	16,910	18,900	21,200	32,180	21,200	20,290	18,120	16,280	8,980	
Washington	tons	96,300	116,660	111,720	126,850	122,000	132,000	167,000	180,000	162,000	219,000	182,000	192,000	
CORN, SWEET														
Oregon	tons	322,480	343,880	340,580	394,940	396,480	399,450	391,430	387,520	431,850	452,330	438,080	353,000	
Washington	tons	295,460	402,290	430,500	470,530	471,790	498,550	512,010	587,330	661,500	823,690	680,710	778,780	
PEAS, GREEN														
Oregon	tons	34,160	43,620	37,440	48,080	43,630	61,770	37,820	51,870	53,660	70,770	36,240	42,810	
Washington	tons	81,400	85,490	90,130	99,150	94,380	108,100	83,560	92,530	121,600	118,610	82,290	104,720	
POTATOES														
Idaho & Malheur Co., OR	1,000 CWT	64,495	64,425	66,010	78,500	78,690	80,570	85,780	90,300	89,250	96,970			
Washington & Oregon	1,000 CWT	58,085	51,555	57,695	61,450	65,250	63,510	70,690	76,780	70,250	80,970			
TOMATOES, PROC														
California	tons	6,480,320	6,702,480	6,547,860	8,585,330	9,306,200	9,893,520	7,932,000	8,951,580	10,748,160	10,606,820	10,660,780	9,349,600	

Appendix C

Supplemental Figures

- I. Processing tomato production, by California region
- II. Cling peach production, by California region
- III. Bartlett pear production, by California region
- IV. Apple production, by California region
- V. Snap bean production for processing, by state
- VI. Carrot production for processing, by state
- VII. Sweet corn production for processing, by state
- VIII. Green peas production for processing, by state
- IX. Processing broccoli production, by California region
- X. Potato production for processing, by state

FIGURE I

**PROCESSING TOMATO PRODUCTION
by CALIFORNIA REGION**

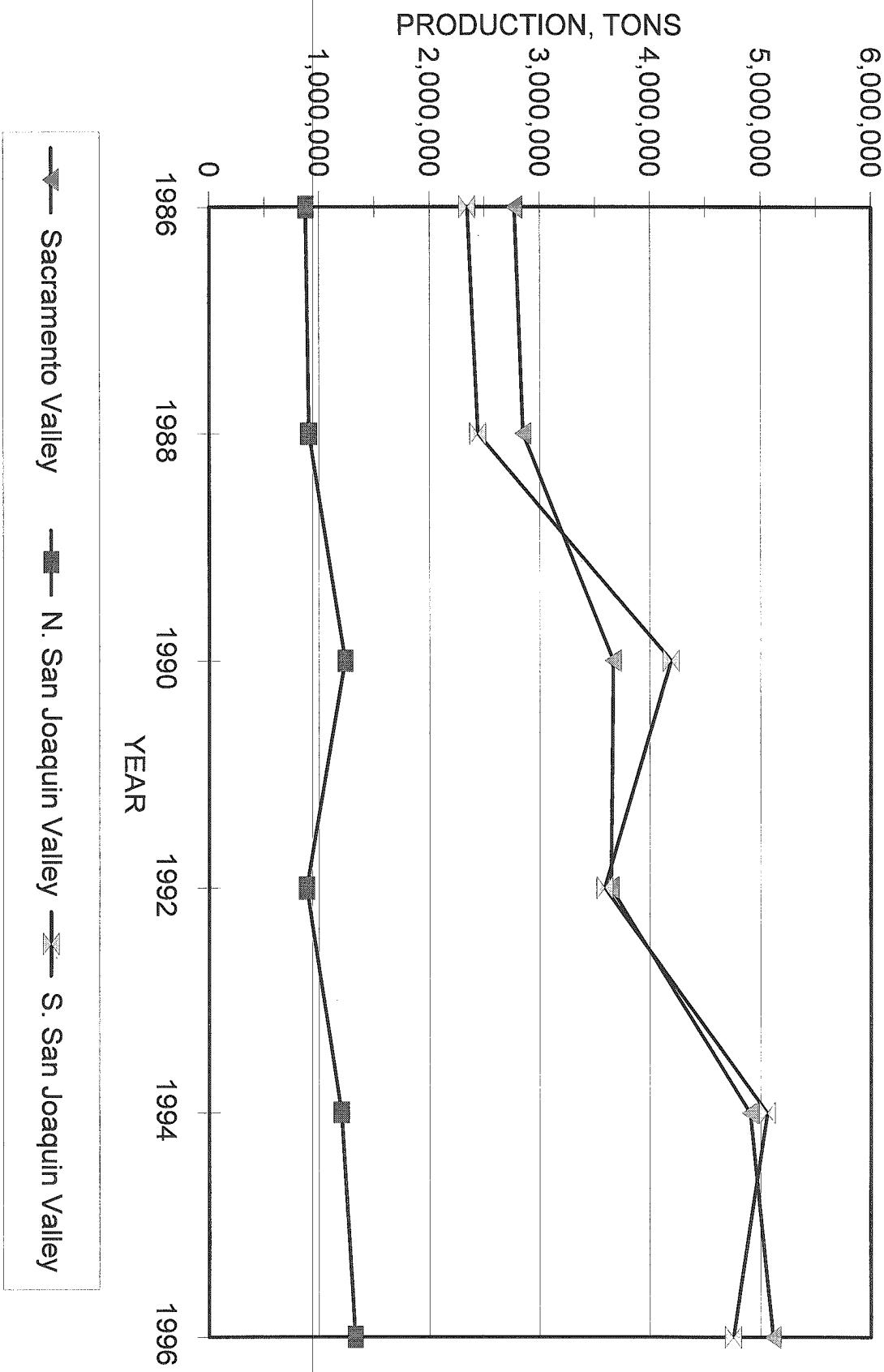


FIGURE II

CLING PEACH PRODUCTION
by CALIFORNIA REGION

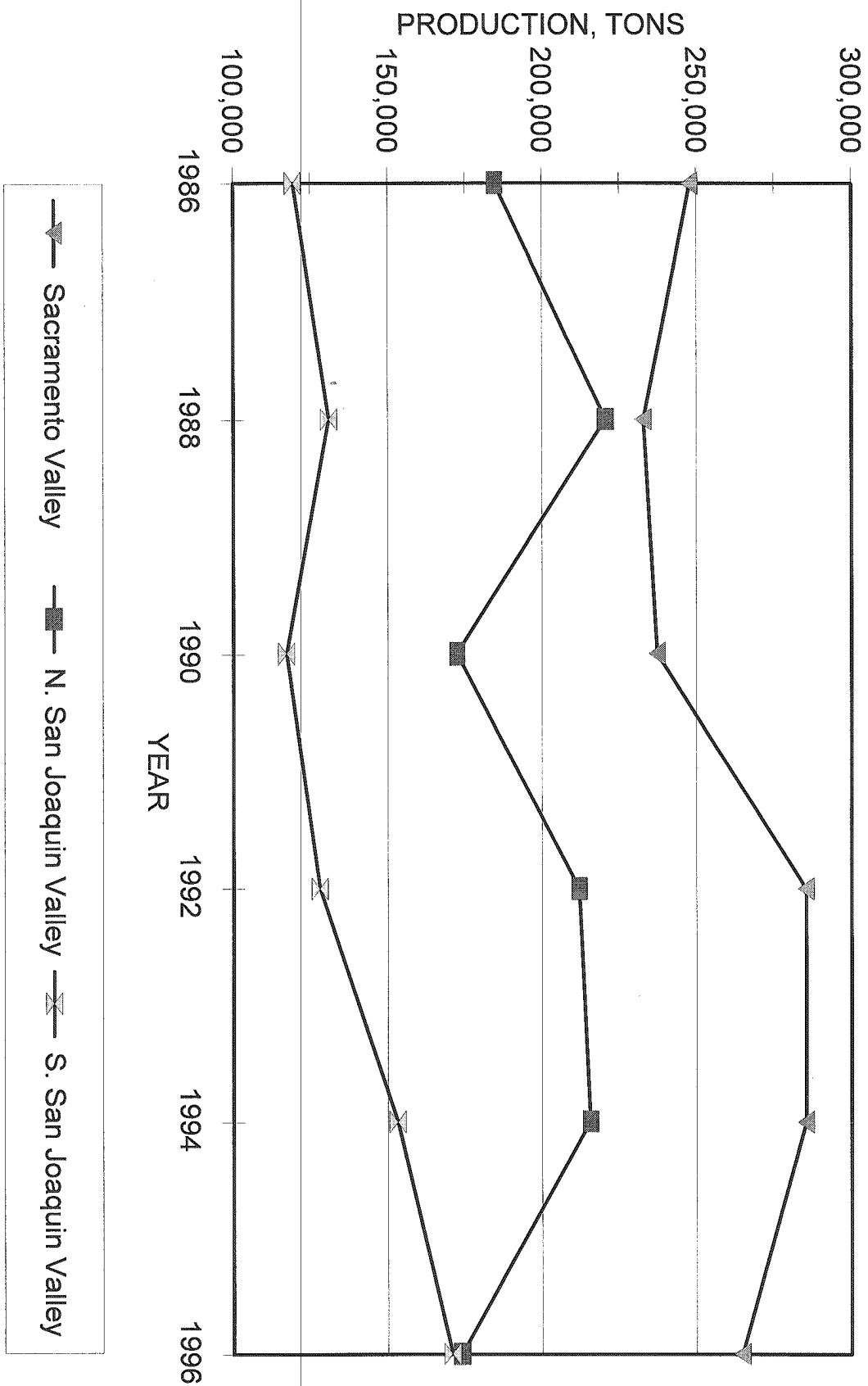


FIGURE III

**BARTLETT PEAR PRODUCTION
by CALIFORNIA REGION**

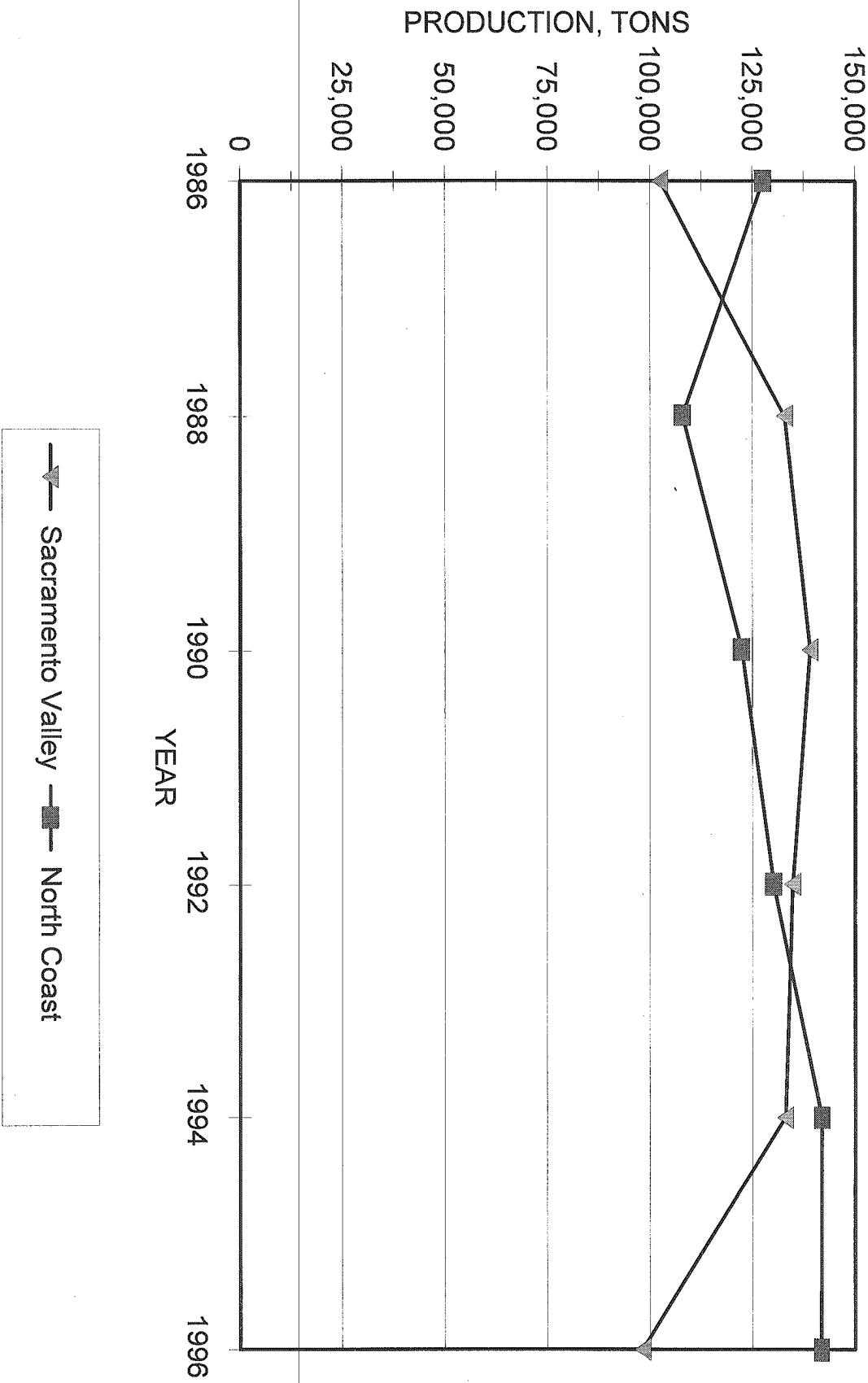


FIGURE IV

APPLE PRODUCTION
by CALIFORNIA REGION

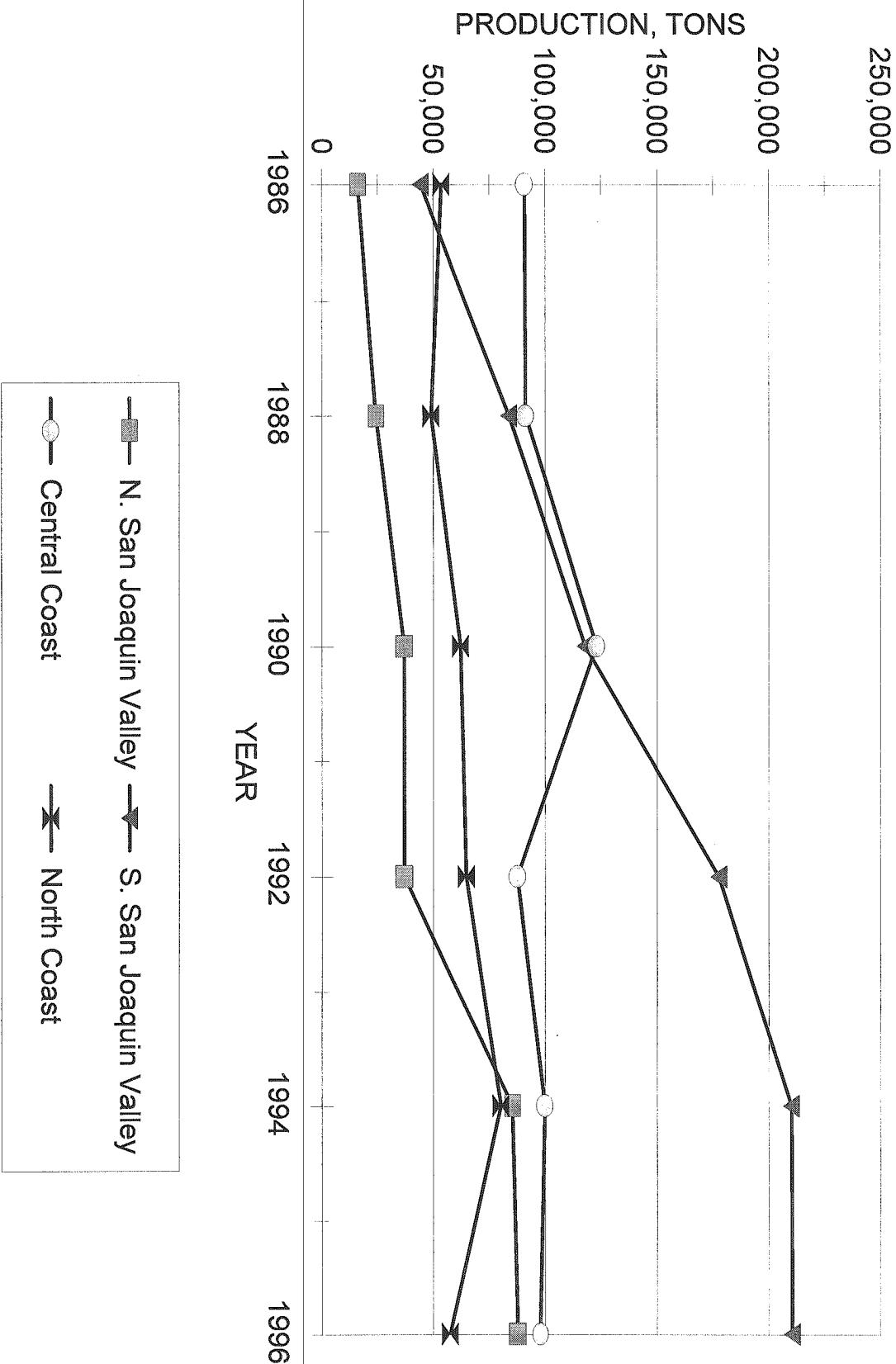
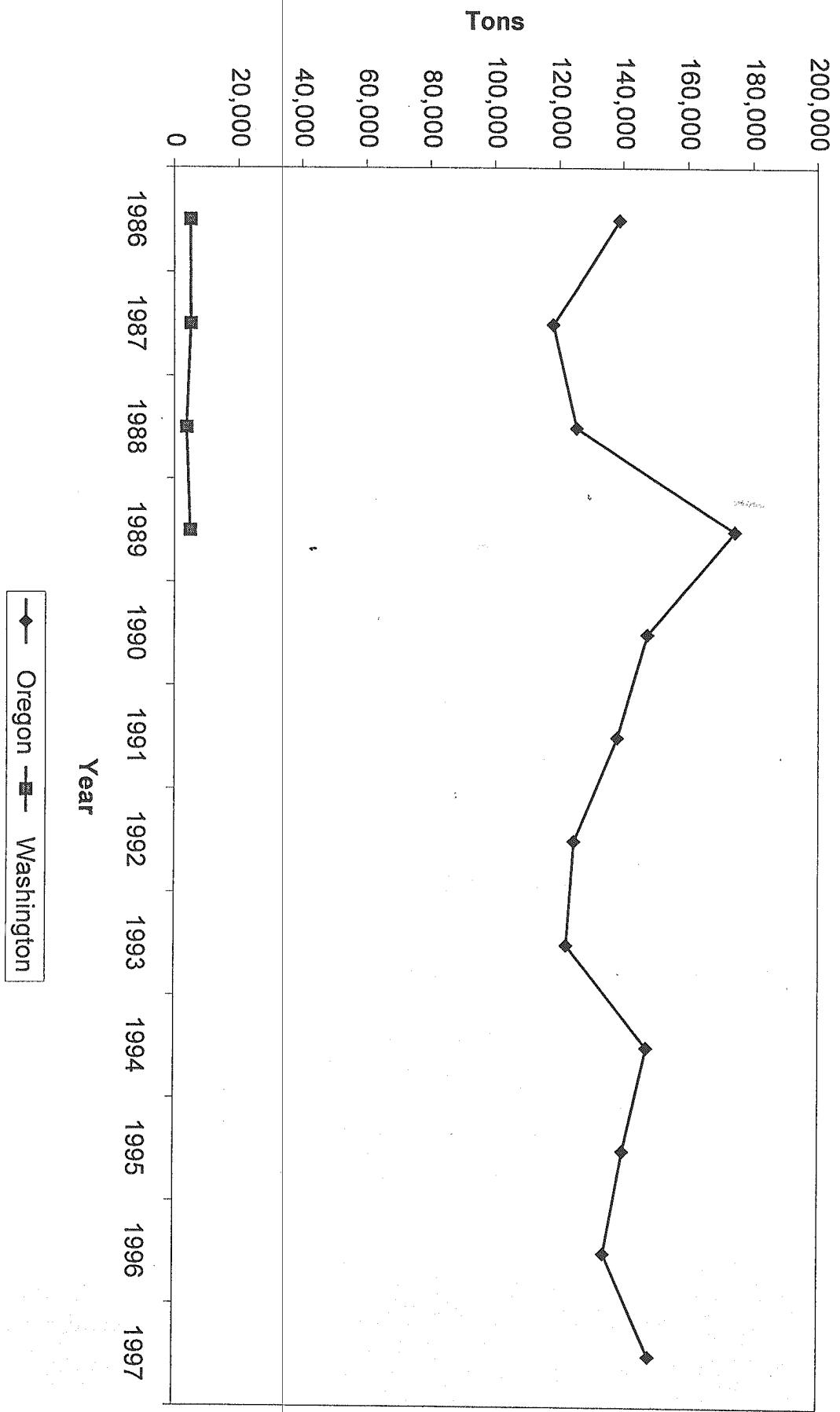


FIGURE V

Snap Beans Production for Processing



C-V

X
FIGURE VI

Carrot Production for Processing

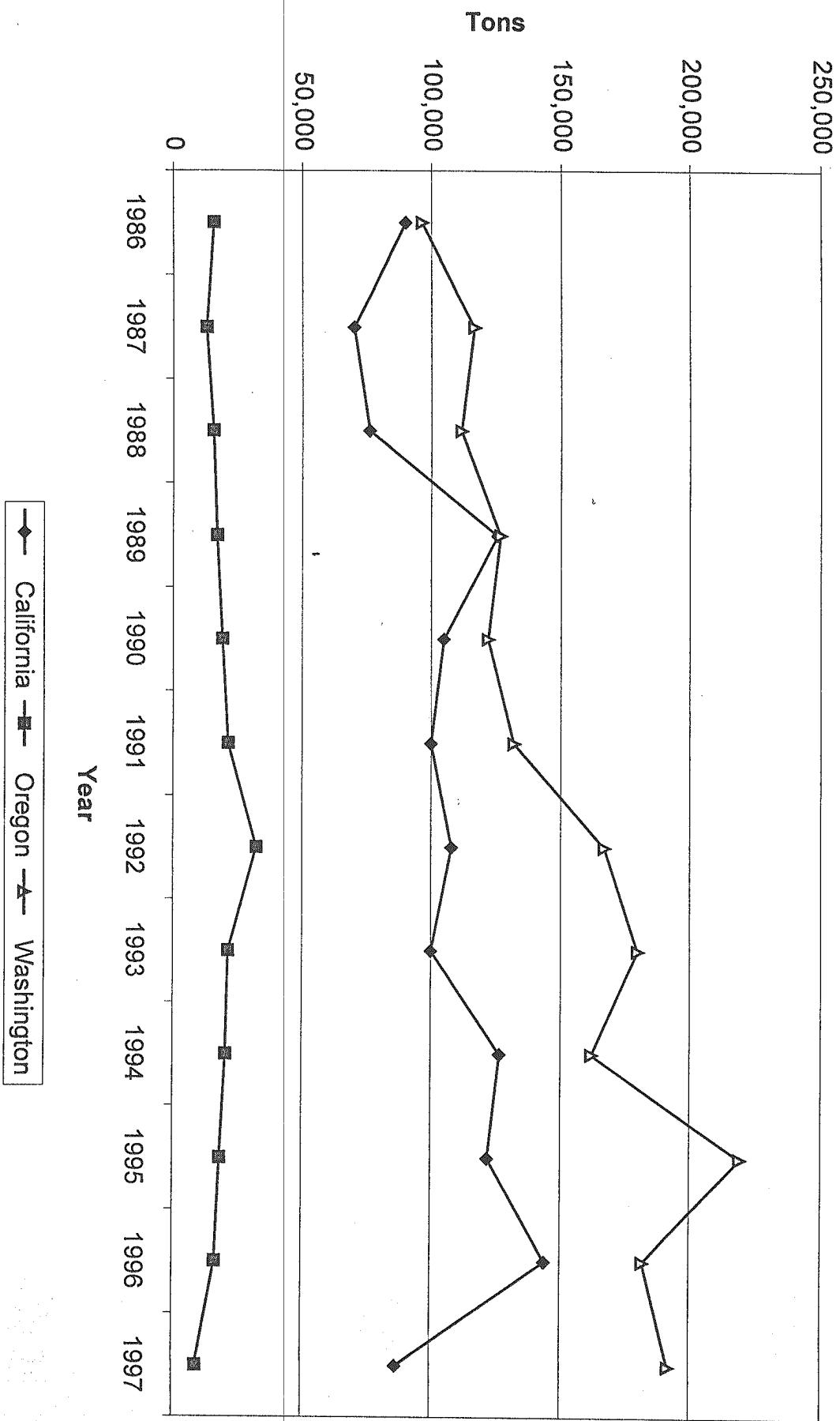


FIGURE VII

Sweet Corn Production for Processing

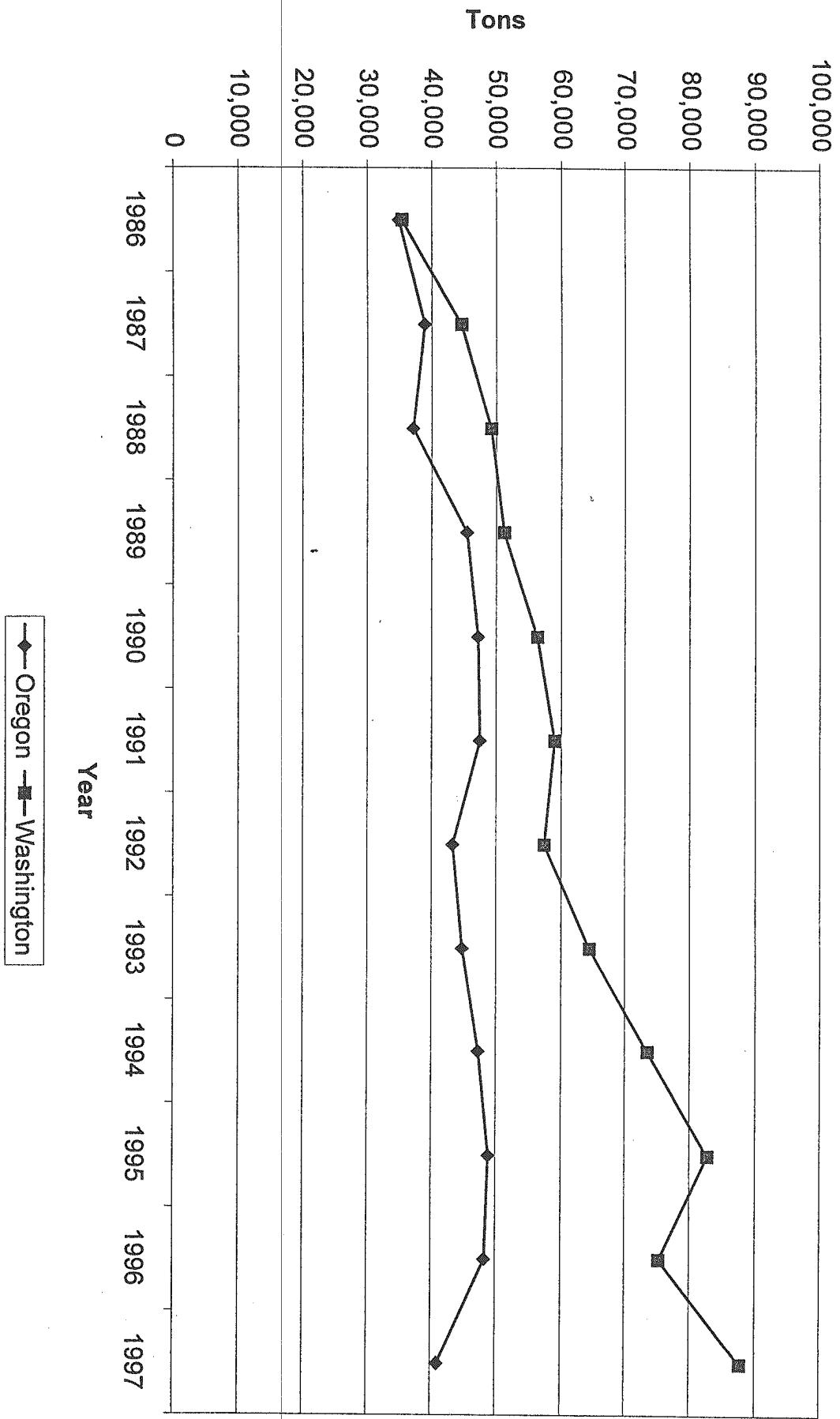


FIGURE VIII

Green Peas Production for Processing

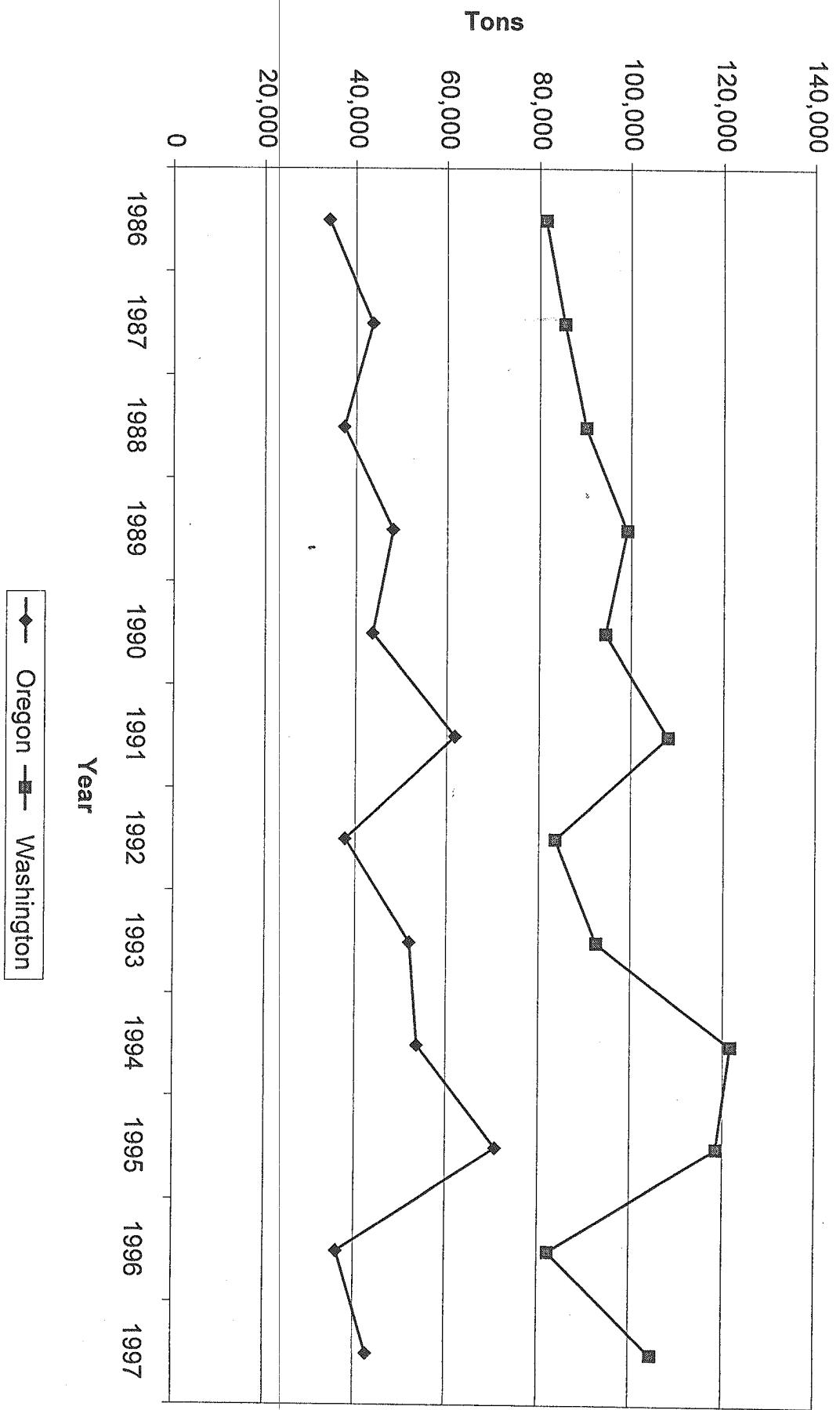


FIGURE IX

**PROCESSING BROCCOLI PRODUCTION
by CALIFORNIA REGION**

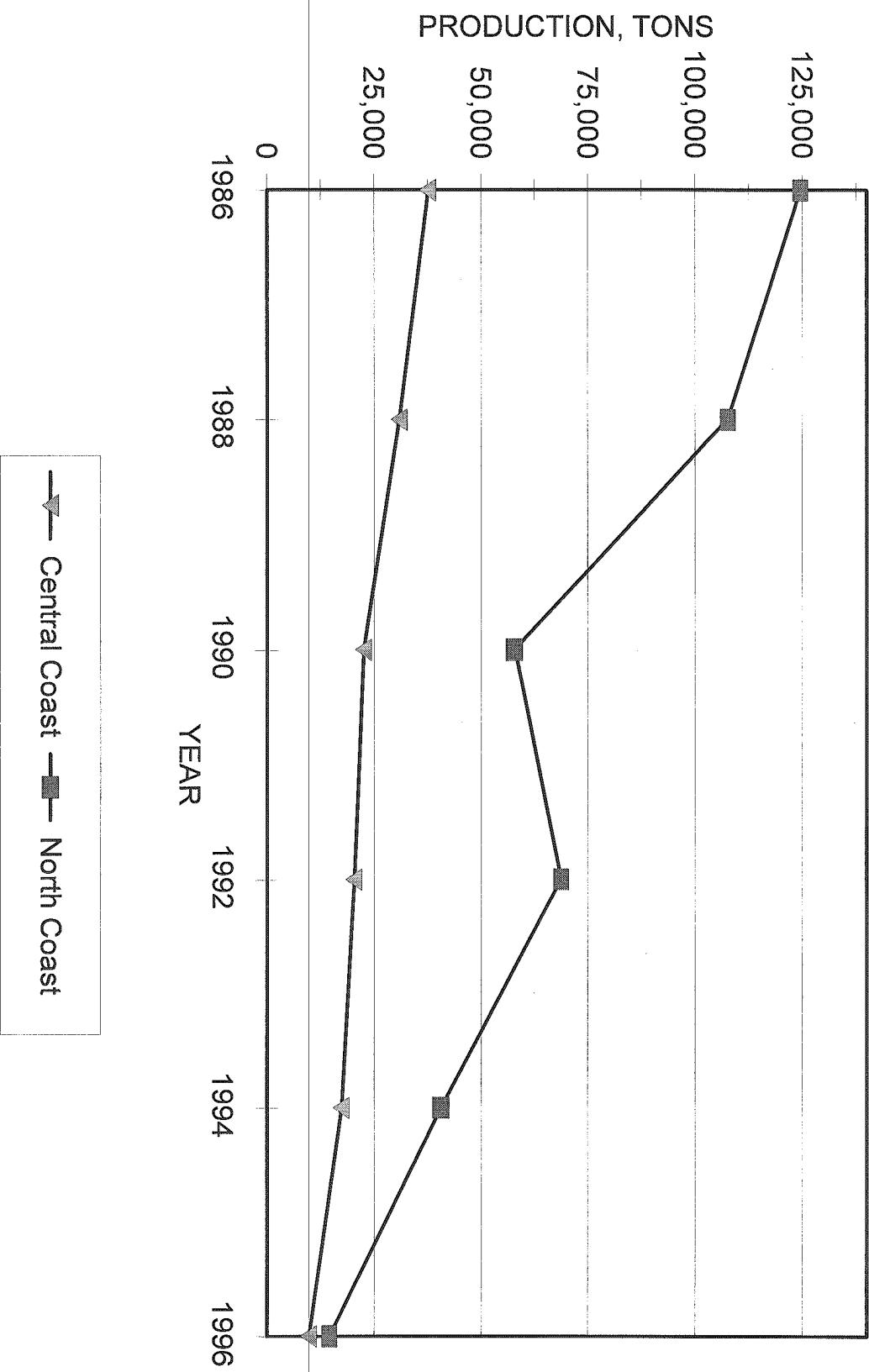
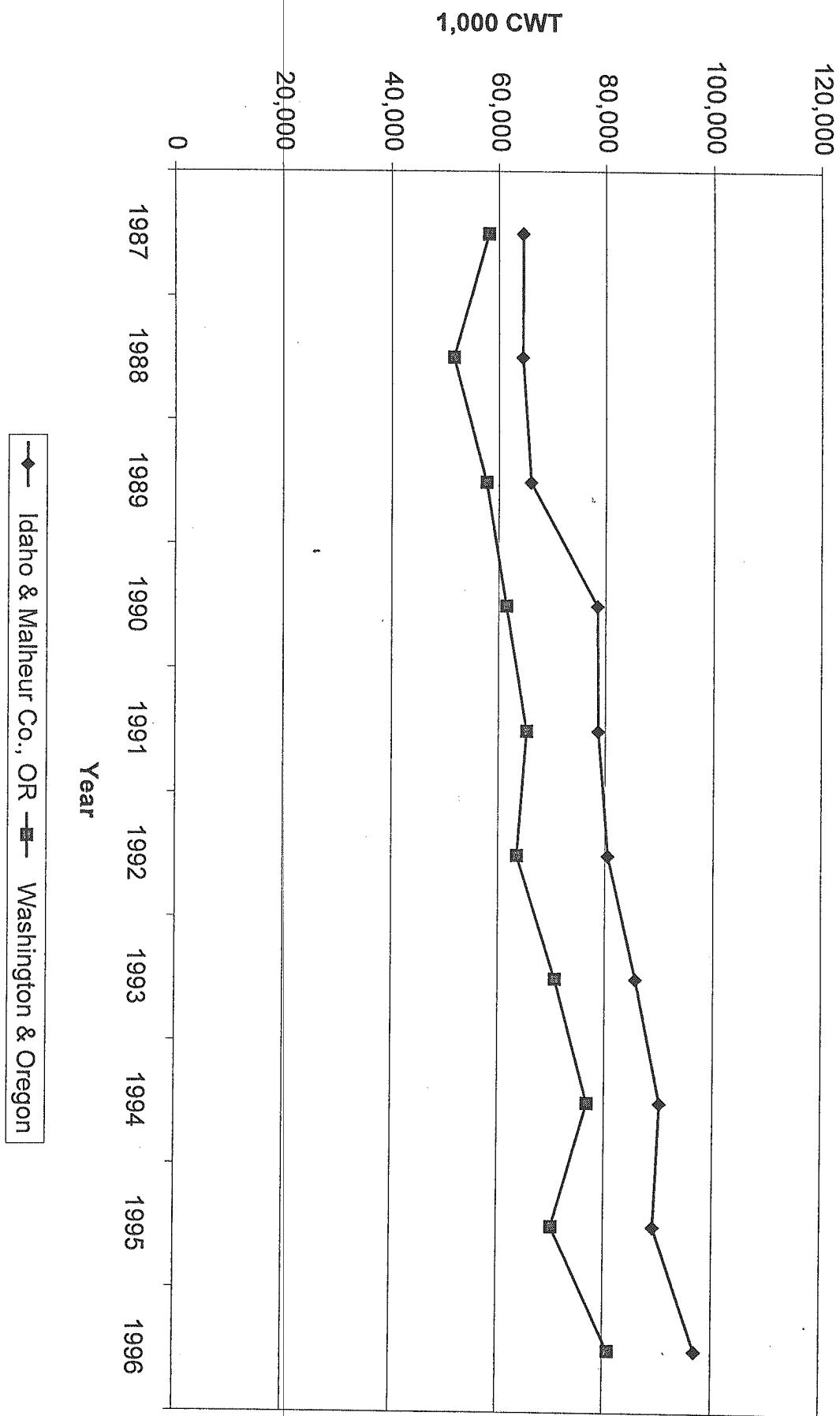


FIGURE X

Potato Production for Processing



Appendix D

The Shift of the Frozen Vegetable Industry to Mexico

The Mexican frozen vegetable industry is concentrated in the state of Guanajuato, in the region known as the Bajío. In 1992, over 80 percent of the Mexican frozen vegetable plant capacity was in the Bajío, with about 68 percent in Guanajuato alone. This share may be even higher today. Most of the remaining capacity is located in the adjoining states of Michoacán, Querétaro, and Aguascalientes. A list of all of the Mexican plants, as of 1991, is shown in Table I below.

The first important fruit and vegetable processors in the region were strawberry freezers, which began operation in the late-1940s. These were followed by the establishment of a series of fruit and vegetable canneries in the late-1950s and early-1960s along the Pan American Highway, which runs through the middle of the Bajío, and which was one of the few decent roads in Mexico at that time. Firms such as Del Monte, Heinz, Campbell Soup, and Gerber set up plants to operate behind the high tariff barriers in effect in Mexico, producing principally for the internal market, which was concentrated in central Mexico close to the Bajío in Mexico City and Guadalajara.

In 1967, Birdseye located a vegetable freezing plant on a farm north of the town of Celaya, Guanajuato. Since Mexican stores and homes had no infrastructure for selling and storing frozen foods, all of the plant's output was exported to the United States. Birdseye management later stated in interviews that they set up the plant in Mexico specifically to be able to do hand labor-intensive operations in the plant that were becoming too expensive in the United States. Birdseye also introduced new crops to the area, such as broccoli and okra. They contracted with many of the same large growers as the canners. Some of these large growers were already exporting other crops (such as garlic) to the United States, and it was this group of growers who set up their own processing plants in the 1970s.

A second wave of foreign investment in the industry occurred after the very large devaluations of the peso in 1982, which made production in Mexico much more attractive. In particular, Green Giant (owned by Pillsbury) set up a plant in Irapuato, Guanajuato, in 1983 in order to remain competitive with Birdseye. The Green Giant operation was very successful, and the firm subsequently moved the remainder of its broccoli processing from its plant in Watsonville, California, to the Irapuato plant, in two stages in 1991 and 1994.

This increased investment by large U.S. processors was accompanied by a stream of investments by large Mexican growers throughout the 1980s in independent plants, many in partnership with independent U.S. firms or with funds from the Mexican government, the World Bank, and a variety of other sources. By the end of the 1980s, however, capacity was outrunning demand in the U.S. market, which had stopped growing with the onset of a recession. The vast majority of the Mexican frozen product was broccoli and cauliflower, and as these markets became glutted, the price fell to unprofitable levels for many Mexican firms. This was particularly hard on newly-built plants, which had high capital costs to cover, and led to the closure, bankruptcy, and reorganization of a number of plants.

TABLE I
MEXICAN FROZEN VEGETABLE PROCESSING CAPACITY, 1991

NAME OF FIRM	CITY	S T A T E	YEAR VEG STAR T	EFFE CANN .VEG. CAP. (millio n lbs)	EST. 1991 ANN.	PROJ. 1992 PROD VEG (mill lbs.)	Est. Num. of Gro wers
Birdseye de Mexico (Dean Foods)	Celaya	GTO	1967	60	44	45	110
La Huerta (Legumbres) (Arteaga Family)	Aguascalientes	AGS	1976	17.5	17		50
Covemex/Alcosa (Javier Usabiaga)	Celaya/Irapuato	GTO	1978	45	43		1
MarBran w/ Simplot line (Nieto)	Irapuato	GTO	1980	65	49	55	40
Productos Frugo (Leal)	Salamanca	GTO	1982	30	10	11	1
Green Giant	Irapuato	GTO	1983	75	50	65	100
Cong. Don Jose (Fox)	Leon	GTO	1985	25	18		10
Expohort	Queretaro	QTO	1986	30	25		
Emp. Chapala	Zamora	MICH	1984	10	0		
FRUVEZSA	Zamora	MICH	1988	8	0	4	
Empacadora del Celio	Jacona	MICH	1985	8-10	2	2	30
Industrias Horticolas	Montemorelos	NL	1987	12-15	12		
Hortimex (Stokely)	Monterrey	NL	n.a.	25	0		
Legumbres Congeladas	Aguascalientes	AGS	n.a.	12	n.a.		
Mexicana Congelados	Luis Moya	ZAC	1990	20	14	17	300
Expor-San Antonio (Other Nieto)	Villagran	GTO	1990	60	28	50	50
Emp. de Hort. del Bajio (Cooperative)	Jaral del Progreso	GTO	1990	20	n.a.		
CENSA (Simplot)	Morelia	MICH	1985	n.a.	n.a.		
Veg. Cong. de Irapuato	Irapuato	GTO	1987	15	10	13	own
FRESPORT	Irapuato	GTO	1987	15	12.5	10	30
La Esperanza de Miranda	Dolores Hidalgo	GTO	1990	6	5		
Raul Leon	Irapuato	GTO			3		
Frexport (Bimbo)	Zamora	MICH	1991	15	n.a.		
Agroindustrial Export.	Tlajomulco/Irapu a	JAL	1987	16	8		
Cong. Hortcola Sonorense	Cd. Obregon	SON	1990	10	7	7	1
	Chihuahua	CHIH					
Agrosem		COAH	n.a.	n.a.	n.a.		